House of Commons

Science and Technology Committee

Communicating climate science

Eighth Report of Session 2013–14

Report, together with formal minutes, oral and written evidence

Additional written evidence is contained in Volume II, available on the Committee website at www.parliament.uk/science

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Science and Technology Committee

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Summary

Government policy on climate change has been consistent for many years based on a wide scientific consensus about the causes of climate change. The mandate for the Government to address the issue is apparent in polls showing that a significant majority of people in the UK think the climate is changing and that human activity is at least partly responsible for this. Most recent polls however have indicated a clear drop in the public support for climate change and therefore, if Government wishes to retain its mandate for action it needs to improve public understanding of the scientific basis for climate change policy.

The main source of information for the public on science (including climate change) is news media, specifically the BBC. Media reporting thrives on the new or controversial. We heard that it was difficult to justify news time maintaining coverage of climate science where basic facts are established and the central story remains the same. Reporting on climate therefore rarely spends any time reflecting on the large areas of scientific agreement and easily becomes, instead, a political discussion on disputes over minutiae of the science or the policy response to possible impacts of climate.

We found the role of the BBC, as the leading public service broadcaster, to be central to public understanding but were disappointed to find it lacked a clear understanding of the information needs of its audience with regards to climate science. We do not consider the ability of individual editors to determine the level of expertise of contributors to debates to be acceptable. Broadcasters need to develop clear editorial guidelines that ensure programmes present an accurate picture of the current state of the science. Commentators and presenters should be encouraged to challenge statements that stray too far from scientific fact.

We found little evidence of any significant co-ordination amongst Government, government agencies and bodies at national and local levels to communicate the science to the public, despite these bodies working to facilitate communities to mitigate and adapt to climate change. This may be due to the fact that the Government is not regarded as a primary, or even a reliable, source of information on climate science by the general public.

A lack of a clear, consistent messages on the science has a detrimental impact on the public's trust in climate science. The Government and other bodies, such as the Royal Society and the Met Office, are currently failing to make effective use of internet or social media to engage with the public and to become an authoritative source of accurate scientific information about climate change. The Government must work with the learned societies, national academies and other experts to develop a source of information on climate science that is discrete from policy delivery, comprehensible to the general public and responsive to both current developments and uncertainties in the science.

The Government's current approach to communicating conflates the scientific basis of climate change and the proposed solutions to its impacts and places a heavy reliance on individual scientists communicating about the science to justify the policy response. Efforts to create a clear narrative that is coherent, constructive and results in proper public engagement have been disappointing. As a matter of urgency, the Government needs to draw up a climate change communication strategy and implement this consistently across all Departments.

1 Introduction

1. The UK Climate Change Programme was put in place in 1994. Its aim was to return carbon emissions to 1990 levels by 2000. The previous Labour Government set an additional domestic target of reducing carbon dioxide emissions to 80% of 1990 levels by 2010.[1]

2. The previous Government's announcement, in 2006, that it expected to fail to meet the 2010 target led to various non-governmental organisations (NGOs) campaigning for tougher targets and, eventually, the introduction of the Climate Change Bill in 2007.[2] The resulting Act of Parliament[3] set the UK legally binding targets for reducing emissions by 80% by 2050 compared to 1990, an interim target of a 34% reduction by 2020, and an obligation for the Government to set five yearly carbon budgets.

3. The Climate Change Act[4] also established the Committee on Climate Change, whose role is to examine, and report annually, on Government policies for meeting these budgets, provide advice on policies to Government, including advice on adaptation to a changing climate.

4. The Department of Energy and Climate Change (DECC), together with other departments, has a wide range of climate focussed policies aimed at achieving the emissions reductions it has committed to. These policies, together with actions and milestones, are set out in the UK Carbon Plan, which was published by DECC in December 2011:

> This plan sets out how the UK will achieve decarbonisation within the framework of our energy policy: to make the transition to a low carbon economy while maintaining energy security, and minimising costs to consumers, particularly those in poorer households.[5]

5. The Government's policy to tackle a changing climate is firmly based on scientific advice that there is a need to reduce carbon emissions and to decarbonise the UK economy. The International Panel on Climate Change published the first part of its Fifth Assessment Report in September 2013. This concluded that there was clear evidence of warming:

> Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.[6]

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[1] Department of the Environment, Transport and the Regions, *Climate Change, The UK Programme,* Cm 4913, November 2000

[2] *Climate Change Bill [HL]* Research Paper RP08/52, House of Commons Library, June 2008

[3] Climate Change Act 2008

[4] *Ibid*

[5] Department of Energy and Climate Change, *The Carbon Plan: Delivering our low carbon future,* December 2011, p3

[6] IPCC, "Summary for Policymakers", *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change,* 2013

And:

> Human influence on the climate system is clear. This is evident from the increasing greenhouse gas concentrations in the atmosphere, positive radiative forcing, observed warming, and understanding of the climate system. [7]

6. More recently the Royal Society restated the current understanding of the link between human activity and climate change:

> Human activities—especially the burning of fossil fuels since the start of the Industrial Revolution—have increased atmospheric CO2 concentrations by about 40%, with more than half the increase occurring since 1970. Since 1900, the global average surface temperature has increased by about 0.8 °C (1.4 °F). This has been accompanied by warming of the ocean, a rise in sea level, a strong decline in Arctic sea ice, and many other associated climate effects. Much of this warming has occurred in the last four decades. Detailed analyses have shown that the warming during this period is mainly a result of the increased concentrations of CO2 and other greenhouse gases. Continued emissions of these gases will cause further climate change, including substantial increases in global average surface temperature and important changes in regional climate.[8]

7. The Government is clear that it accepts the science. The Department of Energy and Climate Change (DECC) states on its website "the scientific evidence that the world's climate is changing is clear and extensive".[9] The website for the Department for Environment, Food and Rural Affairs (DEFRA) states that "the world's climate and weather patterns are changing. Global temperatures are rising, causing more extreme weather events, like flooding and heatwaves".[10]

Our inquiry

8. Although government policy has been consistent since at least 1994 and there is wide scientific consensus about the causes of climate change, there has been increasing debate in the public arena in recent years on the validity of the science. The Government accepts that its plans will increase costs in the first instance, though it considers that there will be an eventual cost saving.[11] We were concerned that it would be very difficult to gain acceptance for even short term increased costs to individuals through energy bills and taxes unless there was confidence among the general public of the need to implement these policies.

9. We launched our inquiry on 28 February 2013. We asked for evidence on the level of understanding amongst the public of climate change, what voices the public trust for information on climate change, how understanding could be improved, and the role of the

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[7] *Ibid*

[8] The Royal Society, *Climate Change, Evidence and Causes*, February 2014

[9] GOV.UK, *Supporting international action on climate change*, [website as of 18 March 2014]

[10] GOV.UK, *Adapting to climate change*, [website as of 18 March 2014]

[11] Department of Energy and Climate Change, *Estimated impacts of energy and climate change polices on energy prices and bills*, March 2013, p5

media and government in doing this. We received more than sixty submissions of written evidence and held seven oral evidence sessions.

10. This report first considers the level of public understanding of climate science and the potential consequences that scientists project from increasing emissions of carbon and other greenhouse gases. It then considers the communication by various bodies by which the general public might become more informed, including scientists, the media and the Government. Finally we consider what the Government will need to do if it wants to achieve its policy aims with regard to climate and demonstrate an evidence based approach to climate policies.

11. Throughout the inquiry we have sought to ascertain what the public understand by the term 'climate change', what experts mean when they use it and what Government 'climate change' policy encompasses. We did not find clear agreed definition amongst responses from our witnesses.[12]

- Professor Slingo defined climate change as "something that transcends the natural variability of the climate on a range of time scales from seasonal to multidecadal. Within, say, our lifetime or longer—say 100 years—is the climate different now than it was 100 years ago when averaged over several decades?"

- Professor Walport agreed: "the climate is the average of the weather over a long period of time, and, if you compare two different periods of time and you see that the climate has changed, that is climate change. The issue here, of course, is the human contribution to that over a very short time scale".

- Professor Rapley also agreed: "that a better term than climate change was global energy imbalance". He went further preferring the term "climate disruption": "climate disruption because it is more descriptive of what this energy imbalance threatens to cause".

- Catherine Brahic's definition was "it is the accumulation of greenhouse gases in the atmosphere as a result of burning fossil fuels, by and large, and the consequences of that accumulation. Carbon gets locked into the earth over the course of millions of years in the form of fossil fuels. It takes millions of years for that process to happen naturally. In a matter of seconds, when we burn fossil fuels—oil, coal, natural gas—we release it into the atmosphere, and as a result it creates an imbalance in a cycle that is normally timed and very balanced."

- Professor MacKay's definition was "climate is the statistics of many variables: temperatures; precipitations; wind speeds; ocean currents; ice masses. The climate is the collection of all those variables, including salinity and acidity of oceans; and climate change is a change in those statistics."

- Minister of State Gregory Barker MP said: "climate change is climate change" or alternatively "climate change is a changing climate". He did not believe that climate change was a technical term.

[12] Q298, Q409, Q45, Q174, Q370, Q369

12. ***In order to communicate what climate change is, the Government must agree a clear consistent and precise definition which can be related to direct observations and measurements. This should be based on Professors Slingo's and Rapley's definitions.***

2 Why is communication important?

13. Extensive reports on public attitudes and behaviours related to the environment, including climate change, were published by the Department for Environment, Food and Rural Affairs (DEFRA) up to 2009.[13] Since then there have been more limited annual surveys on public understanding and knowledge of the environment, supplemented by a quarterly public attitudes tracker produced by the Department of Energy and Climate Change (DECC).[14] The Department for Business, Innovation and Skills has published two *Public Attitudes to Science* surveys in 2011 and 2014, which included some information on climate change.[15] The availability of data was highlighted to us as an issue. Professor Nick Pidgeon, from the Understanding Risk Research Group in Cardiff University, expressed concern about the lack of good quality tracking polling and the restricted questions asked in more recent government polls. He was also critical of what he described as poorly worded ad hoc polls often commissioned by the media and called for a more consistent approach and increased funding from Government: [16]

> More resources could be made available to adopt a systematic approach to the testing and evaluation of communications messages surrounding climate change and to maintain an on-going assessment of public attitudes to climate change. This is a critical gap.[17]

Public concern about climate change

14. The last in depth report published by Defra in 2009, found that 61% disagreed with the statement "the effects of climate change are too far in the future to really worry me".[18] The most recent DECC information, published in April 2013, found that when asked directly, 66% were concerned about climate change (similar to 65% in July 2012), with 12% attributing it to natural causes (down from 15% in 2012).[19] A survey carried out for the UK Energy Research Centre in 2013 found that 72% of those asked thought the climate was changing, with the majority of those believing it was caused by a combination of human activity and natural processes (46%), mainly human activity (22%), or entirely human activity (6%).[20]

15. A study by Emily Shuckbrugh and funded by several Government departments, *Climate Science, the Public and the Media,* was published in 2012. 80% of those that took part thought the climate was changing. The most common belief (46%) was that this was

[13] Department for Environment, Food and Rural Affairs, , *Public attitudes and behaviours towards the environment – tracker survey*, September 2009

[14] Department of Energy and Climate Change, *DECC Public Attitudes Tracking Surveys,* 2013-2014

[15] Department for Business, Innovation and Skills, Ipsos MORI Social Research Institute, *Public Attitudes to Science*, May 2011; *Public Attitudes to Science*, March 2014;

[16] Understanding Risk Research Group, Cardiff University, Ev 119, para9

[17] Dr Emily Shuckburgh and Dr Rosie Robison, Ev w58, para34

[18] DEFRA, 2009 Survey of Public Attitudes and Behaviours Towards the Environment, 23 September 2009

[19] Department of Energy and Climate Change, *DECC Public Attitudes Tracking Surveys,* 2013-2014

[20] UK Energy Research Centre, *British public split on nuclear power*,19 March 2013, p24

caused by a combination of natural processes and human activity (the same as the UKERC study above). There was also a correlation between those who accepted a human influence in climate change and were concerned about it (over 70%) and willingness to change behaviour (over 75%). However, the study also found:

- 44% believed the seriousness of climate change had been exaggerated;
- 10% rejected the existence of a human impact on climate change; and
- a decrease in concern about the issue with 82% at least fairly concerned in 2005 falling to 63% in 2011.[21]

16. Attitudes to climate change may be related to experience of extreme weather events. One example is a survey carried out in Wales for the Climate Change Consortium for Wales at the end of 2012 that found increased levels of concern about climate change, partly linked to the severe floods experienced that year. The survey found 88% of respondents considered that the world's climate was changing (up from 77% in 2010).[22]

17. The findings of these surveys, which show a level of acceptance of climate change amongst the public, were reflected in evidence we received from Ministers. Greg Barker MP, Minister of State in the Department of Energy and Climate Change, told us "the public are informed; there is broad support. It is not universal. The minority of those who do not accept the science are particularly vocal".[23] David Willetts MP, Minister of State for Universities and Science in the Department for Business, Innovation and Skills, told us that amongst the public "overall there is a recognition that something very significant is happening to the climate".[24]

18. **Despite the existing polling information, it remains difficult to draw firm conclusions on how public acceptance and understanding of climate change is changing in the UK. However, it is clear that a significant majority of people think the climate is changing and that human activity is at least partly responsible for this. The polling on public understanding is limited and unlikely to highlight the information needs of the general public. *In its response to this report, the Government should detail how it will collect, and make available, more regular and more in depth information on the public understanding of climate change.***

19. Many of those who provided evidence to our inquiry commented on a perceived reduction in concern about climate change amongst the public in recent years: "Right now the economy is the top priority for most people and politicians".[25] The experience of local authorities was that the public has "more pressing issues to deal with, particularly in the current economic climate".[26] The Minister, Greg Barker, told us that "most people [...] will

[21] Emily Shuckburgh, Rosie Robison and Nick Pidgeon, "Climate Science, the Public and the News Media", *Living with Environmental Change,* September 2012 p11

[22] Capstick, S. B., Pidgeon, N. and Whitehead, M., "Public perceptions of climate change in Wales: Summary findings of a survey of the Welsh public conducted during November and December 2012", *Climate Change Consortium of Wales*, Cardiff, 2013 p12

[23] Q357

[24] Q338

[25] Q10 [Dr Catherine Happer]

[26] Q214 [Paul Crick]

not act in a way that will cost them money when they have many other competing demands on family budgets, particularly in the current environment with the pressures on the cost of living".[27]

20. The Glasgow University Media Group (GUMG) reported that their work with focus groups showed that, in some cases, "there was an assumption that [climate change] had [already] been solved",[28] which they attributed to a reduced political and media focus.[29] In addition, the Environment Agency told us how, in its experience, interest in climate change was correlated to severe weather events. These "are sadly, very effective at raising awareness. You rely on these weather events to give that burst of energy to the communication".[30] This was evident in the coverage of the severe weather experienced this winter, which resulted in extensive debate on whether climate change could be one of the causes.[31]

21. Professor Nick Pidgeon summarised his experience of public concerns:

> What we do know from the research is that people have a high level of concern in the UK. Awareness is very high of the term climate change. There is endorsement by many of an anthropogenic component. It is not necessarily the most important issue for people in life.[32]

Public understanding of climate science

22. One of the main conclusions from the *Climate Science, the Public and the Media,* study was that:

> while a substantial majority of the UK public believe the world's climate is changing, many feel relatively uninformed about, or uninterested in, the findings of climate science, and a sizable minority do not trust climate scientists to tell the truth about climate change.[33]

23. Acceptance of climate change as real does not necessarily correlate with a detailed understanding of the causes or the underpinning science. Defra's 2011 survey on understanding and knowledge of the environment showed a sharp drop in the level of knowledge people felt they had about climate change. In 2009, 61% of respondents thought they "knew a lot/fair amount" about climate change and 33% just a little.[34] In 2011 this had

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[27] Q392

[28] Q10 [Professor Philo]

[29] *Ibid* [Dr Happer]

[30] Q251 [Phil Rothwell]

[31] "UK storms a result of climate change, say nearly half of poll respondents", *The Guardian* , 18 February 2014; How the floods have changed Britain: climate change, *The Daily Telegraph*, 22 February 2014

[32] Q36

[33] Emily Shuckburgh, Rosie Robison and Nick Pidgeon, "Climate Science, the Public and the News Media", *Living with Environmental Change,* September 2012

[34] Department for Environment, Food and Rural Affairs, , *Public attitudes and behaviours towards the environment – tracker survey*, September 2009

changed to 44% and 44% respectively.[35] In contrast, the *BIS Public Attitudes to Science* found that 75% of respondents felt informed about climate change in 2011 and 78% in 2014.[36] However, when questioned more closely people often fail to give an accurate explanation of climate change and its causes. Dr Catherine Happer, from the Glasgow University Media Group, told us how they found that "most people, unprompted, struggled to give a consistent and accurate explanation of climate change".[37] People also tended to confuse climate change with other environmental issues, such as ozone depletion.[38]

24. Dr Emily Shuckburgh who published the report titled *Climate Science, the Public and the News Media* in 2012,[39] believed that there was an appetite for more information and that "many non expert members of the public do have a wide ranging and subtle understanding of climate change, are able to grasp new concepts, and are willing to engage in debate".[40] The *BIS Public Attitudes to Science 2011* survey found that, with regard to science more generally, "four in ten (38%) think they hear and see the right amount of information, while five in ten (51%) think they hear and see too little or far too little". This 51% figure was unchanged in the 2014 survey."[41]

25. Professor Chris Rapley told us that there were certain key concepts that were important "but in the end most people do not have the time, or need, to understand all of the detail".[42] Professor Greg Philo, from the Glasgow University Media Group was of the view that "the bulk of the population" would be more likely to "trust the science if it is clearly explained to them" that there is a scientific consensus.[43] Kent County Council offered a different perspective, indicating "that people are not overly interested in the detailed science" but that "they know the headlines and they want to know what they can do about it".[44] Their experience was that detailed information on the science disengaged the majority of those they worked with.[45] However, Professor Philo cautioned that the public needed to understand that this was a major issue as, "if you want to introduce behavioural change in relation to climate change and you want to alter what people do [...] you must take the public with you".[46] The Government position reflected this; they told us that "that

[35] Department for Environment, Food and Rural Affairs, *Attitudes and Knowledge relating to Biodiversity and the Natural Environment, 2007 – 2011*, 2011 Table 2a

[36] Department for Business, Innovation and Skills, Ipsos MORI Social Research Institute, *Public Attitudes to Science*, May 2011; *Public Attitudes to Science*, March 2014

[37] Q2

[38] *Ibid*

[39] Emily Shuckburgh, Rosie Robison and Nick Pidgeon, "Climate Science, the Public and the News Media", *Living with Environmental Change,* September 2012

[40] *Ibid*

[41] Department for Business, Innovation and Skills, Ipsos MORI Social Research Institute, *Public Attitudes to Science*, May 2011; *Public Attitudes to Science*, March 2014

[42] Q37

[43] Q5

[44] Kent County Council, Ev 160, para16

[45] *Ibid*

[46] Q11 Professor Philo

improving public understanding is necessary but not sufficient for developing increasing action to tackle climate change."[47]

26. Despite the complex nature of the science, improving understanding is important to ensuring effective policy implementation.

[47] Government Departments, Ev 130, para 1

3 Communicating climate science

27. We set out to examine the routes through which individuals obtain information on climate change, how effective these are and to what extent they are trusted. Scientists, traditional media, the internet and government all play a role in providing information and are trusted to different degrees.

The media

28. James Painter from the Reuters Institute for the Study of Journalism told us that whilst it is not clear to what level media changes opinion, or behaviour, there is agreement that it has a "huge role in setting the agenda for what people talk or think about".[48] He also explained that the media plays a crucial role in public knowledge of science:

> In the specific area of science coverage, most people in the UK get their information from the media, so the way the media report and frame climate change is one significant input into public understanding of the topic.[49]

29. Professor Greg Philo, of the Glasgow University Media Group (GUMG), told us that "the media have an enormous impact on behaviour and belief" and forms "the key source of information, especially the BBC, for what people believe on almost any issue you want to name".[50] With regards to climate change, the GUMG research found that the most referred to single source of information (58%) was TV news, usually the BBC.[51] Dr Shuckburgh found that "TV news was the most cited source of information on climate science".[52] The *BIS Public Attitudes to Science 2011* survey found that "people's most regular sources of information on science tend to be traditional media, such as television (54%) and print newspapers (33%)".[53] It also found that people mistrusted how science was presented in the media:

> People also have concerns about the reporting of science. Seven in ten agree that "there is so much conflicting information about science it is difficult to know what to believe" (71%) and that "the media sensationalises science" (70%).

30. The Science Media Centre praised some of the efforts of both newspapers and broadcasters in covering climate change but it stressed that fundamental problems remain with the presentation of climate change as a news topic:

> many of the underlying values remain in newsrooms: the appetite for a scare story, the desire to overstate claims made by one individual, the reluctance to put one

[48] James Painter, Ev 157, para 11

[49] *Ibid* para 12

[50] Q25

[51] UK Energy Research Centre, UKERC Project Final Report, *Climate change and energy security*, December 2012, p8

[52] Emily Shuckburgh, Rosie Robison and Nick Pidgeon, "Climate Science, the Public and the News Media", *Living with Environmental Change,* September 2012

[53] Department for Business, Innovation and Skills, Ipsos MORI Social Research Institute, *Public Attitudes to Science*, May 2011

alarming story into its wider context, 'journalistic balance' that conveys a divide among experts where there is none.[54]

Drivers for media coverage

31. We were interested to understand what shapes the level and tone of media coverage of climate science. We were told that, in science programming, there was always a need for something new, or a new creative approach, to drive coverage.[55] Channel 4 told us that "communicating science by broadcasting is tremendously difficult" and that "if you simplify science, you often make it wrong, so the process of working with science is by degrees much more complex than the process of working with other subject areas".[56]

32. This is also a difficulty when considering news coverage as "often, there is not that much new to report, and that can be a problem".[57] David Jordan, Director of Editorial Policy and Standards for the BBC, told us that "news is about change and things being different" and that climate coverage will be competing with other news stories, including the recession.[58] Editors told us something similar: "the general overarching narrative has not changed that much. It is the same story being told over and over again".[59] The same issue was highlighted by journalists who told us that "you cannot write the same story every day". Catherine Brahic, of the New Scientist, told us that "what matters, is that the public understand that the message is still the same, it is still there, and it is not an issue that has gone away".[60] Mr Jordan, told us that "politicians driving an issue and talking about its importance and policy developments in relation to it will be clearly important to our news agenda".[61] James Randerson, of the Guardian, explained that "from an editor's point of view, if politicians are talking about it, we report it. It gives us something to report, so if politicians are not talking about it there is one fewer source of stories".[62] Professor Philo also emphasised the role of politicians in ensuring a subject receives coverage because politicians "are seen as opinion leaders; they are what media specialists [...] would call primary definers".[63]

33. There is evidence that increased politicisation of the issue has polarised debate in the UK media. James Painter's research suggests that "the presence of politicians espousing some variation of climate scepticism, the existence of organised interests that feed sceptical coverage and partisan media receptive to this message, all play a particularly significant role in explaining the greater prevalence of sceptical voices in the print media of the USA and the UK". [64] On the other side of the argument, when the use, in schools, of Al Gore's

[54] Science Media Centre, Ev 144, para3

[55] Q87 [Ralph Lee]

[56] Q84 [Ralph Lee]

[57] Q87 [Ralph Lee]

[58] Q88 [David Jordan]

[59] Q162

[60] Q163 [Catherine Brahic]

[61] Q92

[62] Q171

[63] Q8

[64] James Painter, *Poles Apart: the international reporting of climate change scepticism*, 2011

documentary "An Inconvenient Truth" was challenged in Court, a High Court Judge considered it to have been prudent that the Government had revised guidance for teachers to highlight nine 'errors' and exaggerations within the film. Fiona Harvey, environment correspondent for the Guardian, told us that "a perception that senior politicians were trying to appeal to a certain part of the populace and had the idea that they could win support by being sceptics [...] has affected the way stories are written in some parts of the press or the media more broadly, and we as journalists have had to grapple with that".[65] The Minister, Greg Barker, echoed this when he told us that "I think it is fair to say that the science has become a bit of a political football, and that is regrettable".[66] Professor Pidgeon was of the view that "the impacts of media reporting on attitudes may be less important than the actions and statements of the elite commentators (politicians, prominent personalities, business and NGOs, and government departments) which prompt that reporting".[67]

False balance

34. Submissions to our inquiry commented on a tendency for the media to approach climate science as an argument about two equally valid points of view, rather than discussion about scientific facts, and on the false balance of views being presented as a consequence. Professor Pidgeon questioned whether the "norm of ensuring balanced reporting [...] is appropriate where the scientific evidence is so overwhelming".[68]When questioned about the balance of views in the media, Sir Mark Walport told us that climate change "is not a matter for opinion or belief. It is a matter of fact whether humans are altering the climate or not. There is a correct answer to this question".

35. In his *Review of impartiality and accuracy of the BBC's coverage of science* commissioned by the BBC trust and published in July 2011, Professor Steve Jones, concluded with regard to science coverage: "in general, its output is of high quality".[69] However, he also stated that the BBC "must accept that it is impossible to produce a balance between fact and opinion" and recommended that it take into account "the need to avoid giving undue attention to marginal opinion".[70] Professor Jones highlighted the recent efforts made by the BBC to find a climate sceptic scientists to comment on the publication on the Physical Science Basis for IPCC Fifth Assessment Report as an example of false balance:

> The producers of the recent Today Programme piece on the new IPCC report tried, we are told, more than a dozen qualified climate scientists willing to give an opposing view but could not find a single one (a hint, perhaps, that there is indeed a scientific consensus on global warming). Instead, they gave equal time to a well-known expert

[65] Q202

[66] Q352

[67] Understanding Risk Research Group, Cardiff University, Ev 122, para23

[68] *Ibid*, para22

[69] Professor Steve Jones, BBC Trust, *Review of impartiality and accuracy of the BBC's coverage of science*, July 2011, p15

[70] Professor Steve Jones, BBC Trust, *Review of impartiality and accuracy of the BBC's coverage of science*, July 2011, p17

> and to Australian retired geologist with no background in the field: in my view a classic of "false balance".[71]

36. The continuing discovery of new perspectives on the climate is necessary to keep the issue in the media but novelty also has a downside. Newspapers thrive on controversy.[72] Dr Randerson, from the Guardian, drew our attention to the:

> tendency for news desks to like things that are new and surprising and favour the underdog. A general issue with science reporting is that mavericks tend to get more coverage than perhaps they deserve.[73]

A former environmental editor for the BBC, Richard Black, thought that disproportionate coverage in the media of sceptical views of climate science was because:

> [climate sceptics] have managed to paint themselves as David in a fight with Goliath, which is a very appealing situation. Everyone has some kind of empathy with that. It is not really true, but they have done a very effective piece of image management.[74]

Ros Donald, from Carbon Brief highlighted how editorial decisions may also change the way an article is read: "there may be quite a straight-up report of a scientific paper, but it would be given an outrageous headline that suggests global warming has stopped".[75]

Broadcasters

37. The Glasgow University Media Group (GUMG) told us that they found that "the BBC, across media, remains a highly trusted source—it was felt to be the least partial, and most serious about addressing the issues".[76] In many of our written submissions the BBC was specifically praised for a great deal of its coverage[77] but the BBC itself was initially reluctant to provide either written or oral evidence to this inquiry. They justified that reluctance on the grounds that climate change is "a matter of reporting and journalistic inquiry, and one where our strong reputation for independence is paramount".[78] We considered, given the importance of the BBC in the public eye, it was necessary for us to hear from the BBC in public session.

38. Alongside the BBC, we also took evidence from Channel 4 and Sky. Both clearly stated their position on climate change to the Committee. Fiona Ball, from Sky, told us that, as an organisation, it took the view that "climate change is one of the world's greatest challenges" and it had a wide-ranging strategy aimed at "raising awareness and understanding of the impact of climate change".[79] Ralph Lee, from Channel 4, told us "we are past the point

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[71] Professor Steve Jones, Ev w127; Professor Jones mentions the Today Programme, we note that the issue was actually with a different BBC programme, the World at One.

[72] Q194 [Mr Lewis Smith]

[73] Q175

[74] Q194 [Richard Black]

[75] Q135

[76] Professor Greg Philo and Dr Catherine Happer, Ev 140, par 8

[77] Science Media Centre, Ev 144, section 4; Q64

[78] BBC, Ev 174

[79] British Sky Broadcasting Limited ("Sky"), Ev 151

where the debate is about whether or not climate change is happening [...] there is massive scientific consensus on that".[80]

39. In contrast, David Jordan, Director of Editorial Policy and Standards for the BBC, was less emphatic on the status of the science, stating that:

> The BBC believes that it has an important role to play in explaining climate science, climate change and global warming, if that is what is happening, to its audiences. All our evidence is that, although we do not have specific evidence of climate change itself, the BBC's audiences expect it to deliver high-quality programming that is informative and educational about science in general and, therefore, about climate change in particular.[81]

Although, later in the evidence session, he seemed less sceptical:

> There are now very few people who say that no global warming is happening and it is not the result of man-made activity, but the debate has moved on to the precise ranges and all sorts of other questions.[82]

40. Earlier in this report we saw that the majority of the public does not have a good understanding of climate change and its causes and a significant number of people would like to be better informed.[83] Despite this, David Jordan believed that there was no lack of understanding among the BBC audience on climate although "that may well have occurred in the early stages of climate science".[84] Given the weight of evidence disputing this, we wrote to David Jordan on this very point, asking him to expand on his evidence for this.[85] His response stated that:

> The BBC does not measure or monitor our audience's level of knowledge about climate change. This would not fall within the BBC's remit and would, in any case, be extremely difficult to quantify.[86]

41. **We acknowledge the difficulty for broadcasters in maintaining coverage of climate change when the basic facts are established and the central story remains the same. We consider it vital, however, that they continue to do so. Our greatest concern is about the BBC given the high level of trust the public has in its coverage. It did not convince us that it had a clear understanding of the information needs of its audience and we note its rejection of Professor Jones' recommendations on climate.**

42. **This is not to say that non-scientists should be excluded from the debate, the BBC has the responsibility to reflect all views and opinions in society and it is worth remembering that not all frauds and mistakes in science have been uncovered by**

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[80] Q114

[81] Q83

[82] Q108

[83] Para 23

[84] Q90

[85] What is the BBC's understanding about the level of knowledge about climate science amongst television audiences? What are your views on the findings published by the Glasgow University Media Group and Shuckburgh et al?

[86] BBC, Ev 174

scientists. Where time is available for careful consideration and discussion of the facts, it should be possible to explore more detailed consideration of where the science is less certain, such as how feedback mechanisms and climate sensitivity influence the response of the climate to increasing concentrations of carbon dioxide in the atmosphere. Scientists, politicians, lobbying groups and other interested parties should be heard on this issue but the BBC should be clear on what role its interviewees have and should be careful not to treat lobbying groups as disinterested experts.

43. Lack of appropriate training for news editors may be an issue. The importance of their role was explained by David Jordan who told us "editors of individual programmes (whether news or otherwise) are responsible for fact checking their content before it is aired".[87] Professor Jones raised the issue of training in his review and there have been efforts by the BBC to address the problem.[88] However, we were very surprised to hear that the science training for the BBC provided by the College of Journalism, and introduced at Professor Jones' recommendation, did not include any direct interaction with scientists because "debates about science are approached from a journalistic point of view".[89] It is not clear to us how a 'journalistic point of view' which presumably emphasises accuracy, can be at odds with a scientific approach whose prime objective is the establishment of empirical fact.

44. David Jordan told us that, in the BBC Trust *Review of impartiality and accuracy of the BBC's coverage of science,* Professor Steve Jones recommended the BBC "regard climate science as settled in effect and, therefore, it should mean we should not hear from dissenting voices on the science of climate change. We did not agree with that".[90] Professor Jones took issue with David Jordan's assertion and in a submission to our inquiry made it clear that this was a strong misrepresentation of the content of his review:

> Attempts to give a place to anyone, however unqualified, who claims interest can make for false balance: to free publicity for marginal opinions and not to impartiality, but its opposite. [...] Why the BBC remains so obsessed with contrarian views on this subject I do not know.[91]

This lack of distinction within BBC News between proven scientific facts and opinions or beliefs is problematic. The BBC editorial guidelines include guidance on accuracy. These were also referred to by David Jordan in evidence to us. However, these state "accuracy is not simply a matter of getting facts right. If an issue is controversial, relevant opinions as well as facts may need to be considered. When necessary, all the relevant facts and information should also be weighed to get at the truth".[92]

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[87] BBC, Ev 174

[88] *Ibid*

[89] *Ibid*

[90] Q93

[91] Professor Steve Jones, Ev w127

[92] BBC Editorial Guidelines, *Section 3: Accuracy* [website as of 18 March 2014]

45. The BBC News teams continue to make mistakes in their coverage of climate science by giving opinions and scientific fact the same weight. BBC guidelines have stringent requirements for the coverage of politicians and political parties. For example, any proposal to invite politicians to contribute to non-political output must be referred to the Chief Advisor Politics. The BBC could benefit from applying a similarly stringent approach when interviewing non-experts on controversial scientific topics such as climate change.

46. The BBC uses another rule that works in its coverage of political issues, particularly during elections. The likely or historical electoral success of an individual party determines the coverage of that party and its manifesto proposals thus avoiding false balance. The BBC could reasonably apply similar rules to those representing minority views on scientific issues.

47. ***We recommend that the BBC should develop clear editorial guidelines for all commentators and presenters on the facts of climate that should be used to challenge statements, from either side of the climate policy debate, that stray too far from the scientific facts. Public service broadcasters should be held to a higher standard than other broadcasters.***

Newspapers

48. During our inquiry concerns were raised about inaccurate and misleading reporting of climate science by newspapers. Bob Ward and Naomi Hicks from the Grantham Research Institute were critical of the role played by newspapers:

> much greater damage to the public interest is resulting from inaccurate and misleading coverage by the UK's national newspapers in print and online. In particular, some newspapers are able to exploit the systemic weakness of the self-regulatory system.[93]

James Painter noted the increased coverage of sceptical opinion in the press in both the US and UK and outlined the findings from his research into the drivers for newspapers that include sceptical coverage or opinion:

> It can be to do with the overall political ideology of the newspaper; it can be an editor or proprietor imposing his or her will; it may be that that type of sceptical column appeals particularly to the readership.[94]

49. Concern was expressed about the difference between the accuracy of reporting in news items, which was generally viewed as acceptable, and the frequent inaccuracies seen in some opinion pieces or personal columns. James Painter told us that "many of the uncontested sceptical voices or opinions were to be found in the opinion pages rather than the news pages".[95] Richard Black, former BBC Correspondent, was critical of the coverage in the Mail on Sunday and the regular inaccuracies that appeared:

[93] Bob Ward and Naomi Hicks, Ev w87

[94] Q136

[95] James Painter, Ev 158

> This is something that *The Mail on Sunday* clearly does not have a problem with because it has done it many times before. Complaints have been submitted and mistakes pointed out, and the same thing carries on happening. Whether one wants to see that as part of a polarised or increasingly variegated media landscape, or see it in terms of a political game, depends on how one looks at it.[96]

James Painter told us that despite "lots of evidence that people distinguish between news and opinion" what worried him was the finding in his research that "that there is an awful lot of uncontested sceptical opinion in the opinion pieces and editorials in much of the right-leaning press".[97] Fiona Harvey, Environment Correspondent for the Guardian, told us that this distinction may not exist when reading an article on the internet, as readers could have arrived at a page via many different routes.[98] Lewis Smith, a freelance journalist, explained that there was an inherent bias in newspapers which affected which stories they covered; "it is never going to be delineated as opinion, but in reality it is opinion".[99]

50. Despite two invites, neither the Daily Mail nor the Daily Telegraph were able to attend an evidence session with the Committee. However, they did each, eventually, agree to provide a written submission. This limited engagement contrasted with that of the Guardian, which dedicates a significant amount of effort and resources on their coverage of environmental issues and climate change in particular. The Guardian now has the equivalent of seven full-time journalists covering environment and science;[100] its website also has a climate change FAQ section, which includes short responses that are reviewed by the Met Office.[101] James Randerson explained the reason behind this increase in coverage:

> We took a strategic decision about five years ago that, looking at the swathe of opinion in the scientific literature and the voices of people like the Royal Society and so on, this was a major scientific issue, with potentially profound societal and economic consequences. We felt it was difficult to do that justice through the normal way of covering any other issue, so we took the strategic decision to up the register of our coverage.[102]

51. There would not appear to be a significant difference between papers in their assessment of the science. The Daily Mail told us that "in climate science there is almost universal agreement that the climate is changing, and humans are having some impact on it".[103] The Telegraph's submission stated that "in terms of our editorial policy, it is that the climate is changing, that the reason for that change includes human activity".[104]

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[96] Q193

[97] Q135

[98] Q199

[99] *Ibid*

[100] *Ibid*

[101] Q169

[102] Q158

[103] The Daily Mail, Ev 181

[104] The Daily Telegraph, Ev 180

52. Differences arise in how they interpret the implications. The Telegraph is of the view that "human ingenuity and adaptability should not be ignored in favour of economically damaging prescriptions", though it failed to provide us with the evidence on which it bases this view.[105] The Mail considers climate science to be a political issue and is of the view "that not every piece of science by every scientist should be reported as fact".[106] This ambiguous view of science may explain the claim in the Mail's submissions that scientists were predicting an ice age 20 years ago. An examination of the scientific knowledge at the time shows that this was clearly not the case, although it was widely and inaccurately reported as such in the media at that time.[107]

53. The Telegraph was clear that it did not see itself as a participant in the debate about climate change. Its sole responsibility was to its readers and "presenting them with a compelling daily package of news and features that they are happy to pay for".[108] Both newspapers relied on their readership to distinguish between factual news reporting and commentary by columnists and absolved themselves of any responsibility for the content of opinion columns. The Telegraph told us "we report information, and rely on our commentators to interpret it."[109] The Mail also made a clear distinction between its own views and those set out in opinion pieces, telling us their readers are "very familiar with the way it reports news and comment".[110]

54. **We are very disappointed by the heavy reliance that the Daily Mail and the Daily Telegraph place on the ability of their readers to distinguish between fact and opinion on climate science. This is especially the case because opinion pieces about climate science in these publications are frequently based on factual inaccuracies which go unchallenged.**

The Internet and social media

55. The Glasgow University Media Group study found that, after traditional media, the internet was cited most (19%) when respondents were asked specifically about further sources of information used.[111] Dr Burch, from the Science Museum, emphasised the potential for using "multiple routes for multiple audiences in order to communicate and engage around this issue".[112] The Met Office told us of "a need and appetite for increased and informative communication on climate change" and pointed to their website traffic and engagement with social media as evidence for this.[113] Lord Deben, Chair of the Committee on Climate Change (CCC), told us the internet is an important form of

[105] The Daily Telegraph, Ev 180

[106] The Daily Mail, Ev 181

[107] Peterson, Thomas C., William M. Connolley, John Fleck", The Myth of the 1970s Global Cooling Scientific Consensus", *Bulletin of the American Meteorological Society,* vol 89, (2008) 1325–1337; and National Academy of Sciences, *Understanding Climate Change: A programme for action*, 1975

[108] The Daily Telegraph, Ev 180

[109] *Ibid*

[110] The Daily Mail, Ev 182

[111] UK Energy Research Centre, UKERC Project Final Report, *Climate change and energy security: Assessing the impact of information and its delivery on attitudes and behaviour,* December 2012

[112] Q41

[113] Met Office, Ev 137, par1 and Q262

communication for the CCC.[114] Both the Committee on Climate Change and the Department for Energy and Climate Change (DECC) highlighted their use of Twitter as a means of communication;[115] DECC specifically mentioned its use in quickly "responding to factual errors".[116]

56. In a written submission, Dr Phillip Bratby, told us of the level of trust he and other members of the public who are sceptical about climate change have in the internet as a source of information:

> Most members of the public who have an interest in "climate change" get their information from widely trusted internet websites and a few independent media correspondents who do not have vested interests and tell the truth.[117]

Andrew Montford, himself a source for sceptics on the internet,[118] concluded that some become climate sceptics because they "realise that the [traditional] media is only telling them the environmentalist side of the story, which again makes them suspicious".[119]

57. Catherine Brahic, of the New Scientist magazine, explained that the internet was often a forum for debate and that "climate change articles, especially anything that relates to politics, get a huge amount of comments".[120] She cautioned against reading comment threads and taking them "as a representation of the public views at large. They tend to be the views of people who have very strong opinions".[121] James Randerson confirmed the level of interest, telling us that people were "very interested in these topics, and they tend to do very well online".[122]

58. The Grantham Research Institute highlighted how the internet, by its very nature, allows for inaccurate information to be rapidly absorbed into the mainstream debate:

> the primary way in which climate change 'sceptics' damage the public interest is through the spread of inaccurate and misleading material via websites to sympathetic journalists in the mainstream media, creating an 'echo chamber of climate change denial. [123]

We would expect a topical and policy relevant scientific topic such as climate change to merit an obvious online presence from the Government aimed at communicating the science to the public clearly and consistently. It was therefore disappointing to find that, despite claims from the Government and organisations such as the Met Office that they

[114] Q313

[115] Q314, Q377

[116] Q377

[117] Dr Phillip Bratby, Ev w5

[118] Bishop Hill Blog

[119] Andrew Montford, Ev 105

[120] Q169

[121] *Ibid*

[122] Q159

[123] Bob Ward and Naomi Hicks, Ev w86

increasingly use online means to communicate, there is little evidence of any significant activity to support these statements.

59. **The internet and social media are increasingly used by the public when seeking to verify media reports or obtain further detailed information about climate change. The Government and other trusted bodies are currently failing to make effective use of internet or social media to engage with the public and provide accurate scientific information about climate change.**

Government

60. We received evidence from Government Departments and from non-departmental bodies such as the Environment Agency, the Met Office and the Committee on Climate Change. These are the bodies and organisations that should be interpreting the science and putting in place an effective, evidence-based policy response. If the resultant policies are to gain public support, the Government and its agencies need to properly articulate the science supporting them.

61. In its submission to us the Government stated that "it is essential to have a simple, clear evidence-based narrative about climate change, its causes and likely impacts in the public domain and regularly reported in the media".[124] However, in oral evidence to us, both Lord Deben and Fiona Harvey told us that, in their view, this was lacking.[125] Professor Slingo, Chief Scientific Adviser to the Met Office, told us that there is still "quite a lot of work to do to create these narratives that people can relate to. That is where it is not just about the climate science, but the translation of that and what its implications are, and then taking it down to the local level"[126] and cautioned against "having too many multiple voices with different messages".[127] The Royal Academy of Engineering was of the view that "consistency across government departments and policies is particularly important".[128] Mr Paul Crick, Director of Planning and Environment at Kent County Council, expressed his frustration with the lack of clear messaging from the Government:

> Clear messages from trusted sources are what win public support. It does not help, when their national adaptation programme is soft launched, that things like the feed-in tariffs are changed and business cases that we previously had for solar panel installations that had a payback of three to five years all of a sudden have a payback of eight years plus. [129]

He concluded that there is currently a "conflicting message" coming from central Government when it should be about "consistency, clear messaging and consistent policy".[130] David Kennedy, Chief Executive of the Committee on Climate Change told us

[124] Government Departments, Executive summary, Ev 130

[125] Q203

[126] Q295

[127] Q264

[128] The Royal Academy of Engineering, Ev w80

[129] Q224

[130] *Ibid*

"someone needs to take charge of the story" and "we can provide a story, and we aim to do that [...] but in terms of cascading and multiplying that narrative there has to be an important role for the Government. There is more that both central and local government can do once there is a story".[131] **We consider the lack of a narrative strongly reflects a lack leadership in climate change**.

62. The public expects clear leadership from Government. Professor Pidgeon told us that people want Government to take a lead.[132] Local authorities told us that in the public's view climate change is a problem that is too big to address at a local level and "it is for national Government to decide or take leadership on",[133] that "what regularly comes up when we are talking to the public is that the roles of local and central Government need better clarification and communication".[134] Katie Stead from Kirklees Council told us that their surveys "show almost 100% of people agreed that they had a part to play in terms of an impact on climate change" but they were looking for a lead on exactly what to do from local and central Government.[135]

Central Government

63. There has been internal wrangling amongst Ministers and a lack of clarity about what Government considers the climate science to show; all of which have been widely reported. Most recently the Rt Hon Edward Davey, Secretary of State for Energy and Climate Change, referring in a speech to Conservative politicians, criticised those "seizing on any anomaly in the climate data to attempt to discredit the whole". [136] He was of the view that "it [undermines] public trust in the scientific evidence for climate change—which is of course overwhelming" and concluded that "we can see around us today the possible consequences of a world in which extreme weather events are much more likely".[137] The Evening Standard published a response to this from the Minister of State for Business and Energy, the Rt Hon Michael Fallon MP, who was quoted as saying that "unthinking climate change worship has damaged British industry and put up consumer bills".[138] These comments were subsequently widely reported in the press. That coverage contrasts with media claims that Owen Paterson MP, Secretary of State of for Environment, Food and Rural Affairs, whose department has responsibility for climate change adaptation, is less engaged with the climate agenda and may even doubt the need for action on climate change.[139]

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[131] Q314

[132] Q36

[133] Q216

[134] Q224

[135] Q226

[136] Rt Hon Edward Davey MP, *Energy Divided? Building Stability in Energy Policy*, 14 February 2014

[137] *Ibid*

[138] "Cameron urges rail and power firms to help flood victims - after warning Thames crisis could last two more weeks", *Evening Standard* , 14 February 2014

[139] For example: "Climate scepticism blamed as Owen Paterson slashes spending on global warming", *The Independent*, 26 January 2014 " Owen Paterson at odds with Cameron whether storms caused by climate change", *The Telegraph*, 9 January 2014

64. The lack of clear, consistent messages from Government has a detrimental impact on the public's trust in sources of information on climate science. This was highlighted as an issue by many witnesses, as discussed earlier.[140] It also, as we have seen, has an effect on the quantity and tone of media coverage of the science.[141]

65. The Minister, Greg Barker, told us that previous Government efforts to communicate with the public about climate science, in particular the "Act on CO_2 Campaign", had not been successful. A reduction in available funding had also had an impact on departmental activity.[142] The Minister mentioned initiatives such as the 2050 Calculator, a toolkit for school, an energy road show and the use of social media but admitted that the Department's efforts were "a work in progress".[143] He told us that in his view no Government had got it right.[144] The 2050 calculator was only mentioned in one other submission to our inquiry.[145]

66. More recently the focus within Government has shifted. Professor MacKay, Chief Scientific Adviser to the Department of Energy and Climate Change, stressed to us that one of the Government's principal roles in communication was to fund climate scientists and to "support those scientists in communicating the science themselves to policymakers and the general public".[146] Sir Mark Walport, the Government Chief Scientific Adviser, was of the view that as "many people as are competent to deliver the message do so".[147]

67. The Minister also told us that, when it comes to communicating about climate science, "there is an underlying strategy and a clear acceptance of our respective responsibilities".[148] However, Professor MacKay described this as a "process" rather than a communication strategy which consisted of "having roughly monthly meetings to co-ordinate DECC, the Met Office and others".[149] The lack of a proper strategy was illustrated by the response from John Hirst, Chief Executive of the Met Office, who, when asked for details of what happened within Government at a strategic level to co-ordinate communication about climate science, told us:

> That is a question that is difficult for me to answer because I do not have a role or an influence on the strategic communications of climate science on behalf of the Government.[150]

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[140] Para 59

[141] Para 32

[142] Q362

[143] Q354

[144] Q354

[145] Understanding Risk Research Group, Cardiff University, Ev 118

[146] Q353, Q354 [Prof David MacKay]

[147] Q424

[148] Q362

[149] Q363

[150] Q255

Professor MacKay told us that the Met Office was one of the organisations DECC regularly met with to coordinate a "comms strategy".[151] There is very little evidence that this is being translated into any kind of effective strategy for communicating to the public.

The Met Office

68. The Met Office is the UK's National Weather Service. It falls under the Department for Business, Innovation and Skills and operates on a commercial basis. The Met Office Hadley Centre, set up in 1990, is funded by DECC and the Department for Environment, Food and Rural Affairs (Defra). The purpose of the programme is to "provide up-to-date, robust and traceable scientific evidence to government on climate variability and climate change".[152] In its submission the Met Office told us it was focused on the needs of decision makers and their science was not, therefore, specifically aimed at the public.[153]

69. The Met Office does however already devote some effort to communicating climate science to the public, despite not having a specific mandate to do so.[154] In its view, there is "both a need and appetite for increased and informative communication on climate change that allows the public to increase their understanding of the issues, the basic science, and the latest challenges of climate change research".[155] Mr Hirst, told us "we would welcome a greater responsibility for communication of science".[156] The Met Office also provided us with evidence of the traffic on their website between 2011 and August 2013, with over 700, 000 visits to their climate pages and over 90,000 visits to climate posts in 2012.[157] They also had, in March 2014, 200,760 followers on Twitter.

70. We asked what preparation the Met Office had made for the publication of the first part of the Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC AR5). We were told there were a whole series of efforts planned, including briefing several key organisations.[158] After publication of IPCC AR5 we were able to find only a single web page on the AR5 report and two blog posts, and three messages on Twitter, one of which linked to the Met Office webpage. There have been some belated updates to the website and, while the information aimed at the public is now better than at the time of the publication of the report, it was disappointing, initially to find so little information with limited efforts to make it engaging to a lay audience.

71. **The Met Office is an organisation seeking to have a greater role in the communication of climate science. As such we would have liked to have seen greater effort to communicate to the public on the publication of the IPCC AR5 report. It should have been more timely with information that should be far more accessible to the public at large.**

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[151] Q363

[152] Met Office: Weather and Climate

[153] The Met Office, Ev 137

[154] *Ibid*

[155] The Met Office, Ev 137

[156] Q263

[157] The Met Office, Ev 137

[158] Q289 [Mr John Hirst] Q291 [Prof Julia Slingo]

The Environment Agency

72. The Environment Agency told us that, with regards to climate change, it focused on priority risks and sectors in the National Adaptation Plan and therefore its service was aimed at organisations and businesses rather than the general public. However, it also worked with partners to help the public and communities understand their risk of flooding. [159]

73. The Environment Agency has found that audiences are usually interested in climate change only to the extent that it affects their direct interests and have concluded that it is more productive to focus on impacts such as flooding or drought. It does not tend to talk about the science[160] and has found that "it can also be effective to focus on adaptation actions (solutions) rather than climate (uncertain problems). In many cases, no or low-regret actions can be taken that make sense regardless of future climate".[161] The Agency has also found that "using more active language, such as 'adapting to a changing climate' and being 'Climate Ready' helps audiences to move on from the idea of climate change being remote and something they need to believe in, to needing to take action now".[162]

74. Whilst we accept that the Agency's focus is on adaptation and resilience to climate change we are disappointed to see the limited value placed by the Agency on communicating the wider context. That this may be counterproductive in the long term was illustrated by some of the reaction to the extreme winter rain recently experienced in the UK and the resulting criticisms of the Agency's work on flood prevention.[163] We note that the trust that the Environment Agency believed it had achieved on the risk of flooding may have been damaged.

The Committee on Climate Change

75. The Committee on Climate Change's (CCC) role is to advise the Government on meeting its carbon targets and monitoring progress in doing this. The CCC told us that whilst public understanding was not directly a matter it took into account it is an important consideration in its work.[164] Under the *Climate Change Act 2008,* the CCC "must have regard to the desirability of involving the public in the exercise of its functions". The Chair of the CCC, Lord Deben, told us of his aim of involving the public more.[165] However, he was reluctant to accept any significant extension of the CCC's work in communicating science, instead viewing its role as enabling others to do so.[166] The CCC was also critical of the Government's efforts:

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[159] Environment Agency, Ev 170

[160] Q216

[161] Environment Agency, Ev 173, para 28

[162] Environment Agency, Ev 170, Summary

[163] "UK floods: Environment Agency board backs chairman Lord Smith", *BBC,* 11 February 2014

"Climate change means we won't in future be able to engineer our way out of flooding", *The Guardian*, 11 February 2014

[164] Committee on Climate Change, Ev 136

[165] Q312

[166] Q314

> The Government has not succeeded in presenting a compelling narrative to the public over the need for action, and the components of an effective response. It has at times been alarmist, and has given mixed messages.[167]

David Kennedy, Chief Executive of the CCC, also highlighted the failure to provide a narrative "I think there is a sense in the Government that we have moved on and we do not need a narrative any more" because the Government's view was that it was already delivering a policy response.[168]

Local Government

76. The requirement for Local Authorities to report on progress on meeting climate targets has been abolished. However, most continue to work in this area. As a result many local authorities are involved in communication about climate change at a local level.

77. We heard from Kirklees Council, which has been engaging with the public for the last ten years to reduce domestic carbon emissions and tackle climate change with a strong focus on improving energy efficiency in its area. It now has plans to stimulate a local green economy and create jobs.[169] We also heard from Kent County Council, which focuses on coastal flooding and the impacts of severe weather and is committed to taking action to address climate change.[170] Both are members of the Local Government Association's Climate Local Initiative. [171]

78. Paul Crick, of Kent County Council, told us that his council saw its actions to address climate change as part of its local leadership role and part of the Kent Environment Strategy.[172] Katie Stead, Environment Officer at Kirklees Council, told us how the messages her council used to engage the public had changed over time. They now focused on those with more direct resonance such as "how to save money on their fuel bills and how to improve their health and wellbeing by providing more affordable warmth and comfort in their homes".[173] Local authorities use multiple avenues to communicate and their experience demonstrates that people are motivated to take action. Financial benefits alone are unlikely to drive behaviour change.[174] They have found that "tackling areas street by street is incredibly powerful in stimulating uptake by word of mouth and seeing neighbours take up an offer".[175] Kent County Council found many residents "citing uncertainty as a reason not to take action".[176] Successful tools in communication included focusing on outcome, keeping information local to make it relevant, and identifying

[167] Committee on Climate Change, Ev 136

[168] Q314

[169] Kirklees Council, Ev 165

[170] Kent County Council, Ev 160

[171] Local Government Association, Climate Control [website as of 18 march 2014]

[172] Q220

[173] Q214

[174] Kirklees Council, Ev 168 par 4.5

[175] Kirklees Council, Ev 169

[176] Q216

actions for communities which ensured climate change was seen as more of a challenge than a threat.[177]

79. **We heard from Government, government agencies and bodies at national and local levels working at engaging with the public on mitigating and adapting to climate change. We found little evidence of any significant co-ordination amongst them to communicate the science. Neither is there any indication that the Government is regarded as a primary, or even a reliable, source of information on climate science by the general public.**

Scientists

80. The Glasgow University Media Group told us that the public had a high level of trust in scientists, academics and other experts.[178] This was supported by the findings of an Ipsos Mori poll from 2012 which found that scientists would be trusted by 66% of respondents if they were giving views on climate change. There was relatively little trust in other sources of information, including journalists and politicians and the poll found that 15% of respondents said they would not trust anyone.[179] The Government also emphasised trust in scientists in its written submission, referring to a Carbon Brief poll which found that 69% of respondents thought scientists and meteorologists were very (20%) or quite (49%) trustworthy "in providing accurate information about climate change".[180] Tom Sheldon from the Science Media Centre told us:

> Trust in science is routinely so high because science is not led by an agenda; it is neutral. Climate data tell a very important story that needs to be heard, but the evidence itself is politically and socially neutral. Scientists need to communicate that.[181]

81. Communicating research findings is, increasingly, seen as an integral part of a scientist's role. Sir Mark Walport, the Government Chief Scientific Adviser, told us "I do not think that scientific research is complete until the results are communicated. Part of that communication is communication to the general public as well as to the specialist audiences that scientists normally communicate with".[182] Dr Emily Shuckburgh's research indicated that while "many of the participants [in her study about communicating climate] found it difficult to relate to scientists [...] nevertheless many felt it is important to hear directly from the people who are doing the research".[183]

82. This level of trust in scientists is not reflected among those sceptical about the science. Many submissions to the Committee from individual members of the public express views such as:

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[177] Kent County Council, Ev 160

[178] Professor Greg Philo and Dr Catherine Happer, Ev 140, para 9

[179] Ipsos MORI, *Public attitudes regarding climate change*, 2 February 2012

[180] Carbon Brief, *How does Carbon Brief's polling fit in with other research?*, 2 April 2013

[181] Q4

[182] Q458

[183] Emily Shuckburgh, Rosie Robison and Nick Pidgeon, "Climate Science, the Public and the News Media", *Living with Environmental Change*, 28 September 2012, p19

> Scientific and engineering institutions are not trusted because of their perception as Government propagandists being funded by Government (he who pays the piper calls the tune).[184]

Andrew Montford, author of a blog "with a focus on dissenting opinion in the climate and energy debate"[185], when asked about his trusted sources on climate, responded "it is probably nobody really. You have to verify everything. Peer review is completely overdone".[186] We cannot agree with this contention as we made clear in our report *Peer review in scientific publications,* in which we concluded that peer review was "crucial to the reputation and reliability of scientific research".[187] Nick Pidgeon summarised the concerns often expressed by those who are sceptical:

> People who are sceptical about climate change—there are about 15% you could define currently amongst the UK population—said three things. They said the point about, "You couldn't trust the scientists." The second group said, "No, it's all natural cycles," and actually there is a sense in which that is not entirely untrue, because climate change is a combination of natural and anthropogenic forcings. The third thing was, "Actually, this is a get up job because the Government wants to tax us more."[188]

Professor Chris Rapley told us that "for those who have formed an opinion that they do not accept the premise, lack of trust in the science community is a key rationalising factor".[189] Greg Barker MP, Minister for Climate Change, told us that the approach to those who are sceptical should be to "listen to their views and treat them with respect, but we should not let the views of a relatively small minority dominate the whole agenda".[190]

83. We were interested in how trust in climate scientists may have been compromised by the "Climategate" story surrounding the disclosure of climate data from the Climatic Research Unit at the University of East Anglia (UEA) in 2010.[191] In our inquiry into the matter, we concluded then that "climate science is a matter of global importance and of public interest, and therefore the quality and transparency of the science should be irreproachable".[192] Needless to say this still applies, so it was reassuring to hear from Professor Sutton that the leak of the UEA e-mails and subsequent reviews has stimulated "debate about how to make climate science more open".[193] Professor Slingo also commented that there was much more openness about the science as a result:

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[184] Dr Phillip Bratby, Ev w5

[185] Andrew Montford, Ev 105

[186] Q134

[187] Science and Technology Select Committee, Eight Report of Session 2010-12, *Peer review in scientific publications*, HC 856, p88

[188] Q43

[189] *Ibid*

[190] Q380

[191] Science and Technology Select Committee, Eighth Report of Session 2009–10, *The disclosure of climate data from the Climatic Research Unit at the University of East Anglia*, HC 387-I,

[192] *Ibid*

[193] Q76

> Scientists have never been secretive, but what we clearly did not understand was that, in a situation as important as dealing with climate change, this whole business of openness, transparency, open data wherever possible, was critically important.[194]

84. With respect to the impact on the public trust in climate scientists, the Glasgow University Media Groups told us that, in their research, "individual stories disappear. Even with Climategate, nobody raised that with us. The only people who even remembered it vaguely were those in East Anglia. The e-mails were from their local university and they remembered it for that reason. Nobody else had any recollection of it".[195]

85. The science community has recognised that it is important that scientists themselves communicate science, particularly climate science.[196] Media training, such as that now offered by the IPCC to contributing authors, is one way to address this[197] but engaging with the media is time consuming and it can interfere with scientists' core business of research.[198] Professor Rowan Sutton, Director of Climate Research at the National Centre for Atmospheric Science, told us that "there is not an understanding across the board about the need to communicate effectively".[199]

86. Climate science is an area of both relevance and interest to the public and scientists are the most trusted source of information on this subject. It is, therefore, especially important that every effort is made by all publicly funded scientists working in this area to actively engage with the public, either directly or through the media. It must also be recognised that there is a minority of the public who in all likelihood will never trust anyone on climate science.

The Royal Society

87. We received submissions from The Geological Society, The Royal Academy of Engineering and the Royal Meteorological Society. The Royal Society, despite initially declining to formally respond to the inquiry, provided us with both written and oral evidence and we were grateful for the intervention the Society's president, Sir Paul Nurse, on this. The Royal Academy of Engineering told us that learned bodies had a role in ensuring there was a consistent message about climate science:

> What is vital, but challenging, is a consistent message from all parties that does not shy away from these difficulties and uncertainties. Government, industry, academia and learned bodies all have a role to play in providing the public with a coherent message. [200]

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[194] Q275

[195] Q10 [Professor Philo]

[196] For example, Q59 [Prof John Wormsley]

[197] Q65 [Prof Rowan Sutton]

[198] Q75 [Professor Sutton]

[199] Q57

[200] The Royal Academy of Engineering, Ev w80

88. The written submission from the Royal Society was not as extensive as we expected. However, it did highlight its role in "providing independent and authoritative scientific advice to UK, European and international decision makers".[201] The Society also told us that it worked on a wide range of issues related to climate science "with a particular emphasis on communicating accurately the most up-to-date science to non-specialist audiences".[202] Professor John Pethica, speaking on behalf of the Royal Society, agreed that, as a body in receipt of public funds, it had an obligation to communicate to the public about climate science.[203] We found it difficult to establish evidence of this activity. The Royal Society's joint publication of *Climate Change Evidence & Causes*[204] on 27 February 2014 with the US National Academy of Sciences, was its first publication on climate science since the publication, in 2010, of *Climate Change: a summary of the science*[205] and, though it has held several scientific conferences since then on various aspects of climate science and participated in a briefing event to parliamentarians, the Society has not held any public event on climate science. The last event with any relation to climate was held nearly three years ago, in March 2011, which focused on carbon storage.[206]

89. The Royal Society receives the majority of its funding, £47.1 million a year, from the Government. Block 2 of its delivery plan up to 2015 is for Science Communication and Education but, of the £515,000 a year allocated to science communication since 2011, very little appears to have been spent on communicating on climate science.[207] The public profile the Society has on this issue is due to the ongoing debate about climate science taking place directly between Sir Paul Nurse, President of the Royal Society, and Lord Lawson from the Global Warming Policy foundation. This debate has been widely reported in the press.[208]

90. Sir Paul Nurse has very publicly engaged with prominent climate sceptics in the past. But the same is not true of the Royal Society as a whole. The launch of its joint report with the US National Academy of Sciences could have been used better to promote and communicate accurately the most up-to-date science to a non-specialist audience.

91. ***The Royal Society is a publicly funded body with a responsibility to communicate about science. We encourage it to step up to that responsibility.***

The interface of science and policy

92. As a Committee we have always been of the vital importance of science in informing evidence based policy. However, in the case of climate change, discussion and disagreement about the policy response have become disagreements about the validity of

[201] The Royal Society, Ev 149

[202] *Ibid*

[203] Q71-Q72

[204] The Royal Society, *Climate Change, Evidence and Causes*, 27 February 2014

[205] The Royal Society, *Climate Change: a summary of the science*, September 2010

[206] The Royal Society, *Carbon storage: caught between a rock and climate change, (*Lecture), 24 March 2011

[207] The Royal Society, *Royal Society Delivery Plan 2011-2015* p3

[208] "Manmade global warming: a stormy meeting between sceptics and believers", *The Guardian*,13 December 2013; and " The secret society of warmists", *The Telegraph*, 30 November 2013

the science. This difficulty in separating discussions about the science, which is a factual debate, from discussions about the appropriate policy response, which is a matter of judgement, was referred to by witnesses. This is of particular concern for scientists, who are wary of being drawn into areas outside their expertise. As Professor Sutton told us:

> Sometimes scientists can be drawn in to comment on things that, frankly, they should not comment on, because an interview goes in that direction.[209]

93. Professor Tim Palmer, from the Royal Meteorological Society, said that it was important for scientists to focus on the science when talking about climate change:

> As a scientist I try to separate [how science will affect society] from the science issues, especially when speaking in public. I believe that the public's confidence in climate science and climate scientists may increase if it is felt that the scientists can take a mostly disinterested view on climate policy.[210]

94. We were told that "confusion between the science and the politics bedevils the public dialogue" and that "the profound policy implications of climate change mean that public discussion often constitutes policy debate masquerading as science". [211] ClimateXChange, the research group that advises the Scottish Government on climate change issues, told us why, in their view, communicating about climate change had become so complicated:

> Climate change is a politicised debate involving conflicting interests and challenging societal and individual habits. The discourse on climate change is complicated by difficulties in communication between science, policy, the media and the public. There is space for miscommunication, resistance and politicisation at any stage of the discourse.[212]

Carbon Brief highlighted how this confusion is reflected in media coverage: "rapid jumps between detailed scientific specifics, broad scientific conclusions and pundits or politicians arguing about climate policy are unlikely to increase understanding in audiences".[213] RCUK wrote that "whilst most publicly-funded climate scientists will acknowledge that their research is relevant to society, engaging in what can often be a challenging dialogue about controversial issues can be a daunting task".[214]

95. The National Centre for Atmospheric Science indicated that this did not mean that scientists had no role in the policy discussion, "it is not the role of publicly funded climate scientists to advocate any specific policy responses, but it is part of our role to explain the likely or potential consequences of alternative policy choices, based on current scientific understanding".[215] Professor Sutton, told us that scientists should be involved in "explaining, on the basis of the available evidence, the potential consequences of different

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[209] Q64

[210] Royal Meteorological Society, *Climate Change Simulation by Tim Palmer*, 1 February 2013

[211] UCL Communicating Climate Science Policy Commission, Ev 127, para 25

[212] ClimateXChange, Ev w59

[213] Carbon Brief, Ev 133

[214] Research Councils UK, Ev 115

[215] National Centre for Atmospheric Science, Ev 107

policy choices. That is very different, of course, from advocating any particular policy".[216] Professor John Womersley, Champion for RCUK Public Engagement with Research, expressed similar views: "I think it is completely appropriate for scientists to become involved in the public policy debate, if they wish to, to make sure that that debate remains evidence-based, but it is not mandatory".[217] Professor Palmer, was more cautious and expressed the view that scientists should simply present the science and allow politicians to discuss its relevance to policy.[218]

96. The politicisation of climate science has made it extremely difficult to discuss the science without becoming involved in climate politics. This makes a dispassionate assessment of new climate data extremely difficult. The communication of these findings can be subject to politicisation before their implications are fully understood. This heightened political context makes scientific progress or debate very difficult.

[216] Q66

[217] *Ibid*

[218] *Ibid*

4 Effective communication

97. We needed to consider how communicating the science of climate change and the evidence of anthropogenic influence is different from other science topics. That this communication may not be straight forward is demonstrated by the continuing dispute about the level of consensus about the science and a persistent minority of those actively sceptical of both the science and related Government policies. The Met Office and Kent County Council have commissioned research to establish how best to communicate with the public.[219] University College London has set up a Communicating Climate Science Policy Commission precisely to address this issue.[220]

An emotive issue

98. Climate change is a complex subject which is not "emotionally neutral".[221] There is an increasing interest amongst scientists about the reasons people may or may not support policies addressed at reducing emissions and the impacts of climate change.[222] The UCL Communicating Climate Science Policy Commission told us how "the 'unwelcome messages' of climate science have the capacity to arouse emotions of anxiety, fear, guilt, loss, interdependency and helplessness" and that "values and worldviews are predicative of climate change concern".[223] People with sceptical attitudes to climate change may still support carbon policies as achieving a "more desirable, less polluted future".[224] Research also indicates that communication focusing on how mitigation efforts "can promote a better society"[225] is more likely to engage those sceptical of the science. This has led some to advocate targeting different messages to different audiences. For example, the Climate Outreach and Information Network published *A new conversation with the centre-right about climate change* in 2013 aimed at "developing a better understanding of how to engage centre-right citizens on climate change".[226] But this approach carriers risks: "people are very sensitive to feeling that you may be trying to manipulate them".[227]

99. Lord Deben was of the view that the key issue was about what happened when "the general becomes the practical and particular":

[219] Q280 [Mr John Hirst]; Sutton R. et al., (2012) *Engaging coastal communities in climate mitigation and adaptation measures*. Unpublished report commissioned by Kent County Council for the CC2150

[220] UCL Communicating Climate Science Policy Commission

[221] Q34 [Prof. Chris Rapley]

[222] Nature, Climate Change, Focus: Public and Experts' Views about Climate Change

[223] UCL Communicating Climate Science Policy Commission, Ev 126, para16

[224] Understanding Risk Research Group, Cardiff University, Ev 123 para 28

[225] *Ibid*

[226] Climate Outreach and Infomation Network, *A new conversation with the centre right about climate change*, July 2013, p2

[227] Q51 [Prof Chris Rapley]

> If you add to that those who have a very strong view that almost any kind of regulation is unhappy and is a disadvantage, there will be a tendency to argue rather more on more of the issues.[228]

Professor Pidgeon considered that the best approach was a message that focused on making the links with climate change explicit and offered "positive rationales and objectives"[229] that went beyond climate change and therefore engaged with a wider section of the public.

Risk and uncertainty

100. As we have previously found in our inquiries into energy infrastructure and advice to government during emergencies, the communication of risk is not easy. Climate communication suffers from similar problems and these are often attributed to be misunderstandings of the language used by scientists, particularly what is meant by scientific uncertainty and how it relates to risk. The Minister, Greg Barker MP, was aware of this and told us that "we are dealing with probability and risk rather than absolutes, which would be much easier":

> Even though the probabilities are extremely high, which are now statistically almost off the scale according to the IPCC—they said they were 95% certain—they are still nevertheless dealing with a range of probabilities, and that can be difficult to convey. It also leaves open an opportunity for doubt—some of it reasonable doubt and some of it just sceptics who take a very contrary view.[230]

ClimateXChange, in their evidence to the Committee told us there is very little uncertainty about human activity influencing the global climate among climatologists.[231] However, uncertainty means different things to the scientific community and the lay public and this difference can result in information being misinterpreted:

> Some of the inevitable debates and uncertainties expressed by experts and scientists are often misinterpreted by the public as a lack of certainty in anthropogenic climate change and therefore become a reason for scepticism by the public in climate change.[232]

101. The Royal Meteorological Society, in evidence to the Energy and Climate Change Select Committee inquiry into the IPCC AR5, highlighted the difference in how scientists use the terms uncertainty and risk in contrast to their everyday use and that there was value in "testing and evaluating whether statements have been interpreted as intended and exploring alternative ways of communicating".[233] James Painter, in his paper *Climate Change in the Media: reporting risk and uncertainty*, pointed out that school science made

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[228] Q319

[229] Understanding Risk Research Group, Cardiff University, Ev 123, para 29

[230] Q359 Greg Barker

[231] ClimateXChange, Ev w60

[232] *Ibid*

[233] Energy and Climate Change Select Committee, IPCC 5th Assessment Review, Royal Meteorological Society (IPC0029), para 12

the communication of risk and uncertainty even more difficult as science was treated as "a source of solid facts and reliable understanding".[234] This is different to research science where "uncertainty is engrained and is often the impetus for further investigation".[235] In his submission to the Energy and Climate Change Committee inquiry he expressed the view that the discrepancy between the expected scientific certainties and the reality of "scientists constantly [talking] about uncertainty" could lead to uncertainty on how to proceed, dodging the problem and even anger. [236] Mr Painter went on to explore some of the benefits of talking in terms of risk:

> Many argue that when compared to the messages of disaster or uncertainty that often surround climate change, risk is far from being a panacea, but it does offer a more sophisticated and apposite language to have the discussion in and a more helpful prism through which to analyse the problem.
>
> [...] it shifts the debate away from what would count as conclusive proof or overwhelming certainty before taking action, towards an analysis of the comparative costs and risks of different policy options (including doing nothing). [237]

Using risk terminology rather than uncertainty was supported by the Grantham Research Institute in its evidence to the Energy and Climate Change Committee inquiry in which it stated that, in its view, talking about uncertainty "might lead to a misinterpretation that there is no disadvantage in delaying until further certainty is attained". [238]

Engagement and dialogue

102. There was a strong view amongst many witnesses that the deficit model, where the reason for a lack of understanding is perceived to be a deficit of information provision, was not appropriate in the area climate change and its causes. For example, University College London told us there was extensive evidence demonstrating that "a 'deficit model' of communication, in which experts treat non-experts as 'empty vessels' to be filled with facts, is flawed".[239] Despite polls that indicate that the public trusts scientists, "statements from scientists are rarely sufficient to persuade or compel particular viewpoints or actions".[240] In UCL's view, traditional debate was also unhelpful and it suggested dialogue as a more effective approach.

103. We were told by several other witnesses that two-way engagement had proven more effective, though it was more expensive and resource intensive. The National Centre for Atmospheric Science told us "direct engagement [...] is probably one of the more effective mechanisms, but also one of the most costly".[241] This was the view of many witnesses.[242]

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[234] James Painter, *Climate Change in the Media: reporting risk and uncertainty*, 2013

[235] *Ibid*

[236] Energy and Climate Change Select Committee, IPCC 5th Assessment Review , James Painter (IPC0044), para9

[237] *Ibid*

[238] Energy and Climate Change Select Committee, IPCC 5th Assessment Review , Bob Ward and Naomi Hicks, Grantham Research Institute on Climate Change and the Environment (IPC0051), para12

[239] UCL Communicating Climate Science Policy Commission, Ev 126

[240] *Ibid* para 13

[241] *Ibid*

Kent and Kirklees Councils told us of the effectiveness of two way dialogue as a way of engaging with public but also cautioned that "that sort of behaviour change is quite resource-intensive and not something we can do so much of anymore".[243]

104. Direct engagement, the most effective approach, may therefore be too expensive to be used for communicating on climate science to the public on a significant scale. There remains a need to produce good quality information. This was highlighted by the Royal Meteorological Society who carried out a survey in 2009 which found that "100% of the public surveyed on weather and climate matters were interested, or very interested, in a plain English explanation of the causes and effects of climate change".[244] There is also an appetite for more information on science, generally, amongst the public as highlighted in the BIS Attitudes to Science Surveys.

[242] Q40 [Prof Chris Rapley]

[243] Q216 [Katie Stead]

[244] Royal Meteorological Society, Ev 110

5 Conclusions

105. **Successive Government efforts to create a clear narrative that ensures a discourse about climate change that is coherent, constructive and results in proper public engagement has been disappointingly limited.**

106. **The Government's hands-off approach to engaging with the public and the media, relying heavily on scientists as the most prominent voice, has a resulted in a vacuum that has allowed inaccurate arguments to flourish with little effective challenge.**

107. **If the Government is to demonstrate its climate policies are evidence based, it needs to be an authoritative and trusted voice which explains the current state of climate science. It is important that climate science is presented separately from any subsequent policy response.** ***We recommend that the Government work with the learned societies and national academies to develop a source of information on climate science that is discrete from policy delivery, comprehensible to the general public and responsive to both current developments and uncertainties in the science.***

108. **We have always sought to ascertain that policy is evidence based. We remain convinced that peer review is the best current option for judging the strength of science in any issue. Peer reviewed science is overwhelmingly of the view that anthropogenic climate change exists.**

109. **Science is the ultimate sceptic, challenging theories and opinion and ready to abandon or adapt as the available evidence changes. Genuine scepticism should be embraced by the climate science community. Dogma on either side of the debate should be revealed as such.**

110. ***To achieve the necessary commitment from the public to climate policy, the Government must demonstrate a coherent approach to communicating both the scientific basis and the proposed solutions. We recommend that the Government consolidates its strategic approach to communicating climate science across all Departments, formulate the principles of that approach and make it public. All Ministers should acquaint themselves with the science of climate change and then they, and their Departments, should reflect the Government approach in person, in media interviews and online by a presenting a clear and consistent message.***

Conclusions and recommendations

C&R Sub heading

1. In order to communicate what climate change is, the Government must agree a clear consistent and precise definition which can be related to direct observations and measurements. This should be based on Professors Slingo's and Rapley's definitions. (Paragraph 12)

2. Despite the existing polling information, it remains difficult to draw firm conclusions on how public acceptance and understanding of climate change is changing in the UK. However, it is clear that a significant majority of people think the climate is changing and that human activity is at least partly responsible for this. The polling on public understanding is limited and unlikely to highlight the information needs of the general public. In its response to this report, the Government should detail how it will collect, and make available, more regular and more in depth information on the public understanding of climate change. (Paragraph 18)

3. We acknowledge the difficulty for broadcasters in maintaining coverage of climate change when the basic facts are established and the central story remains the same. We consider it vital, however, that they continue to do so. Our greatest concern is about the BBC given the high level of trust the public has in its coverage. It did not convince us that it had a clear understanding of the information needs of its audience and we note its rejection of Professor Jones' recommendations on climate. (Paragraph 41)

4. This is not to say that non-scientists should be excluded from the debate, the BBC has the responsibility to reflect all views and opinions in society and it is worth remembering that not all frauds and mistakes in science have been uncovered by scientists. Where time is available for careful consideration and discussion of the facts, it should be possible to explore more detailed consideration of where the science is less certain, such as how feedback mechanisms and climate sensitivity influence the response of the climate to increasing concentrations of carbon dioxide in the atmosphere. Scientists, politicians, lobbying groups and other interested parties should be heard on this issue but the BBC should be clear on what role its interviewees have and should be careful not to treat lobbying groups as disinterested experts. (Paragraph 42)

5. We recommend that the BBC should develop clear editorial guidelines for all commentators and presenters on the facts of climate that should be used to challenge statements, from either side of the climate policy debate, that stray too far from the scientific facts. Public service broadcasters should be held to a higher standard than other broadcasters. (Paragraph 47)

6. We are very disappointed by the heavy reliance that the Daily Mail and the Daily Telegraph place on the ability of their readers to distinguish between fact and opinion on climate science. This is especially the case because opinion pieces about

climate science in these publications are frequently based on factual inaccuracies which go unchallenged. (Paragraph 54)

7. The internet and social media are increasingly used by the public when seeking to verify media reports or obtain further detailed information about climate change. The Government and other trusted bodies are currently failing to make effective use of internet or social media to engage with the public and provide accurate scientific information about climate change. (Paragraph 59)

8. We consider the lack of a narrative strongly reflects a lack leadership in climate change. (Paragraph 61)

9. The Met Office is an organisation seeking to have a greater role in the communication of climate science. As such we would have liked to have seen greater effort to communicate to the public on the publication of the IPCC AR5 report. It should have been more timely with information that should be far more accessible to the public at large. (Paragraph 71)

10. We heard from Government, government agencies and bodies at national and local levels working at engaging with the public on mitigating and adapting to climate change. We found little evidence of any significant co-ordination amongst them to communicate the science. Neither is there any indication that the Government is regarded as a primary, or even a reliable, source of information on climate science by the general public. (Paragraph 79)

11. The Royal Society is a publicly funded body with a responsibility to communicate about science. We encourage it to step up to that responsibility. (Paragraph 91)

12. Successive Government efforts to create a clear narrative that ensures a discourse about climate change that is coherent, constructive and results in proper public engagement has been disappointingly limited. (Paragraph 105)

13. The Government's hands-off approach to engaging with the public and the media, relying heavily on scientists as the most prominent voice, has a resulted in a vacuum that has allowed inaccurate arguments to flourish with little effective challenge. (Paragraph 106)

14. If the Government is to demonstrate its climate policies are evidence based, it needs to be an authoritative and trusted voice which explains the current state of climate science. It is important that climate science is presented separately from any subsequent policy response. We recommend that the Government work with the learned societies and national academies to develop a source of information on climate science that is discrete from policy delivery, comprehensible to the general public and responsive to both current developments and uncertainties in the science. (Paragraph 107)

15. We have always sought to ascertain that policy is evidence based. We remain convinced that peer review is the best current option for judging the strength of science in any issue. Peer reviewed science is overwhelmingly of the view that anthropogenic climate change exists. (Paragraph 108)

16. Science is the ultimate sceptic, challenging theories and opinion and ready to abandon or adapt as the available evidence changes. Genuine scepticism should be embraced by the climate science community. Dogma on either side of the debate should be revealed as such. (Paragraph 109)

17. To achieve the necessary commitment from the public to climate policy, the Government must demonstrate a coherent approach to communicating both the scientific basis and the proposed solutions. We recommend that the Government consolidates its strategic approach to communicating climate science across all Departments, formulate the principles of that approach and make it public. All Ministers should acquaint themselves with the science of climate change and then they, and their Departments, should reflect the Government approach in person, in media interviews and online by a presenting a clear and consistent message. (Paragraph 110)

Formal Minutes

Wednesday 26 March 2014

Members present:

Andrew Miller, in the Chair

Jim Dowd	Mr David Heath
Stephen Metcalfe	David Morris
Stephen Mosley	Pamela Nash
Sarah Newton	Graham Stringer
David Tredinnick	

Draft Report (*Communicating climate science*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 110 read and agreed to.

Summary agreed to.

Resolved, That the Report be the Eighth Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

Written evidence was ordered to be reported to the House for printing with the Report.

[Adjourned till Wednesday 2 April at 9.00 am

Witnesses

Wednesday 19 June 2013

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Wednesday 26 June 2013 (Atmosphere Gallery, Science Museum)

Wednesday 17 July 2013

Monday 9 September 2013

Wednesday 11 September 2013

Wednesday 9 October 2013

Wednesday 6 November 2013

List of printed written evidence

List of additional written evidence

(published in Volume II on the Committee's website www.parliament.uk/science)

List of Reports from the Committee during the current Parliament

The reference number of the Government's response to each Report is printed in brackets after the HC printing number.

Session 2013–14

First Special Report	Educating tomorrow's engineers: the impact of Government reforms on 14–19 education: Government Response to the Committee's Seventh Report of Session 2012–13	HC 102
First Report	Water quality: priority substances	HC 272–I (HC 648)
Second Special Report	Marine science: Government Response to the Committee's Ninth Report of Session 2012–13	HC 443
Third Special Report	Bridging the valley of death: improving the commercialisation of research: Government response to the Committee's Eighth Report of Session 2012–13	HC 559
Second Report	Forensic science	HC 610 (Cm 8750)
Fourth Special Report	Water quality: priority substances: Government response to the Committee's First Report of Session 2013–14	HC 648
Third Report	Clinical trials	HC 104 (Cm 8743)
Fifth Special Report	Clinical trials: Health Research Authority Response to the Committee's Third Report of Session 2013–14	HC 753
Fourth Report	Work of the European and UK Space Agencies	HC 253 (HC 1112)
Fifth Report	Pre-appointment hearing with the Government's preferred candidate for Chair of the Natural Environment Research Council (NERC)	HC 702
Sixth Special Report	Forensic science: Research Councils UK Response to the Committee's Second Report of Session 2013–14	HC 843
Seventh Special Report	Clinical trials: Medical Research Council Response to the Committee's Third Report of Session 2013–14	HC 874
Sixth Report	Women in scientific careers	HC 701
Seventh Report	Pre-appointment hearing with the Government's preferred candidate for Chair of the Arts and Humanities Research Council (AHRC)	HC 989
Eighth Special Report	Work of the European and UK Space Agencies: Government Response to the Committee's Fourth Report of Session 2013–14	HC 1112

Session 2012–13

First Special Report	Science in the Met Office: Government Response to the Committee's Thirteenth Report of Session 2010–12	HC 162
First Report	Devil's bargain? Energy risks and the public	HC 428 (HC 677)
Second Report	Pre-appointment hearing with the Government's preferred candidate for Chair of the Medical Research	HC 510–I

	Council	
Second Special Report	Engineering in government: follow-up to the 2009 report on Engineering: turning ideas into reality: Government Response to the Committee's Fifteenth Report of Session 2010–12	HC 511
Third Report	The Census and social science	HC 322 (HC 1053)
Fourth Report	Building scientific capacity for development	HC 377 (HC 907)
Fifth Report	Regulation of medical implants in the EU and UK	HC 163 (Cm 8496)
Sixth Report	Proposed merger of British Antarctic Survey and National Oceanography Centre	HC 699 (HC 906)
Third Special Report	Devil's bargain? Energy risks and the public: Government Response to the Committee's First Report of Session 2012–13	HC 677
Fourth Special Report	Building scientific capacity for development: Government and UK Collaborative on Development Sciences Response to the Committee's Fourth Report of Session 2012–13	HC 907
Fifth Special Report	Proposed merger of British Antarctic Survey and National Oceanography Centre: Natural Environment Research Council Response to the Committee's Sixth Report of Session 2012–13	HC 906
Seventh Report	Educating tomorrow's engineers: the impact of Government reforms on 14–19 education	HC 665 (HC 102, Session 2013–14)
Eighth Report	Bridging the valley of death: improving the commercialisation of research	HC 348 (HC 559, Session 2013–14)
Sixth Special Report	The Census and social science: Government and Economic and Social Research Council (ESRC) Responses to the Committee's Third Report of Session 2012–13	HC 1053

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First Special Report	The Legacy Report: Government Response to the Committee's Ninth Report of Session 2009–10	HC 370
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Fourth Report	Astronomy and Particle Physics	HC 806 (HC 1425)
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Fourth Special Report	Scientific advice and evidence in emergencies: Government Response to the Committee's Third Report of Session 2010–12	HC 1042

Sixth Report	UK Centre for Medical Research and Innovation (UKCMRI)	HC 727 (HC 1475)
Fifth Special Report	Bioengineering: Government Response to the Committee's Seventh Report of 2009–10	HC 1138
Sixth Special Report	Scientific advice and evidence in emergencies: Supplementary Government Response to the Committee's Third Report of Session 2010–12	HC 1139
Seventh Report	The Forensic Science Service	HC 855 (Cm 8215)
Seventh Special Report	Astronomy and Particle Physics: Government and Science and Technology Facilities Council Response to the Committee's Fourth Report of Session 2010–12	HC 1425
Eighth Report	Peer review in scientific publications	HC 856 (HC 1535)
Eighth Special Report	UK Centre for Medical Research and Innovation (UKCMRI): Government Response to the Committee's Sixth Report of session 2010–12	HC 1475
Ninth Report	Practical experiments in school science lessons and science field trips	HC 1060–I (HC 1655)
Ninth Special Report	Strategically important metals: Government Response to the Committee's Fifth Report of Session 2010–12	HC 1479
Tenth Special Report	Peer review in scientific publications: Government and Research Councils UK Responses to the Committee's Eighth Report of Session 2010–12	HC 1535
Tenth Report	Pre-appointment hearing with the Government's preferred candidate for Chair of the Technology Strategy Board	HC 1539–I
Eleventh Special Report	Practical experiments in school science lessons and science field trips: Government and Ofqual Responses to the Committee's Ninth Report of Session 2010–12	HC 1655
Eleventh Report	Alcohol guidelines	HC 1536 (Cm 8329)
Twelfth Report	Malware and cyber crime	HC 1537 (Cm 8328)
Thirteenth Report	Science in the Met Office	HC 1538
Fourteenth Report	Pre-appointment hearing with the Government's preferred candidate for Chair of the Engineering and Physical Sciences Research Council	HC 1871–I
Fifteenth Report	Engineering in government: follow-up to the 2009 report on Engineering: turning ideas into reality	HC 1667 (HC 511, Session 2012–13)

Oral evidence

Taken before the Science and Technology Committee

on Wednesday 19 June 2013

Members present:

Andrew Miller (Chair)

Jim Dowd	Sarah Newton
Stephen Metcalfe	Graham Stringer
Stephen Mosley	Hywel Williams
Pamela Nash	

Examination of Witnesses

Witnesses: **Dr Catherine Happer,** Glasgow University Media Group, **Professor Greg Philo**, Glasgow University Media Group, and **Tom Sheldon,** Senior Press Officer, Science Media Centre, gave evidence.

Q1 Chair: Can I welcome our witnesses to this morning's session? As you know, this inquiry is not examining the issues around climate science but how it is communicated to the public. We have a number of questions to put to you in the next hour. For the record, it would be helpful if you could introduce yourselves.

Dr Happer: I am Dr Catherine Happer from Glasgow University Media Group.

Professor Philo: I am Professor Greg Philo. I am the research director of the group.

Tom Sheldon: I am Tom Sheldon from the Science Media Centre.

Q2 Chair: Dr Happer, you have recently published research on how the delivery of information through the media affects attitudes to climate change, energy security and so on. Could you summarise for us very briefly the findings of your report?

Dr Happer: We did an 18-month in-depth qualitative research project looking at public understanding, beliefs and commitments to behaviour in response to accounts of climate change. The research had three stages. The first stage was to establish existing beliefs, opinions and commitments to behaviour in terms of climate change-related activities. We then sought to introduce new information to gain a sense of the way new information is negotiated by audiences and absorbed into existing belief structures. We did that by using new methodologies. We introduced the information by way of constructed news reports, online newspaper, radio and television, to get a sense of the way that impacted on the formation of opinions within a group setting and also whether that impacted on commitments to behavioural change.

The third stage was to go back to our original sample six months later and ask them about the longer-term impact on attitudes and behaviours and whether anybody had gone out and changed their behaviour in relation to the information we had given them. The new information focused on the global and local consequences of climate change, with scenarios such as a massive flood in Bangladesh that led to mass immigration to Britain, and a localised flood in Glasgow. There were lots of findings. To summarise the key points about public understanding, belief and commitment, we found a great deal of confusion about climate change and low understanding on the subject. Certain polls have found that if people are given a list of causes and effects they can identify them, but in a focus group setting we found that most people, unprompted, struggled to give a consistent and accurate explanation of climate change. Maybe they would throw out key terms—"greenhouse gases" and so on—but most people struggled to give an accurate definition. We also found that climate change is used almost as an umbrella term for other environmental issues. Pollution and population growth are talked about a lot when people think about climate change. For example, there is consistent confusion about the ozone layer both as a cause and an effect. There is a lot of confusion.

To come back to the role of media in that, when we asked about where people were getting their information, television news rated very highly, but the main point about the level of confusion and where we felt it was coming from was that people were very wary of the speakers involved in this debate. There is a real lack of trust. Scientists defined as a very general group were trusted in a broad sense, but there was a real lack of trust about the science. That took two forms, one of which was that it was seen as a theoretical issue. It was very difficult to prove or disprove and the evidence was seen as woolly. As a result, the speakers involved could manipulate the data to their own ends and agendas.

Even though the scientists as a broad group were trusted, we found there was a real lack of trust in the speakers involved in the debate, and people were very cynical about the coverage of climate change. They did not see it as based on the facts but led by agendas. In this very long answer, I do not want to answer everything you are going to ask about the findings, but, as a result, we found that led to disengagement in terms of behaviours and attitudes because there was such confusion, lack of trust and conflicting accounts they were drawing on from a whole range of sources, and people were very confused.

Q3 Chair: As I understand it, you found that increased engagement in topics such as climate or

energy security did not lead to any fundamental changes in behaviour. Is that correct?

Dr Happer: Are you talking about increased engagement? Engagement in climate change—and I think other research backs this up—has decreased in recent years. It is seen as less of a priority. That is in a general sense, but in our specific research, when we introduced the new information, we found that in the short term people were very struck by the information we had given them, which was contextualised within the science. Quite a few of them said that it would lead them to change their attitudes and potentially their behaviours. But when we returned to them six months later and they were re-immersed in the media environment, which is incredibly sceptical—I refer to the research by James Painter, which has covered in depth the scepticism in the British press—we found that any potential for attitudinal change was diluted by that re-immersion in an environment full of conflicting accounts about climate change. In a general sense, engagement in recent years on this issue, for a variety of reasons—changing priorities, the economy and so on—has decreased.

Q4 Chair: Mr Sheldon, do you have any initial observations on this work?

Tom Sheldon: We do not carry out research at the Science Media Centre. We are an independent press office for science. Our goal is to try to get more scientists engaging with the media and to try to make sure that journalists have access to the best experts and available evidence when science is in the headlines. Our focus is on controversial science. Climate change has had more than its fair share of controversies over the last few years. However, those fights and battles tend to be media or political controversies rather than scientific controversies, but we always see those media events, storms and kinds of threats as opportunities for scientists to get into the media and make their climate research better understood by the public.

In terms of public understanding of climate science, it is vital for scientists to be brutally honest with the public about their research. We want the public to hear from as wide a range of climate scientists as possible who can explain the importance of CO_2 in the atmosphere, polar ice melt, ocean acidification, links between climate and weather, as has just come up with the Met Office, and things like that.

Public trust in scientists is routinely reported from surveys as very high among the professions: it is 70% and 80%. That is very much because the public expect scientists to tell the unvarnished truth about things, stripped of all politics and messaging. Catherine referred to things being seen as led by agendas. Trust in science is routinely so high because science is not led by an agenda; it is neutral. Climate data tell a very important story that needs to be heard, but the evidence itself is politically and socially neutral. Scientists need to communicate that.

Q5 Pamela Nash: Do you think that a complex scientific issue such as climate change can be effectively communicated in the media as it stands today? Do you think that the reduction in the number of specialist reporters has affected the ability to do that?

Professor Philo: Yes, it can be, but the specialist reporter would not make a huge difference, in the sense that it is very complicated and not many people understand it. What you would find is that, in a situation like this, the bulk of the population is prepared to trust the science if it is clearly explained to them that there is a scientific consensus. We found that the people in our groups—it seems to be general—did not even know that there was a scientific consensus. There has been a considerable amount of confusion in the media, particularly in television. TV likes to have a debate, so it will bring on a scientist and then a sceptic because it wants to generate debate. We found an enormous amount of confusion about the issue. When people say that the science is a bit woolly, it is not woolly; it is perfectly clear to all the scientists we have spoken to—they don't see it as woolly at all—but that impression has been created by the manner in which it has been presented in the media. Sometimes that is done deliberately; sometimes it emerges from the institutional structures of the media. The second point that comes out from this, very importantly, is that people's distrust is not just about climate change; it is about absolutely anything. People simply do not believe what they are being told. Scientists are in a sense still a treasured group, and one that probably has to be used much more effectively in this debate, but people in these groups said to us, "Why are you asking us? People like us will have no effect on any of these decisions." The perception people now have is that everything is done above their heads by small, elite powerful groups—corporations or whatever—who influence Governments.

Q6 Pamela Nash: To be clear, are you talking about scientists here?

Professor Philo: They do not include scientists in that, no. Because scientists work in universities, they are one of the few groups that are not seen as having that kind of vested interest. In that sense they are a crucial group in conveying the information, but at the moment we don't have any real research about the relationship between what politicians say or people who are trying to give professional advice in this area. With regard to the inputs into the media, we have no real analysis of what happens when that information goes in and how it is mediated, changed and reorganised in the media, and then how it results in actual beliefs, attitudes or change. We did the attitude and belief section, but my feeling is that there is an absolutely crucial need to work out what is in the media and how it is getting there, because none of that is being studied at the moment.

Dr Happer: There is a particular gap with television news and documentaries. Work is being done by James Painter on newspapers and the level of scepticism in the British press, but television documentaries, such as "Frozen Planet" and so on, are quite important in engaging and informing people on this issue. Currently, no work is being done in measuring or looking at the patterns and coverage on television, so it is quite limited. As Greg says, no

connection is being made between the reception analysis, content analysis and production at the initial stages.

Professor Philo: You are right about the training of journalists, but in a way it is not just about having specialists; it is about having journalists as a whole better educated in these issues. Not all of them will be major climate scientists; none of us is because it is very complicated, but a lot could be done inside television and the papers as well to educate journalists in how to convey information in a clear way and what the balance of opinion is. One of the most alarming things is that, if you have 97% of scientists saying one thing, people just don't seem to be aware of that.

Tom Sheldon: Can I come in on specialist reporters, because, in our experience, specialists make a huge difference to the way that these subjects are covered? We see time and time again that specialist science and environment reporters have a very good grasp of climate science and where the weight of evidence lies, and they give proper representation to that. You are right that there has been some reduction in the number of specialists in all quarters, especially at newspapers, but it is still worth noting that practically every major national media outlet in the UK has at least one specialist. They have been under just as much pressure from sceptic groups over the years as anyone else, but they are the best. They have access to the climate science; they have examined it for years; they have developed a very good grasp of it, and they have themselves fought for that kind of coverage, sometimes against a hostile editorial line.

There is a huge appetite for science in the UK news media. They often get prominence. Just last night on "News at 10" there was a big piece by David Shukman on climate and weather. It covered uncertainty beautifully and explained it to a mass audience at peak time. It is still getting out there. In newspapers, the way that news articles are written is generally pretty good. The daily specialist reporters routinely cover science and the environment, and the quality is quite high and the evidence well represented.

Commentators are a different kind of animal and are paid to be provocative, selective and misleading. You see a lot of very shrill and hysterical mud-slinging by commentators, but I would set that aside. They are paid to take extreme views. In broadcast media, balance in the DNA of news reporters is still an issue. It works brilliantly in politics. Maybe you disagree, but you have someone for and someone against and you have your slot on the "Today" programme, but it does not work in science when all the weight of evidence is very much on one side, as my colleagues have been saying. It is not fair to give five minutes to a climate scientist who has spent 30 years covering something and then five minutes to Nigel Lawson to say climate change is not real.

Things have improved. The BBC, especially after the Trust's review of impartiality in science, is recommending that the weight of evidence is taken into account when considering balance, but we need intelligent, true balance. There is argument among climate scientists—of course there is. This is how science progresses. Scientists try to tear strips off one another constantly. They are the true sceptics, and where those arguments are being had is what we want to see playing out in the media.

Q7 Pamela Nash: We have been talking about journalists having more science training and if they are specialists, and the difference that makes, but what about scientists having media training to be able to get their message across? First, do you think scientists have a responsibility to get their message across? Obviously, we are thinking of climate change here, but also in general. In BioCity in Airdrie in my constituency, I have been really impressed by young scientists getting business training and learning more about how to set up their own businesses, but there is no media training being given to them to get their message across. Is that something we could incorporate more in science degrees?

Dr Happer: Definitely, in terms of the profile of scientists. They have a very low profile at the moment, and part of that is to do with the retreat following the Climategate incident and possibly the kinds of responses they get from the sceptic groups, which can be quite intimidating, and a number of them have retreated. That is an issue in itself, about their willingness to put themselves in a public role, if you like.

Coming back to the idea of the sceptics, Tom mentioned Nigel Lawson. As a sceptic, that is a household name. Most people know that name and maybe attribute some credibility to it, but nobody in the groups that we did could name a single genuine expert or scientist. You have an imbalance of sceptics being household names and the scientists not being known at all to the public. If you do have a few household names—people who appear regularly and are very visible—it is very easy to attribute credibility to somebody who you know is working in this area.

We talked about the trust invested in scientists when they appear in the broadcast media or press. One of the problems is that people have no idea about the credentials of those scientists. Particularly on television, the introduction is so brief, and most people don't have the knowledge to assess the credibility of one person versus the credibility of another. If they are scientists, where are they coming from? What is the research and background? So, yes, we think scientists should play a much greater role in communicating to the public, but there are a number of issues as to whether we could do something to combat those problems.

Professor Philo: There is a very serious issue here in relation to the responsibility of scientists. They need to think about their colleagues in medicine and the kinds of arguments and controversy that took place in areas such as cancer or HIV. Scientists put up their hands and said, "These are major public health issues." They took a lot of abuse initially and were under enormous pressure—but eventually the medical community took on a very powerful role as communicators of their own science—and still are. They are now demanding changes in tobacco, alcohol and all of those things. That is where the natural scientists have to be. They have to say that climate change is a public health issue and stop worrying as a

group about the abuse that they sometimes receive or have received. They have to stop worrying about the odd programme like "The Climate Change Hoax".

Q8 Pamela Nash: We could teach them that as well.
Professor Philo: I am sure that you could. There is an absolute need for them to say, "If we are wrong, the issue is that there are more wind farms; if the other side is wrong, we are talking about the potential dangers to sustainable life on the planet for large numbers of people." That is a different order of risk, and they need to come out and say that. The difficulty scientists have is that they do not have routine access to the media. I entirely take your point about training, which would be very helpful, but they do not and cannot command that access to the media. The people who can command it, with all its problems and abuse, are, indeed, the politicians, because they are seen as opinion leaders; they are what media specialists like me would call primary definers. They have routine access. What is crucial there is that access is no use without the scientists, because the population does not believe the politicians, as you know. There have been so many difficulties. I don't need to rehearse them now, but you know to what I am referring. In our groups people said to us, "Well, if it was being said to us by a politician, I would not believe it because I would think there was a vested interest." That was said to us in the groups. What is required is an exact link between the political structures and the natural scientists. The natural scientists will give the credibility of their science to what is being said. People will believe it if it is seen as coming from the scientists and if they see the politicians being nudged by them, because this is seen as a planetary public health issue.
Chair: We need to move on.

Q9 Stephen Mosley: I was interested in some of the points you made about the media previously. Mr Sheldon talked about the news broadcast last night. I do not know whether you have seen the front page of today's *Sun*, which refers to 10 years of wet weather because of warming in the north Atlantic. Do you think climate change issues are more productively raised in the media through the reporting of things that people can associate with, such as changes to localised weather, or even extending it to things like energy security and the issues covered by that?
Professor Philo: The answer to that is yes. The weather is something about which people are very concerned, but you raise energy security. We did that as a second major part of our study. Catherine mentioned the scenarios to you that we created. We submerged people in an alternative news environment with stories that had not yet occurred but which we were advised would very likely occur in the near future. We showed people news programmes that we had constructed ourselves about massive floods, energy black-outs and things like that so that we could understand the triggers for possible changes in attitudes or belief. It was a completely new methodology, and it worked very well.
The most powerful was the material on energy. That immediately clicked with people, especially young people. When they thought their mobile phones, Twitter and Facebook would no longer work because of energy black-outs, they were absolutely traumatised by this and demanded instant action; they were prepared to pay more tax for it and everything else. That had an enormous linkage. People immediately saw the link and said, "If you are worried about climate change and you can solve it through sustainable things, and those sustainable things can give us energy security, it is no contest; we have to go for that."
Dr Happer: Returning to your point about weather, people are very concerned about the things that impact on them directly. One of the big concerns is energy pricing. A lot of people are struggling to pay their bills right now and that is a big issue, but the weather was the most commonly cited association with climate change when we talked about it in the first place. That was in the form of whether the people directly experienced extreme weather events reported in the media. That was the tack that Obama took in his State of the Union address when he linked the science to extreme weather events and the level of risk. I thought that was a very effective model, rooting it in the science but making the direct connection with people's lives and the level of risks. Weather is something that people experience and make a connection with, so the answer is absolutely.
Tom Sheldon: I would agree with that. Scientists in all disciplines need to make their explanations relevant to real people, because everything you see when you pick up a copy of the *Sun* or any newspapers, or anything on TV or radio, has to be relevant to people; otherwise, the audience will switch off. Scientists need support from their press officers, encouragement to speak out about their work and engage with the press.
Greg's point that scientists do not have routine access to media has typically been true in the past, but the SMC exists to try to rectify that to ensure that when science is in the news scientists' voices are clearly heard.
We would also argue that scientists should be permitted to stick to the scientific evidence that they are coming up with in their discipline and not be drawn on what the policy decisions should be as a result of that, because those are not their decisions to make; those are your decisions to make, but policies need to be very visibly underpinned by the best available science.

Q10 Stephen Mosley: We have seen figures showing that the reporting of climate change has decreased over the past few years. Should we be worried about that?
Dr Happer: There has been a sharp decline. There was a period of intense attention in about 2007 and a spike in 2009 as a consequence of the Copenhagen conference as well as the Climategate incident. One of the reasons is that politicians have been talking about it less. Whether or not that is important, we found a broad disengagement. In addition to the level of confusion people felt, there was a sense that, because climate change was not in the media because the politicians were not talking about it any more, it

was less of a priority and they were thinking about it less. That led to levels of disengagement and impacted on the commitment to behavioural changes. It does make a difference. It is almost, if it is in the media, it is in people's heads and it is perceived as a priority. Right now the economy is the top priority for most people and politicians, and there is a knock-on effect.

Professor Philo: In the groups I was in, there was an assumption that somehow it had been solved. If it was not being talked about any more, it had gone down. People were a bit puzzled. We did not tell people what we were going to talk about when we did these groups. When we said we would be talking about climate change, some of the responses were, "Oh, are you still talking about that old thing?" It is not just disengagement, but there is a sense that it is no longer an issue in some way.

Tom Sheldon: It is also because there needs to be a story—and a scandal is a story, whether it is a real or perceived one. There was a spike at Climategate because of the UEA e-mails, but when the scandal went away—this applies to all news stories—it dropped off the agenda, but individual studies can also make stories in their own right. When there are new and important pieces of high quality peer-reviewed climate science published, they need to be consistently rolled out to the press. They tell their own stories.

Professor Philo: The problem is that individual stories disappear. Even with Climategate, nobody raised that with us. The only people who even remembered it vaguely were those in East Anglia. The e-mails were from their local university and they remembered it for that reason. Nobody else had any recollection of it.

Q11 Stephen Mosley: Following on from all three of those answers, can I play devil's advocate? Government often find it easier to develop policy when they do not have hysteria on the front pages of newspapers. Could the reduction in coverage of climate change help the Government develop their policies without getting into histrionics in the press constantly?

Professor Philo: It would depend on the policy. In the case of HIV, if you want to introduce major behavioural change, in, for example, the use of safe sex, you absolutely need to take the public with you in the sense that they have to understand this is a major issue. If you want to introduce behavioural change in relation to climate change and you want to alter what people do—for example, restrict air travel or put up taxes to deal with it, or whatever—you must take the public with you. They have to perceive that this is a major issue. Some policies can be done by stealth, in the sense that people would not notice very much, but I would have thought that for a lot of the policy in this area the public must have a sense that this is an absolutely crucial, major, planet-type issue involving survival. In our scenarios what made people sit up was the notion of climate refugees. There would be a lot more people who were refugees on the planet and some might or would end up coming here. That immediately got people upset, particularly the ethnic minority groups in our study who felt themselves to be under enormous pressure anyway. They said, "Oh, my goodness, if more people come, as a group we will be under more pressure." We found that the big behavioural changes in our study came from the ethnic minority groups—people who owned take-aways and things like that. One woman who owned a take-away completely altered—and carried on altering—the disposal of all of her waste and take-away stuff. She ended up hiring a commercial company to come and do it because of what she had seen in the scenario with us.

Tom Sheldon: It is encouraging that you say it is easier to make Government policy and talk about it in Parliament in calmer times. I hope that is true. There is a lot that Government can do here. One is to continue to give a clear message, irrespective of policy disagreements between parties, that climate science and climate change are things to be taken seriously, and to keep raising them at PMQs and things like that, but also to allow media access to Government scientists. This is a problem we have come across time and time again when sometimes the best scientists across all disciplines get sucked into Government—this particularly counts for scientific advisers—and the public never hear from them again. It is crucial that those people who are advising Government, precisely because they are the best scientists in their disciplines, are given freedom and are let off the leash to communicate their work to the public as well.

Q12 Sarah Newton: I want to stick with that very important point you have just made. Although I accept that, generally speaking, people are totally confused, from the evidence we have received there seems to be a distinction in people's minds between scientists and climate scientists, and between Government advisers and Government scientists and non-Government scientists. Can we stick with that and pursue the line as to who would be the trusted voices and who is not really capturing the trust and respect of the public at the moment in this debate?

Tom Sheldon: For me, the most powerful thing is having a range of people to hear from. It is very difficult to ignore when a whole bunch of climate scientists independently, and from all quarters of the UK, or even the globe, come to the same conclusions. They are not sitting in a room deciding on what their public message is going to be; they are just speaking from their own evidence and research, telling it to the public without anyone tapping on their shoulder and whispering in their ear to say they are not allowed to say this or that. Then the public get to make up their own mind based on the evidence they have heard from an expert.

Dr Happer: The response to that is that it is very difficult for the general public to make a distinction between those different groups. When we talk to them, most have no idea whether a scientist is funded by a particular group or is backed by the Government. When they give their credentials and are introduced in the media, the background to that is not always explicitly stated. It is very difficult for people to make those decisions. In a digital environment in attributing trust, it is a very complex process of weighing up different sources and the bits of information that you

can attach to those different sources. Because of the very low level of trust in politicians, we found that, if somebody is a Government adviser, unfortunately, alarm bells would ring immediately, but scientists who seem to be independently funded and come from the right place would be more likely to be trusted. It is a very complex process, and people are so confused because they cannot necessarily make that distinction; it is very difficult for them to do so.

Q13 Sarah Newton: It seems that you are contradicting what Tom said, which I found very interesting. He said that the best scientists were invited to become Government scientists and Government advisers. Once they are in that situation, they are often in the best place to give the best information because the public just want the actual information about what is going on. Then somehow they stop talking; they are not out there in the media making the case. But you are saying that, because they are part of the Government, there is confusion about vested interests and the people who are trusted.
Professor Philo: I do not think that is what we found. Catherine is saying that people just would not know where they were coming from. A Government political adviser or politician would be distrusted, but not a scientist. The sense of what Tom was saying is that they would physically not be out in the media as much, but they would not be distrusted if they were.

Q14 Sarah Newton: It is important for us to take away that there would be trust and the Government scientific advice would have trust among the public.
Professor Philo: Yes, absolutely.

Q15 Sarah Newton: It is very important for us to understand who the trusted voice is to cut through this confusion and people's concerns about vested interests on both sides of the argument. If we could think about ways in which Government advisers could take a more prominent role in communicating, you are all agreeing that they would be trusted.
Professor Philo: Yes.
Tom Sheldon: We do not see any conflict between advising Government and speaking to the media. In the BIS survey in 2011 on public attitudes to science, public trust in university scientists was about 82%; public trust in what were called Government scientists, whatever that means, was still running at about 70%, which is phenomenally high. John Beddington, the outgoing CSA, was quite prominent in the media. He spoke out on a range of issues and maintained a high level of public respect and trust throughout that. If you are seeing a scientist of any kind in the media, there is automatic trust in them. The public need to rely on the journalist to make the call whether or not this person is a credible source.
Professor Philo: That is exactly what we are saying. Politicians need to be seen to be acting on very specific scientific advice—
Tom Sheldon: And referring to it.
Professor Philo:—and referring to it. People will then see that that is a priority. In those circumstances, we found people were saying they would change their behaviour. We kept raising the issue of air travel, because that seemed to be an obvious one. People said they would accept restrictions or higher taxes on air travel. I was surprised that people consistently said that. As long as it was seen to be an absolute priority, they would go along with it. If it was a rule, they would obey it, rather like seat belts or something like that.

Q16 Sarah Newton: You keep drawing attention to public health analogies, which are interesting. To tease this out a bit, you are making the analogy with smoking. For a long time vested interests prevented a full understanding of the public health problems related to smoking. Eventually, all the scientists supported one another and broke through it and Government started to warn the public about it. There is a huge range of public policy as a result of that, but yet each year we still have huge numbers of young people smoking.
Professor Philo: It has gone down from 70% of males to 26% of males, but you are right.[1] People still smoke, but it is a very addictive drug and has all kinds of status implications beyond health. It is difficult to tell a 16 year-old, who wants to show off to his mates, that he should not smoke because he is going to get cancer when he is 70. I have done quite a bit of work in that area and it is very difficult. You can invite me back to talk about it. There are very specific ways in which you can deal with those problems in removing the status and kudos associated with smoking.
Sarah Newton: We probably ought not to go down that path.
Chair: We need to move on, I am afraid.

Q17 Graham Stringer: I cannot remember now who said it, but somebody said that scientists should be let off their leashes. Is not one of the problems that, when scientists are let off their leashes and are not talking very specifically about the paper they have just written, they tend to get into even more extreme language than politicians? For instance, the previous scientific adviser to the Government said that climate change was worse than terrorism. Scientists at the university of East Anglia said in 2003 that children would never see snow again after 2010. I think you can say that was wrong. Don't scientists become part of the political problem when they make statements like that?
Tom Sheldon: It was me who said that they should be let off the leash. I don't mean they should be encouraged to talk outside their field of expertise but that they should be let off the Government leash, and there is one. Government employ hundreds of scientists to do Government-commissioned work in arm's length bodies, and these people have to seek special permission to talk about their work publicly. We would argue that they have got to that position because of their expertise. What I mean by letting them off the leash is giving them the freedom to speak from the evidence and also to disagree with one another. Government are obsessed with getting a single public message out there, whereas science does

[1] The witness later clarified that, it has gone down from 82% of males to 21% of males.

not work like that. There are disagreements, and we think they should be aired quite happily.

Q18 Graham Stringer: There are disagreements. The point I am trying to get at is whether in the public mind it is possible to separate the uncertainties and ambiguities about the politics and the consequential price of energy, for instance, from the uncertainties about the scientific debate. Is it possible to separate that?

Tom Sheldon: I think we should trust the public with this. The public are often underestimated in this kind of thing. They have a capacity to make up their own minds and weigh the evidence, and they want to be spoken to. I keep saying "they"—we—all of us—want to be spoken to frankly and honestly. We don't want to be given instructions and messages. We want to hear from experts so that we can decide for ourselves.

Q19 Graham Stringer: In mixing up the political debate with the scientific debate, you said previously it is not balanced to have a climate scientist appearing with Nigel Lawson, who is saying that climate change is not real. I found this an interesting comment, because that is not what Nigel Lawson says—ever—if you read his work. He says that, if you accept climate change, you need to deal with it in a different and more proportionate way. That is an illustration, isn't it, that it is inevitable that the politics and science mix, but it is very difficult, even for somebody in the professional position you are in, to separate out those political debates from the scientific debate?

Tom Sheldon: I don't think that is a completely fair comment, because Nigel Lawson's Global Warming Policy Foundation tells the story that global average surface temperatures have not risen in the last 10 or 15 years, and it uses that to undermine the evidence for climate science. I used him as an example, but there is a history in the media of reporting in this way, using false balance and putting up a scientist against someone who takes the opposite view but not from an evidence point of view and a position of having researched this area, so it is a fair point to make.

Q20 Graham Stringer: We are going to have the BBC in later. Would you recommend that the BBC put up only scientists against scientists in this context?

Tom Sheldon: It depends on what you are talking about. If you are talking about what policy decisions should be made on wind farms, the Severn tidal barrage or new nuclear build over the next 40 years, no, because they are not scientific issues; they are policy issues, and then a whole range of voices need to be heard. If you are talking about the implications of CO_2 levels in the atmosphere having just recently reached 400 ppm, that is something only a scientist can answer. If you put on someone who has an anti-climate change agenda for political reasons, you are skewing the debate in an unfair way.

Q21 Stephen Metcalfe: Following on from that, are you concerned that the media's relentless search for a good story, despite the truth, and the fact they want to present a conflict will undermine the trust that still remains in scientists as a group compared with anyone else?

Professor Philo: No. It undermines trust in the media but I don't think it undermines trust in scientists. Trust in scientists remains for a number of reasons. One is that they are seen as publicly funded, quite often. It is people's encounter with science and how they are seen. People are now going to university; there are very large numbers of people in higher education. It is not just scientists but academics. It is a question of seeing people as being somehow disinterested and having a genuine public concern. Against that is a very generalised sense that the world is now being carved up by private specialised interests and that these interests make all the decisions. To get beyond that, you need to tap into the groups that are seen as having a genuine public concern; and that is academics and universities, who still retain a very high level of credibility.

Dr Happer: You also have to be realistic and work within the confines of the media. The television and press are there to inform and educate, but they also have to bring in audiences and engage people. For instance, we talked about extreme weather as a potential news peg for stories about climate change. Perhaps that is where it comes in, because that is a way to bring in audiences in a way they can directly relate to. We are talking about the media. The audiences are there and we have to work within the confines that they have, and journalists have certain conventions beyond just balance that they have to meet. So, being realistic, we have to find ways to bring audiences in within that, I think.

Q22 Stephen Metcalfe: Someone said earlier that there is confusion, distrust and disengagement because of the conflicts that the media have to create to make a good story, whereas the reality is that 97% of scientists agree on this, but that does not make a great story.

Dr Happer: But, in the case of extreme weather events, there is no particular need, as Tom said, when you are talking about the science to bring in somebody who is sceptical in that context; it is not necessary. You can have debates about the uncertainties of the science or risks, but you do not necessarily have to bring in a sceptic in that context. You still have the news peg, but there does not necessarily need to be a conflict in terms of the discussion about the science.

Professor Philo: There are many different great stories. The problem with this particular one is not so much that the media necessarily always want controversy, but they always want something new; it is as simple as that. They had a great story four or five years ago that there was a tremendous danger if it increased by 4º. Then they got bored with that a bit. The basic problem is that we have done that one. Now what is there? If another thing comes up about controversy, we will do that. We need a reorienting of the debate to say that it is still very serious. When that is said collectively by the scientists linked to the politicians, and the politicians are seen to be taking that as very specific, important and world-changing evidence, it will go back on to the major agenda again.

Tom Sheldon: In between all the controversies, of course, are hundreds and hundreds of very high quality scientific papers being published, constantly, always, about new things. By definition they are new. If you get a new piece of research using satellite data to demonstrate clearly that rates of ice loss at the poles have been accelerating, that gets into the news because it is new, important, relevant and is happening now. That is something that has not been done before. Editors are not stupid; they are not going to put things on their news programmes and papers that will bore people, yet routinely they keep coming back to these stories, so there is a great source of evidence-based information for the public.

Q23 Stephen Metcalfe: You said earlier that there are people who are paid to take extreme views in the media. How is the public supposed to know which ones are being paid to take extreme views and which ones are presenting a balanced, accurate representation of the facts?

Tom Sheldon: Anyone who reads a newspaper regularly will know where to find the news and the comment, and newspapers have taken this format for years and years. Commentators tend to be minor celebrities in their own right and will take on an ultra-climate sceptic persona and be quite insulting and rather libellous a lot of the time as well. It is quite different from reading a news story where a subject or a new piece of work is presented impartially.

Q24 Stephen Metcalfe: I accept that, but we as politicians know from the correspondence we receive that those who take the more extreme views tend to be believed more by the wider general vocal public. The columnist who takes the extreme view is the one who frames the debate, whether it is on climate change, immigration or the euro, rather than the balanced reporting bit at the front. People still have the tendency to believe what they read in the paper without running it through a filter to say this is written to sell newspapers.

Tom Sheldon: I would hazard the guess that the people who believe it were already persuaded in the first place, because, when I read commentators with whom I do not agree, it just makes me dig my heels in where I already am.

Professor Philo: It might also be a function of the people who are writing to you, because that is not what we found. With randomly assorted groups we did not find that; the strong people they would believe were the scientists. Some people in the BBC such as David Attenborough came up. There was a whole range of people to whom they would go and they would believe. I have to say that nobody ever mentioned Melanie Phillips in all of our groups.

Dr Happer: Jeremy Clarkson was mentioned. People would always say that he is a climate sceptic, but he is there to entertain; he is a celebrity. I agree that to an extent people are still informed by what they read, even if they approach it with the cynical view, "This is here to entertain me," but I don't think people would necessarily go to Jeremy Clarkson for their scientific information.

Chair: Who doesn't even know how an engine works.

Q25 Jim Dowd: The question I have here is: is it possible for the Government to be considered a source of trusted and consistent information on climate change issues? The answer to that is no, so I am not going to put that to you. I am more interested in the answers that all three of you have given this morning. Why do you assume that any part of the media, whether it is electronic, broadcast, printed or online, has the responsibility or mission to explain? They have a mission to fill space, whether it is printed or electronic. Surely, they do not really care what is in there as long as something is in there.

Professor Philo: The difficulty is that they are the key source of information, especially the BBC, for what people believe on almost any issue you want to name. They have a huge impact on things like health. I did a study of suicide and looked at how a single episode of "Casualty" showing a suicide doubled the rate of admissions to hospital for suicide. Whether we like it or not, the media have an enormous impact on behaviour and belief.

Q26 Jim Dowd: I am not dismissing that for a moment; it has an enormous impact. What I do not believe is that it has a mission to explain; it has a mission to survive. You said a moment ago that people trust David Attenborough. That flies in the face of any logic. It does not matter what is being explained. As long as David Attenborough is explaining it, they will believe it, in the same way that Jeremy Clarkson could advance a particular issue. The content of what he is saying does not matter. Because it is him, whether you like or loathe him—I will not say where I stand on the issue—people decide simply on the basis of the media, not the message.

Professor Philo: I would say yes to David Attenborough and no to Jeremy Clarkson, exactly because of their different positions and the manner in which they present themselves and are marketed. The BBC does have a mission to explain and a duty to inform, educate and entertain. It is not there just to fill space. As the BBC is anyway the key source of information for most people, it does have that responsibility. I think you will find that the BBC will want to show that it is fulfilling it.

Q27 Jim Dowd: I am not sure the BBC does. If you take the BBC at its own evaluation, it is one of the highest organisations and establishments in the entire history of humankind. I do not necessarily share that view. Can the Government re-establish any credibility in this area?

Professor Philo: Yes, if they are seen to be acting on the best scientific advice, especially if they are seen to be doing it, not in any way for their own interests, but they constantly defer to the scientists and say, "We are having to do this," in the way that it was done with HIV and AIDS. What made that campaign so credible was the fact that, when talking about safe sex, Government Ministers looked so embarrassed. They obviously did not want to be doing what they were doing and therefore it was hugely convincing. The moment people believe politicians is when they say, "We're doing this because in essence we are absolutely being told this is it." Very powerful voices,

like that of Chris Rapley, who has worked on the British Antarctic Survey and as the director of the Science Museum, have huge public credibility. If they are standing alongside you saying, "Actually I do know about this and it is terribly important," they will believe you.

Q28 Jim Dowd: The crux of it is that it is not the message but the delivery that counts.
Professor Philo: Yes; it is the trust in the person delivering it. I think that is right.
Tom Sheldon: You have given a very cynical description of what the media is for. You might say it is a realistic view, and you are right: the media do exist to entertain and sell newspapers. We have covered the BBC a little, but it is not just the BBC where you would find journalists who take a more noble view of their profession.

Q29 Jim Dowd: Noble—journalists!
Tom Sheldon: They would say so, in order to get under the skin of people they perceive not to be telling the truth and make sure that they are accurate in the copy they write. I know a lot of journalists. They don't like getting it wrong. The specialists in science, health and environment, in particular, would see part of their role not just to write entertaining, fun, interesting and attractive copy but also to make sure the facts are in there and it is a fair representation of the subject for which they are champions.
Jim Dowd: One of the great maxims of journalism, though, is, "Never let the facts get in the way of a good story."

Q30 Hywel Williams: Are the public aware that individual newspapers take a particular line on climate change?
Tom Sheldon: Are the public aware?
Professor Philo: It depends on how much they compare the papers. We found out a fascinating thing where we had a group of people who read only the *Daily Record*. They were absolutely convinced about climate change and were surprised there was any debate. The whole grouping was not particularly aware that there was much debate in the area and they took all of their opinion from that. We had a group of *Sun* readers who were different; it depends. Most people do not sample from a whole range of media, as I do, but they would be aware that there was a confusion and a conflicting debate—but from the particular media that they are sampling. If they read the *Daily Mail*, they would not necessarily be aware of what the *Sun* was saying at all. In fact they would be very unlikely to know. In fact we do not even know because it has not been properly researched.

Q31 Hywel Williams: Is the perception of confusion differentiated at all by classification—that is, by what papers they read or by rural and urban people? I tend to think that people who are closer to nature might have more awareness of climate change. Is there a differentiation of that sort?
Professor Philo: We interviewed people in Norfolk whose houses were falling into the sea and things like that. They and all the people in that area were intensely aware of it because of those particular issues. Asian ethnic groups were very aware because they were worried about climate refugees. There is a series of specific interests that intensifies people's concern with the area. Educated *Guardian* readers who take a particular interest in that area will have quite a high level of awareness, but we found that with the other quality papers as well.

Q32 Hywel Williams: Dr Happer drew an analogy with public health. There is a theory that compliance with health messages varies according to class as well. That is why I am thinking in those terms. Chair, I have to confess—perhaps it is early in the morning—that I keep on thinking about whether we could convey the message in a more traditional way: red sky in the morning, climate change warning, or that sort of thing, which might attract a rural audience.
Lastly, is it possible to report the minority view without giving undue prominence to the evidence supporting it? I think the minority view is 3%. How do you report that without giving undue prominence to possibly the dodgy science behind it?
Tom Sheldon: I think you consider it in the same way. You have to compare it with other subjects. Does HIV cause AIDS? I could find you a scientist, probably fairly easily, who says no. As for smoking and lung cancer, there are probably one or two scientists knocking about who think there is no link, but if you were to wheel them on and give equal representation without explaining that the scales are not balanced, it would be giving undue prominence to one over the other. If you are having a big debate about it, and these are people who are publishing and they are credible sources in an area that is scientifically debated—as I have said, there are lots of those—then I think that is fair.
Chair: Thank you very much. It has been an interesting session. It has brought out some views in the Committee that I was not entirely aware of. This is going to be quite a lively session when we see some of our further witnesses. From your point of view, it would be helpful if you could keep an eye on some of the evidence sessions, and any comments you would want to make reflecting on the answers you gave today would help us immensely. Thank you for coming.

Wednesday 26 June 2013

Members present:

Andrew Miller (Chair)

Stephen Metcalfe
Stephen Mosley
Pamela Nash
Sarah Newton
Graham Stringer
David Tredinnick
Roger Williams

Examination of Witnesses

Witnesses: **Professor Nick Pidgeon**, Understanding Risk Research Group, Cardiff University, **Professor Chris Rapley**, Communicating Climate Science Policy Commission, UCL, and **Dr Alex Burch**, Director of Learning, Science Museum Group, *gave evidence.*

Q33 Chair: May I welcome everyone here to this morning's session? I think this is a first—the Select Committee coming to take evidence in the Science Museum, which is a place that is incredibly appropriate for our particular inquiry. We are working right in the centre of the Science Museum's whole reason for existence—how to communicate good science to the public—and we recognise how good the work is that is done here. Can we particularly put on record our thanks to Mailinh Tuong and Lizzie Quill, who made the arrangements here? Welcome, everyone, including the members of the public sitting behind our witnesses. Let us go straight on, because I realise people have very busy lives and we have quite a tight schedule to maintain, and we want to get through this session pretty smartly. Could I, for the record, invite the three witnesses to introduce themselves?

Professor Pidgeon: Good morning. I am Professor Nick Pidgeon from Cardiff University's School of Psychology. Just to say, I have about 10 years of research on British attitudes to climate change. I was also the author of the "Public Understanding of and Attitudes Towards Climate Change" report, as part of the International Dimensions of Climate Change foresight study.

Dr Burch: I am Dr Alex Burch. I am Director of Learning for the Science Museum Group, and I was also Project Leader for the Atmosphere Gallery that we are sitting in. Prior to that, I spent eight years at the museum studying audiences' reactions to science, and how we can engage them better.

Professor Rapley: Good morning. I am Professor Chris Rapley from University College London, where I am a Professor of Climate Science. I started my research career as a space scientist, working on satellites to study the Earth, working with the European Space Agency and NASA. I then ran one of the big international global change research programmes and was Director of the British Antarctic Survey for 10 years, and then was Director of the Science Museum here for four years, during which time we put together, amongst other things, this Atmosphere Gallery, for which I was the Head of Content. I am currently at UCL, working on the psychology of climate opinion, and also I am Chair of the London Climate Change Partnership, which seeks to climate-proof London.

Q34 Chair: Thank you very much. All three of you have had to actively engage on the subject of climate change, how it is communicated to people, and people's attitude to it. Is climate a more difficult area than other science disciplines to engage with the public on?

Professor Rapley: Yes, I believe so. If one is presenting the narrative of the Higgs boson or the origins of the cosmos, it is essentially emotionally neutral, or indeed it taps into something that pretty much all humans have, which is a sense of curiosity about the world around them. One taps into a very positive feeling. However, the narrative of climate change tends to raise anxieties, fears, guilt and feelings of helplessness, and the human response to that is different from something that is emotionally neutral, and that needs to be taken carefully into account when one delivers the narrative.

Professor Pidgeon: Might I add to that? I agree entirely with that. It is also a complex subject, unlike many other things we study, like GM food or nuclear power, which is a single object that you can have an attitude towards. Climate change has a temporal aspect into the future, and a geographical aspect in other countries. It has a set of complex systems, so it is not a single object that you can have a simple attitude towards, as well.

Dr Burch: I would agree with that. From our own research, for our visitors this is a subject that is complex, has an emotional element and can sometimes be overwhelming, and there is a certain degree of confusion, as there is a lot of information, and it can be very difficult to tap that information into an underlying framework of understanding of the science.

Q35 Chair: So it is difficult. What new methods and approaches are you using to solve this?

Dr Burch: One of the ways we have been looking at it at the Science Museum is to take our visitors through a narrative. This gallery is structured around a five-point science narrative. We provide access to the science, to the scientists and to the real objects; we know that that is important. We provide space—an area for visitors to share and converse around the subject—and equally what we are looking to do is populate the Museum and use the multiple communication routes that we have to engage our audiences. We have an online educational game. We know that online gaming is very good as a science

learning tool. We use artists to bring in new perspectives, and we use our historical galleries to tell different parts of this very rich and complex story.

Professor Rapley: Perhaps I would just add to that, now with my ex-Science Museum hat on, rather than my current hat. The structure of the gallery, as Alex says, is first of all to be engaging. This very "atmospheric" experience is something that is unique, and that draws in people who would not necessarily be interested in climate science. The whole idea was not to attract, if you like, the converted, but to attract everybody, so that is why it is different, unusual and immersive. It mixes objects and interactive exhibits so that the different learning styles that people have are accommodated.

Particularly we know that personal experience helps. When people are exploring information themselves, they tend to get more engaged and feel ownership of it. What is more, the gallery was designed to engage, to inform, and then to let people make up their own minds, so we were very careful to construct the narrative in a way that we felt would be helpful in providing a scaffolding for the bits and pieces of information that people already have.

We start by saying that the climate has always changed, and talk about how the climate has changed, why it has changed in the past, we talk about the Earth's energy balance, and we talk about the carbon cycle and the way human activities have disrupted it, none of which is controversial. We also look to future ways that the world might be made a better place through more efficient use of energy. We concentrate the narrative of the science that is more controversial, about what is happening and what will be happening, in that section over there. It is structured in a way that provides a scaffolding for people to make greater sense and indeed make up their own minds. It is not the job of the Museum to tell people what to think.

Professor Pidgeon: From the perspective of social science research on public understanding of risk and science and technology, what we do in the universities both here in the UK and elsewhere working on this problem is, in a sense, a number of things. The first thing is to try to understand where people are at currently, as a science issue—whether there are gaps in knowledge, what they currently understand that is correct, and where there may be misinterpretations. That helps with a programme of communication, then, obviously, but I think the second thing that is innovative in this area is that one also has to analyse what people need to know, and that question will be different for different sectors of the population, or different interventions. There are two fundamental things we are trying to do.

Q36 David Tredinnick: Good morning. You have explained the importance of the visual side of science, and this great museum is a good example of that, with a wonderful makeover, which I personally find very impressive. We still have massive confusion out there amongst the public, and that is a fact. What are the key concepts that the public need to understand, and how do you prioritise those? You have already touched on some of them, but what are the priorities? What should we really be focusing on—in order, please?

Professor Pidgeon: May I just say something about your question there? On the point about "massive confusion", I think I said in my evidence that the Committee should take an evidence-based approach to understand what is going on here. I certainly would not use that phrase. There are things that people do know, and other things that they do not. What we do know from the research is that people have a high level of concern in the UK. Awareness is very high of the term climate change. There is endorsement by many of an anthropogenic component. It is not necessarily the most important issue for people in life. That is very important for their engagement with it, and they want Government to take a lead.

What they do understand, and have understood for a long time, the research shows, is that fossil fuels are causing this problem—although they may not understand the scientific way in which that occurs—that this will have impacts on weather certainly in this country, and that the consequences will be both long-term and particularly severe in other countries. There is a well established set of data that will tell you that, so to say that the public are confused about climate change I think is not quite right. Also, there are different publics: if you look at education level, for instance, people who are more educated tend to know more about climate change, but interestingly, they are also more polarised. You get more people who believe it is not true, and more people who passionately believe it is a serious problem, as people become more educated, so it is a complicated question about who is confused and who is not.

Professor Rapley: It seems to me that one of the core concepts is risk, and it is unfortunate that the science community in its professional mode is very interested in uncertainty; after all, it is unravelling the mysteries of the universe that motivates most scientists, so they are constantly concerned about maintaining the esteem of their colleagues by being seen to be, and being, honest about the levels of uncertainty. There is a tendency always, in the public dialogue, to talk about uncertainty, but what is really at stake here, and what the reasonable person understands, is risk, and the metaphor of insurance.

Most people—pretty much everybody—have house insurance. It is very unlikely that their house will burn down, but they recognise that if it did so it would be disastrous, so they are prepared to make that investment. I think the idea is that there is a risk here and that there is uncertainty; we cannot be sure exactly what the impact on the climate system will be, precisely, and we cannot be sure exactly what the impact of that will be on humans, but we do see that food supplies, water supplies, infrastructure and so on are designed in this complex world to fit the climate system we inherited. A changing climate system presents a risk, and getting that idea across is crucial.

Q37 David Tredinnick: Moving on from that, do you think it is necessary to focus on the science in any depth, or should we really be looking at policy implications to do with flooding or other acts of God?

Professor Rapley: I think the science community has an obligation to give a plausible account of the logic and evidence that it has gathered, which leads it to conclude what it has concluded, and indeed that is what this gallery seeks to do, but in the end most people do not have the time or need to understand all of the detail. There are certain key points, however. I will give you an example. One of the arguments that is used to say, "This is not a problem" is that the evidence from the ice cores—and we have one over there—is that in the natural variations of climate, it is temperature that has led carbon dioxide, and now the argument is that carbon dioxide is going to cause a temperature change.

There is an assumption that one thing kicks another, but this is a coupled system. We need to get the idea across of a coupled system, so it does not matter which one goes first; the other will follow. It is a deep concept. That is important.

Q38 David Tredinnick: You say that, but with respect, evidence from your own university, University College London, has referred to the problem of policy debate masquerading as science. Does that not, in your mind, prioritise the way forward? Finally—and I have no more questions after this—should we not be really focusing on end-user benefits, as all good marketing organisations do? We have to sell this as a way of improving your life.

Professor Rapley: Your question makes some assumptions about the role of a scientist, and there is a book written by Roger Pielke Jr. in the States that identifies four general roles for the scientist. One is to do the science, to the best of their ability and as impartially as possible; the second is to explain the science; the third is to identify issues that society might wish to address; and then the fourth is to sit down with others and try to address those issues. The role of the scientist in that fourth role is to provide all necessary information that the science can offer, to allow a sensible decision to be made. I think this is where that comment in the UCL evidence was suggesting there has been quite a lot of muddle, and unfortunate muddle, in the past, with scientists straying too far into the policy implications and their views on them, when in fact that is not their role.

Q39 Stephen Metcalfe: Good morning. In your answers to the Chairman at the start of this session, you were explaining how your approach in this gallery is to inform and let people make up their own minds. We can see it is a fantastic facility. The problem is that it is probably not getting to enough people to educate them in enough numbers. That is not your problem, it is just a fact. Therefore, the majority of people, presumably, are relying on some form of media to understand what the issues are and what the challenges that we all face are. Do you think the Government should be worried about that—that the media, and particularly television, is the main source of information on climate change?

Dr Burch: One of the things it is important to highlight is that museums and science centres are trusted sources of information, and we can play a really important role, then, within the public. We are trusted both by the public and by scientists, so what we can do extremely well is to bring those two groups together to facilitate dialogue, to ask questions, and to explore the science around this. Science museums and science centres have a key role in helping to inform around this area.

Professor Pidgeon: May I add to that? I guess this is about the question of scaling up, which is that we could do a small dialogue with a small group of the public in this room, and they would go away and think more about it, and that might change their lives, but how does one change the population, or in some sense engage the population? I think it goes wider than just the science community. All health promotion campaigns, if you go back to where behavioural change initiatives have been very successful, are multi-component, they take place over long periods of time, and they involve communication and removal of barriers.

In all of this, the role of Government is very important, but not just in a simple way. In the evidence session last week, there was a lot of discussion about Government scientists, and I absolutely endorse the point that the Chief Scientist, who has a very independent role and can speak, has an important role in this, and will have credentials and will be believed by both the public and media. However, it is equally important that prominent politicians speak out about this issue, because that is how you get media coverage. I made the point in my evidence about Margaret Thatcher's speech in the late 1980s, which brought this to the public notice. There is also Government body language; it is how Government acts. You can say one thing, but then if you decide to let Heathrow have a new runway or some less sustainable development, then the public are not silly and they will spot that as well.

The final thing, which was not discussed last week, is the role of 'friendly opponents'. What we need is to persuade people like Jeremy Clarkson to come out and say, "I really think this is a serious problem." I will give you the analogy with nuclear energy. What has happened over the last 10 years is a change in public attitude towards nuclear energy, and part of that has been due to a very long-running change in discourse at the policy level, but it has also partly been induced by some environmentalists who have come out and, whether you agree with nuclear or not, they have said, "We believe it is a low-carbon source and therefore we are now more prepared to support it." The old adage is that your best supporter is actually your enemy, because people believe, "They had a stake in the other argument, but now they have been convinced, so I must look at that."

Professor Rapley: The question was about the role of the media, and you asked whether the Government should be worried about the media. I think you can draw your own conclusions from the Leveson inquiry about whether we should worry about the media. After all, the job of the media is not to educate people or to define policy; it basically is to sell newspapers, and one needs to bear that in mind, although it is clear that a number of newspapers follow a very political line, and this is where climate change has got drawn into the political debate about energy policy and those sort

of issues about the future wellbeing of people in the world.

It seems to me that an issue about the media is the question of debate versus dialogue. A standard format that newspapers and the television media often go for, because it is deeply in our psyche, is to place one person against another, and so there is an issue about false balance. I am not saying there is false balance, but there is an issue about false balance. If one person is representing the conclusions of a science community and the other is representing opinion, this is often not clear to the audience. The media are very sensitive to that and are trying to deal with it in various ways, but, more generally, debate tends to force people apart. People who form differing conclusions or opinions are driven apart, because it is a combative exercise, whereas a dialogue tends to draw people together. A good example of that at best practice is in the Science Museum's Dana Centre, where dialogue events do draw people together, and one sees quite considerable shifts of opinion throughout the evening as the dialogue progresses. The problem then is how to scale that up. It is very costly and staff-intensive to run those events.

Q40 Stephen Metcalfe: Recognising the crucial role that the media do play in communicating climate change, firstly, do you think, in the main, they do it in a responsible enough fashion? Secondly, do you think that scientists themselves adapt their message to make it more accessible to the media? Are they good at discussing what is a fairly complex issue with people who want snappy headlines?

Professor Rapley: There are some obvious examples. I will not name names, but there are some obvious examples where climate science evidence is presented in ways that do not conform with the way that the climate science community would represent them. For example, simply taking the last 15 years of surface temperature data and making them your front page is disingenuous, it seems to me, when you do not explain what the previous part of the curve looked like.

There is evidence that the data are not presented in ways that the climate science community would be comfortable with, but equally, climate scientists are human beings and they suffer from assimilation bias just like everybody else does. They are also used to, in their professional lives, presenting information to each other in an information-deficit mode. You simply pass information across, and leave it to the audience to figure out the implications. It is not well understood by the climate science community, and the science community more generally, how to deal with people who are not used to receiving information in that way and who have an emotional response to it, as we discussed earlier. This is an area that we are particularly interested in.

If I might say so, we started a novel piece of work that we are doing at UCL by asking ourselves how we could help climate scientists become more effective communicators. The more we have thought about it, the more we have looked at the situation more generally. We have asked ourselves how human beings form opinions. When they have formed opinions, how do they cope with evidence that challenges those opinions? In particular, how do they rationalise the fact that, over there, there are other perfectly reasonable and sensible people who disagree, and vice versa? What you see is that there is a tendency to stereotype or patronise them as sad, mad or bad. "If only they understood science a bit better," or they are just "swivel-eyed loons"—(a the technical term that has been used recently)—or they are bad. For example, from the scientist's point of view those who dismiss climate change can be disregarded as being in the pay of coal companies, but equally the scientists can be rationalised by their opponents as being just out to increase their influence, research grants and power. You excuse the existence of those who disagree with you by finding some mischievous meaning and explanation. The work that we are doing is to take some climate scientists through an experience, expose them to their degree of irrationality and emotional reaction to opinion-forming, and see if that gives them a deeper insight into how to convey their messages differently and more effectively in future.

Q41 Stephen Metcalfe: Recognising the challenges in the fact that this complex message has to go through a filter of the media, are there opportunities to utilise new technologies—phones, social network sites—to get scientists communicating directly with the public? First, do you think it would improve the situation and improve the communications? Secondly, how would you go about actually doing that?

Dr Burch: There are some really great opportunities around that. Certainly, from our own work, and some of the work Nick has been involved in as well, there is a desire to connect directly with scientists. Actually, that is a very powerful experience. There are some examples of where this is beginning to happen through new media, one of which is a Wellcome Trust-sponsored project called "I'm a Scientist, Get me out of Here!" It is extremely good. You can log into a live chat with different scientists. You use various social media ways of communicating. I do not think it is one answer. What we are looking for are multiple routes for multiple audiences in order to communicate and engage around this issue.

Professor Rapley: Social networking is particularly important for—if I call them "the younger generation," I am really talking about anybody under about 30–35. If I give the example of the museum, it has suffered over many years a big notch in its demograph from about the age of 18 to 30. It has set up its monthly Lates, which have been hugely successful, and it did that entirely through the social networking system. It used no formal advertising at all. There was a review recently where, out of goodness knows how many young people, none had bought a newspaper in the last 10 years.

This leads on to two other very important issues. One is trust, and the other is the way the world has changed and the way the science community is still reeling under the impact, because out there there are many, many people who are passionately interested in climate science and who are investigating the evidence in ways that have not been possible before, because they have access to it through the internet.

They are challenging the professionalism and the quality of work that the science community does. What we have seen is that the science community has found it hard to come to terms with that. The whole Climategate issue points to some of the problems here: that, in many ways, the professionals have not taken too kindly to having their work looked at. On the other hand, you can turn that on its head, in terms of regaining trust. By being completely open and transparent, and showing your working, so to speak, through the internet, you can build up trust in a vast hinterland of people who are taking an active interest in the subject. It is a very underused opportunity.

Q42 Sarah Newton: Let us stick with that idea of trust, because it seems from all the evidence we have received that there is plenty of actual evidence and science there, but it comes down to who the trusted voices are.

Professor Pidgeon: I should possibly start this. We have studied this for about 10 years. Following the House of Lords' "Science and Society" report, which was very path-breaking, in that they argued that to regain trust after the BSE crisis, as you will remember, scientists and the science policy process must be as open as possible. That is part of that.

Two things are particularly associated with trust in institutions or parties. People will ask, "Do you have expertise and do you have some kind of agenda that would bias you in one way or another?" That is the reason why independent scientists tend to be highly trusted by the public, because they actually have both of those qualities. That then relates to the question of whether they should step into the policy domain. What is their responsibility there, because they then might lose that second one, which is the independence question.

There is a caveat to this, though. When we did work on trust in science across a range of issues, we said, "Who do you trust?" and we got the normal ranking—independent scientists with environmental issues, environmental scientists and then, in the middle somewhere, Government scientists. Down the bottom, we have politicians, the media, industry, etc. We asked the follow-up question, which was, "Who should be involved in the decisions about climate change?" Immediately, particularly with Government and Government scientists, they then rose up the rankings. Just because somebody does not trust a party does not mean they believe they should not be involved in the decision making, if they have a legitimate voice. There is a small caveat on that trust question. It is very, very important, but it is not the only thing that people think about when they think about dealing with complex environmental and social problems, as we have here.

Dr Burch: Just to add to what Nick was saying, one of the things that is interesting about trust is it is shaped by a number of things. There is a perception of expertise, and there is the question around what is the agenda. For us, what we were also finding was, "Are you going to practise what you preach?" If this is a gallery about climate science and climate change, actually, what was also important was that we ourselves were taking action. The other question that often comes out of this around trust and communication is, "Who will profit from this?" This leads back to what Nick was saying: that openness around communication and sources is really important.

Professor Rapley: Trust is absolutely crucial. I looked through the written evidence that you have received, and there was this lady, Caroline Peacock, who is trying to assist a parish council decide about wind farms, and has put a lot of due diligence into trying to understand the complex science of climate change, who is right, who is wrong and who has the right opinion. I thought it was interesting that, in her evidence, she said, "I got to the point when, in the end, I could not really make up my mind from the technical stuff". Why should she? She is not an expert. It is hard enough for the experts. So she said, "I looked at people's motives, and tried to decide based on that".

I think you see that all the time. When we were developing this gallery, if you raised the issue of climate change with focus groups, their first reaction was to feel guilty. "Wait a minute. I think you are going to ask me to turn my lights off or not fly to Ibiza this year." That raises anxiety, a little bit of anger and an instant hunt for a way out. They would look at the lighting in the museum and say, "That does not look very low-energy." In here it is actually, but where they were they would say, "That does not look very low-energy. Therefore, you are being hypocritical. You do not really believe this because, if you did, you would have done something about it. Therefore, I do not have to accept your premise." It does seem to me that you have to work at trust. You cannot assume it. Just because scientists have been trusted in the past, it does not mean that, on this issue, they can assume that they can draw on a reservoir of trust from the past, so they have to work at it by being open, transparent and by answering those challenges: "You were just suffering from groupthink"; they have to demonstrate that they are not, and so on. I fear that the community has not quite grasped that yet.

Q43 Sarah Newton: On this issue amongst scientists, do you think trust is improving or declining? What is the trend in the trust of scientists in this particular area, by the public?

Professor Pidgeon: There is some tracking data going back to about 2005, initially from Department for Transport studies, but in subsequent years myself and a number of other people have put these questions in opinion polls or on surveys we have done. Trust in all institutions to tell the truth about climate change has declined a little over that period. It is not just scientists. Independent scientists still remain at the top, as most trusted. About 50% of the population will say they trust them to tell the truth about climate change.

The one thing that we have picked up from this surveying, and it is quite mixed evidence, but it seems that after the e-mail affair, sometimes called Climategate, there may have been a dip in trust in climate scientists, in particular. The very latest evidence I have seen, that we have collected shows that this may now be recovering to the levels it was

before. My conclusion about that is that there were a lot of other background things going on post the peak of concern in 2006–07, around about the time of the Stern report and IPCC 4, which led to a declining public interest in climate change first, and then the e-mails affair and Copenhagen both followed this, both at about the same time. There was a big spike in media coverage and questions during these 2009 events, which put trust down a little, but not by a large amount. It shows how resilient this question of expertise and independence is, when you ask people about independent scientists.

Professor Rapley: If I could just respond, I read through the written evidence that you have received, and of the 17 or so pieces of written submitted evidence from individuals who passionately disagree that climate change is real or hazardous—you know the various arguments—although some technical evidence was presented, that "It's all a natural cycle," or "We've seen this before," a common theme through all of those was distrust of the science community. Either the peer review system is corrupt or ineffective, or this is simply a power and finance grab by opportunists, or what-have-you. For those who have formed an opinion that they do not accept the premise, lack of trust in the science community is a key rationalising factor.

Professor Pidgeon: I would just add to that. It is interesting that, if you are passionately against something, then it probably makes you distrust the people who are advocating it. There is a counterintuitive reverse causality going on here. We have found this in research in a very large survey we did in Wales, but it would be generalisable to the UK. People who are sceptical about climate change—there are about 15% you could define currently amongst the UK population—said three things. They said the point about, "You couldn't trust the scientists." The second group said, "No, it's all natural cycles," and actually there is a sense in which that is not entirely untrue, because climate change is a combination of natural and anthropogenic forcings. The third thing was, "Actually, this is a get-up job because the Government wants to tax us more." There are three narratives out there.

Chair: We need to pick up the pace a little, so if you find yourself slightly cut off, please feel free to add any additional information to us in writing, because this is an important theme we are developing here. We are desperately short of time, unfortunately.

Q44 Graham Stringer: You are extraordinarily diligent witnesses, having read everybody else's evidence to this Committee. Just having listened to what was said, I do not think your description of those people who are not enthusiastic, shall we say, about anthropogenic climate change being catastrophic would apply to Professor Anthony Trewavas, would it? He is a fellow of the Royal Society and gives pretty sound scientific reasons why one should be sceptical about the points that you are making.

Professor Rapley: If I gave the impression that everybody made the same arguments—I withdraw that. I agree with your point. Of course, there is a range of opinion. It is a free country, and science is a fundamentally sceptical activity, and so there will always be people who interpret the data in different ways, and jolly good. They are grit in the oyster that causes the process of science to be honest. I think Karl Popper said that it is not crucial that the scientists themselves are unbiased; what is essential is that the scientific process should be unbiased. We have a good example there of somebody challenging the accepted view.

Q45 Graham Stringer: And using Karl Popper in his arguments. Is part of the confusion caused, do you think, because over the last 10 or 15 years we have moved away from the term "global warming", which is an understood scientific term, to a more ambiguous term about "climate change"? Where there is a consensus on the physical processes of the greenhouse effect, there is much less of a consensus about what that will lead to. Do you think there is a problem about the use of the word "consensus" in that sense? Would we not be better to use something more easily measurable like "global warming"?

Professor Rapley: I will respond quickly to that one. The use of words to frame an issue is an absolutely crucial matter and, if we look at the origins of this, the climate scientists who, originally, 20 or 30 years ago, were interested in this subject, although they saw the societal relevance, I do not think for a moment they sat down and thought, "How can we craft the best way to express this?" They just used terms that they understood and, in some cases, in retrospect, were unfortunate and a bit careless. You could argue that a better term would be "global energy imbalance". That is why this display here calls out the Earth's energy balance, because that is the fundamental physical process that is the response of the climate system to increased greenhouse gases.

It is not just the terminology. By overdosing on the surface temperature dataset and issues like climate sensitivity, if we take climate sensitivity, if half the Earth warmed by 10 degrees and half of it cooled by 10 degrees, it would have a hugely disruptive impact on the climate system, but the climate sensitivity would be zero. Climate scientists know that, and so they are using these terms as shorthand in their professional roles, but they have let them spill out into the public presentation of this, and by doing so have brought ourselves a number of problems. Again, if you read in some of these submissions and more generally, the shift from "global warming" to "climate change" is seen as mischievous, malicious or to have some bad motive behind it. Personally, I use the term "climate disruption", because it is more descriptive of what this energy imbalance threatens to cause. It is just unfortunate that certain terms have become common currency and they do not tell the whole story. It is complicated to explain why.

Q46 Graham Stringer: That is really a very interesting answer, is it not? The logic of that position, to increase the public's understanding of the science, is that scientists have to be much more precise about what they mean. Professor Jones's group at the University of East Anglia were telling us not long ago that there would be no snow after 2010. Professor

Pidgeon earlier on said that, if you build new runways, you will increase carbon dioxide. I would argue the opposite in a constrained system, but scientists have to be very careful. Should that be one of our conclusions: that scientists should be very precise and stick to exactly their science, rather than entering into the political arena?

Professor Pidgeon: I would agree with that, but there is no simple neutral framing. That is not an easy message to pass back to you. To get back to what we said right at the start, this is a complicated problem which has multiple facets. Climate scientists recognise that and you see around you here an attempt to grapple with this. It is not straightforward to generate a neutral way of discussing this issue, particularly given all the policy issues that then become attached to the question, quite rightly, and are debated in society.

Professor Rapley: I would put it slightly differently. I agree with what you say. I think it is true that scientists in general have to think very, very carefully about the narrative they are delivering and the way they are delivering it, but it seems to me that part of the problem is that everything has become one-dimensionalised, because there has not been sufficient engagement between the community and people who are interested, to explain the very point that we have just been discussing. That is why I go back to dialogue and trust. If it is clear that, in a dialogue, a misunderstanding has developed because of slipshod or unfortunate use of terminology, then in the dialogue that can be teased out and sorted out. It is because, in some cases, the sides have become so separated, they are not engaged in that dialogue. That dialogue would be really helpful.

Q47 Stephen Mosley: Following on from that last question, the one thing that does cause me some confusion is manmade climate change is happening, natural climate change is happening, but what should be the intention of Government policy? Should it be to attempt to freeze the climate in the current situation, or should it be to remove the manmade impact and only allow natural climate change to happen? After all, some 22,000 years ago we were probably on the edge of a massive ice sheet where we are sat today.

Professor Rapley: I was born in Birmingham, and 20,000 years ago it was under a kilometre of ice. A lot of people might think that was a good thing, though I disagree. There are a couple of points here. First, we have spent 100 years investing trillions of units of currency and all of that effort and a huge amount of fossil fuel to build the modern world. The modern world is tuned to the climate system we inherited, which has been unusually stable for the last 10,000 years. Look at the paleo-record. The climate system has the capacity to be much more unstable than it has been for the last 10,000 years. We have tuned the modern world to it.

Those who are concerned about international security see climate change as a force multiplier. It stresses an already stressed highly interconnected modern world. As you say, there is natural variability in the climate system, so we always have to cope with the impacts of climate variability. It is sensible to make ourselves as robust to climate variability as we can, whatever its source is. That is an adaptive strategy, if you like.

What the paleo-data show us is that the climate system is quite sensitive to small driving forces. A volcano somewhere has a significant impact on the planet's climate for a couple of years, and very small changes in the Earth's orbit around the sun can drive ice ages and interglacial warm periods. People talk about the mediaeval warming and the little ice age. You look at the impact they had on human wellbeing, and you see human wellbeing is very coupled with these tiny drivers and their consequences. If we know that we are provoking change in the climate system by emitting greenhouse gases, changing land use cover and all the other things we do, it just seems prudent to look at how we might reduce those driving forces, because we are simply going to make things worse.

Q48 Stephen Mosley: We are politicians at this end of the room. How effective do you think Government is at communicating about climate change and engaging with people to get support for the policies that it needs to introduce?

Professor Pidgeon: I have noted in my evidence that I think there is a capacity problem, which is not really Government's fault at all. It has happened over a number of years, partly to do with institutional changes. Two things that we do not have the capacity to do are to bring the academic research on risk communication and the climate scientists together, with the policy problems, in one place, to think through these things. It needs to be above and beyond what is currently done at the Hadley Centre communications group to actually apply the research evidence on communicating climate change to the particular policy problems. Government has not yet grasped this nettle. There is a need to put in place some kind of capacity in risk communication more generically.

I should also make a small point that a lot of people in the science community feel that it was a mistake to abolish the Royal Commission on Environmental Pollution, because they served a very good function in raising some very critical science issues and trying to think through some of the thorny questions. There is a sense in which they were one of the trusted parties that scientists contributed to over a very long period of time. Again, there is a capacity problem there. I think more needs to be done.

Dr Burch: I would just quickly add that, when we were talking to our visitors around this project, one of the things that they are really interested in hearing about is what is being done at Government level. It was also one of the things that they were very unaware of the action around. In a way, for them to take actions or to engage in this, they need to see and there needs to be communication around Government level.

Professor Rapley: This goes back to the issue of trust. It is well known that politicians, not just in this country but elsewhere, have a relatively low trust rating but, on the other hand, have a huge influence on what people think are the important issues of contemporary life. There is evidence from the States, and Nick will know more about this than I do, but what I am aware of is that, because this concept of

climate change and what we should or should not do about it is not top of the political agenda or high on the political agenda, evidently then radiated through the media, people discount it. They say, "Well, if the Prime Minister is not talking about it, it cannot really be important."

The obverse of that is that I was asked to brief another House of Commons Committee a year or so ago. At the end of it, the Members of Parliament present said, "One thing you should understand, Chris, is that in the last year we have not had a single e-mail or letter from our constituents about climate change. We have had a lot about the economy and the National Health Service, and a few about wind farms, although not connecting them with the climate change issue. As long as that is true, do not expect it to be a political priority." There is a chicken-and-egg issue here. The word "leadership" springs to mind. Having read a few of Churchill's speeches recently, one pines for the day when top-ranked politicians talked to people about what they saw as the big issues of the day. That is why, in our evidence, we made the point that what people think is very important in a democracy, clearly, and how they form their opinions and what they conclude is critical, but there are opinion-formers in society, and talking to them is crucial too.

Q49 Roger Williams: I think there is a consensus on the panel that, in terms of communication and engagement, the deficit model of communication and the traditional debate are not the best ways forward. Could you give the Committee an opinion as to whether scientists, still believing that the best way forward is through dialogue, actually put a lot of effort into dialogue or do they revert to the other two systems that we have thought are not particularly good?

Professor Pidgeon: I absolutely agree with your point about the deficit model, but a scientifically literate public is still a desirable thing to have. Scientists have to engage at that level with key critical issues like this. You have to recognise though that that will not change people's behaviour overnight. There are all sorts of other barriers that prevent that.

The other point I will make, which is less about scientists, but more about the responsibility of politicians and others, is that we often think about the appeal to environmentalism, which is a fairly catastrophic, hair-shirt type of way of thinking about climate change. What we actually need is to appeal to a set of values, which pretty well everybody would agree with. There has been very interesting research just completed by my colleague Adam Corner, and he has been working with some of the centre–right groups just to see, even if somebody was a climate sceptic, what values would bring agreement with the way forward on some of the tricky policy issues. He argued localism, energy security, business greenness and wellbeing of communities are, in a sense, values that are endorsed across the political spectrum. Rather than appealing to a simple environmentalist catastrophic message, we should be thinking more widely about communicating the science, but also then saying, "Let's look at the solutions within a value set that everybody can agree with".

Q50 Roger Williams: Could I just move on to another subject? I think every Government would like to see their citizens engaged, for instance, in mitigating the effect of climate change. How do you rate the Government's work in that sphere of encouraging their citizens to be more proactive?

Professor Rapley: I am going to cop out on this one and say that, as a scientist, I do not have a view, other than to note that, overall, worldwide carbon emissions continue to increase, so something is not right if the objective is to reduce them. In the UK, there have been modest inroads into achieving our goals.

I think, as a citizen, that the Climate Change Act was a rather brilliant concept to deal with one of the problems of short-termism in democracy. What we see around the world is that other nations—Spain, for example, and others—admire what the UK achieved there and are considering following suit. Of course, there is now some questioning in the UK as to whether that was the best way to go forward.

In terms of energy policy, as a citizen I am very disappointed by the Government's grip on energy policy, just from the point of view of keeping the lights on, let alone the impacts on climate change. We would all feel a lot happier if we felt there was more directed leadership, if you like, on that issue.

Q51 Pamela Nash: In preparation for this morning, I was looking at the Climate Outreach and Information Network's publication this month. It is called "A new conversation with the centre-right about climate change". Do you think this approach of an adapted specific message for groups that already have their existing priorities is a good way forward? Do you know of any other examples of this?

Professor Pidgeon: I agree with your question. I think yes. It comes back to what I said earlier, that there is a danger that we get into a narrative that is not helpful, even though it was the narrative that initially alerted the world about climate change. The environmental movement was on to this question very early on, but that does not resonate with everybody. We know there are different sectors in society—and there are segmentation studies to show this—with different levels of engagement with the environment.

The one caveat on this is that there is a lot of evidence that if you just appeal to people's pockets—money—they become very internally motivated, and they are not motivated for the wider good. It has to go wider, which is why Climate Outreach's "New Conversation" document is really interesting, because they are trying to define a set of values with which pretty well all of us could agree, whether you are in the slightly more sceptic camp or you are very comfortable with the science. That is something that Government and politicians—it is not so much a thing for scientists—have to think through very carefully, in terms of communication with the public in the future.

Professor Rapley: There have been quite a lot of publications over the last decade really, which are essentially giving the message, "Understand your audience and connect with them; make it relevant to them." I read that work on the centre-right. I feel very nervous about it, because people are very sensitive to feeling that you may be trying to manipulate them.

You can be too clever by half. Also, some of that advice is very unhelpful, because there was a value modes diagnosis done a few years ago that segmented people into settlers and pioneers and so on. You needed to appeal to this in the settler and that in the pioneer, but in your audience they do not wear labels, so you can say, "To the settlers over here, I'll tell you this".

You have to do what Nick just said. In the end, there are some deep-rooted, fundamental, often emotional issues, values and ideas that people have in common. After all, we all share this planet and many of us have children and want to see a better future for them. It is just being honest to your science, and then finding ways to connect to people, so that they feel you are a trustworthy individual, and they can honestly make an appraisal of how to work out what to do next.

Professor Pidgeon: May I just add to that as well? We have just completed, independent of Adam Corner's work, a major project for the UK Energy Research Centre. The conclusion from that is that people across the spectrum are enthusiastic about the prospect of change in the energy system. They basically say, "We need to move away from fossil fuels, which we know are polluting, to a more renewable system, however you define that. It need not necessarily be all wind farms in the longer term. If we are going to change the energy system for environmental and energy security reasons, we ought to get it right." That is the overwhelming message we have had from that research, and that fits very nicely with the value system work as well.

Q52 Pamela Nash: Thank you, gentlemen. That is extremely helpful. Just on what you were saying, Professor Rapley, about getting the message correct, I would say there are three groups of people. We have those who are very interested from both sides of the debate, those who accept climate change and those who remain sceptical. Also, the huge majority still have confusion about the subject and therefore are turned off by it. Do you think we have the balance right in engaging each of those three groups of people?

Professor Rapley: It goes back to a question earlier about whether scientists engage enough. Many scientists will give a public lecture, which is information deficit mode, and then go into a question-and-answer session, which is engagement mode or dialogue mode. Quite often in a public discussion, somebody will stand up and be passionately negative about the message from the scientist. I had this experience myself. The question to ask is, "What could I tell you that would change your mind?" In some cases, the answer is, "Absolutely nothing. I really did not come here to have my mind changed. I am angry with you and I wanted to show you up."

What matters under those circumstances is what other people make of that discourse. As you say, most people are not passionately one way or the other, but they are trying to make up their mind in what is a very technical, confusing and polarised discussion. Again, it is the job of the scientist to simply be reasonable, come over as reasonable and explain why they have concluded what they have, and help people where there are technical and other questions that they have raised. It is always a question of dialogue.

Professor Pidgeon: May I add one final thing on that? You are right: you have the committed camp, the slightly more sceptical camp and then lots of people in the middle. A multi-pronged approach, without in any way trying to persuade people unduly, would look at the ways in which issues of climate change connect with everyday life. The question of wellbeing is about infrastructure, cycling and doing more exercise. The question of localism—we have evidence that with some of the flooding that has occurred in the UK, although there is an issue about how you attribute flooding to climate change, it is nevertheless the case that increased risk of flooding will occur in the UK as a result of warming temperatures. An awareness of flooding raises people's concerns about climate change, so there is a conversation that should be had at a local level, whether it is in north Wales and west Wales, where it happened last year, or elsewhere in the country.

There will be all sorts of opportunities, not just for central Government. It was interesting to see President Obama's speech yesterday, and there is a sense in which we have always complained about America lagging behind on climate change policy, but at the local level, at the State level, for many, many years lots of things have gone on, particularly in California and elsewhere. We must not forget that there are people intervening, discussing and thinking about this issue all the time at a local level, and here there are opportunities to connect with people's everyday lives. That is how you connect with that group in the middle who are not having this vigorous debate about the question.

Professor Rapley: There are many good news stories out there. At the city level, and here I am thinking with my London Climate Change Partnership hat on, city mayors around the world have introduced many measures, not just because of the environmental consequences but simply to make life better in the city, to reduce air pollution, to improve public transport and so on.

The point about this fifth part of the exhibit here is that one of the problems that people have with the climate change narrative is that it makes them feel powerless, that they have no efficacy, that "We are all stuck in this high-carbon web, and what can I do about it? If I emasculate myself or if the UK emasculates itself, it will not make a jot of difference in the future." When you show people that there are ways forward, which if they will not completely solve the problem nevertheless move in the right direction, then they get very enthusiastic and engaged. If you do not offer that, then they will find ways to shut down or reject, because what else would they do? You are making them feel very unhappy, uncomfortable, anxious and guilty, when there are ways—through their personal lives, professional lives, public lives and through technology—that we can move to a better world. They go, "Oh okay, I can understand that. Now let's engage in the conversation."

Chair: I thank the panel very much for their contribution. It has been a particularly interesting

session. I know, Professor Rapley, you have a tight timetable to make. Thank you very much to all three of you for your attendance.

Examination of Witnesses

Witnesses: **Professor John Womersley**, Chief Executive, Science and Technology Facilities Council, and Champion for RCUK Public Engagement with Research, **Professor Tim Palmer**, Vice President, Royal Meteorological Society, **Professor Rowan Sutton**, Director of Climate Research, National Centre for Atmospheric Science, and **Professor John Pethica**, Physical Secretary and Vice-President, Royal Society, *gave evidence.*

Q53 Chair: May I say to the second panel, because there is rather a lot happening in the House today, one or two of our colleagues are having to slip off early for various events? There is a certain statement being made this afternoon that I know some of you will be particularly interested in as well. May I move straight on and invite the four of you to introduce yourselves?
Professor Womersley: My name is John Womersley. I am the Chief Executive of the Science and Technology Facilities Council, and I am here representing Research Councils UK as their Champion for Public Engagement with Research.
Professor Palmer: My name is Tim Palmer. I am a Royal Society research professor in climate physics at Oxford University. I am the previous President and now Vice President of the Royal Meteorological Society.
Professor Sutton: My name is Rowan Sutton. I am the Director of Climate Research for the National Centre for Atmospheric Science, which is a research centre with core funding from the Natural Environment Research Council. We are embedded in universities, and I am personally based at the University of Reading.
Professor Pethica: I am John Pethica, the Vice-President and Secretary for Physical Sciences at the Royal Society.

Q54 Chair: Thank you very much. You have been listening to the previous session, and we touched on scientists' capacity to engage and communicate with the public. Twice yesterday I pleaded with science audiences to engage with us: once to the Parliamentary Links Day—there was a very big audience there—and the second was the 100th anniversary bash for the British Ecological Society, which was great to be at, especially as the report they launched yesterday was really touching on some of the issues that we are addressing. The public's view still is that scientists are inherently bad communicators. What can we do about it?
Professor Palmer: Scientists are like everybody: some are good; some are not so good. The ones who are good have a duty to go out and try to explain the science as best they can. I wanted to say on this particular point, however, that one of the vehicles for outreach that a large number of the climate community engages in is through the IPCC, the Intergovernmental Panel on Climate Change. This produces major reports every few years about the state of climate science. Even the scientists who may not be good on their feet speaking to the public feel very deeply that they have a duty to contribute to these reports. This is one area that is reasonably unique in science, where a rather definitive outreach document, which is the product of many hundreds, if not thousands, of scientists is produced. Even for those who are not, let us say, gifted at communication, this is a vehicle and an important vehicle for the communication of science research to the public at large and to policymakers in general.
Professor Womersley: If I could follow up on that, the research councils have a clear expectation that the scientists who we fund should engage with the public about their research. There is a concordat, which has been led by RCUK, which is part of our grant. The expectation is when we grant-fund researchers in universities that they should have an institutional strategic commitment to research. The scientist should be recognised and valued for their involvement in public engagement, in promotion activities within the university, for example—things like that. They should be enabled to participate.
None of that is enough, of course. We need to provide training and help and resources, so the research councils, along with the funding councils and the Wellcome Trust, have supported a number of initiatives about best practice in public engagement: the Beacons for Public Engagement; we are now supporting eight catalyst universities; there is a National Co-ordinating Centre for Public Engagement. One of the key messages that we are trying to get across is to move scientists away from the deficit model that was discussed earlier to the value of engagement, especially engagement around the public policy implications of the research, which is clearly where a lot of the discussion in the last hour was leading.

Q55 Chair: You and I were at the fantastic event where we participated in the worldwide round of applause at the announcement of the Higgs results last year. In answer to a question from me, you really put down a marker that your scientists ought to be getting out there and engaging with the public. I took it to mean that the research councils ought to be taking a lead to participate in things beyond their historic role, and reach out more rigorously to the public and to the next generation.
Professor Womersley: The short answer is that yes, of course I agree with you. As surveys have shown and previous witnesses have testified, there is a lot of trust for individual scientists. We want to use individual scientists. We want to encourage and help

individual scientists to get out there. That is not to say that every individual scientist is best placed to do so, but we should provide them with the tools and the support to do that. NERC, for example, runs regular training sessions for environmental researchers, in fairly small groups, many times per year, in order to familiarise them with the issues and the communication challenges around that.

As you noted, and as some of the previous witnesses noted, it is sometimes easier, both for the speaker and the audience, to communicate things about the joy of discovery in the universe, than it is where individual people's behaviour may be required to change. Climate change is not the only example of that. I always feel guilty when I go and see my doctor, because he invariably tells me that I am overweight, that I am at risk for all sorts of bad things to happen and I should change my behaviour. That does not mean he should not communicate it, but it does illustrate that the challenges are not unique to this area.

Professor Pethica: In the long-term context, of course, the structure of science effectively includes the Baconian imperative for the relief of man's estate, so there is a duty to actually participate in this process. Over time, the nature of that debate and the way in which you participate with it changes quite a bit, and we are seeing that with media at the moment.

Q56 Chair: Do you think, therefore, that scientists need and should receive better training on engaging with the media, for example?

Professor Sutton: Yes, absolutely, and as we have heard, it is happening. This is a slow process of cultural change, though. I think we should acknowledge that. The history was that scientists frequently saw their job as being in the laboratory and not engaging with the public, as a core part of the role. There has been a lot of progress and we need to continue that. We are moving in the right direction, but cultural change is slow, I would say.

Q57 Stephen Metcalfe: I want to return to the role of the media in communicating climate science. Do you think scientists understand the importance of the media in communicating climate science, and are they experienced and good at communicating those complex messages to the media, so that they can then pass them on in a more palatable fashion?

Professor Sutton: I might just go on briefly on that. I think it is a fairly mixed picture. There is an understanding of the importance of the media, but there is not an adequate understanding across the board about how to communicate effectively. We heard in the previous session about the need for statements to be very precise in some cases, and there is not always the awareness of which sorts of statements could be misinterpreted, and sometimes will be misinterpreted, for a variety of reasons. There is clearly room for progress there, but it is a mixed picture.

Professor Palmer: I find this a really difficult area as a climate scientist. The reason is, and it was touched on in the previous session, that the media are looking for stories. As somebody said, the bottom line is that they have to sell newspapers. I ran up against this, for example, during the Climategate issue, when I tried to say, "Well, okay, you've published these multi-page spreads claiming that climate science has been undermined by the e-mail leak. I would like to write a corresponding piece saying, actually, that climate science has not been undermined." The overwhelming response I got from the media was, "That is fine, if you want to write it on our online blog or something, but this is not news. 'Climate scientist says nothing undermined by the e-mail leak' is not news." I find this one of the most difficult issues in engagement with the media. Research is a very long-term thing. You do it day in, day out, year in, year out. Packaging it into a story that the media view as news is one of the biggest challenges.

Professor Womersley: There are some interesting data from the Public Attitudes to Science survey, which is carried out regularly by the Department for Business, Innovation and Skills. It found, as previous speakers have noted, that the public tend to trust scientists working in universities the most. 51% of the public think they see or hear too little information about science and are hungry to hear more. 70% of the sample think that the media sensationalises science. The public, in general, trust the scientists more than the media, but they have nowhere else to go for the information than the media, so I think there is an opportunity to do better in that area. We have heard a little earlier about social media and routes to reach the public that are not mediated by editors, so that may be something in the future we should all be thinking more about.

Q58 Stephen Metcalfe: Have any of you thought about that at the moment? Are any of you engaging in new media to try to communicate directly with the public?

Professor Womersley: I have tweeted about being here today, but I have not tried to change their mind on climate change.

Q59 Stephen Metcalfe: That is all very useful, but it is not a systematic approach, is it?

Professor Womersley: No, exactly. The research councils' public engagement exercise is becoming more aware of that. We are currently going through a refresh of our public engagement strategy, looking at what has changed over the last three years. A lot of these things have become much more mainstream than they used to be.

We should also remember that the advent of newspaper websites and the BBC's own website has changed the depth of reporting that they can go into on some of these issues. It is no longer so driven by, "Is it front-page material and can I make the headline big enough?" Some of these things do get discussed on the web first, and then that convinces editors that there is sufficient interest in the story to promote it into a news article. The question that you were asked, "Is this news or not?" may apply to the print issue, but perhaps less so to the web. If we can generate enough interest around online, stories often stay there

for longer and can generate comment streams, which show that the audience is interested. The click-through data show that the audience is interested. There are ways here to influence what the media think is newsworthy, as well as simply seeing them as a black box.

Professor Pethica: Again, just to recall the diversity of the media and the way it is rapidly changing, it is not as if these contentious-type issues have not existed before. I have a long list of them here: GMOs, vaccination, evolution. The list is long. Of course, the means of media by which someone engages with us is, in fact, changing fast. Climate science is in an interesting position compared to some of those earlier cases.

Professor Sutton: Within NCAS, we have experimented a bit with using social media. Twitter is interesting. I am not personally involved, but a number of my colleagues are. There has been quite a growth of communication by that mechanism, which has involved some real interaction between what you might call the climate sceptic side and the climate scientists. Some of my colleagues are quite positive about that interaction: that it has been a genuine dialogue that has led to some improvement of understanding on both sides. It is a fairly small community, of course.

Q60 Stephen Metcalfe: My final question is about how you widen that community to include those who are not already polarised into the two camps, to actually get the public more engaged with this.

Professor Sutton: That goes back to the earlier discussion about it not being one avenue; there are multiple avenues. There is no silver bullet.

Chair: We realise that this is a very complex area. In fact, Graham and I were discussing it on the train, in the context of the trashing last week of Owen Paterson's views on GM foods as a good example. It was a dreadful piece of journalism. I would be interested to see that peer-reviewed, but we will move on from there.

Q61 Graham Stringer: Some of you were at the Met Office discussion last week, which got huge media coverage, some of it very negative. Christopher Booker said the Met Office has no idea what it is doing. The *Mail* said the Met Office was predicting barbecue summers not long ago. Now it is predicting rain, and, if not pestilence, very damp summers. Why do you think there is so much interest, and why was so much of the coverage negative?

Professor Sutton: I think the reason there is so much interest is straightforward: the weather matters a lot in the UK. When we have a string of wet summers it affects a lot of people. It affects where people go on holiday, it affects farmers—this is straightforward.

The reporting that I saw was varied. Some of it was pretty good. The headlines, on the whole, were not very accurate, and that is often a problem and some of that relates to the problem of newspapers looking to sell newspapers.

Regarding the confusion issue, it is quite a good illustration of one of the issues in communication of climate science more generally, which is the difference—and this applies to other areas of science—between areas that are very well understood and areas that are at the frontiers of research. To put this in a climate change context, the effect of increasing levels of greenhouse gases on the climate system as a whole is an area of very well established science. What that means for the UK, which of course we would all like to know about, is absolutely at the frontiers of research, so there is a lot of uncertainty. Undoubtedly this causes confusion, because it is easy to say that because we do not know what is going to happen to the weather in the next few years, therefore the science community does not know anything. It is quite a difficult thing to communicate. I would say that the scientists' responsibility in terms of trying to put that message across to the media was fulfilled reasonably. There were an awful lot of interviews with an awful lot of media outlets; I was involved in some of them. Not all of them were models of clarity in scientific communication; some of them were very good.

Q62 Graham Stringer: Sorry; from the scientists or the journalists?

Professor Sutton: Some of the scientists did a very good job. Others did a less good job and you could certainly say that they should have been more precise and clearer. That is the world we live in. The scientists certainly need to get better in terms of communication, but as Tim made the point, it can be very difficult when newspapers are looking for headlines at the same time, so however carefully you make a statement, people will look for the bit that sounds most exciting and will make a good headline.

Professor Palmer: I think this particular meeting highlights a very specific issue in climate science. As I think we talked about in the last session, the British weather is variable. Some years are wet, and some years are dry; some years are warm, and some years are cold. It varies due to a process we call "chaotic dynamics"; it is understood. As scientists, when we try to ask the question, "What will be the effect of, say, the melting Arctic sea ice?" or "What is going to be the effect of variations in the solar output?" the way we phrase the answer to that question is in terms of changes in the probability of occurrence of wet summers, dry summers, hot summers or cold summers. We talk about shifts in probability distributions. The media look, on the other hand, for very clear, black-and-white statements of causality: "We are going to get 10 more years of wet summers because of sea ice," or something like that. This is not the way the science is framed, so it is being able to communicate this issue about probability, risk and threat, and try to get away from this very naive causality, which of course the headline writers like because it is simple to state. It is one of the key challenges in climate science, and it is not just about natural variability; it is about long-term, manmade climate change as well.

Professor Womersley: I think there are other areas of scientific communication where the media and the public have understood those kinds of issues. If I eat

more than two slices of bacon this week, there is an increased risk that I will have a heart attack. It does not mean I will die next week and I will not be upset with the medical research profession if I do not, but I understand that some things carry greater risk and I may be lucky enough to live for ever despite that. There is an understanding in some areas, like health, about risks and the likelihood of it being population-wide and not connected necessarily to a single individual.

Q63 Graham Stringer: It does take us back to the discussion we were having in the previous session about the understanding of probability, but do you not think the Met Office are not as clear as they could be about some of their long-term forecasting, both of climate and of seasonal variation, and that their computer programs have not got it right, and would it not be better to explain that and try to explain why there have been errors, rather than use simplistic phrases, which have got them into trouble with the media in the past?

Professor Palmer: This is a real debate. It is not only about seasonal forecasts; it is about ordinary weather forecasts. Predicting the weather three days from now can be uncertain—it can be very certain and it can be very uncertain. Many of us in the science community are trying to get an acknowledgment and a quantification of uncertainty expressed just on the daily weather forecast in a more routine way. This would help in the public's understanding about uncertainty on the longer climate change time scale. On the other hand, there is a perception that ideas about uncertainty and probability are beyond the understanding of the average person. I personally do not believe this myself, but there is a strong feeling that one should try to simplify the message as much as possible—that one should try to avoid using quantitative expressions of uncertainty when engaging with the public. As a result of that, sometimes the message is overly simplified, but as I say, I think a good step forward could be to try to tease these things out a bit more explicitly in our daily weather forecasts.

Q64 Sarah Newton: Just to summarise, what I think you have said so far is that publicly funded science has a responsibility to communicate its findings, however controversial they are, and that the nature of being a scientist is changing rapidly and some scientists are more or less willing or able to respond to the significant challenges of communicating complex issues to the public, especially as we have quite a polarised, simplified media requirement. I can see that. But we also have in our country the BBC, which is another publicly funded body, and, through the Reithian principles, one of its aims at least is to inform the public. I would be very interested to know, in all the endeavours that you have described in reaching out to the public, what your particular effort is towards the BBC.

Professor Palmer: I have been personally involved in many BBC documentaries. I am very proud of one of the things that I put on my CV: that I was involved in a documentary that was nominated for a BAFTA, so I walked that red carpet at one time in my life.

One point I would like to make about public engagement, and this applies a little bit to the BBC, is that certainly in recent years there has been a tendency for the BBC to have an adversarial type of presentation about climate change. So if you get invited onto "Newsnight" or something, there will be somebody from the opposite camp discussing their view. We can talk about the need for scientists to be involved in media training, but one thing that I know a lot of my colleagues are uncomfortable with is the adversarial debating. Not only do they not have training in it, in many cases the way scientists think is not necessarily the right mode of thinking to engage successfully in debate. This is a tricky area, and I know a lot of my colleagues avoid situations where they feel they are going to be put into a debate with an adversary, but I would say on the whole my general experience of the BBC has been very positive, over the years.

Professor Womersley: The comment I have got from other colleagues elsewhere in Europe is that they see the BBC as a great asset in terms of science communication to the British public, partly because of the Reithian mission, but also because of a history of very good programme-making in this area. In many cases, they are jealous of the impact that the BBC can have, but that does not mean that BBC producers and journalists are free from the need to convince their editors that there is a story. It is still the same imperative. The media want to know, "What is the issue here? What does it mean? Why is this new? Why is it interesting?" They may have a slightly broader definition of a public service role, but there is still a need to convince people that there is a story here.

Professor Sutton: Just briefly, following up on Tim's point, this is probably obvious but I think it is important to state. One of the reasons why the debate format is rarely helpful, certainly in terms of scientific communication, is that, at the end of the day, science is always a debate about evidence, and it can be very difficult to put across evidence in a debate format. It is the language of rhetoric and so forth, and therefore the weight of evidence is hidden, however effective a communicator one is. So the debate format is rarely useful in terms of scientific communication. The other thing to say is that we are obviously in an area where the science is relevant to policy, and what we heard this morning in the first session, and those of us here would also support very much, is that, as far as possible, we should try to keep genuine scientific debate separate from debate about policy. That is helpful in terms of the communication of these issues, and sometimes those two things can be blurred, understandably, in a media context, but that can be a source of confusion. Sometimes scientists can be drawn in to comment on things that, frankly, they should not comment on, because an interview goes in that direction.

Professor Pethica: Just very briefly, again there are complex issues and, of course, the debate format, as has been pointed out, is not always helpful. We have examples such as with MMR recently, which has now

fully panned out, if you like. To amplify the point that was just made, the scientific evidence accumulates over a long period of time very often in these cases. The other thing to keep in mind is that when one is debating a particular scientific issue, there will often be other things related to it that are like the elephant in the room. The particularly obvious one in this case is energy policy, which has been described earlier on.

Q65 Sarah Newton: Given that you all seem to be very committed to try to better public understanding of climate change and to make the evidence more available, we know in September the IPCC will be producing its report. This is a golden opportunity for the science community to share their evidence and to use the publication of that report to raise public awareness and to tackle some of the issues that you very openly admit to as being problematic. Can you describe what each of your organisations that you represent is doing to make the most of that opportunity in September?

Professor Palmer: John and I are looking at each other because at the Royal Society we are organising a two-day meeting to coincide with the publication of the IPCC report and we have some of the real world experts talking about the latest developments in the IPCC science, very much to non-specialists. You are extremely welcome to come if you are interested. That will be a major event in London. Publication of the IPCC report is a newsworthy story, so it will attract the David Shukmans, the Roger Harrabins, and so on, of the world to come and do stories, and I am sure we will all be highly engaged in discussing with them. This is what I am saying: it needs an IPCC to trigger this type of reporting. If I just phone up as Fred Bloggs, the reaction will be, "What is the story? What is new? What is news?"

Professor Pethica: May I add to that? There are several other things going on. This meeting is one. One of the things I think we mentioned in our evidence to the Committee is that we are also working with the US National Academy of Sciences on a new summary of the science or what is new in the science; you will be aware of the one we produced two and a half years ago. I think it is very important to emphasise that international aspect. As has been pointed out earlier on in the evidence, of course this is not just a global phenomenon, but the fact is the UK is a relatively small part of where the critical decisions will have to be made. That has a very strong effect on the public's perception of the significance of this, so it is really important that we engage very closely with the major players—obviously the US and China—in this process, and we are heavily engaged in precisely that, in that context; it goes beyond just the question you raised.

Professor Sutton: Just briefly, obviously, the IPCC event is in September. It will not surprise you to learn that the IPCC is offering media training to anybody who wants it or who feels that they need some more. Perhaps that is partly learning lessons of the past, and that is a good thing. I and others will be in Stockholm and there will undoubtedly be an awful lot of dialogue, I hope, after that meeting. The Natural Environment Research Council is also discussing whether, in addition to the events that we have heard about, there may also be some further communication events.

Professor Womersley: The lead research council for this will be the Natural Environment Research Council. The best way to do this is to use the researchers and the institutes of NERC, but there is also a NERC magazine, which is distributed widely, to raise interest in this and there may be some RCUK communications around high-profile events like this as well.

Q66 Roger Williams: I think Professor Womersley said that publicly funded scientists have a responsibility or expectation to engage with the public about their work. Do you think there should be an expectation that scientists should get involved in the policy debate as well?

Professor Womersley: That is one where individual scientists need to make that decision. All of us believe that scientists, especially if they are in receipt of public funding, should explain the results of their research. The dissemination of the research is part of what we are supporting. When that goes into areas of public policy, there are certainly some areas where scientists feel they have a moral and ethical duty to explain what this might mean. Public health is an example. The first scientists who discovered that smoking caused lung cancer felt a very strong moral obligation to try to change public policy as a result. In other areas, social scientists and statisticians feel that they are observing a system and they should not be interfering with public policy. I know and respect environmental scientists who take both views here, but I think it is completely appropriate for scientists to become involved in the public policy debate, if they wish to, to make sure that that debate remains evidence-based, but it is not mandatory, in my opinion.

Professor Sutton: There is obviously a distinction. When you say, "get involved in the policy debate," there are two ways of doing that. One way, which scientists certainly should be involved in, is explaining, on the basis of the available evidence, the potential consequences of different policy choices. That is very different, of course, from advocating any particular policy.

Professor Palmer: I will just follow that up to say that, if you ask me, "Has global temperature been rising?" I will say, "Yes." If you ask me, "Is it due to mankind?" I will say, "In large measure, yes." If you ask me, "Is that due to greenhouse gas emissions?" I will say, "Yes." If you say, "If we continue to emit greenhouse gases, will temperatures continue to rise?" I will say, "Yes." If you then ask me, "Therefore, should we cut our greenhouse gas emissions?" I will say, "That is a policy decision, and it is not for me to say." It comes, in a way, to this issue about trust. If you can present the science in a disinterested way—if I can use that word—where you are not pushing a policy, you are just saying, "Here is a societally important problem. What can I, as a scientist, say about it that is independent of policy?" that can be

important in winning the public's trust about at least understanding the serious nature of the threat of climate change.

Q67 Roger Williams: I think we on this Committee are always very taken by the quality and expertise of scientific advisers to Government, both on a Departmental level and right across Government, but are they somehow a wasted resource and should they be more outward-looking and speaking to the public, as well as advising Government?

Professor Palmer: May I just say that I think the Committee on Climate Change has been extremely effective, not only in advising Government but being very prominent in the public eye, so in communicating climate change? That has been a very successful creation of Government, which really does serve two quite distinct functions and both quite successfully.

Professor Womersley: We have talked a little bit already about the importance of two-way communication and dialogues. One area is where dialogues are with relatively small targeted groups, so that you can have an in-depth discussion, as sometimes takes place here in the museum. That is very important in the formulation of policy: for Government to understand what the public's attitudes, concerns and issues may be around policy, what level of evidence is necessary and what level of understanding is already there. So when we talk about dialogue we are not just talking about dialogue with researchers. We are talking about dialogue around policymaking and understanding the implications of the evidence that has been presented by scientists.

Professor Pethica: To address your point very specifically about the Government science advisers, there are numerous reports, as you will be aware, from Select Committees on exactly this subject. Of course, there are the usual constraints of being involved in the civil service, totally independent and so forth. I just want to make a general remark. We are having some nice, if you like, simplifications here. Scientists come in neat little packets: this one is a civil servant; this one is publicly funded; this one is independent. Of course, the reality is they are all mixed up in various ways. Funding comes in from all sorts of sources to people in work, everything from their own private resources through to strictly public service. The important thing to recall is that the process of science itself should be the same for all of them, which is looking at the evidence—discussion and debate of the evidence.

Q68 Roger Williams: Do you think that Government scientific advisers should speak about their own research?

Professor Pethica: In the sense that they have a specific competence in that area, it would be sensible to do that. On the other hand, if one is dealing with a very broad subject of science, it is not possible for anybody to be an expert in more than a small number of those areas. That is the reality of science these days. What one should do, and what the scientific advisers do, is when you require some specialised evidence, or some specific experience, you can call upon that. That is the purpose of entities such as the Royal Society and other organisations here represented: to provide that expertise when required.

Q69 Roger Williams: Do you think, on climate change specifically, there should be a more coherent and concerted approach to delivering a message by the Government scientific advisers?

Professor Palmer: As I say, I think in climate science we are rather unique in having this IPCC framework, which really is a consensus of world scientists. It is not just the UK or the Royal Society; it is the whole world. This is the key evidence that Government scientists and others should draw on, because this really does represent the entire community.

Chair: We are in the Science Museum. It attracts a lot of young people, so the background noise might rise as we carry on, but we will try to make each other heard.

Q70 David Tredinnick: As far as communicating science is concerned, one of the most important points came up in the first panel, and that is that younger people are simply not buying newspapers. I think newsprint is in decline at a rate of 10% per annum, so they are going online and making their own stories and I think this works very much in favour of science. What do you think about the role of scientific societies generally in this debate? Should they be doing more to get people to focus on climate change? What are your views on that?

Professor Palmer: I can speak a little bit about both the Royal Society and the Royal Meteorological Society, of which I was President. In the Royal Meteorological Society, of course, climate is an absolutely central issue. We have many outreach events around the country, in different regional centres, where scientists would talk to both the public and amateur meteorologists about climate change. We recognise what you are saying, and we have just set up a new communications group about climate change, and all the issues about social media and other forms of communication are very much rising to the fore. As I say, the big issue, for me, is trying to package new outreach in terms of what is the new headline, what is the new story that you can link it to, to publicise it? That is always the challenge.

Professor Womersley: It is also important that we do not get over-focused on particular issues at particular times. We need to have a more scientifically literate public, because there are many interconnected issues that have big implications where we will be looking at the balance of evidence from various scientific studies. There is educating young people, for example, in what science is and how it reaches conclusions, what uncertainty is—we talked about that—and what risk is, before we get into a push on a particular issue. I think STEM skills in general, which will benefit the economy hugely, will also benefit an informed electorate that is able to make decisions on these kinds of issues.

Professor Pethica: The short answer to your question is that absolutely yes, we should be engaged with them. We should also go into it with open eyes,

because again the rate of change, and the means by which those things are focused—this is not all Marshall McLuhan, although there is some of that in there too: "the medium is the message". We should be aware of the fact that that is a very highly dynamic system and it is not yet entirely clear how those networks will work out, but it is absolutely right that we should do so.

Q71 David Tredinnick: Professor Pethica, the Royal Society has had its own internal debates, some would say battles, about publishing information. Do you think that has been healthy, and what has been learnt from that?

Professor Pethica: Are you referring specifically to climate or more generally?

David Tredinnick: I am referring to both. I am referring to climate, but I just wonder how you feel about the internal debates that have been going on.

Professor Pethica: First of all, the fact that there is debate is not news. What one should be doing is looking at the weight of the views. Every subject that we have, there will always be somebody who does not like something. This is perfectly normal and so, as a result, what one should do is have a discussion and debate about that process.

I just want to address the general question you raise, which of course is part of our report on open data and open access and all the rest of it, as you will be aware, which is a recent thing. It is absolutely critical that all that is available to anybody who wishes to read it. Whether people will be able to assimilate all the information in that at the detailed technical level is another question, but at least it should be all open and available, and we very strongly adhere to that policy, as you will realise from our documentation.

Q72 David Tredinnick: Finally, do you feel that you have any obligations as you receive public funds?

Professor Pethica: Of course.

Q73 David Tredinnick: What are they?

Professor Pethica: The public funds, in our case, are used almost entirely to fund young researchers at the leading edge of their subjects and so the primary obligation is to make sure that they do absolutely the best work that is possible for the UK. That is the primary objective. The other work that we do is all about essentially the quality of what is done. It is the quality and calibre of science and that is the primary objective: the best use of that money.

Q74 Pamela Nash: In previous evidence we have heard that commentators, including politicians, because they have a higher profile, find it a lot easier to get their message across—because they get that media coverage—than the average scientist. Do you think it is possible for scientific societies to try to raise their profile, in order to make it easier for scientists to access the media?

Professor Pethica: I seem to be doing a lot of talking at the moment. Again, I would agree with you entirely that there is a need to better engage, and you are right that we should be making it easier for scientists. It could be that the new media, so-called, is the way in which that should be done, but we should also not forget the importance of past achievements, in the sense that there is a great deal of scientific information out there that has been accumulated at considerable expense over the years. It is very important that that is properly presented as well, not just in the deficit model, but in terms of people being able to look at what the evidence was, what it is, and what it is likely to be in the future. So I agree.

Professor Palmer: I had a slightly mischievous thought, which I was trying to decide about, but I think I will say it. If you are right—and I am sure you are—that politicians do have a natural affinity with the media and engage with the media more readily than scientists, I would be very happy to provide you with an application to join the Royal Meteorological Society. In that way, maybe we can, as a society, be more successful in engaging with the media, so please do contact me afterwards if you think you can contribute.

Professor Pethica: May I just add a reminder of our MP-Scientist Pairing Scheme, which is an excellent experience. I cannot comment from the politicians' point of view—you are the experts—but certainly for the scientists it has been an excellent experience and we would love to expand it.

Q75 Pamela Nash: That is two interesting and unexpected invitations this morning; thank you very much. Turning that on its head, rather than the media contacting or scientists finding it difficult to get into the media, what concerns do scientists have that may prevent them from talking about climate, and does this mean that when media outlets are looking for scientists to discuss this, they may find it difficult?

Professor Sutton: To be blunt, the biggest concern is time. It is very time-consuming, so opportunity is one thing, but of course we are all torn between doing our core business of the research and how much time we spend talking to the media, the public and so forth. That tension will not go away. There obviously are concerns about whether reports will be accurate, and that certainly puts some people off. Over time, that is an issue that can be addressed through training. It gives people greater confidence that they can say what they mean and there is at least a decent chance that what they mean will be reported. Beyond that, I do not think I have much more to add. I think there has been progress. Probably only five or so years ago, there was much more suspicion of the media within science generally, and perhaps particularly within climate science. That has lessened and that is definitely healthy. People have understood that it is part of our responsibility to meet the media on their terms somewhat more.

Professor Palmer: One thing I would just like to add, coming back to something I said earlier, is that the media often look for very simplistic messages. They might say, "Are we all going to fry? Are we all going to die 100 years from now? Is the planet going to be boiling?" The truth of the matter is that the science is uncertain, and what we can do is try to estimate risk or threat. We can say that the threat of major climate

change is quite unequivocal, but saying that there is a threat is not the same as saying that it will happen. This is the nature of the dialogue: how big does that threat have to be before it is worth taking action? That is where the science and the policy interface.

Expressing this notion of uncertainty and the fact that one can only really make reliable predictions in a probabilistic way or a risk-based way is sometimes a message that a media person does not want to hear. They want to hear something very clear: "We are all going to die," or "It is going to be wet for the next 10 years," or whatever it is, whereas the science is not as simple as that. That is an area where scientists do still struggle in their engagement with the media: trying to be scientifically honest on the one hand, but giving enough of a story for it to be a story in the papers on the other hand.

Professor Pethica: It is perhaps inevitable that there is a tension there, because scientists, of course, are trained to look at physical science evidence and the data, and the questions you are asking are precisely ones about human behaviour and human decision making, which again politicians have a lot more experience in, and that is quite a different process. Science content alone, which people are trained to focus on, is not enough, and so it is good that there is an increasing experience of that, but it takes people outside their expertise.

Professor Sutton: Just to add one thing that is slightly off-topic, but it relates to something we were talking about before about the media process. A lot of us have experienced the difference between the discussion with the journalists and then the role of the editors. That is most obvious in terms of the writing of a headline, which may often bear little resemblance to the content of an article. There is an issue here partly about the education of editors maybe, although editors are basically there to sell papers. The link is back to the question earlier about the BBC. It does seem to me that there has been some significant progress in terms of editors better understanding the issues around the communication of science. I had some personal experience of that in discussion with an editor around what constituted balance in the context of a particular issue, so that is a good thing.

Professor Womersley: I would just like to add a mention of the role of the Science Media Centre here, which has demonstrated over the last few years a very good role in helping scientists access the media and helping the media access scientists, and dealing with some of these questions about who is a reputable voice to talk to, and so on. Again, that is something that has shown there is an appetite in the media to engage with science, so in some sense we are pushing at an open door as long as we can provide people who are trained and resourced to make use of that.

Q76 Chair: A final question, if I may, but before I ask it, I fully endorse Professor Pethica's plea for more MPs to join the Royal Society Pairing Scheme. I was involved right from the outset, and I think it is a fantastic scheme. Maybe one of the things we could do to develop it is invite the scientists to ask us how we deal with the media. That is a little bit of feedback, because we do develop a certain amount of skill in this field, sometimes with great failing, but there you are.

A final question: we heard last week in our session that in 2012 there was some focus group work done on the public collective memory of Climategate, and it is not as strong as people think. Do you think the scientific community has forgotten it, and what have been the effects, positive and negative, of Climategate when it comes to how climate scientists engage with the media?

Professor Palmer: I think it lives long in scientists' memory, for sure, and I have to say that we are probably slightly more careful with what we write in e-mails than we were previously. As I say, I think the frustrating thing about the so-called Climategate episode for most scientists is that none of it detracted from the basic science, and that was clearly found by the various inquiries. Equally, I think many of us found it frustrating, in our dealings with the media, that we were unable to put that message over. As I say, it comes back to the issue of what is and what is not a story. Climategate was a story. "Scientists say this does not undermine climate science" is not so much of a story. For me, one of the big messages, to which I still do not know the answer, is how to get that balance right in the media.

Professor Pethica: Again, it probably crystallised a number of things that have been happening not just in climate science. We should recall all the stuff about medical trials at the moment. I am sure you are all well aware of the discussion on how that is reported and so forth. What is essential in this is producing a balanced, traceable, trackable, open record of what is happening. In that sense, you could argue there is a positive element of it, but I would agree with Tim's point that, in terms of the science that is done, it was rather something of a distraction.

Professor Sutton: Also briefly on the positive side, it has contributed to some debate about how to make climate science more open, and this is not easy. Obviously, the focus there was on climate data, but also one of the major tools that we all use are big computer models, computer simulations. These are incredibly complicated pieces of code. There is nothing hidden about them, but there is some debate now about how to try to make them more open so that other scientists could come and look at them, and so forth. That debate is not concluded, but it is a healthy debate to be having, so that is a good thing.

There certainly were lessons around the need for the climate science community to be more proactive in communications. The community was criticised at the time of this event for being just too silent, and I think some of that criticism was fair.

Chair: Thank you very much for a most interesting session. As you appreciate, we have to get back to Parliament for a fairly important afternoon, in terms of the national economy and, more particularly, reflecting our interests, to make sure that we do our best to protect the science budget as well. Thank you very much for your attendance.

Wednesday 17 July 2013

Members present:

Andrew Miller (Chair)

Stephen Metcalfe	Sarah Newton
David Morris	Graham Stringer
Stephen Mosley	David Tredinnick
Pamela Nash	Roger Williams

Examination of Witnesses

Witnesses: **David Jordan,** Director of Editorial Policy and Standards, BBC, **Ralph Lee**, Head of Factual, Channel 4, and **Fiona Ball**, Head of Environment and Engagement, BSkyB Limited, gave evidence.

Q77 Chair: I welcome the witnesses to the session this morning. For the record, I would be grateful if the three of you would formally introduce yourselves.
Ralph Lee: My name is Ralph Lee, head of factual programmes at Channel 4.
David Jordan: I am David Jordan, director of editorial policy and standards at the BBC.
Fiona Ball: I am Fiona Ball, head of environment and engagement at BSkyB, so I look after environment strategy for the group.

Q78 Chair: Thank you. First, we were slightly baffled that some organisations were not terribly keen to give evidence to us. As professionals in the industry could you speculate on why that is?
David Jordan: I hope I can do more than speculate—I can give you a reason. There are fundamentally two reasons why the BBC always looks carefully at its appearances before Parliament, not just before Select Committees. First, we seem to be doing an awful lot of it these days and there is a general desire not to appear more often than we absolutely have to. Secondly, we jealously guard our editorial independence, so for us it was a question of making sure that the session that you wanted to conduct was not going to impinge on the editorial independence of the BBC, which is one of its most important attributes. We simply sorted that out with your Clerk and, through your Clerk, with you, and, once we were satisfied that was not an issue, we were happy to come along and talk to you.
Ralph Lee: On behalf of Channel 4, I can underline only the same point about editorial independence, which is something that we preciously guard. It will always be a factor in our discussions about appearing before Parliament.
Fiona Ball: We were happy to attend to discuss these issues with you.

Q79 Chair: It is fairly obvious that climate scientists have learned the hard way that lack of transparency has a tendency to cause bad press. Has that been a problem for broadcasters as well?
David Jordan: I don't think that has been a problem from the perspective of the BBC. We approach this in the same way we approach all the other subjects that we deal with. The issue of transparency and accountability is one that I know the BBC has taken enormously seriously over the past five or 10 years, and it has increased the levels of transparency hugely. We are accountable to our licence fee payers and our audiences via the BBC Trust. That also holds us accountable for what we do, what we broadcast and how we broadcast it, and what perspectives we offer on whatever subjects we are dealing with. I do not think that transparency is a particular issue in relation to this subject. In general, the levels of transparency and accountability of the BBC have hugely increased over the last five to 10 years.
Ralph Lee: As to general transparency, I represent the programming floor of Channel 4. I am a commissioning editor, so my main responsibility is generating the programming that you see on air. From my perspective, Channel 4 is a very transparent and open organisation, and I do not think there is a lack of transparency in our processes and the way we operate.

Q80 Chair: In some respects, there is a possible disconnect between what you do as corporate organisations about climate change and your editorial approach. In terms of the BBC in particular, we were impressed by the work done by Steve Jones for the BBC Trust. I understand from some of your colleagues that that is still having an impact on the way science is reported. Is there still a disconnect?
David Jordan: I am not entirely sure I know what you mean by "disconnect." There is an obvious difference between the way in which we approach any subject editorially and corporate positions that we may take on something. Today, we could have fielded Fiona's equivalent in the BBC who is in charge of making sure the BBC reduces its energy footprint to the greatest possible extent and does various other things that might be regarded as part of a corporate social responsibility agenda, but that is kept completely separate from what we do editorially and the huge number of editorial decisions we have to make about the subjects we cover on a day-to-day, month-to-month and year-to-year basis. I don't think there is very often any impinging of one on the other, and you can see that most clearly when the BBC has to report about itself. Almost uniquely, the BBC is prepared to report about itself in a way which is not always, from a corporate perspective, entirely helpful. None the less, our journalists feel a duty and keenness to do that, whereas in other media organisations that perhaps would not be greeted in quite the same way by the bodies' corporate entities. There is a substantial distinction between the corporate and editorial positions we take.

Ralph Lee: That is as entirely true of Channel 4 as it is of the BBC. The editorial independence of the commissioning floor is not influenced by the corporate positions that Channel 4 in general takes.

Fiona Ball: With respect to Sky News, editorially it is independent and separate from what I do, but at Sky we see an opportunity to engage wider consumers with our 10.7 million consumers on issues of climate change. We look at ways in which we can engage people in a positive manner in the solutions to climate change, although we do not touch on the science itself. In addition, we have joint venture partners that we carry on our platform and that go into the facts and science behind it, like National Geographic, the Discovery Channel and so on. Sky as a corporate takes the very strong opinion that we have an opportunity as a broadcaster to engage the public on these issues of how, particularly, we can work around the solutions to climate change.

Q81 Chair: Mr Jordan, the BBC did not choose to submit written evidence. Was there a reason for that?

David Jordan: There is no reason not to submit written evidence, other than we hope that I will be able to help with as much as you need to be helped today. If there are any outstanding matters that I cannot help you with today, we are happy to address those in writing if you need it.

Q82 Chair: If, after the end of today, you feel there are things that you can add, it would be helpful to have a formal note from you.

David Jordan: Certainly, or if there are things that you require of us as well.

Q83 David Morris: Evidence to the Committee strongly suggests that the media, especially news broadcasters, are central to public understanding of climate science. Would you agree?

Fiona Ball: Obviously, I cannot speak on behalf of Sky News because of its independence. It is a 24/7 rolling news programme, so climate science issues or any story would be dealt with in the same manner, depending on the subject matter itself. I cannot comment, except that public understanding needs to focus on what the public can do. Climate science is a very complex issue, but as a wider, general proposition it is very good to focus on what individuals can do to make a difference and provide a solution.

David Jordan: The BBC believes that it has an important role to play in explaining climate science, climate change and global warming, if that is what is happening, to its audiences. All our evidence is that, although we do not have specific evidence of climate change itself, the BBC's audiences expect it to deliver high-quality programming that is informative and educational about science in general and, therefore, about climate change in particular. We would regard ourselves as having a duty to inform and educate our viewers and listeners on any major topic facing the world or country, or any major topic that is of great interest to the political leadership of the country, and to explain that in detail to our audiences so they can make up their mind what they think about it. That is what we endeavour to do in a variety of ways.

Ralph Lee: There is no doubt that broadcasting has a huge responsibility in helping inform the public. Ofcom data suggest that broadcasting has a far greater influence than newspapers, magazines or other media, so that is a responsibility we take very seriously. Channel 4 is always mindful of the fact that it is our job to do something different. There is a point of difference to Channel 4, which is written into our remit. Whereas the BBC will cover the waterfront of a subject like climate science, Channel 4 will always look at it for ways in which it can be new, different, alternative and diverse from new perspectives. Those are the kinds of principles with which we approach it.

Q84 David Morris: The Royal Statistical Society said last week that generally the media have to try to illuminate issues rather than use statistics to sensationalise. Do you accept that that statement often applies to media coverage of science issues?

Fiona Ball: When looking at climate change issues, it is important to put them in the perspective of stories and story-telling that people can better understand. Rather than cite facts and figures, you need to paint the whole picture for people in a story-telling way.

David Jordan: I do not think it is desirable to sensationalise the coverage of any subject. That does not mean to say there will not be times when there are controversies around the politics or policy of particular issues, which, if I may put it this way, may give rise to some heat as well as light being cast on the subject. We should not shy away from that; indeed, we have programmes that do not shy away from that, and are very accessible to the public as a consequence. For example, "Question Time" gets large audiences, on the basis of sometimes fractious but always robust debate. I do not think we should shy away from that, but, on the other hand, we are not looking to sensationalise in those circumstances. The most important thing we need to do is make sure we can inform the largest number of people to the greatest possible extent. That means finding ways to report science in a manner that is accessible to large audiences as well as smaller audiences already interested in the subject. We take our responsibilities seriously in that way, but we are not seeking to sensationalise things.

Ralph Lee: To add a bit of context, as we are talking about this subject we should recognise that communicating science by broadcasting is tremendously difficult. One of my responsibilities is history programming. If I am working with Niall Ferguson, David Starkey or Andrew Roberts, translating what they write in a book or academic work into a piece of television is a relatively easy process, because there is narrative, a big picture and structures and theories that are not that difficult to reduce into the form of television. Science does not like to be reduced into the form of television. The detail of it is much more complex. If you simplify science, you often make it wrong, so the process of working with science is by degrees much more complex than the process of working with other subject areas. That is very true of climate science. For

a broadcast medium that needs narrative, story and some form of revelation—you might call it sensationalism, but ultimately we market ourselves to our audience every day; we have to appeal to our viewers. Putting public information on every day would not do any of our organisations justice, so the process of trying to make climate science understandable to an audience and put it within the frame of television so it is attractive to them is really difficult.

Q85 David Morris: It would appear to us that the public see broadcast information as a trusted voice, and do you accept the responsibility that comes with that status?

Fiona Ball: I would hope they do see us a trusted voice, and we take very seriously the big responsibility around ensuring that all the information we put on air is factually correct. As a result of that, for all of our programming we use a range of expertise to ensure that any facts we have on are properly checked by both our compliance team and our expert panels. We use a number of different organisations, including the British Antarctic Survey and WWF. As part of Sky, we have very strong partnerships and relationships and ensure that we engage with them at every single step in the process.

David Jordan: We know that audience trust in our BBC news and factual programmes is incredibly high, even higher than that of my illustrious colleagues from Sky and Channel 4. That is critically important to the BBC, not least because it is the foundation on which the BBC rests. It is very important to us to make sure that we adhere to our core values of accuracy, impartiality and maintaining levels of trust in what we have to say on this and on many other subjects but across our science coverage in general. That is a key issue for us.

Ralph Lee: Trust is hugely important to us too, but I come back to the point that the audience expectation of Channel 4 is to provide something different. What they trust us to do is not just to be factually accurate and represent the facts but also to provide alternative points of view and make them think differently about subjects. When we do audience research, these are the metrics on which the audience judge Channel 4 most favourably. That is their expectation of us, and that is in line with our remit. We are there to provide an alternative often to the BBC and other broadcasters.

Q86 Chair: Mr Lee, can I pick up a comment you made about science programmes being hard to make? To take the opposition, Mr Jordan's corporation does fantastic work. Great pieces have been done by Brian Cox, Attenborough and so on, but clearly they are very expensive. By "difficult" do you mean "expensive," or is there something more to it?

Ralph Lee: It is both. If you look at the cost of making a natural history programme, it is almost as expensive as drama. To make the quality of programmes that the BBC offers in a genre like science is very expensive, but I also think that the quality of the programmes you point to with Brian Cox and the "Horizon" unit at the BBC is an exception globally. We should recognise that quality. The BBC is the exception, not the rule, because it is extraordinarily skilled and well resourced in making those programmes and finding and developing science communicators like Brian Cox and Alice Roberts.

Channel 4 as a publisher/broadcaster does not have any of the in-house production that the BBC has. When we talk about science at the BBC, we are talking about quite a large and well-resourced unit that makes programmes and provides radio and online material based in London and other parts of the BBC around the country. When we talk about science at Channel 4, it is me, one science commissioning editor and all the external suppliers that Channel 4 relies on for all its programmes, because we do not have any in-house productions. We rely on the independent production community to provide the kinds of resources that the BBC has in-house. The truth is that science programming is expensive and not a very commercial genre. In the last 10 to 20 years, the number of different science specialists in the independent sector that has got more commercial has reduced. Finding that expertise in our supply sector is not always easy.

Q87 David Tredinnick: Mr Lee, you said earlier that you had a responsibility to inform, but I put it to you that coverage in the media of climate change has gone down in recent years. Is that because audiences are just not interested in climate change any more and what scientists have to say about it?

Ralph Lee: There are two different streams here. One is the news, for which I should say from the outset I am not responsible, although I am aware of its work. Tom Clarke, our science editor, is very keyed into this issue and keen to get climate issues on to the news. He needs something to report. Often, there is not that much new to report, and that can be a problem.

In terms of general science programming, you cannot keep making the same programme over and over again, so I need new material and need things to happen, or to find new and creative approaches or editorial points of view to continue to inform. We cannot just keep informing the public in a straightforward way and say, "Here's an update on what's going on in climate science." Those updates are generally quite complex and do not always lead the public in the direction that a Committee like this might want them to be led. The current perspectives coming from the science community are revising a lot of the data around potential rises in global temperature in a way that is not going to pull the public necessarily in a way you always want to. It is not as simple as saying that every year we should have a certain number of programmes on this subject. We need something new, or a new creative approach, in order to drive it.

Q88 David Tredinnick: You are saying, in other words, that you can have only so many polar bears on a block of ice.

Ralph Lee: Yes, because there is a negative effect if you hit the public with the same information over and over again. We get climate themes into programmes that the public might come to thinking they are watching a programme about floods, weather or

animal anatomy. There are lots of environmental and climate-related things we are able to put into other programmes, but if a programme has "climate change" written over the door that is not necessarily a great audience draw.

David Jordan: It would be wrong to look at whether the amount of material done on climate change at the moment is about programmes purely to do with that subject. You will find that the notion of climate change infuses a whole range of programming that we do at the BBC and also our news coverage. I am talking of things like energy policy where it is very rare for us to do a piece about energy policy, nuclear policy, windmills, the closure of coal-fired power stations and the opening of gas-fired power stations. Almost always, those issues involve a reference to the overall policy framework in which those things are happening, and the overall policy framework is one of climate change.

Similarly, when we do natural history programmes, about which Ralph was being kind a moment ago, very often we are talking in programmes like "Springwatch" about the difference between this spring and spring 10 years ago. Is there any climate change involved? The other day I was reading an article in *The Economist* about wine producers in this country. It told me that it is now possible to grow grapes that could never be grown in southern England before and bring them to ripeness. Ten years ago, it was not possible. There are observable things happening in the natural world that get built into our coverage. It would be wrong to think that, unless the programme says on the tin it is about climate change, there is nothing going on about climate change.

Having said that, in news, clearly, what we follow are scientific, political and intergovernmental developments. News is about change and things being different. We pick up on those at a continuous rate. Even there, it is not always the case that you can judge whether or not a subject is at front of mind simply by the number of pieces about it, because it is question of what it is competing with. Did the amount of coverage of climate change go down when we were going through a major recession? It probably did because most of the big stories at the time were about that subject. There is always a context in which news decisions are being made. What else is on the agenda? What else is happening in the world? Generally speaking, we have been maintaining a pretty consistent level of coverage across our science programmes of issues to do with climate change, and we have been following developments pretty closely in our range of news coverage as well.

Fiona Ball: On our joint venture channels, the coverage has remained the same with respect to climate change or wider environmental issues. Over the last three or four years, we have tried predominantly to increase our programming that looks at environmental and climate change issues in a different and engaging way for a different audience to try to reach beyond those who are interested in it day to day. We have looked at opportunities using our talent to engage people in quite a different fun manner on Sky Arts, Sky1 and even Sky Movies to try to break into a difference audience.

Q89 David Tredinnick: To what extent do you think you are following or setting an agenda? Where is the balance here? You have just said that, in a recession, people are more interested in jobs than climate change. To what extent do you feel you are following the issue as it appears or trying to set the agenda by saying, "Our viewers feel strongly about this, or they ought to feel strongly about it, and it is going to be a priority. Channel 4 is going to drive this issue"?

Ralph Lee: There are a number of good examples of Channel 4 taking an issue and driving change within it. One of the things Channel 4 can do that the BBC cannot is campaign on issues and take polemical points of view.

Q90 David Tredinnick: Which ones?

Ralph Lee: For instance, Hugh Fearnley-Whittingstall's "Fish Fight." He took on a clear issue under the European fisheries policy about discards. He campaigned very hard against it and brought a huge amount of public will and campaigning with it. We changed people's behaviour in the supermarkets. You could see people at Waitrose buying different fish and that influenced fishing. In climate, it is difficult to do that, because what are we asking people to do? What behaviours are we asking people to change? What outcomes do we want to achieve, and who is going to take that on as an issue? There is a danger of it having a negative effect on the public if everything about climate is doom and gloom and the solutions are widely contested. One of the difficulties is what we should do about it and the degree to which we should respond to climate change. There are great degrees of contention around that, and some of it leads to a bit of confusion on the part of the public.

David Jordan: To us, what you refer to as agenda setting would be responding to audience needs. We follow the agenda—in the sense that we report it—the agenda set by government, scientists and others in this subject as in many others. Equally, we then look at what we think our audiences are interested in and where we think there may be a deficiency in their information about an issue. Where we think that is the case, we are quite prepared to do major events and programming around those issues, try to bring the audience up to speed, explain to them what the situation is and give them the information they need or require. I would not call that agenda setting in the sense of campaigning, because the BBC does not campaign—but agenda setting in the sense of making sure our audiences are up to speed with something if we feel they are not at the time. That might very well have occurred in the early stages of climate science, where people were not familiar with the notion that adding CO_2 to the atmosphere results in global warming. We felt we had a responsibility to make sure they were aware of the scientific views on that subject.

Fiona Ball: We have a very close relationship with our customers. The only reason we do rain forest programming and "Sky Rainforest Rescues" is that we asked them what they would like us to have a look at as an environmental issue.

Q91 David Tredinnick: That makes you different from Channel 4 and the BBC, in that you have a survey system and go out and talk to your audience.
Fiona Ball: Yes, and we do it on an annual basis. We want to understand what our customers want. We are a pay television service, so we want to engage with them and understand what they would like to see from us. As a result of that survey and the work we are doing—for example, around "Sky Rainforest Rescue" and WWF—we know from the start of it that 43% of our customer base of 10.7 million are engaged. They have seen our programming and initiatives around "Sky Rainforest Rescue," which is a considerable increase in awareness of what we are doing.

Q92 David Tredinnick: We have been told that politicians—us—are central to ensuring that a subject remains topical to broadcasters. Do you think that applies to climate change? To what extent are the issues driven by politicians? How important is political input and politicians raising the level of awareness? How do you see our role in climate change? Speak frankly. This is your chance to have a pop at us.
David Jordan: As a former editor of political programmes in the BBC—"On the Record", "The Westminster Hour" and so on—you might expect me to say this, but the fact that politicians, the Government and the Opposition take this seriously is very important. It is very important to the BBC to make sure people understand the preoccupations and priorities of politicians so that they can make up their own mind about things as well. It is a development in the sense of news. We have a lot of political correspondents, whom you all know, across the road, who will be interested in what politicians have to say. Politicians driving an issue and talking about its importance and policy developments in relation to it will be clearly important to our news agenda, and we would always take that seriously.

Q93 Graham Stringer: What has changed in the BBC's coverage of climate science since the independent review of Professor Jones?
David Jordan: Professor Jones said that we should do a lot of process things. He said we should bring in a science editor. We brought in a science editor, David Shukman. He said we should get together some sort of forum that would be able to discuss science issues in general across the BBC, not just restricted to news but across all of our output. We put in place the science forum. He said we should generate more training in science and climate science for our journalists, and we have put that in place. It is a face-to-face course that so far over 300 journalists on band 10 and above in the BBC have taken.
He also made one recommendation that we did not take on board. He said we should regard climate science as settled in effect and, therefore, it should mean we should not hear from dissenting voices on the science of climate change. We did not agree with that because we think the BBC's role is to reflect all views and opinions in society in its output, and we have continued to do that. He also said that we should develop our links with scientists, and we have continued to do that in a number of ways. He had an important effect on the processes that we follow in trying to do the best we can in reflecting science to our audiences.

Q94 Graham Stringer: Who provides the courses for the BBC?
David Jordan: The College of Journalism.

Q95 Graham Stringer: On the science.
David Jordan: Yes.

Q96 Graham Stringer: Is that not a bit strange?
David Jordan: No more strange than that it should provide courses on economics, politics and a range of other subjects.

Q97 Graham Stringer: What I am obviously getting at is: should it not be done by scientists rather than journalists?
David Jordan: No, I do not think that is the point. The point is to make sure that people are aware of the ways in which we cover science, and the impartiality and accuracy of debates around science from a journalistic point of view. I do not think it is strange at all. One of the other things Professor Jones suggested—forgive me for forgetting it—was that we should set up a series of seminars with scientists. The College of Journalism also now runs seminars with scientists and other people with a clear interest in science for our journalists. I do not think it is strange that we should do it through journalists rather than scientists. The question would be: if you did it through scientists, which scientists should be the ones you do it through, and would you end up more with a debate rather than a course that is trying to set out some of the basic principles of how we approach these subjects?

Q98 Graham Stringer: One thing Professor Jones said—I think it is a fair point—is that you cannot balance fact with opinion. One thing that irritates me about climate science coverage on the BBC is that quite often lobbying groups like Friends of the Earth or Greenpeace are put forward as experts in the area. They may or may not have a scientific background, but they are clearly lobbyists. Why do you do that?
David Jordan: There are two reasons. First, those people often have something to say and have said it and put it into the public domain. It is part of the news agenda, and you want to hear what they say and why, and hear them defend it against, hopefully, some robust questioning. It would be wrong to think that all people who work for lobby groups are not experts, although we would not treat them as experts in the same way we would treat scientists. Many people who work for lobby groups have considerable expertise in their subject matter, even though they may no longer be working in the field of science research or academic science. They have something valid to say. It is important how you contextualise that—who else you interview or talk to or debate with on the same subject and how you report on the subject so all of that is put into context. I do not think there should be some sort of ban on lobby groups on this or any other

subject. I say that as someone who started his career in lobby groups, so I want to defend them.

Q99 Graham Stringer: I am all for freedom of speech, and Friends of the Earth, Greenpeace and other groups have a view of the world to which they are completely entitled. My point is that they come to these issues with a particular bias. I will give you examples if you want them. Often, journalists on the "Today" programme or other BBC programmes just ask them for their opinion, and they are posing as experts. They may or may not be, but they are certainly lobbyists.

David Jordan: I think you will find that, when we introduce various groups, we often describe them as having a particular viewpoint they are coming from before we start, and the viewpoint they are coming from is pretty obvious when they start. I would be sad if I thought there were times when their views were not properly challenged, but they should be on the air waves, just as other people who take different views—the Global Warming Foundation or others—should be on the air waves and should be appropriately challenged as well. I am sure there are times when we fall short of the best standards to which we aspire, but I hope people try to ensure that when they do interview people of that sort they are challenged appropriately.

Q100 Graham Stringer: What do your audience insights say about your coverage of climate science?

David Jordan: What they say about science in general is that audiences expect us to cover science; 70% of them say they are very interested in science and want us to cover it in a way that reveals information to them. The major interest is in health and medical developments, but there is substantial interest in climate science, climate change and global warming as well. They rate what we do on the subjects very highly and want to see us continue to do it. Broadly, that is what they say to us.

Q101 Graham Stringer: How do Channel 4 and Sky measure the effectiveness of their coverage of climate science?

Ralph Lee: It is quite difficult for us, without the huge resources of the BBC, to measure the effectiveness and outcomes of individual subject areas that we cover.

Fiona Ball: We do not look at the science itself, but we measure our programming on general environmental issues, as we measure all programming, and it matches with any other factual programming that we have on air. We also have a tracker. We ask our customers every year about our programming and issues that we are raising and whether it is something they are aware of and are interested in. That is on the increase, so we regularly engage with our customers on it.

Q102 Stephen Metcalfe: I want to focus particularly on the way the news covers climate science. I recognise that none of you is responsible for news directly, but I would be interested in your comments. News is a competitive environment now; it is seeking out market share and saying, "Look at me." Is there a danger that, where the news reports scientific uncertainty, it can portray it as controversy in an attempt to gather market, and is that helpful?

David Jordan: There is always a danger that you can portray things in that way. You are right to identify that as an issue. Broadcasters, and indeed the whole of the media, have to pull off a particular trick, which is to get audiences interested in something and willing to listen and to view before they are able to explain what it is about. In a very competitive media environment, sometimes there is a temptation to controversialise things in ways that, at first sight, do not necessarily help to provide the information required. Very often, that is a superficial view. Those sorts of techniques are used to pull people into the subject. You see that most obviously in the titles given to some factual documentaries on Channel 4, if I may say so, and on our own BBC3 and elsewhere. The titles might startle you, but, when you get into the subject matter of the programming, you find they are very informative, educational and balanced in their approach. It is a question of sucking people in. Sometimes, we can give the impression that we are generating controversy unnecessarily in an attempt to get people interested and pull them into the subject matter, and to discuss it in ways that convey lots of information and that mean our audiences are much better informed.

Fiona Ball: I am going to find it quite difficult to answer this question. Sky News has strong editorial guidelines that are in the public domain for anybody to look at. Their core values are around balanced, fair and accurate reflection of the story.

Ralph Lee: I cannot speak for news because it is independent of the part of commission that I am responsible for, but, watching the way they cover it, they take their responsibility incredibly seriously. David may be right that occasionally in factual programmes we might sensationalise with titles and the framing of programmes to compete in the marketplace for television, but that is very rarely the case in Channel 4 news, and the responsibility you describe is taken really seriously.

Q103 Stephen Metcalfe: I recognise that great titles drag people in. They watch the programme and it puts it all into context. I am a bit concerned about where it is headline news, particularly where it may be only the headlines—"The end of the world is nigh"—and people listen to that without waiting to the end of the programme where item No. 14 then puts it into some form of context. If you accept that can happen, is that just the nature of the way the market is and the way news is portrayed these days? Can more training or information be given to journalists and news editors to try to avoid doing that, or is it just the world in which we now live?

David Jordan: We do not want any of those headline sequences to be inaccurate, wrong or misleading but, clearly, as Ralph was saying earlier, when you are trying to encapsulate a difficult subject in very few words, which indicate we are going to tell you more later in a news bulletin, or something like that, inevitably, boiling it down in that way can sometimes

seem a bit of an oversimplification and could be interpreted as controversial. That does not happen very often, but I do not think that is the inevitable nature of the media, in the same way newspaper headlines can sometimes not fully reflect the story that lies underneath them. I am sure most of my newspaper colleagues do not always do that deliberately. Inevitably, occasionally the headlines in a news bulletin are going to have the same effect, but we are not trying to do that, and we would be very concerned if it was inaccurate.

Q104 Stephen Metcalfe: So you think there is enough scientific literacy among journalists to avoid that happening too often.

David Jordan: We take a lot of trouble to try to increase the literacy of our journalists and the range of subjects. Obviously, we have specialists who I believe are of very high quality in the BBC. Our science editor, other correspondents specifically charged with science and those who make our science programmes have a very high level of literacy on the issues. If you have general reporters reporting on such things, it is important that they understand their limitations. We do an awful lot of training to make sure that people are aware of their limitations and get the kind of training that we were talking about earlier, which is to bring people up to speed, should they be required to be involved in science issues. We try very hard to ensure that happens, but we are not perfect and I am sure we make mistakes from time to time.

Q105 Stephen Metcalfe: Do your science editors monitor that output and, where they do see it, correct it? Do the science editors also engage with the scientific community to try to get their sense of how science is being portrayed?

David Jordan: Absolutely, or at any rate within the BBC. We do not monitor any of our output specifically in terms of taking down the date and particulars of every story we do, simply because if we did so we would need to employ a vast army of bureaucrats to do it and we would lose out on the amount of money we can show on screen and on air. That would not be a very sensible thing to do, but the editors of bulletins, programmes and channels and the science editor, environment analysts and other people are constantly across what we are doing. If they see or hear something on the air or online that they regard as deficient, they will quickly move to rectify an inaccuracy, if they spot it, or make up a deficiency in coverage, saying, "We don't seem to have done this subject and we think we should be."

There are regular monthly meetings between the science editor and the editors of our radio and TV science programming in which they take a general overview of what has been happening and what will be coming up so they can plan what kind of programming might be appropriate for whatever is about to happen. A lot of liaison between them, partly as a result of the recommendations in the Jones report, is now going on across the science community to try to make sure we do not leave big gaps in our coverage and have not given people all the information they should be getting.

Ralph Lee: The matter you are pointing to is more of a problem in the press than in broadcasting. People browse headlines much more readily. For Channel 4 news in particular, which is an hour-long bulletin with a small but very dedicated audience, who generally consume news at quite a sophisticated and deep level, there is much less of a problem in the sense of a fracture between the headline and the piece itself. I do not think we would find any cases where the headline had oversimplified it to the point of being wrong and misleading.

Q106 Stephen Metcalfe: You said in earlier evidence that you cannot keep updating the public about the same thing. First, why not? Secondly, if it is not your responsibility to do that, whose is it, and how can you get that out?

Ralph Lee: There is a difference between informing the public and public information. Broadly, it is our job to inform the public and cover important items that are key to our times. Channel 4 is clued into the major issues of our time and we try to cover them, but just to report on the slow progress going on within a subject like this by way of public information would be counter-productive. A programme like "Grand Designs" and a television figure like Kevin McCloud, who ostensibly has absolutely no relationship with climate change, probably does more in informing the public than a bulletin about how climate change science is being progressed, because the messages you find within "Grand Designs" about how building and material design is changing to be more energy-efficient are seamlessly woven into an aspirational editorial about people's hopes and dreams. If you are a consumer of that programme, over time the energy-saving messages are all there, and we hope that at some level our viewers are making the underlying connection between that and the bigger picture within the news about climate change.

Q107 Pamela Nash: I would like to develop some of the questions raised by my colleague and concentrate particularly on balance in factual programming, both documentaries and news. We have repeatedly seen examples of commentators rather than scientists speaking and debating climate change. I am not talking about the programmes you have just referred to, but particularly news programmes. You might have a commentator arguing against the existence of climate change. Do you think this is responsible programming when the scientific consensus is that climate change exists?

Ralph Lee: I cannot think of a recent example where a spokesperson for the view that climate change, and anthroprogenic climate change, is not true or real has not been balanced against the consensus view. There is a huge amount of contention as to what we should do about it, how long it will take and the projections for it. The fact that the public get confused and find it quite difficult to navigate around the very real and important debate about what the responses should be to climate change appears to suggest that there is an ongoing debate about whether climate change and man-made climate change is a real thing. It is not the case that the consensus is always found to be balanced

against a minority of deniers or dismissers of climate change. I cannot think of examples of that.

David Jordan: The BBC has accepted that is a danger. A bit of our editorial guidelines talks about the importance of giving due weight to different viewpoints in relation to any controversy, debate or anything on which we are required to be impartial. One of your earlier witnesses, Professor Rapley, referred to the false balance between the vast majority of scientific opinion and a small minority of scientific opinion. A debate between the two as if it is a 50–50 split is something we seek to avoid. We may have done that early on, but we would now seek to avoid that. We want to reflect the minority view, which is now different from that, but in the right context, and having a 50–50 debate on it probably does not do that.

Q108 Pamela Nash: To be clear, you say "early on," but the example we have is a year ago. A debate of the sort I described earlier happened in "Daily Politics" in 2012. Is that something that would not happen today?

David Jordan: It is difficult for me to comment on the precise example without knowing it. I am happy to look into it and come back to you. We have been saying for some time, since the Bridcut report in 2007, that the right way to do this is not to have equivalence between a small minority and a very large majority, but it is also right to continue to report the views of that small minority.

There are now very few people who say that no global warming is happening and it is not the result of man-made activity, but the debate has moved on to the precise ranges and all sorts of other questions. I would be disappointed if programmes were still having that false balance in discussing both the issue of climate science and some other issues too.

Q109 Pamela Nash: We can send you details of the programme we are talking about. Fiona, I am not sure what your involvement is in news programmes.

Fiona Ball: I do not have any involvement in news programmes; it is quite separate. Our programming within Sky does not really look at the science behind it; it looks at the solution. It tries to look at issues that come up time and time again in different and innovative ways that might engage different people. For example, as well as programming, as a broadcaster, we have a huge opportunity to engage our customers through lots of different media channels, whether that is social media—for example, Facebook and Twitter, which we do as part of it—or online blogs to support the programming and depth of information behind a particular fact, or issue, or programme. It is continuously looking at how we can revitalise the issues and problems in different ways to engage different audiences.

Q110 Pamela Nash: What is the process? When you are producing any programme that covers climate change, does part of the planning involve consideration of balance, and how would you define balance?

Fiona Ball: The balance is really around the scientific facts and science rather than the issues and solutions that need to be addressed.

Q111 Pamela Nash: When you say you do not do the science but the solutions, do you mean it is assumed that the science is correct and climate change exists?

Fiona Ball: From the corporate perspective of Sky, we think climate change exists and is a serious issue that we all need to address, and that is a very strong opinion we hold.

Q112 Pamela Nash: So programming on this issue is based on that opinion and comes from the viewpoint that it already exists and now you are looking at the solutions.

Fiona Ball: We are looking at the solutions from a Sky corporate programming perspective, separate from the Sky News perspective, obviously.

Q113 Pamela Nash: Can I put that question to both of the other witnesses? I am not a broadcaster, but I imagine there will be two different processes for documentaries where there is long-term planning and for quick reactive news programming. Are there parts of that procedure where balance has to be considered? Is that in the guidelines, or how does it work?

David Jordan: I prefer to call it impartiality, only because the word "balance" tends to get you to the false balance we talked about earlier. We do not express our impartiality through strict balance, except at times when we are reporting elections when we make sure we have representatives from all the political parties. Impartiality is a more subtle concept than that. Of course, our editorial guidelines, which I am sure you are familiar with—they are online and available to anybody in the UK and abroad—stress the importance of impartiality in approaching any matters that are regarded as controversial. The phrase used is "due impartialities," so it is the impartiality that is due in any particular circumstance, but in news and current affairs the highest level of impartiality would be required. Any programme maker in the BBC when looking at subject matter like this would be required to make sure that it was approached in an impartial way, either within a programme or report or a series of programmes or reports over time in which attention is drawn to the other episodes in the series at the time that you hear only one of them. There is a variety of approaches to that, but, we are absolutely committed to being impartial on any controversial subject. The subject of climate change has been controversial since the outset among a number of people, notwithstanding what I said about the majority of scientists being in agreement.

Q114 Pamela Nash: I am using "balance" rather than "impartiality" because I want to make sure we have got the same definition. It is not balance between two differing opinions; it is fact that is presented rather than opinion on something where there is scientific consensus.

David Jordan: There will be occasions on which you are reporting the science and it is about the facts. There will be occasions on which you are reporting the policy that deals with the science and it will be about fact and opinion. Clearly, there will be different debates that take place around this subject matter, so

you look at each of those debates differently. All of them have to be done in an impartial way either specifically in the item or over a series or over time.

Ralph Lee: In the forward planning of documentaries, we are not looking at how we can tackle this subject directly but more how we can infuse various different programming with the main themes of this subject. For instance, last year we did a programme called "Is the Weather Getting Worse?", which was about last year's extraordinary weather, where we went from droughts one minute to flood the next to an extraordinarily wet summer. Weather is a very effective way of connecting the public to issues of climate and climate change, because it is something they relate to and feel very directly. There has been a change in the last few years. Climate scientists are sometimes more willing to make speculative links between climate and weather. Up until now, they have been very reluctant to link any individual weather event with climate change.

We take as our position that there is not an ongoing debate about whether or not climate change is happening. There is a lot of debate about the severity of it, the speed with which it is happening and the degree to which you can link it to different weather events. When we talk about debate, we are past the point where the debate is about whether or not climate change is happening. There is not a sense of balance there because there is massive scientific consensus on that, and the debate, taking that for granted, exists in a slightly different space.

Q115 Pamela Nash: You have done a really good job of plugging programmes on Channel 4.

Ralph Lee: They are all available on 4oD, if you get online.

Q116 Pamela Nash: And lots of people go online.

David Jordan: Don't tempt me.

Q117 Chair: I have just been looking at a blog commenting on the Andrew Neil programme from last Sunday. There is a lengthy posting by two renowned experts correcting mistakes made. Maybe when you write to us you could comment on what you are doing to eradicate that kind of mistake. It is very difficult in that kind of rapid exchange programme, but it is critical that the lead journalist is properly briefed, is it not?

David Jordan: It is critical but also important that our presenters are able to put an alternative point of view to a Government Minister that has some support.

Q118 Chair: There is a difference between an alternative point of view and things that are factually wrong.

David Jordan: Yes. It goes without saying that we would not want factual errors in any of our output.

Q119 Stephen Mosley: The IPCC is producing its fifth report and will start to publish it at the end of September. When it did its previous report in 2007, it led to quite a frenzy of media coverage. When you have a big report like this coming out, what factors and considerations do you need to consider when talking about the coverage?

Ralph Lee: From speaking to Tom Clarke, I know that he is already working towards that as a news item, but what piece that will be, what place it will take, how big it will be and how prominent it will be will depend a lot on the report, what it says and how he can put that in the context of news. What is new in the report? It is very difficult to shape wider documentary output from a report like that. We will obviously look at it with interest and see where it leads us and whether it can inspire other factual programming, but principally it is an issue for news.

David Jordan: We would be only at the initial stages of planning for an event like that. Clearly, an IPCC report is a very big and important event in the history of this subject in terms of its findings and predictions and also its policy implications. I would expect the BBC to do extensive coverage, but we cannot always be absolutely certain because we do not know what else will be going on at the time we cover it. We will certainly be covering it, and there will be programming related to it on our Radio 4 science programmes, whether immediately at the time or soon afterwards reflecting its findings. To echo what has just been said, an awful lot depends on what the report says.

Fiona Ball: I'm sure our science correspondent, Thomas Moore has got it on his radar. It will be very dependent on what is within the report, and it will be looked at on its merits, as every other story would be.

Q120 Stephen Mosley: Two of you at least have said that the science correspondents are looking at it and talking to scientists. With a big story like this, would you make sure that there is preparation and scientists are talked to in advance of the report? Is it really just a case of waiting to see what is in the report and whether it makes it on to the news on that particular night?

David Jordan: With a big planned event in news, it is never just a question of waiting and seeing what happens. Clearly, we have huge plans in place about how many people go to wherever the report is being delivered, who is going to report on it, what kind of resources we are going to put in and so on. All I can say is that already discussions are going on about how we will cover that report when it comes out. It is being taken very seriously within the BBC. Very often, in relation to these kinds of issues we hold meetings with all the interested parties to talk about what the coverage will be. What it says really does matter. If the Autumn Statement does not say very much, it gets less coverage; if it says a lot, it gets a lot of coverage. The same will apply. It clearly matters what the report says, particularly if it amounts to a major revision of its previous view, for example.

Q121 Sarah Newton: I would like to ask a question of the BBC specifically. You are such a trusted voice and have a unique position because of the licence fee and the Reithian principles. With such an important milestone coming up, I want to probe you a bit more about the period of preparation to make sure that, in addition to the scientists on that committee and the

UK scientists who support the work of it, you are also talking to the scientists who feel they do not have a voice at the moment so that the public can be assured you are listening to all the voices on the issue, and that that has been properly thought through before the actual report on the day.

David Jordan: I can give you that assurance. I can also give you the assurance that we try our level best to talk to as many scientists as we possibly can in this field, as well as in others. We have programmes in place through which we try to make that happen. For example, our radio science units have been taking media fellows from the science community every summer for more than 20 years. That has not been dreamt up just recently. A more recent initiative is to try to improve the number of women experts on BBC output. That has been incredibly successful. I know that a number of women scientists have been part of a programme to help them to be more media-friendly so they get on our media more often. They have been successful. Sadly, some of them have been successful with our friends and rivals in Channel 4 and elsewhere, but they are doing very well. We are already seeing the beneficial effect in terms of the number of people coming on. Those are just two examples of the way in which we are constantly trying to make sure that we have close connections with the scientific community, that our programmes do and that we know what scientists think and want to talk about at any one moment.

Q122 Sarah Newton: For example, you would engage with scientists who believe there is climate change but not as a result of CO_2, and you would give them the opportunity to make their case.

David Jordan: We are engaged with everybody. There are people in this room who know that only a few weeks ago I had a long meeting with Lord Lawson about his view of climate change. Not that very long ago, I had a long meeting with Peter Lilley about his view about of climate change. We have long meetings with scientists who take different views about climate change and what is going on in the world, and whether there is or is not a standstill in global temperatures. We are constantly monitoring all of that with politicians, scientists and everybody else who has a view.

Chair: I thank you very much for your attendance this morning. It has been very interesting.

Examination of Witnesses

Witnesses: **Ros Donald**, Carbon Brief, **Andrew Montford**, Bishop Hill Blog, and **James Painter**, Head of the Journalism Fellowship Programme, Reuters Institute for the Study of Journalism, gave evidence.

Q123 Chair: Can I welcome the three of you to the session? I appreciate that we are running somewhat behind time. The House starts its business shortly, so I want to try to crack on. Perhaps the three of you would kindly introduce yourselves.

James Painter: My name is James Painter. I am head of the journalism programme at the Reuters Institute for the Study of Journalism at Oxford university, but, perhaps more relevant to this Committee, along with other authors I have written several studies on how climate change is reported in the media in the UK and around the world.

Andrew Montford: I am Andrew Montford, a writer and blogger on the subjects of energy and climate change.

Ros Donald: I am Ros Donald and I am a writer and researcher for a blog called Carbon Brief. I have a journalistic background on which I hope to draw a little in this session.

Q124 Chair: The three of you are involved in commenting on what gets reported about climate change in the media. Would you tell us briefly exactly what you do, why it is important and in a sense what makes you qualified to take part in the debates on climate change?

Ros Donald: Carbon Brief examines how climate and energy matters are reported in the media. When it comes to the science, a core job we do is fact check reporting and check it against what scientists have concluded through their own work, and how that fits in with the wider body of scientific literature. We also cover climate science ourselves. We ask a range of scientists to comment when reporting on new research. We try to contextualise it ourselves. One of my colleagues, Roz Pidcock, who is a scientist and understands the processes going on there, leads that work. For the past two and a half years, we have been covering how the media look at climate science. Although a lot of media coverage does a very good job of explaining climate science, showing the areas of disagreement as well as broad agreement, a significant minority of coverage does a bad job of informing people about climate science.

There are active debates in the scientific community, but there are things on which scientists basically agree. There are areas where the uncertainty is not accurately expressed. There is also the issue of coverage that represents a minority view as one half of the debate. Part of that can be presenting climate science as a debate between believers and non-believers, so it is happening or not happening, or it has or has not stopped. One thing that could be done to improve this is to have better representation of scientists in the media to show where that range of opinion lies, as well as the wider body of evidence, and to situate dissenting opinions within that range.

Andrew Montford: In terms of what I do, my blog, Bishop Hill, is probably the biggest energy and climate blog in the UK and has the biggest readership. I am able to bring a lot of expertise to bear. Essentially, it has become a site for crowd sourcing. My readership tends to be very highly educated. We have a lot of people with scientific degrees and a lot of people with advanced scientific degrees, so if a story comes out in the media we are able to bring

that expertise to bear on questions of global warming science, economics and policy. People go off and fact-check it and question it. This is popular because there is huge dissatisfaction out there with what we are getting from the mainstream media. There is a sense that the people whom newspapers and broadcast media get to cover global warming tend to be English literature or history graduates. They do not bring any particular expertise to bear, and they are not able to question what they are being told by the scientists in a meaningful way. There is a sense that what we are getting from the mainstream media is regurgitation of press releases. I think my site has become popular because it is able to question things.

James Painter: We come at it more from an academic background. In the first study, we looked at how climate science was reported during the Copenhagen summit in 2009, and we were particularly interested in who got quoted on the science. Was it university scientists? Was it NGOs? Was it politicians? Was it organisations? We were interested in who had credibility and who the media followed. In the second study, we looked at the presence of climate scepticism in all its various forms in the media across six countries. We looked at the UK in great detail as well. We were particularly interested in why it was that there was much more climate scepticism in the Anglo-Saxon print media, that is, the US and UK, compared with countries like France, Brazil, India and much of western Europe. In a third study, which is coming out in September, we are looking at the reporting of risk and uncertainty around climate science. We are examining whether risk language might be a better way of portraying some of the uncertainties around the science, but we are also looking at the dominant messages—what we call narratives—about climate science that people who consume media get. In other words, are there lots of messages about imminent disaster and uncertainty, or are there messages about risk or opportunity? We have done those three different types of study.

Chair: That is very helpful.

Q125 Roger Williams: Perhaps you could comment on the way in which scientists should communicate their findings. Should it just be filling a gap in knowledge, or should it be about the implications of those findings and the effects they may have on policy development?

Andrew Montford: Scientists need to be rather cautious about communicating their findings. There is a tendency among university press departments to try to make the findings as exciting as possible. I am thinking of one example a good few years back when there was a finding that climate sensitivity might be 5 degrees per doubling of CO_2 which is, top end, quite scary. It means that, a century down the line, we are 10 degrees hotter, in theory. That made for great headlines, but it fits into a bigger picture: climate sensitivity is hugely uncertain, and at the other end, at less than 1 degree, it is not scary at all and we can carry on as we are for ever, so scientists need to be very careful about what they communicate.

There is a big role for the media in trying to put an individual finding within context, which again is something we do not really get. We constantly hear about the scary scenarios; we do not hear about the non-scary ones, even though they are within the scientific mainstream. The draft IPCC fifth assessment report shows climate sensitivity figures from less than one through to around four or five. If it is less than one, we do not have a problem. At the end of another century, we are not going to be much more than 1 degree warmer, which is not an issue.

We have heard from the previous panel about consensus and that 97% of scientists say climate change is real and is happening. I am a dreadful sceptic, but I agree that man has always changed the climate; carbon dioxide is a greenhouse gas; and we have got a little bit warmer. Is it a problem? I am not so sure.

James Painter: If I understand the question right, you are asking whether scientists should stick to the science or enter the policy field. Is that right?

Q126 Roger Williams: That is one aspect.

James Painter: On that particular one, you have had evidence from scientists. Different scientists have different views on that. If they are dealing with the media, I think they should make it very clear when they are talking just about their science and when they are entering into a policy area. Like Andrew, I think that they have to be very careful about showing ranges of possible outcomes and to be very clear about what they are very sure about and what they are not so sure about.

Perhaps we will talk about this later, but uncertainty is a real problem for climate scientists, and how you communicate uncertainty is desperately important. The problem is that many scientists have come up with some new research, which often has uncertainty, but fail to mention, rather as Andrew has said, that there are areas about which there is an awful lot of certainty and consensus. In every interview with the media it is extremely helpful if they say, "We are pretty sure and confident about this area, but that is an area of uncertainty." I think that would be very helpful when they deal with the media.

Ros Donald: One thing a lot of scientists say to us is that they are wary of getting drawn into policy debates. That is something to be aware of. There is also a big range of people who want to comment on policy, but science also has a role in deciding at which point making policy is sensible. There was a piece in *The Economist* recently that looked at climate sensitivity and atmospheric temperatures and came to the conclusion that, because we are now getting some lower-end readings, perhaps we have more time and do not need to make policy quite so quickly. After the article, Myles Allen, one of the scientists involved in sensitivity papers, commented that the slowing or pausing, if it is within the range he is talking about, gives us a difference of around 10 years. That is not much in policy terms. It is important to put the policy relevance of those areas of cutting-edge science in the context of the wider body of knowledge.

Q127 Roger Williams: About 20 years ago, climate science was probably a very worthwhile career to be in but not very dynamic or exciting. Do you think the

change of public perception about these issues encourages different characters in science, or people who communicate in different ways, to get involved in particular sectors of science?

James Painter: I am not sure there is any evidence that changing public perceptions drives certain types of climate scientist to be more or less prominent in the media. There are all sorts of motivations for why climate scientists might decide to get involved in the media, or not. The really big issue, which you have discussed in your Committee, is: what are the obstacles for climate scientists to engage in a better and more productive way with the media where they do not feel frightened, will be given justice and be heard and are not involved in a false debate? That is much more the issue for climate scientists than whether somebody is jumping on the bandwagon to be a media star as a result of heightened public interest.

Andrew Montford: That is a very good point. There are lots of scientists who are trying to get themselves on the telly by saying outrageous things.

Q128 Chair: It happens in politics as well.

Andrew Montford: One thing I have tried to do on my blog is bring on board people from within the scientific mainstream, not sceptics, to talk to us. That has been successful up to a point. The perennial problem is that a lot of my readers are very angry about what they see in energy and climate policy and people misrepresenting our views. They tend to treat any climate scientist who comes on the blog as somebody they can shout at. It is a problem, but we have had conversations going. We have got together and met for beers and things, which has been very nice, and that has helped to develop a degree of trust between the non-activist half of the climate science community and the sceptic community. We are now able to talk and have a conversation, which has been helpful.

Q129 Roger Williams: At the centre of it all is: do the media make the best use of scientists in addressing these issues?

Ros Donald: There is a huge appetite among scientists that is very clear, for example, when you look at Twitter. After the Andrew Neil segment on the "Sunday Politics," where he was engaging with Ed Davey on a very technical aspect of climate science, which is atmospheric temperature readings, at least five scientists offered to go on that programme and talk to him about decadal forecasting. I do not know whether they got a response, but there is a big appetite to discuss science and to bring alive what could be quite a dry subject.

A very good example of where talking to scientists was used to very good effect to discuss areas of a little more uncertainty is the question of whether Arctic sea ice may or may not be affecting UK weather. "ITV News" did a very good segment on that and talked to a scientist who is looking at how ice melt might be changing temperatures and weather systems, and putting that into context by talking to Julia Slingo at the Met Office and showing there is still a great deal of uncertainty. There was a new development, but it was not being portrayed as evidence that we were all doomed, or that everything was fine and we needed to go back to square one on climate science; it was just put into its proper context by talking to two scientists. That was a really great example.

James Painter: I think that is right. When there are really important issues like climate sensitivity to be discussed, it is much better to have that discussion between climate scientists. The BBC, who generally does a very good job, had a discussion on the "Daily Politics" show between Andrew Pendleton from Friends of the Earth, and James Delingpole, both of whom have an agenda. That did not seem to me to be very sensible. My understanding is that there are lots of climate scientists out there who are prepared to discuss climate sensitivity. Some people think it is a big problem and cannot explain it; others do not. To take your point, why have NGOs discussing that and not climate scientists? There are lots of good examples that the media use, but occasionally, there are examples where it would be much better to have a debate between climate scientists on those issues than people with a vested interest.

Q130 Roger Williams: Andrew, in your written evidence you referred to low-profile mainstream scientists who are honest brokers and perhaps do not get the coverage they should. Are they missing from the debate entirely, and are there any other scientific ideas missing as well?

Andrew Montford: The lower-profile scientists are missing from the mainstream media. They are out there, and I have tried to get them on to my blog. They come on and talk. Ros mentioned Twitter. They are out there a lot. We have a problem in the UK, in that a lot of people in the scientific community do not want to stick their heads above the parapet because, if you are outside the alarmist mainstream, you will get hammered. I have heard of scientists—I am not entirely surprised by this—involved in the IPCC process talking about people who are worried about their families. I am not talking about attacks on them but how their career will go if they step out of line on this. That is pretty surprising for the UK.

We have a problem in the UK, in that science is moderately monolithic. There are some moderate voices out there. There are very few sceptics—none I am aware of—within mainstream university climate science. They are out there in other countries. There are sceptics working in universities in America, Scandinavia, Australia and places like that, but in the UK there is nobody. We lack those voices entirely, which I think is an indictment.

Q131 Roger Williams: Would the others like to comment on that?

James Painter: I am not sure there is huge evidence for the statement Andrew has just made.

Andrew Montford: I would agree with that; there is not a lot of evidence for it. I have heard people say it.

James Painter: We have done a study. It is right that there are very few climate sceptics within the university science community in the UK, but one surprising thing that came out of the study "Poles Apart" was that there were lots of voices quoting university scientists, Ian Plimer from Australia and

Dick Lindzen from the US, so it is not as if the UK media are devoid of voices they can go to when they want sceptical voices. If you read the book, a lot of them are there and quoted an awful lot. I would disagree that from the evidence there is an absence of climate sceptic voices, although I agree there are very few UK university scientists who are climate sceptics and, therefore, they are not going to be in the UK media.

Q132 David Tredinnick: Some of us as politicians might be jealous of the fact that scientists usually come top of the professions most trusted by the general public. However, when we look at the climate debate, it seems to be different and there is not the same level of trust. Why do you think that is?

Ros Donald: When we conducted polling, the same thing happened; 69% of people who responded said that scientists were the people they trusted to tell them about climate science in particular, which also tallies with Ipsos MORI's trust index. On the other side, in the media there is a steady stream of examples of coverage that tries to show climate scientists as being untrustworthy in some way. There was a piece in *The Spectator* recently talking about how the Met Office could not forecast its way out of a paper bag, and there were comment pieces by Boris Johnson suggesting that the Met Office was wrong to predict hot, dry summers. It shows that the public do not believe everything they read.

Andrew was talking about the monolith of British science. That is perhaps perpetuated in the media by the fact that scientists are under-represented, so you do not get those personalities coming out. Everyone knows who Brian Cox is, but there are probably not a lot of other scientists in the media people could name. I think there are a lot of very interesting and savvy scientists who would be ready to talk to the media in a way that people would engage with, and that would increase trust in science.

Q133 David Tredinnick: How do you get these people whom you think are interesting into the public domain? Is it a media problem? Is it a problem of the general attitude to science? Why are these interesting, articulate people not available to contribute to the debate, or not available to the public to hear?

Ros Donald: I referred to the Andrew Neil interview. There is an appetite there but also a wariness to get trapped into a believers versus non-believers debate or end up talking about climate policy, which a lot of scientists would be pretty uncomfortable doing. Increasing the range of voices from the science community that speak on climate change is possible—but is something for the media to decide. The ITV example was a very good one and shows how you can increase the range of scientists who appear and talk about these areas of science, which makes much clearer what we are dealing with. It is not an area where people are disagreeing with one another the entire time on the fundamentals of climate science. If they were contradicting one another the whole time, we would have very good reason not to trust them. With that contextualisation and increase in range of voices, it is possible, and it is not difficult, to get more scientists on to discuss science.

Andrew Montford: The issue of trust in scientists—in particular climate scientists—is a major factor in the doubts that the public have about the line they are being given. We have had the hockey stick affair and Climategate, both of which I have written about at length. They have affected public perceptions and, perhaps more importantly for you as a Committee, the issues arising from those matters, particularly Climategate, have not been addressed. We have had lots of inquiries that have not been satisfactory and have not even addressed the major public policy issues.

We out there in the climate blogosphere can see that; we know that none of the inquiries looked at the question of whether scientific journals were being threatened or nobbled by people in British universities. From a public policy perspective, we therefore don't know whether the scientific literature is biased or whether we can trust the IPCC. That has to be addressed, or public trust will not come back. You can brush it away and say you do not care, in which case people will carry on not trusting what comes out of British science, and that is a shame for probably the majority of people working in climate science who are honest and are just trying to do a good day's work.

James Painter: I think your question was: why is there less trust in climate scientists than other scientists? First, I am not a pollster, but I have read a lot of it. There is some evidence that, as Andrew said, Climategate probably did have an effect on levels of trust. My understanding from looking at Nick Pidgeon's latest work is that that trust is rising again. Secondly, it is much more to do with the nature of climate science as opposed to other forms of science. If someone like Brian Cox talks about the wonders of the universe, that is what some people call school science; it is the science of the known and what we understand very well. It is like Higgs boson, DNA or gravity, whereas a lot of climate science is about uncertainty, particularly in the future.

A lot of climate scientists come in and talk about that uncertainty, quite rightly, so it is partly to do with the nature of climate science versus the nature of other forms of science. You have also had evidence from Catherine Happer and others that media coverage of climate science often leaves the public very confused about what scientists do and do not know, and that also undermines climate science.

To answer your second question very quickly, I think you asked why more scientists do not go out into the media. Was that the question?

David Tredinnick: Yes, it was.

James Painter: We have done surveys with numbers of climate scientists and there are lots of reasons. A lot of them do not like, and do not feel comfortable with, the adversarial debate format that is very common at the BBC. A lot of them do not have sufficient training to be able to make points quickly and still be respectful of the science. It is difficult for them. They are used to talking to other scientists; they are not used to talking to the general public. It is very difficult to summarise a scientific point in three

minutes. What is the average soundbite on a news bulletin? Twenty seconds. There are all sorts of obstacles, but your Committee has heard that there are lots of really interesting initiatives about getting more training for climate scientists to go out there, but it is going to be a long task.

Q134 David Tredinnick: Thank you for that. Very briefly, what are your trusted information sources on climate?

Ros Donald: For us, peer reviewed papers—we look at the peer review literature—and talking to the scientists themselves. That is our primary source, but that is our role as a blog.

Andrew Montford: It is probably nobody really. You have to verify everything. Peer review is completely overdone. I know this Committee has done its own inquiry into peer review, but there is a lot of empirical evidence out there that peer review does not do a lot for you. On the whole, it does not find fraud or error, so the only way of getting to the bottom of whether something is right is to verify it. One thing I keep banging on about is that policy makers need some way of verifying the science on which they are relying. In business you have what is called a red team, which goes out to throw stones at the official position. Nobody is really doing that for science. Back in the 1950s and 1960s, people would go out and try to replicate papers. PhD students would spend quite a lot of time replicating other people's work. That does not happen any more, so peer review with somebody reading through a paper and saying it is okay is not really proving the point for you. The foundations on which policy is being based are rather shaky, in my view.

James Painter: We as an institute do not have a policy on whom we trust or do not trust. At an individual level, there are scientists who have years of experience and have published lots of work. I disagree with Andrew. The peer review system does work pretty well. More than anything, there are scientists who are prepared to be honest and transparent about what they do and do not know. Those are the people I would trust on a personal level.

Andrew Montford: It is a good point. I agree that scientists need to be able to admit when they do not know things. One of the big warning signs that you are being spun a line is when they overstate their confidence.

Ros Donald: I do not think that happens very often. I do not have experience of that. Often, there are papers that do not fit with what has happened previously. They will tend to be quite excited about finding something new, but it then requires more investigation and discussion. Generally, scientists are excited when things do not match what happened before, because they think they might get to know more if either they cannot replicate what has happened or it leads them on to a new area.

Q135 Stephen Mosley: What is your view of the mass media coverage of climate change?

James Painter: Well, how long have you got? I will try to summarise it very quickly. We looked quite extensively at print media coverage from 2007 to 2009–10 and then did the later update. If I had to pick out one thing, what would worry me is the finding that there is an awful lot of uncontested sceptical opinion in the opinion pieces and editorials in much of the right-leaning press in that period. There is lots of evidence that people distinguish between news and opinion, but, if I was reading an opinion piece, I would like to know whether that reflects mainstream consensus views. It is not like having an opinion on politics or on whether policy should be different. That is a problem that needs to be looked at, but, in general, the work that environment correspondents, editors and reporters do pretty much does reflect where the science is at. It is more of a problem in the opinion pieces, particularly those written by celebrity columnists, or people with no background in the science who very often are in-house columnists. How can a reader judge whether or not what they are saying does reflect the mainstream consensus? That is a problem. I can talk about many other issues, but that is one for the UK print media.

Ros Donald: Our bread and butter is looking at climate science in the media. There is a great deal of very good coverage, and that shouldn't be forgotten. There are specialist editors who have a very good grasp of how to communicate science. But there is a range of different types of article that perhaps put forward sceptic opinions in an uncontested way. Two very good examples are the claims that global warming has stopped or climate sensitivity may be at the lower end of scientists' previous estimates. That has formed the backbone of a series of articles in the *Daily Mail* and *Mail on Sunday*, for example.

There is also a distinction to be made between perhaps journalists and the editorial conventions they must follow. David Fogarty, who was a reporter at Reuters until recently, wrote in THE BARON, which is Reuters' in-house blog, about the turn towards more sceptical coverage that Reuters had taken over the past year or so due to a change in the editorship. He was saying that, suddenly, climate change is not such a big issue on the agenda, or it needs to be reported in a more sceptical way. He ended up leaving because in the end, he was given the choice between writing about climate change or moving to shipping.

Editorial decisions may also change the way an article is read. There may be quite a straight-up report of a scientific paper, but it would be given an outrageous headline that suggests global warming has stopped. There was one recently on the aerosol effect of glacier melt in Bolivia that the *Daily Mail* wrote up as evidence that carbon dioxide is not warming the planet, which did not reflect what the piece itself said.

Andrew Montford: It always worries me when people say they want to look at media coverage. We live in a free country and we cannot control the media. If the media want to have an uncontested sceptic opinion published, one would hope that is their right so to do. There are probably far more uncontested mainstream opinions in the media than there are sceptic opinions. I do not really see what the problem is. If you are going to allow dissenting views to be aired, which I hope everybody round this table would agree you should, I do not see why you automatically have to have them contested.

Ros Donald: From our point of view, it is providing a resource that allows people to situate what this news and opinion means in the context of the science. I do not think we have an agenda against free speech by any means, but it is just allowing for that context to be provided and, for example, when scientists say they have been misrepresented, for them to be able to say what they meant about their paper.

It is interesting to look at the recourse available when science has been misrepresented. For example, the Press Complaints Commission will not arbitrate on questions of science, but there is one example, which I have brought along—because we have a library of clippings—of a piece by David Rose in the Mail on Sunday that suggested that climate change had stopped 10 years ago. There were two complaints, one by James Annan, a climate scientist who was quoted in it. He received a partial correction of his quote through the PCC. Somebody else complained about the fact it showed too short a time line to be able to see the full trend of atmospheric warming. The PCC responded that they could not arbitrate on questions of science. We do not want to silence anybody. But we think that dissenting views should at least be taken in context with a range of views, so that is why we publish our fact-checking blogs.

Q136 Stephen Mosley: One of the reasons I think there are quite a few dissenting or varying voices within the media is that scientists and politicians do not articulate what they want the end result to be. Do we want the end result to be no more climate change? Do we want it to be no more climate change, or no more man-made climate change, even though natural climate change might be happening, or are we trying to get to a situation where we attempt to negate various forms of climate change, whether it is man-made or natural? Until politicians and scientists give a firm position of where they want to be, there will be a vacuum where the press will have its own opinions and put forward different points of view. Do you think that is a valid argument?

Andrew Montford: That is a rather top-down view of the world. Politicians say where they want the world to end up and then the media move into action to persuade people that that is the right way to go. I imagine the world works more the other way. The people who are wondering what they might want assess the problem and then tell you guys what to do about it. I am not sure I would agree with that.

James Painter: If you are asking why there is a certain amount of sceptical coverage in print media, it is not to do with a vacuum left by politicians and scientists not agreeing with what the end is. We have interviewed a lot of editors and environment correspondents, and there are all sorts of drivers for why a particular newspaper might want to put in sceptical coverage or opinion. It can be to do with the overall political ideology of the newspaper; it can be an editor or proprietor imposing his or her will; it may be that that type of sceptical column appeals particularly to the readership. For example, the *Express* has done lots of research into what sorts of articles appeal to its readership. If we are looking at drivers for why the press or media fill that gap, I do not think it is a large one where politicians and scientists cannot agree on what the end is.

Q137 Chair: You missed out the selling of newspapers.

James Painter: Selling newspapers is of course a major driver.

Andrew Montford: The undertone of some of these answers is that somehow sceptic views are not valid. Ros says they should be there in the context of what the real science is, and that any sceptic view should be put forward with somebody saying why it is wrong. It is a mad way of running things.

Q138 Chair: I have not heard anyone say that.

Ros Donald: I think that is a bit unfair.

Andrew Montford: You wanted the sceptic views put in context.

Ros Donald: That means putting them in context; it does not mean they are wrong. That is a big difference.

Andrew Montford: But if you are going to have somebody of the opposite opinion at all times, they are going to say, "He's wrong." I am not saying it is invalid to say that a sceptic view is wrong, but we do not apply that to the mainstream view. Every time there is a climate scientist on television I would love to be able to go on and put them in context, the context being my sceptic view. Views that people do not like need to be put out there and people can assess them on their own merits. They know what the context is; they know that a sceptic view is not a mainstream view, but they still want to hear what we have to say.

Q139 Stephen Mosley: Could Ros and James address that specific point?

James Painter: It is a very good point. To be absolutely clear, in certain circumstances sceptical voices should be there and it is extremely important that they are. I am a great fan of the BBC's due impartiality. It is the role of editors and journalists to go out there and investigate where the mainstream consensus on a particular issue lies. That should be the driver. It is not a false balance and the truth is somewhere in between. Good environment correspondents and editors go and talk to scientists who have spent years looking at a particular subject and publishing on it and say, "Look, where is the consensus on this issue?" That is not to say that sceptics on certain issues should not have a very loud voice, but at least it should be governed by the principle of trying to find out where mainstream consensus lies, and the concept of due impartiality is extremely germane to that debate.

Ros Donald: I agree. When I refer to putting something in context, it now sounds a bit draconian. For example, we have contacted Nic Lewis, who would probably describe himself as a climate sceptic and who has co-authored a paper on climate sensitivity. The two issues of temperature slow down and climate sensitivity are extremely good questions. We can thank sceptics for pushing them to the top of the agenda of the issues we are talking about. Part of the problem at the moment is the adversarial system

in the media where we are pitting believers against non-believers, when it is a matter of allowing people to decide for themselves instead of being bombarded quite often by campaigners talking about areas in which they are not expert.

A good example of sceptic opinion being brought into a report was when Roger Harrabin covered temperature slow down and climate sensitivity on the Today Programme. I believe Andrew Montford appeared on the segment. It was really interesting because it allowed people to see where that cutting-edge science fits in with the mainstream of climate science and the view of sceptics. That is what we would like to see in the media so that people are able to take all of these views in context.

Q140 Stephen Mosley: Do you think it is fair to label people as sceptics and believers?

Ros Donald: No.

Q141 Stephen Mosley: Ultimately, everyone believes that climate change is happening and the discussion is on the scale, causes and effects of it.

Ros Donald: I was trying to say that that was more the effect of the media coverage. James has done research into the different types of scepticism that we see. Andrew would probably disagree with a lot of people who look at his blog. There is a huge range, as there is in the scientific community at the moment. But in the media we are seeing a 2D debate with two sides bashing each other on the head. No wonder people feel mistrustful and confused, because that is what we see in the media, especially on flagship programmes. We had Andrew Pendleton against James Delingpole on "Daily Politics," and Andrew Neil and Ed Davey discussing temperature slow down, which then segued into a discussion on politics. We are also mixing up political positions with positions on science. For example, one thing that comes out is that people who do not like wind farms are labelled as climate sceptics, which is probably unfair. There is a whole range of opinion we are not seeing. There is a 3D argument, yet we are seeing it only as if it was a cartoon. That is why I think people feel a bit put off by climate change.

James Painter: Very briefly—I could talk to you for 20 minutes on this—it is helpful to distinguish what are called trend sceptics, i.e. people who do not even think temperature is increasing; attribution sceptics, who think it is increasing but it could be natural variability or solar activity; and impact sceptics, who argue that we do not know enough about when it is going to happen, the scope and so on. It would be really good if, when the media have people like Andrew and others on their shows or in print, they make absolutely clear what sorts of sceptic they are. My understanding is that most people accept one and two but not three, so that would be helpful, and the media could do a good job. "Sceptic" is far too catch-all a word.

Q142 Pamela Nash: Andrew, you said earlier that the media had to be free to publish what they want. They have to have freedom to tell the truth. I do not think they have got freedom to mislead the public, which has been a problem in recent years on many topics. It is crucial to ensure that opinion is not seen as fact and that opinion is put into context or backed up. James, you said that the public did have the ability to distinguish between news and opinion in print media. How widespread do you think that sensitivity is, and does it matter what the medium is? Is that only the print media, or does it extend also to broadcast media?

James Painter: There is evidence that people do understand the difference between opinion and fact in a newspaper. The problem is: is that opinion representative of a mainstream point of view, or is there any context for that? If you have the headline "Rise in sea levels: greatest lie ever told," which appeared in *The Daily Telegraph* a couple of years ago, is it right, fair and okay that someone reading that would think that sea level rise is not a problem when there is a lot of other research that says it could be a problem? That is what worries me about it. If your question is whether people distinguish, they probably do.

As to broadcast media, people have explained previously that, because of the way they are regulated in the UK, there is a lot more trust in what the BBC does in its news reporting compared with newspapers. There is evidence for lots of trust in the BBC, but not so much for opinion pieces in newspapers.

Andrew Montford: Like James, I think people can distinguish. The issue that your opinion has to be supported by fact is right in principle but it is awfully difficult to police. We were talking earlier about the Andrew Neil programme the other day. The fact that a couple of scientists have put their heads above the parapet and said he was wrong scientifically on fact a and fact b does not necessarily mean that he was wrong on fact a and fact b. That may be just their opinion of a scientific fact. You may be able to read the science in a completely different way. What is a genuine fact and what is the current scientific consensus view may be two different things. This becomes a dynamic process in which people can, quite rightly, put their heads up and say he was wrong on that and that, and other people can throw more stones at the scientists and say they are not right. Eventually, out of that mess, eventually, with a bit of luck, the truth will emerge, but we must avoid saying that if the scientists say he is wrong, therefore he is wrong. That is not necessarily the case.

Ros Donald: The Andrew Neil case is interesting, because he also quoted a couple of scientists. Doug Smith was one of the Met Office scientists who was quoted. When we contacted him and asked him about that particular part, he said he had been taken out of context in suggesting that scientists are baffled about what is happening with climate change when they are trying to work out what is happening with surface temperatures, which is an important part of the climate system. Again, it is a matter of finding that context.

Talking about the responsibility of the print media, that is down to editors and their editorial line, but I do not think anyone can police that, and that would be wrong. It is important to have more scientists talking about science—I know I keep coming back to it. If people are able to see how that richness of debate

is played out, they are less likely to take opinion pieces at their word. That has much more to do with people's own values and what chimes with them. Research done by James and others shows that people's views on climate change do reflect their values. It is a matter of giving people the ability to distinguish all of these things for themselves. For example, on the BBC, David Jordan said Professor Jones had said climate science should be sacred. I did not read that in the Jones review. I understood him to say that due weight should be given to the areas of agreement in climate science. That is a very different thing. At the moment, with the head-to-head model, we are not getting either the weight of agreement or the areas of disagreement and how they fit in with the mainstream.

Q143 Pamela Nash: Mr Painter, you said in your research that coverage of this had become much more polarised. Is that still the case? That was a couple of years ago. Is that improving or getting worse?

James Painter: I am not sure I said it was becoming polarised. We were looking at the presence of climate scepticism and whether it had increased or decreased in the UK and other media. The evidence was that, not surprisingly, because of Climategate and other scandals around the IPCC reporting of the Himalayas possibly losing their ice, there had been an awful lot of climate sceptical voices in all the newspapers, but much more in some than in others.

It may be of interest to you that a lot of people argue that that is what you would expect and the climate sceptic voices were entirely legitimate. Therefore, we went back and looked a year later when Climategate, Himalayagate and all the other gates had diminished, and the sceptic voices in all their diversity were still mentioned in about one in five articles, but particularly in opinion pieces in the *Telegraph, Sun* and *Express*. There is a big distinction between the way it is reported in the news pages and the way it is reported in opinion pieces, and you still have a lot of uncontested sceptical opinion, even though Climategate and Himalayagate have dropped. Is that what you were asking?

Q144 Pamela Nash: Yes. You think that trend is continuing.

James Painter: About one in five articles on climate change in general include mention of sceptics in some form or other. I did not take a view on whether this is good or bad, but we were mapping it.

Pamela Nash: That is more than I would have thought. That is quite helpful.

Q145 Graham Stringer: Are there facts that can be agreed on? Andrew, you mentioned that you accepted carbon dioxide was a greenhouse gas and that human beings affected the climate. Is there a range of facts that you think virtually everybody can agree on?

Andrew Montford: Beyond the two just mentioned, probably not a lot. I do not think we agree on very much at all in a system like climate about which we have such extraordinary levels of ignorance. It is very unlikely we will be able to agree very much on anything.

Q146 Chair: What about the retreat of Arctic glaciers, for example?

Andrew Montford: I think everybody would agree that the Arctic ice has gone down. There was a very big drop in 2012 and another big one in 2007, both of which have subsequently been attributed to changes in currents rather than melting.[1] By looking only at the Arctic, you are missing half the story, because the Antarctic ice has increased. The focus on the Arctic is very good for alarmist propaganda, if you like, but, if you are to be scientific about it, you should look at the whole globe. The IPCC says in its fourth assessment report that we should expect big decreases in both Arctic and Antarctic ice. One has gone up and one has gone down. Does the IPCC really know what it is talking about? I would say not. The models are not working, so we will not get agreement there.

Chair: You won't agree with it.

Q147 Graham Stringer: Given that, rather than getting more scientists explaining more facts, would it be helpful to Mr Painter's view, to explain where the different uncertainties in the science are coming from? Would that be a better approach?

James Painter: It is a really complicated issue as to how you communicate effectively about the science. There is a lot of evidence that how you communicate that uncertainty effectively is really important. You heard in evidence from Dr Catherine Happer that people get very confused about uncertainty, partly because many members of the general public do not understand the difference between what some call school science, which I mentioned earlier—the science of facts—and all the uncertainty of research science where certainty is part of the game. There is also evidence from the United States that when people or scientists are uncertain it is called a gateway issue for public engagement.

The debate, which has begun to be reflected in some of your discussions and submissions, should turn much more towards: is it a better way of framing the debate to talk in terms of risk? People understand risk much better; it is part of everyday life. Again, I can talk about it for ages, but there is an interesting debate in the US, Australia and the UK about whether it is more helpful if scientists say there is a risk this might happen and there is a lot of uncertainty, but we have to take decisions in the context of uncertainty. It is certainly a much more helpful way for policy makers. The jury is out on whether it is a more helpful way for the general public. What we do know is that disaster narratives that are very common in the media and lots of discussion about uncertainty are obstacles to public engagement, if that is your aim. Does that help?

Q148 Graham Stringer: I think so. It is also the case, and has been referred to previously in the oral and written evidence we have been given, that climate science is not just school science but it does not conform to Karl Popper's test of what is science, because in most cases it is not verifiable or testable. Therefore, the media fall back on words like "consensus," which are unusual in the context of

[1] The anomalous 2007 melt extent was attributed to changes in currents, the 2012 melt to a major storm.

science. Do you think that is one of the problems of communicating climate science?

James Painter: They use the word "consensus."

Graham Stringer: Yes.

James Painter: I do not find a problem with the word "consensus." It depends on what your aim is about communication. Do you want public understanding, public engagement or behaviour change? There is an awful lot of research out there that different types of messaging will have a different effect on understanding engagement and behaviour change. If you want behaviour change, there is evidence that, with lots of images of catastrophe and disaster, fear and guilt are not good motivators. If you want public engagement, there is a lot of evidence to support a dialogue-based approach with scientists, rather than yet more facts, data and information that there is consensus about the science, which is not a good way. You have heard several times that more and more information is not the best way for public engagement. It is about dialogue, for the reason—there is a lot of science out there to support it—that most people have formed their views on climate change not according to the science, although that is a factor, but according to their political, social and cultural values. I am sure you have heard all this, but that is really important if you are thinking of the effects on the public. I do not think that the use of the word "consensus," or not, is the essence of the issue.

Q149 Sarah Newton: The reason we started this inquiry is the part we are not really talking about. Any Government are making huge policy decisions based on the assumption of man-made climate change and are deeply committed to reducing our carbon footprint, which is costing every consumer a lot of money. It is very important that we have, first, the evidence and, secondly, the trust of the public that we have the right evidence to be making such huge policy changes. Given all the things that you have said today, all our evidence and the very important moment in September when we get the IPCC report, how should we be advising both Ministers and, critically, the media—it is such a shame that the BBC and others have left and not heard this—to tackle communications in the run-up to that report, and how we can have a proper discussion about the science in the news when the report comes out, rather than a very sterile debate about believers and non-believers?

Andrew Montford: You are probably a bit short of time between now and the IPCC report coming out. I do not know what you can do in that space of time. You are right that we need to get away from the whole believer/unbeliever thing. There is a span of opinion: the 97% who recognise that there has been some global warming, that carbon dioxide is a greenhouse gas and that man can affect the climate. These are all relatively agreed, but people need to understand that there is a range of valid scientific opinion within that 97% between a position that is not alarmist at all, where basically we can pack up and go home, and one that is quite alarmist. Until the possibility that we are spending a lot of money to no useful end is recognised, we will not get anywhere.

Ros Donald: In the run-up to the IPCC, and once the report is published, there will be a great deal of interest in the media on areas that are different from the ones before, so it is important, as I keep saying, to situate it within what is already there in terms of agreement. From a leaked report, I believe there are now areas that are much more certain than in the previous report. Therefore, it is a matter of contextualising the new evidence within what already exists to help people understand what the IPCC is doing and what the IPCC is and to be able to identify scientists who come and talk about areas of greater uncertainty versus areas of certainty. Part of the problem is that these new areas are discussed in the media as though they change everything that has happened, either in the sense that we are all doomed or everything is fine. We want to be able to see the train of science and know the story. People engage with stories, not bits of dry science, rather than being bombarded with information that seems to contradict everything that went before. It is the building a base of understanding about what the report actually does and what it means.

James Painter: The first question was: how do we make that report interesting to the media?

Q150 Sarah Newton: How do we approach the run-up and reporting of it and afterwards tackle some of the issues you have highlighted today, rather than have a sterile debate between believers and non-believers, and how do we have a proper discourse around the science, perhaps exploring some of your views or describing it as risk and managing risk?

James Painter: There is a real problem for the media with the IPCC report. I am in a very fortunate position in that I know a lot of the reporters, including those from the BBC. What is going to be new about it? Maybe you are right and there will be more certainty and more uncertainty about some things. To say that the IPPC is even more sure that we are causing these problems is not a massively interesting headline. There is an issue for the media. We are going to monitor it, and it will be fascinating to see how much they cover it. There really is climate fatigue both within the media and the general public. Even though you have these blockbuster reports, I wonder just how much reporting there will be.

I come to your second question: how do you make it interesting and relevant to the general public and the media? I am not sure. I would absolutely go down the path of trying to train up IPCC scientists to be media-friendly and talk about it in a way everybody understands, perhaps using the concept of risk, although that is my personal view. But more important than anything is to make it relevant. There is quite a lot of evidence out there that people engage in the issue of climate change when they think it means something to their lives. One of the top line results of Catherine Happer's work at the Glasgow Media Group is that people really engaged with the issue when they saw how it was affecting their lives. It is very difficult. You have to both report the IPCC and supplement it with colour pieces or background pieces on how this matters.

As to the issue of uncertainty and the ranges, that is much better portrayed on online sites with infographics. People can visualise it. There is an awful lot of fascinating work done by Professor Spiegelhalter at Cambridge on public understanding and how people absorb information about risk and uncertainty. In text, it is terribly difficult to explain, whereas if you have visual aids—the technology of infographics is now there—that really helps. You have other stories that make it relevant and important to their lives. That is what I would recommend.

Chair: Thank you very much indeed. I am sorry we have had to push a bit hard. It could have gone on a lot longer, but the weekly ritual of Prime Minister's Questions starts in four minutes' time.

Monday 9 September 2013

Members present:

Andrew Miller (Chair)

Stephen Metcalfe
Stephen Mosley
Sarah Newton
Graham Stringer

Examination of Witnesses

Witnesses: **Dr James Randerson,** Assistant National News Editor, environment, science and technology, *The Guardian*, and **Catherine Brahic**, News Editor, environment and life sciences, *New Scientist*, gave evidence.

Q151 Chair: Could I welcome our two witnesses and, just for the record, invite them to introduce themselves?

Catherine Brahic: I am Catherine Brahic, Environment News Editor at *New Scientist*.

Dr Randerson: I am James Randerson, Assistant National News Editor, which means I sit on *The Guardian*'s news desk and deal with both print and web, but I have specific responsibility for environment and science news.

Q152 Chair: Welcome to both of you. You are both experienced journalists. I know that the world of journalism is not totally isolated in your respective newspapers and publications; you have some cross-over with your colleagues elsewhere.

One of the odd things is that, when we announced this inquiry, we found it extremely difficult to get a response from some parts of the media. We proactively invited papers here like *The Daily Telegraph* and *Daily Mail*, and eventually they both said no. In a slightly shorter time scale, *The Times, The Economist* and *The Sun* either could not send someone along or it was too short notice. Can you speculate on why there is a reluctance on the part of the media to help us solve some of the difficult problems that we are tackling?

Dr Randerson: It is a bit hard to comment on the motivations and reluctance of my colleagues in other parts of Fleet Street. It is a pity, because it would be good to hear their point of view on different things. I do not know. Perhaps it was in the box marked "a bit difficult", but it should not be.

Q153 Chair: But the editorial of the *Daily Mail* is regularly commenting on climate change issues. Why do you think they would not help us?

Dr Randerson: Only they can answer that question.

Catherine Brahic: I cannot possibly fathom that. I would agree with James that it is a shame and we would have liked to hear their contributions as well, but it is difficult to speculate.

Q154 Chair: We would have welcomed their views. What difficulties are there when reporting subjects like climate change compared with other issues?

Catherine Brahic: It is an incredibly difficult and complex topic—obviously, *New Scientist* deals exclusively with science news—compared even with other domains that we cover. The uncertainty issues are also considerable in climate science and can only really be compared with certain biomedical issues. It is also not just a scientific issue. It is a scientific issue that is inherently enmeshed in social, economic, financial and political issues, and that makes it a very emotional scientific topic, unlike some others.

Dr Randerson: I concur with all that. It is a very big topic and it is complex. There are elements of it where there are uncertainties; there are elements where there are fewer uncertainties, and those two different areas can become confused. It also has a tendency to be very political.

I have been reading some of the previous evidence sessions. There has been an elephant in the room, touched on by some speakers but not really addressed. There is a tendency among some people on either side of the debate to argue backwards, whether or not they are doing it consciously. There is a certain strain of opinion on the left that climate change is a good issue for them, because one way of countering it is along the lines of saying that big business, free markets and so on are bad. There are some people who think that is a good route to go down and will shift that on to their scientific position. Likewise, on the other side of the debate, there are people who see that and think, "This is a bad issue, and we will aim our fire at the science," when they have not made up their mind based on the science.

I am not suggesting for a minute that all the actors in the debate are arguing on those terms, but it has a tendency to be quite political. The scientific aspects of it also follow through to different potential policy outcomes, which themselves are quite complex and indeed international in terms of global climate agreements and so on. All that makes for quite a difficult mix in terms of reporting on it.

Catherine Brahic: The politics of it tend to be very entrenched, so people tend to have opinions that they stick to. Everything they hear is used to support their own entrenched opinion. Unlike, say, theoretical physics, you tend to take the science to back up your point of view, which differentiates it from the other topics that we cover.

Q155 Chair: What is it that would make a climate story an interesting one? What is of interest at the present time?

Dr Randerson: It is the same sort of test that we would apply to any science news story. Is it interesting to the readership? Is it surprising? There is an element of entertainment there as well, I suppose. What impact is this going to have on me? What are the potential policy implications, and so on? All of those things

feed into a mix that is about newness and interest to the reader.

Catherine Brahic: We tend to look at whether something is true to the best of our knowledge; whether it is verified and held up by the science; whether it is relevant to our readers; and whether it is something that they will be inherently interested in and want to relate to their friends. It is the factor of the conversation down at the pub. Is it something that is going to generate some kind of conversation?

A lot of climate science fits the other two factors, so it will be true and verified to the best of our knowledge and relevant to everybody's life, but inherently quite dull because it relates to a very small aspect of climate science, which is probably interesting only to the scientists themselves. So the third factor—interest—is important to a news editor as well.

Q156 Chair: I am not sure whether either of you is familiar with each other's editorial processes. Are there differences in the way your two publications approach climate stories?

Catherine Brahic: James used to work at *New Scientist* and so is very familiar with the workings of it.

Dr Randerson: I have been at *The Guardian* for seven years, but before that I was at *New Scientist*. In many ways, it is similar in that we are generally working with the same sort of source material for many kinds of stories—new scientific papers and so on. The difference is in asking the question, "Will this be of interest to our readership?" *New Scientist* has a slightly more specialised readership, who are more interested in and tend to be better informed about many of the issues—not to a huge degree, but obviously to some degree. So there would be a slightly different editorial calculus going on.

Catherine Brahic: Our readers tend to have a scientific background. They are not necessarily scientists; in fact, the majority of them no longer practise science, but they will often have a first degree in science. They read *New Scientist* in order to stay connected to the science; they already have an interest in it, so we do not need to captivate them probably in the way that *The Guardian* needs to. We also stick strictly to the science, so we cover less of the climate policy and probably some of the harder economic aspects than *The Guardian*. Our readers tend to be more interested in the science itself.

Dr Randerson: It is probably worth saying that we probably do more domestic politics as well on the issue than *New Scientist*.

Catherine Brahic: Yes.

Q157 Chair: So the challenge of captivating people is perhaps the reason why some newspapers allow their headline writers to go a little wild on some of the science stories. Is that your suggestion?

Catherine Brahic: I would not want to comment on the policies of other newspapers, but the purpose of a headline is to catch the reader's eye. That is fundamentally why it exists.

Chair: Enough said.

Q158 Stephen Metcalfe: *The Guardian* has more extensive science and environmental science coverage than any other paper. Why is that?

Dr Randerson: We took a strategic decision about five years ago that, looking at the swathe of opinion in the scientific literature and the voices of people like the Royal Society and so on, this was a major scientific issue, with potentially profound societal and economic consequences. We felt it was difficult to do that justice through the normal way of covering any other issue, so we took the strategic decision to up the register of our coverage.

We now have seven full-time-equivalent journalists—reporters—covering science and environment. The two science reporters are doing other issues as well, as are the environment reporters, but none the less there are seven reporters and two specialist editors—of whom I am one, but I have other responsibilities as well—and three specialist sub-editors. That was part of a decision to do the topic justice, to go beyond just reporting individual scientific papers and try to give more joined-up, long-range coverage, including things like explainers, analysis and so on.

Q159 Stephen Metcalfe: I think that is very good and excellent. Was it just because you thought this was a major issue, or did you feel it was not being covered fairly elsewhere? Did you see a niche for this in the market, or was it just that you felt it was your responsibility in some way?

Dr Randerson: I suppose there is an element of both. Perhaps there is a kind of Reithian motivation behind it, but we also saw that people were very interested in these topics, and they tend to do very well online. It is a controversial issue particularly in the US, where there is much less coverage of the general scientific position, and, therefore, as a global media organisation there was a real opportunity for us there.

Q160 Stephen Metcalfe: Do you recognise a trend in other papers away from covering something as complex as environmental issues in such depth—that they are losing their expertise in this?

Dr Randerson: It is probably true that the amount of coverage of climate change has gone down, particularly since 2009. There was a high water mark around the time of the Copenhagen international summit, but there are many reasons for that to do with the worsening economic situation, politicians had other preoccupations, and the fact that we were told ahead of that summit that it was incredibly important that a global deal be done—and in effect, it was not. Probably a lot of readers turned round and said, "Hang on a minute. We've been told this is really important, and the politicians are now telling us that it is not that important." A combination of all those factors has perhaps fed into that.

As to whether expertise has gone elsewhere, I can think of a few people who have left newspapers—Mark Henderson at *The Times*, Roger Highfield at the *Telegraph*—but, by and large, they have been replaced by other people. I do not know whether there is a general flow of people out, if you see what I mean.

Q161 Stephen Metcalfe: You would not agree with the statement that there is a trend to lose that. People might be moving, but they are being replaced.

Dr Randerson: My sense is that probably there has not been a flow of expertise out of newspapers, but that is not totally evidence-based.

Q162 Stephen Metcalfe: Would you say that perhaps there has been a trend towards that in other news agencies?

Catherine Brahic: I want to see the staff numbers to say whether there is a flow of expertise. I agree with James that there has been a general decrease in the amount of coverage. That is not necessarily a reflection of the staff; it is probably more to do with either disillusionment on the part of readers or a general sense of reader fatigue. We are certainly getting a sense that our readers are less interested, but these things go in cycles.

There is probably a broad cycle going on right now of a decline in interest and an increase in fatigue since 2009, but within that every year I see cycles of readers becoming more interested in climate science, commenting more on articles and then dropping off and migrating into other areas—biomed, neuroscience and so on—and then coming back. There are a lot of cycles in reader interest going on. Again, that is possibly due to background economic and social forces and also the fact that you can hammer readers with the same gist of an article only so often.

If we are talking about climate science, the science has not actually changed that much. The fundamental message is very much the same: humans are emitting greenhouse gases and those are causing climate change. After that, we are talking about the nitty-gritty of how much, when, what the consequences are and so on, but the general overarching narrative has not changed that much. It is the same story being told over and over again.

Q163 Stephen Metcalfe: Does it matter now that there is less coverage and public interest? As a supplementary, which drives which?

Catherine Brahic: It does matter, because the public need to understand climate science and what is happening. As to whether it matters that they follow the latest papers that explain climate sensitivity and how much that has changed by a fraction of a degree and so on, probably not.

What matters is that the public understand that the message is still the same, it is still there, and it is not an issue that has gone away. It can be compared with flu stories. We are constantly being warned that there is going to be a massive outbreak of some kind of super flu that will cause a huge number of deaths, and the crisis seems to be averted every time. That is probably because scientists are working very hard in the background and producing excellent vaccines, and there is a lot going on in order to avert that, but every new crisis that is averted means that the public do not see the forecasts being played out. That is possibly a little similar to what James said about Copenhagen in 2009. They were told that something was going to happen and there would be a sea change. That did not happen, so there can be a sense of, "Let's go round this merry-go-round all over again. Is it going to change?"

Dr Randerson: As to whether it matters, I endorse what has been said. It does matter that people understand where the uncertainties and lack of uncertainties lie within climate science. I would endorse the idea that perhaps it is not essential that every little cough and spit of the science is understood. The really interesting stuff now is in the policy implications. What does that mean? Should we do something about it? What should we do? Which energy sources are cost-effective and which are not? Can we afford it? What kind of international climate deal is on the table and could be done, and what are the barriers to that? All of those are, in a way, much more interesting questions than the core climate science, which has not really changed.

Catherine Brahic: We are seeing the story shift towards that. We are seeing reader interest shift towards that as well, so we are internally debating how to react to that.

Q164 Stephen Metcalfe: How to feed the public interest in that.

Catherine Brahic: Yes.

Q165 Stephen Mosley: Following on from that, most people get their knowledge of what is happening scientifically and what is happening in climate change in particular from the media, but it is much more interesting to debate what happens next, what sort of policy implications there should be and what we should do.

Why are you not talking about those things? Why are you still having almost a black and white debate within the media as a whole as to whether or not it is happening? Why can you not accept that the science is valid and that carbon dioxide does cause global warming? The interesting thing is whether we should do anything about it, and, if so, what. Why are you not doing that?

Catherine Brahic: This is where it becomes very unfortunate that some of our colleagues have not responded to your calls. At *New Scientist*, we do not debate the question any more of whether or not climate change is happening. We probably state it in certain articles that require it, but if every new study that says climate change is happening does not get covered we cover the implications.

As to the solutions, at the minute there is an ongoing internal debate within *New Scientist* about how we change our coverage. We are already reflecting the increased interest in solutions, so we are covering more of those, but to what extent do we do that? Editorially, we are going to be very different from *The Guardian*, but the politics of it are not our core area. We cover science, so the types of solutions that we would and do cover are more technological than political ones.

Q166 Stephen Mosley: It is saying that this solution is feasible and will cost this much.

Catherine Brahic: The modelling of outcomes of various economic approaches or energy solutions and so on are things we would cover, but the political and

sociological solutions are things we leave more to the general press.

Dr Randerson: With respect, you might be asking the wrong people that question.

Q167 Stephen Mosley: To an extent maybe not, because *The Guardian* has a particular stance: climate change is happening and something has to be done about it. That is one perspective, although in terms of the perspective of not doing something, or doing something different, many might see *The Guardian* as being blinkered in that view, so I think it is fair to ask you as well as those who are more sceptical.

Dr Randerson: I see what you are getting at. Atmospheric physics does not vote for any particular party. As I alluded to in my first answer, the issue is that there is a vacuum in this debate to some degree on the centre right. Many centre right thinkers and politicians have ceded ground to the left and think this is an issue of the left, which is ridiculous. It should be an apolitical issue. The science is there and it is posing serious questions that we have to answer.

I agree that one answer might be that we should not do anything about it because it is too expensive. There might be other answers along the lines that we should put lots of money into nuclear power, which may or may not be attractive to a lefty greeny. I would argue that we do talk about lots of different solutions, but it is quite hard. I would extend an invitation to any centre right thinkers who would like to engage with us and give us that kind of stuff. We would welcome it with open arms because that is a hole in the debate, and the sort of solutions they want to put forward may look rather different from those that come from a lefty greeny, if I can use that shorthand.

Q168 Stephen Mosley: We have seen evidence from Kent council and others saying that a focus on science turns people off basically—that is probably not the case with the *New Scientist* but the more general media—and that most just want a clear headline message. Would you agree with that?

Catherine Brahic: Yes. There is also a reasonable amount of evidence coming from researchers in the States showing what I was alluding to earlier. People tend to be entrenched in their views. If you throw science and graphs at them, that does not change their entrenched positions; in fact it can sometimes harden them. Climate change is a very emotional topic. Science is appealing to people to change their lifestyles fundamentally, and that can be very scary. There is other research to show that, when people are afraid, they stop using their reason and thinking about it and have a very emotional response. You can probably ascribe that to some people's response to climate change.

The environmental psychology research suggests that the way to change people's attitude when faced with that kind of situation is not to present a lot of graphics and complicated science but to use voices with which they identify, for the same reason that, if it is claimed a certain vaccine causes autism, you have a backlash from scientists, 99% of whom say that is rubbish and the vaccine does not cause autism, but mothers across the country claim that it does and that it has. People listen to those mothers because they tend to respond to the voices that speak to them which are closest to them and with which they can identify.

I am just relating the findings of various environmental psychologists. Our audience is very different because it is inherently interested in the science and comes to us for the science; so we still throw graphs and science at them, but our audience is not necessarily representative of the general public.

Dr Randerson: As to a clear message, when reporting all scientific issues you have to pick your battles within the science and decide what you are going to present as a narrative and which caveats to leave out. That is inevitable in any complex field, not just science but economics or whatever it might be.

With respect to climate science in particular, you have to distinguish between those things that are controversial, such as exactly what climate change may do to hurricane intensity in the north Atlantic, and those that are less controversial. If we are not clear about where the controversy lies within the science specifically, I do not think we are doing a good service to our readers, but I do not think that means we should patronise our readers by not presenting uncertainty and risk. People are capable of understanding the concept of risk and an insurance policy against an event where there is uncertainty as to whether it is going to happen and exactly how bad it is going to be.

I am a little uncomfortable about the idea of sanitising the message, if that is what is being suggested, but that is the science. When it comes to what you can do about it, there is a whole separate strand of coverage where you can say, "If you take from it that you want to do something, what are the most effective things you can do? Is it worth getting a solar panel on your house? What would be the carbon savings from cutting your water use by x amount?", and things like that. You can be clearer there about exactly what the carbon benefits are of various actions.

Q169 Stephen Mosley: I think you said that science and technology was enjoying a renaissance as it is going online. The science and technology page is very popular online. How is the move to media affecting coverage of scientific topics in general and climate change as well?

Dr Randerson: From our point of view, at *The Guardian* we have an across-the-board philosophy of being quite open and embracing digital media in a way that gives a greater richness to our coverage. It is about recognising that the journalists are not the experts here and that there are multiple sources of information and publishers now out there from the Royal Society, to an NGO and a blogger.

We still have our traditional 800-word news stories, or whatever it might be, but, alongside that, you can have more nuanced coverage that uses this information in quite interesting ways. Live blogs are a way of linking out to a lot of quite detailed material without getting too bogged down in the core of the coverage. Equally, we have a strand called "The Eco audit", which is a rolling analysis blog that unfurls over the course of a few hours. It invites submissions from readers, and journalists will go out and ask for

information from interested parties, experts and so on. In this particular strand, we ask a question about whether wind farms cut carbon emissions, or something like that, and go out and answer that question with large chunks of information from external sources. In that way you can give the reader a much richer experience. For those readers who want to get deep into a topic, they can really understand it. To give another example, we have been building up what we call "The ultimate climate change FAQ", which is a series of short articles on common questions that people ask about climate science but also about policy as well. All of the science articles within that are checked over by the Met Office to give them a stamp of authority, but they are all bite-sized and short, so if you do not want to go into a huge amount of detail but want a fairly pithy answer to your question it is there. There are 30 or 40 of these answers now in the FAQ.

That is not the sort of thing you would have in a traditional newspaper, but the internet allows that.

Catherine Brahic: *New Scientist* is quite a different product from *The Guardian* in this respect. All our magazine coverage goes online. We have a website that is able to respond more rapidly to some of the latest climate news, but it probably focuses more on the analysis than some of the others. We do not do Reuters-style immediate response to every single news item that comes up. Maybe we are a little bit more picky and choosy about that.

The big difference that the media and internet have made to the coverage of climate is that it is a real popularisation of the topic. Climate change is one of those topics where people comment a lot and you get enormous debates. Very often, the comment thread at the bottom of articles—whether it is on our website, *The Guardian*'s or anywhere else for that matter—will be longer than the article itself. That is a good thing, in my opinion. It is always a good thing when the public can get involved in the debate, but it is also a bit dangerous to read those threads and take them as a representation of the public views at large. They tend to be the views of people who have very strong opinions, and even those who are quite angry about the topic will comment.

In response to our articles, especially about climate change but also other topics such as evolution, we were getting so many comments that one approach was to create a registration barrier. You had to sign up. It was not a paying barrier at all. You had to put in a user ID or something, so there was an extra step and you had to be committed to that comment in order to make it. That reduced the number of comments considerably, but the climate change articles, especially anything that relates to politics, get a huge amount of comments.

I was live tweeting from Copenhagen and that was incredibly popular. The audience feel much more in touch with day-to-day and minute-by-minute unrolling of events, and there seems to be an appetite for that.

Q170 Graham Stringer: You partly dealt with my question in answer to Stephen, but I will ask it in a different way. There has been a reduction in the coverage of climate change in the media and a fall-off of interest in the public, and a fall in the number of members of the public who think it is a serious issue. Is there a cause and effect either way between those two statistics?

Catherine Brahic: I do not think it is down to just two factors. It would be oversimplifying to take it back to just the media feeding into the public and the public feeding into the media. There is a bit of a cycle going on there, but are readers or the public less interested in climate science now because they do not believe in it, or because they are fed up with false promises, or is it because they are more preoccupied with the price of milk? It is a little difficult to boil it down to just the media feeding less of it.

Dr Randerson: It is clear that the political action has shifted somewhat since 2009 for very understandable reasons, so perhaps politicians are talking about it less.

Q171 Graham Stringer: Do you think politicians lead the agenda in terms of the public's interest, or is it the media and then followed by politicians?

Dr Randerson: Obviously it is a complicated mixture, which I accept.

Graham Stringer: It is.

Dr Randerson: Certainly, from an editor's point of view, if politicians are talking about it, we report it. It gives us something to report, so if politicians are not talking about it there is one fewer source of stories. The political action has been elsewhere, for understandable reasons, but I do not think that means necessarily that there has been a radical shift in where the public is at.

Q172 Graham Stringer: In terms of interest—this may or may not be relevant to the media—we do not have a very well attended meeting today. When we had Professor Jones here in 2010, people were queuing all round Portcullis House to see him being questioned. Do you think some of the conflict has gone out of it? Certainly, at the time of the University of East Anglia's climategate there was a great deal of public interest.

Dr Randerson: There was a remarkable moment back in 2008 when politicians on all sides of the House voted for the Climate Change Bill. I do not say "remarkable" to comment on that particular piece of legislation and whether it is good or bad, but it has incredible scope and reach into the future. It has immense economic implications for business, international competitivity and so on. Despite that, there were only three votes in the House against, so it was a moment of great unity in a sense.

Looking at the media coverage now across the piece, there are perhaps more sceptical voices. I know you heard from James Painter in a previous session, who said that about one fifth of voices quoted in the media about the science are on the sceptics' side of the debate, which is well out of kilter with the recent study that suggested that 97% of papers published in peer review journals went along with the mainstream view of the science. There is quite a lot of conflict in the media generally, so, if it was just about conflict

generating interest, one would imagine there would still be that level of interest.

Catherine Brahic: But climategate and the Phil Jones incident came at a hugely politically charged moment. That was all in the run-up to Copenhagen. A two-year machinery had been launched in Bali two years before in 2007 to promote the fact that the next Kyoto protocol was going to be signed in 2009 in Copenhagen. Everybody was watching that event and climate change in the run-up to it, and I believe the e-mails were released a month before. That was another remarkable moment two months immediately before the Copenhagen summit going through to the end of the year. That highlighted the conflict and got everybody involved in it. It is difficult to compare that piece of history with now without taking that into account.

Dr Randerson: There was a subsequent release of e-mails a year or so afterwards that had barely made a ripple.

Catherine Brahic: They did not get nearly as much coverage.

Dr Randerson: There was clearly more to it than just the release of the e-mails.

Q173 Graham Stringer: When this Committee was looking at the terms of reference of this inquiry, we found it difficult to come to a definition of climate change. We have talked about it easily here. Can you give us a definition?

Dr Randerson: I think the helpful way of describing it is the elements that make up a scientific case, so clearly we are talking about anthropogenic climate change. We are releasing large amounts of CO_2 that have been locked up underground. We know from basic atmospheric physics that CO_2 is a warming gas, and that will have an impact on the regional and local climate in ways that scientists tell us are potentially quite profound, particularly if we keep doing it for long enough. I do not know whether that is what you are after or you want something a bit more pithy.

Q174 Graham Stringer: It is interesting that people use the word and have different definitions of it. If you go back to the original discussions on global warming, there is a pretty obscure definition about global average temperature anomalies, but there is a definition. However, although everybody now talks about climate change, there is not a clear definition.

Catherine Brahic: I am surprised. I find it remarkably easy to define. It is very much what James just described. It is the accumulation of greenhouse gases in the atmosphere as a result of burning of fossil fuels, by and large, and the consequences of that accumulation. Carbon gets locked into the earth over the course of millions of years in the form of fossil fuels. It takes millions of years for that process to happen naturally. In a matter of seconds, when we burn fossil fuels—oil, coal, natural gas—we release it into the atmosphere, and as a result it creates an imbalance in a cycle that is normally timed and very balanced. We are now seeing a huge accumulation of carbon dioxide and other greenhouse gases in the atmosphere. As James has explained, for very well understood reasons, that increases the greenhouse effect and warms the planet.

There is perhaps a little confusion over the difference between climate change and global warming. The terms are used interchangeably now, but global warming really refers to the warming—just the increase in average temperatures across the globe. Climate change is a slightly more holistic term that encompasses all of the environmental changes which are going to happen as a result of that warming, so changes in sea level rise because ice melts or slides into the sea and therefore the oceans rise. As a result, we get more storm surges and more forest fires because tinder is more readily available. You get changes in biodiversity. There is a huge slew of changes after that, but, fundamentally, it all starts with an accumulation of greenhouse gases in the atmosphere.

Dr Randerson: I think you have answered it. The phrase "climate change", as opposed to "global warming", journalistically describes something that is more relevant to people's lives. People want to know what is going to happen to the climate and how that will affect them, so that has an advantage. Clearly, a change in local and regional climate is one of the things that scientists are forecasting.

Chair: You mentioned James Painter's research, which takes us neatly to Sarah's questions.

Q175 Sarah Newton: It does; thank you, Chair. I wanted to explore the research of James Painter and also Andrew Montford. Both of them were looking at the whole issue of polarisation, accepting what you were saying that there is less reporting. The reporting now tends to be more polarised and is even taking on a very emotional or political aspect: the believers versus the non-believers. Why do you think this polarisation has happened and is happening, perhaps going back to some of your opening comments about how the issue has become hijacked by particular strands of politicians? Perhaps you might share that with us.

Dr Randerson: Undoubtedly, there are people in the debate who have vested interests or a comfortable position on one side of the debate or the other in the way I tried to describe earlier. Rather than make the case on the basis of policy, there is a tendency to take it back to the science, because there is a lot of material to work with in terms of complexity and uncertainty to sow doubt and so on. Talking on that side of the debate, that is what is going on with some people.

I do not think it serves the reader very well to play up uncertainties in the science where basically there really is not any. Obviously, there will be one or two people who disagree, but I do not think that is helpful for the reader. There seems to be more of that happening than five or 10 years ago, but that is because of the implications. I alluded to the Climate Change Act earlier. The implications are so huge in terms of the economics, technology, global conflict and business—all those things.

Climate change is the elephant in the room in so many news stories we deal with that there are lots of people who want to get in on the action. Combine that with a tendency for news desks to like things that are new

and surprising and favour the underdog. A general issue with science reporting is that mavericks tend to get more coverage than perhaps they deserve. I am speculating, but I suspect that a combination of, "We've heard this story already and I want a different kind of story" is the sort of thing that goes on.

Q176 Sarah Newton: You make an interesting point about the mavericks getting perhaps a disproportionate amount of media coverage—I am not talking about *New Scientist* at all but about broadsheet and popular journalism, which really informs the vast majority of people's opinions—because of the desire for something new and to make it a bit more sexy and interesting. If somebody comes along with a contrary view, they get a disproportionate amount of coverage compared with the scientific base. I can see that point. Why do newspapers in particular take certain lines? Obviously, *The Guardian* has a particular line and other papers are taking different ones. Why do you think that is? You are all exposed to contrary science or mavericks.

Dr Randerson: I am speculating into the mind of Paul Dacre and things like that. It is a difficult world to enter. As I said at the beginning, the elephant in the room is that this debate is perceived to be in one political camp and it should not be. People have reacted very strongly against that and feel it is a proxy for a political agenda and want to make sure that politicians have no part of it. They are making a political case as well.

Everyone should step back and say, "Here is the science on which, by and large, people can agree, although there will be something on which they do not agree. Let's have a mature discussion about what we do from here." It seems to me that there was an attempt by the previous Government in the Stern report to say, "Here's the economic case for doing something about it," but it is really about policy being mixed up with science.

Q177 Sarah Newton: Policy is being mixed up with science. Here is a really important opportunity to do what you say to try to pull apart the policy, which people are getting increasingly focused on—for example, they hate windmills or want windmills, or they want nuclear power stations or do not want them. The policy and science are getting muddled up. Here we have the next big report coming out looking at the scientific basis for climate change. Understanding what you have both said and your deep commitment to trying to get the science out there and inform people, in your preparations for the report in October on the IPPR's latest round of research how are you approaching that? How are you planning to try to achieve that?

Dr Randerson: Presumably, you mean the balance between science and policy.

Q178 Sarah Newton: How do you disaggregate it and see what we can agree on in the science?

Dr Randerson: Basically, the IPCC report has different elements to it. There is the basic science and then the impact. In a sense, the basic science part of it will be difficult to report because they will be saying largely the same thing as last time, perhaps with a higher degree of certainty. The fact that there is a major international report is itself news, but it will probably say roughly the same thing.

In terms of disentangling policy from it, we will just report what the report says. That news story will not go into tub-thumping in the form of a news story, "We must do something about it." The leader pages may get into that territory. We try to be very careful about keeping the two separate. When we are reporting a science paper, we just report what it says and try to give an indication about the uncertainties of the particular issue we may be writing about, but, as to the policy, whether the UK should engage in fracking and to what extent the planning rules should be relaxed so that there are more wind farms are very different things. There will be a line in there saying that the impetus for this is energy security, reducing greenhouse gases or whatever, but we try to be very careful about those stories being about the policy. With respect to your question about the IPCC, the reporting of that will probably not go into policy, except in a very labelled and badged way because the actual report will not go into that in any detail.

Q179 Sarah Newton: We had a degree of consensus when taking evidence from people who very happily called themselves climate change sceptics and are authors on the subject. They did believe that the climate was changing but they just did not think it was all as a result of man-made changes. One of their criticisms was that, because everybody was following that one line of pursuit, other aspects of climatic change impacting weather were not being pursued. When you consider your own reporting—perhaps this is a chance for Catherine to come in—do you look at some of the science around climate change not related to greenhouse gases and CO_2 emissions going up?

Catherine Brahic: The fact is that the majority of science is around greenhouse gases, and there have been polls or surveys looking at published science. We are talking about publication in peer review journals. The vast majority of that is around greenhouse gases. I do not think it is true to say that everything else is being completely ignored. There is quite a lot of research happening at the minute around solar effects, for instance, and we do report on that, but none of it finds a solar effect that is causing the current warming. If it did, we would certainly report on it—but it does not.

Dr Randerson: I would endorse that. I do not think it is correct to say that scientists are not looking at the alternative point of view. That is a way of constantly re-evaluating and testing the consensus view, if you like. When those papers come up we look at them, but there are not very many of them. We look very carefully at the ones that say it is all down to solar activity and is nothing to do with anthropogenic CO_2 or whatever, but they tend not to stand up to scrutiny.

Q180 Graham Stringer: It was interesting that at our last evidence session Andrew Montford said a very similar thing. He said that virtually everybody—not everybody—agrees that carbon dioxide is a greenhouse gas. The real debate is about how much

warming it is causing, and whether it is a relatively trivial amount or it will be 6º over the next century. Do you accept that is the case, and that to characterise people as deniers, extreme warmists, or whatever the phrase is, misrepresents the debate, which is about trying to estimate the impact of the increased carbon dioxide in the atmosphere?

Catherine Brahic: It definitely misrepresents the scientific debate. Well, it is not really a debate. The science that is happening is a slew of studies in order to determine how much warming we will get by, say, 2100—by the end of the century. There are lots of projections and they vary. As to the amount of variation you get as a result of scientific uncertainty—this is going into nitty-gritty detail—there is a factor called climate sensitivity, which is how sensitive the atmosphere is to a given increase in carbon dioxide. How many degrees, or fraction of a degree, of warming do you get for x amount of additional CO_2 in the atmosphere? That is ongoing, and there are lots of studies looking at that.

But the amount of variation you get as a result of that scientific uncertainty is absolutely nothing compared with the amount of variation you get as a result of the societal and economic uncertainty. When you look at graphs that start, say, today and go forward to 2100 and give you a range of possible outcomes for the future, varying between 1.5º and 6º of warming, those different lines do not describe scientific uncertainty but things which are known as climate scenarios, where climate scientists plug into their models how many children people will have on average, what the global economic situation will look like, where we will get our energy, how global trading will change and so on. They describe what we would define as a series of possible futures for the world and say that, if we choose to do x, we will get 2º of warming, but, if we choose to do y, we will get 4º of warming. Those are not scientific uncertainties; they are uncertainties of choice; it is what we decide to do in the future.

I sometimes get frustrated by the debate about scientific uncertainty. People say, "We don't really know how much the planet will warm." The uncertainty that science contributes to that is so small compared with the uncertainty that is contributed by us not knowing what choices we will make for the future of our planet. I do not know whether I am describing that well.

Graham Stringer: I understand what you are saying.

Catherine Brahic: The scientific uncertainty is being worked on and lots of studies are going into that. That is probably going to make up a chunk of the first IPCC report that James was describing. The great uncertainty is about what we decide to do in the future: where we decide to get our energy from; how the population is going to change and how Governments are going to change in future.

Q181 Graham Stringer: Post-Leveson, when the Press Complaints Commission has gone, do you think that grossly inaccurate reporting of science should be subject to the new body that replaces the Press Complaints Commission?

Dr Randerson: I know the frustrations of scientists who have seen their work misrepresented, or have been misquoted and those kinds of things. It is a very difficult area. I can see very difficult arguments being made among people who do not necessarily have the expertise to do it. Having said all that, it feels wrong that people should be able to write things that are completely inaccurate. To what extent at the moment are other issues subject to the PCC in that way? I am not quite sure. Certainly more needs to be done.

Q182 Stephen Mosley: Catherine, you talked about scientific and different types of uncertainty.

Catherine Brahic: I am sorry; that was—

Stephen Mosley: When scientists talk about uncertainty and things like risk, they mean different things to the public at large and can in some ways, sometimes, scare the public if they talk about risk, uncertainty and this, that and the other. Do you think there is a better way of talking about these things?

Catherine Brahic: Uncertainty is one of the hardest things to communicate because it is not what readers want. Readers want a message, and also their views are generally governed by headlines. We always strive to describe the uncertainties within the article. Is there a better way of doing it? We have not come up with a better way of doing it internally. We do it as best we can. The difficulty I find in my job is more about getting it across in the headline rather than the bulk of the story. In the MMR debate, the EPSRC found that people's opinions were formed largely by the headlines, so it is then about the use of terms like "may" and "could".

I do not have a straight answer to this because I am not sure there is one, but that is where the greatest difficulty lies. It is not satisfying to write a headline that has those conditional terms, and yet you need to include them because the findings are often uncertain and somehow you need to encapsulate that in the headline. Uncertainty can be dealt with quite reasonably in the body of an article, but the greatest difficulty lies in getting it across in the headline.

Dr Randerson: We have to strive to do it because the alternative is to gloss over uncertainty where it lies, which I do not think is acceptable. People can engage with this. I was giving the insurance analogy earlier. People can get their head round the idea of an uncertain future and wanting to prepare for it. It comes into all sorts of news stories. The calculations about whether to bomb Syria are based on uncertainties about the future outcomes, even uncertainties about exactly what has happened with respect to chemical weapons. The world is full of uncertainties on which newspapers report, so climate change is not special in that regard.

I agree with the comments about headlines. It is particularly tricky in headlines because you have to be able to sell a story and make people want to read it and you have only a few words to do it in, so it is very hard to hedge it. That is tricky, but, fundamentally, the article has to do the work in terms of explaining uncertainty.

Q183 Chair: Thank you very much. Dr Randerson, perhaps I will send you a note next time I see an offending headline in *The Guardian*.

Dr Randerson: Please do.

Chair: Perhaps you will both rush into print to answer Graham's challenge about a good definition. Thank you very much for your attendance. It has been very helpful.

Examination of Witnesses

Witnesses: **Fiona Harvey**, Environment Correspondent, *The Guardian*, **Lewis Smith,** Freelance Journalist, and **Richard Black,** former BBC Environment Correspondent, gave evidence.

Q184 Chair: Can I thank you all for coming this afternoon? I would be grateful if you would introduce yourselves for the record.
Lewis Smith: My name is Lewis Smith. I am a freelance reporter.
Fiona Harvey: I am Fiona Harvey. I am the Environment Correspondent for *The Guardian*.
Richard Black: I am Richard Black. Until about a year ago, I was one of the BBC's Environment Correspondents. I now work for a body called the Global Ocean Commission, but I am here in my personal capacity. For the record, I did not leave with a six-figure pay-off.

Q185 Chair: All of you have extensive experience of reporting climate change. What particular issues do you face when reporting complex and contentious scientific subjects like this?
Richard Black: Climate change has its innate problems. It is an evolving and complex science, and it becomes more and more complex as we learn more and more about it. If I were describing climate change to someone now, I would start in a different way from the way I did three or four years ago. For Mr Stringer, I would describe it as all the consequences of the extra energy being trapped in the earth system by greenhouse gases. That is a definition I would use now; I would not have used it three years ago.
Having said that, intrinsically I do not think it is any more difficult than immunology, for example. The most difficult articles I ever had to write for the BBC were on maths prizes. You try to explain the field of maths, what it is relevant to and what that person's contribution is. That is much more difficult than doing climate science from a journalist's point of view. Climate science is almost unique in that you have very powerful political forces that actively do not want science to be communicated effectively. That is the meat and drink of politics. It is far from unique in the media, but in science it hardly ever happens. This is one of the few cases. I think that is one of the reasons communication does not always work very well that you cannot overlook.
Fiona Harvey: I would agree. One of the problems here is that you are trying to describe incredibly complex systems. This is about the universe and everything that surrounds it. You are talking about everything to do with this planet, its natural systems and also the man-made effects upon it, and you are trying to do that for a lay audience who may not have a great deal of interest in or knowledge of science and may not know terms that we take for granted—for example, greenhouse gas, the anthropogenic warming effect and issues like that. You are trying to convey that in a way that is not only informative and gets across these very complex ideas but is fresh each time, because you cannot write the same story every day, every week or whatever. You are trying to convey this in a way that captures the reader's interest.

Q186 Chair: Is there a difference of view between the journalist and editor on how it should be handled?
Fiona Harvey: Probably. Editors have a tougher job in a way because they have always got lots of competing stories. As a journalist you are working on a few stories but they are yours. You have delved into them in great detail, you know what they are about and have an attachment to them. When the editor sees them, he sees a list of stories, all of which are about vastly different things. One might be about climate change; another might be about politics, the media, business or whatever, and the editor has to choose between them and which ones to give prominence to and place on a page or website. The editor has that to deal with, whereas the journalist has just one big thing to bring forward.

Q187 Chair: From a freelance perspective, that must be a bit challenging.
Lewis Smith: From a freelance perspective, it is less challenging because when you are staff your first hurdle is the news desk, which is always mindful of what the views of the editor may be. When I was on *The Times* I was very well aware that I could use the term "climate change" quite freely, but if I used the term "global warming" I had to make damn sure it was absolutely spot on.
This is where politics come into it. You can report on climate change in much the same way as every other subject. You tell the story, break it down and turn it into nice simplified language that everybody can understand, but getting it published fairly is a different matter. That is where political views come into play, whether it is *The Guardian*, *The Times* or *The Daily Telegraph.* The BBC is pretty much exempt; it is a lot more fair-minded about everything, possibly because it does not have an owner.

Q188 Chair: Are the science community and people like the Science Media Centre more effective at getting the message across to editors about some of these difficult subjects?
Richard Black: I am not sure that the Science Media Centre has much impact on editors. It is a useful service for reporters and the contact services it maintains are quite useful, but in terms of contact with editors there are others out there who are much more effective. They are higher up the political food chain and have been much more effective at talking to editors and persuading them that a certain line is right, or that there is more uncertainty than scientists would have us believe.

Q189 Chair: Let us go back to your old employer. Given the independence of your previous employer, who up the food chain would be the right person to do the Science Media Centre's job on the key news editors?

Richard Black: BBC News is unusual in the sense that it has so many different bits of output, all of which have different editors, who will have a slightly different take not only in terms of what they think the science is but what their audience wants. The science that one did for the website is very different from the science for Radio 4, for example. Newspapers are much easier to deal with because, generally, you have a nice linear chain of command and there will be one person who is the controlling mind. I defer to my colleagues for greater expertise on this.

Q190 Chair: Newspapers have it easier.

Fiona Harvey: Newspapers tend to have more of a single focus than the BBC, which has so many outlets over such different audiences. Newspapers tend to have a clearer idea of who their readers are, but that is a very big generalisation. When you look on the web, newspapers in the UK now have a worldwide audience and a much more diverse readership than they had in print. We are all much more diverse and looking at a much more diverse picture.

Q191 Chair: Let us take a recent story. Was the *Daily Mail's* attack on Owen Paterson on GM foods—by the way, I am on Owen Paterson's side on this—pandering to their readership or their owners?

Fiona Harvey: I cannot possibly imagine what was going on in the minds of the editors at the *Daily Mail*, I'm afraid, having never worked there. You would have to ask the *Daily Mail*.

Chair: They did not want to attend.

Q192 Sarah Newton: It seems that what we are really talking about—we touched on this before, and you listened to it—is this argument about policy masquerading as science. Richard talked about this being driven very much by politics and not the science. Can I tease out what you mean by "politics"? What we mean by it is probably party politics. I am assuming that you mean politics in its widest sense—about people wielding influence. All of you have mentioned the food chain and political decisions. What do you mean when you talk about political decisions?

Richard Black: I certainly did not mean in the narrow sense of party politics. As James Randerson mentioned, back in 2008 there was a remarkable cross-party consensus here. If you look at the Climate Change Act, that has implications in terms of energy policy. The science, plus a sense of global responsibility perhaps—I do not know—drives you to a certain policy area, but there is a constituency within Westminster and outside it that does not like that and, therefore, the science must be challenged and brought into doubt.

It is a little like Soviet Russia and Lysenkoism, where genetics could not be right because it conflicted with communism. Therefore, genetics must be wrong because communism was a doctrine. It is a little like the situation here. You have a free market libertarian view that cannot deal with the consequences of the science. Therefore, the science must be challenged and put into doubt. I do not think this is unique in Westminster or the media, but it is difficult for people with a science tradition to deal with, because usually science is very good at sifting out bad and good arguments. Eventually, via a slightly messy procedure sometimes, you end up with reality, but that is much more difficult in the arena of climate change.

Lewis Smith: There is a large element of polarisation. It is not party politics; it is whether people are or are not willing to believe in climate change, and that colours everything that the newspapers, as well as you, do.

Fiona Harvey: It is also important that most editors are used to hearing from politicians much more than scientists. Editors will have lunch with politicians or members of the House of Lords, whereas very rarely in the course of their daily lives and jobs will they come across a scientist face to face. Richard was talking about food chains and that is part of it. Editors swim in these rather rarefied seas where they talk to law makers, policy people and things like that. Such people tend to have more of the ear of your average newspaper editor than an average scientist ever would.

Q193 Stephen Metcalfe: Climate change, climate science and global warming have been with us for some time now. Has the way it is covered and reported changed during that time? How do you think the reporting of it will change in the future? We heard from the previous panel that we have been marched up to the top of the hill and told that catastrophe is just over the horizon—the example used was a flu pandemic—and it never arrives, so there is scepticism about whether this is being talked up. How do you think things have changed, and where will we end up in terms of getting people to take this seriously enough so that policymakers can have an impact and push through things that need to change?

Lewis Smith: A few years ago, the emphasis was far more on what the science was saying. Is there or is there not climate change? Is there global warming? More recently, with general acceptance that there is climate change to one degree or another, the coverage is far more on how it is dealt with and what solutions there are, and there is a far greater degree of polarisation with the rise of Lord Lawson's group and similar organisations and the money that oil companies in America put into trying to contradict what is said.

As for the future, I do not know. It will depend on what happens. If, as we expect, climate change continues, sooner or later we will get a catastrophe that will get people's attention and they will react to that.

Richard Black: Coverage of climate change has changed. If you go back a decade or so, journalists tended to be quite a lot looser about terms like "chaos", "catastrophe" and that sort of thing. We have tightened up, and some of the pressure from people with a contrary viewpoint has perhaps been good for us because of that tightening up. The story became much more political around 2006 when Tony Blair put

it on the agenda for the UK presidency of the G8, and that peaked in Copenhagen. As you have discussed, subsequently the volume of coverage has gone down. To add to the earlier discussion, I do not think that is surprising. Coverage of tennis goes up during Wimbledon. Things have to be happening in order for people to report on them.

We are, however, seeing a rise of, "Is global warming happening? Is climate change real?" For example, just this weekend there was an article in *The Mail on Sunday.* It was quite an extraordinary article because of the sheer number of things that are wrong in it. Depending on how generous you want to be, there are between 10 and 15 things wrong in that article, but it goes in a newspaper. This is something that *The Mail on Sunday* clearly does not have a problem with because it has done it many times before. Complaints have been submitted and mistakes pointed out, and the same thing carries on happening. Whether one wants to see that as part of a polarised or increasingly variegated media landscape, or see it in terms of a political game, depends on how one looks at it. In terms of coverage, I cannot see anything on the horizon that will give us massive changes.

Fiona Harvey: I agree with what Richard and Lewis have said. One way in which coverage has changed is that, if you go back a decade, climate change was very much covered by science and environment journalists only. It did not really make it out beyond that. When one got more political emphasis, one saw non-specialists—lobby journalists, political journalists and so on—taking on more of these stories, and perhaps they do not always have quite the same depth of knowledge, background reading and context as specialist journalists. That quite significant change happened a few years ago. Now that climate change has slightly come off the news agenda, the actual science is once again the preserve of science and environmental journalists, but you still see some political stories written by political correspondents rather than specialists, and that has consequences.

Q194 Stephen Metcalfe: It seems to me—I think there is some evidence for this—that there is disproportionate coverage of the sceptical viewpoint compared with the number of scientists who would back that view. Do you think that has any influence on the way in which climate change is covered at the moment? Does the sceptical voice have too big an influence? Is it given too much credibility, and is there anything we can do about that?

Lewis Smith: It is given vastly too much credibility. What more do I need to say? There is not a lot you can do about it as far as I can see. Newspapers thrive on controversy; without it, they do not sell. It is as simple as that. If you want to be an editor of a newspaper, you know full well that you have to give people a reason to buy the paper—the more exciting the headline the better. You do not get exciting headlines with, "We all agree."

Richard Black: The sceptics, deniers, contrarians—whatever you want to call them—have managed to paint themselves as David in a fight with Goliath, which is a very appealing situation. Everyone has some kind of empathy with that. It is not really true, but they have done a very effective piece of image management.

Q195 Stephen Metcalfe: Bearing in mind that they are probably all watching us now as we speak, do you think this issue is too important to play that kind of game?

Richard Black: Absolutely.

Q196 Graham Stringer: Lots of our submissions, from both sides of the argument, have blamed the media for the confusion about the word "consensus" in terms of global warming. Do you think that is fair?

Richard Black: I would have a lot of sympathy with that. For me, it is not about what proportion of scientists would say this or believe this. Certain things come to be facts in science, and there is a body of evidence that you can look at. As with so many other areas of science, there is one set of things that is more or less proven because we have so much good evidence on it, and another set of things that seems to be in the range between this and that, and that is all you can say about it. There are other bits where we really do not know.

If you take the key issue of climate sensitivity and talk to scientists about it, most of them will say, "Here is the range. We are not really sure where climate sensitivity is. A number of studies indicate this and a number indicate that, but it is in the range." It is profoundly unscientific to say, as some of the deniers/contrarians/sceptics do, "Because it is probably in that range, we will assume it is at the lower end and take off a little more and proclaim it as fact."

Fiona Harvey: What needs to be emphasised is the degree to which there is consensus on climate change. Consistently we see that the vast body of evidence and scientific research points to the glaring conclusion that climate change is not only happening but is caused mostly by human actions. If you look at other issues at the moment—GM or badger culling—where is the scientific consensus? You have quite a lot of debate on that, people from both sides quoting different pieces of scientific evidence. When you look at climate change, you can see a very clear consensus. When you talk about where the uncertainty lies, it is very much around the edges. In other scientific issues that are politically active at the moment, that is not the case. We should be taking note that climate change does have a massive weight of opinion behind it.

Q197 Graham Stringer: Going back to your original statement about definitions of climate change, one of our earlier contributors said that we should move away from "global warming" and "climate change", and use the term "energy balance". Would you agree with that? That is almost, but not quite, what you said.

Richard Black: In a strict scientific sense, that is probably about right, but it is a bit meaningless to people. "Global warming" came about in an era when basically all we had data on was the atmospheric temperature. Now that we have data on the oceans, ice and all kinds of things, we can see that there are changes throughout the whole earth system, but it is still an uncomfortable term because some climate change is natural. Then you bring in the word

"anthropogenic" and nobody understands what you mean, so it is tough.

Q198 Sarah Newton: I would like to come back to something that Fiona said, with which you all agreed, which is that, over time, this is being seen now far more as a political issue than a scientific one, so it is very difficult to get the scientists' voices heard. Do you think this is because of who is doing the reporting? Scientists are becoming very leery about being quoted, because they are not dealing with you guys, whose professional background they would respect, but lobby journalists or political correspondents, who perhaps will not respect them and will misquote them.

Fiona Harvey: Very few lobby correspondents do talk to scientists. They talk more to politicians and NGOs rather than directly to scientists. As to whether scientists are becoming more wary, in my experience, they have always been rather cautious in their dealings with the press, and that is a good thing. They have to be careful to get their message across in ways that are clear, understandable and will not be misinterpreted.

When you get to the real experts, they are still as willing to talk as they ever were. Our job as journalists is to use experts and build up a relationship of trust with them so that we can discuss these issues and report them fairly. That is what goes on. When it comes to more politicised reporting, mostly scientists do not get a look in.

Richard Black: I would very much agree with what Fiona said. If I may add to her earlier point about editors, not only do editors have much more contact with politicians than scientists, but, if they have been journalists themselves, they will tend to come up through political journalism, where there is always spin, and everyone has a reason and an angle. It is genuinely quite hard for them to appreciate that most science is not like that. There are scientists who are like that, but most of them are not. You are dealing with evidence, and it is a different mindset.

Q199 Stephen Mosley: Following on from that, there is a difference between opinion pieces and news reporting. Do you think the public recognises the difference between the two and can tell that sometimes these pieces might be coming from different angles?

Richard Black: It is very nice when they are clearly delineated and you have news on the outside and opinion in the middle. A lot of American papers are much better at doing that than British ones. It depends a little on who the writer is. If someone is flagged as a correspondent, you are expecting it to be newsy. The problem comes when the two things are conflated, as we have seen with *The Mail on Sunday.*

As to whether people differentiate, I do not honestly know, but I guess it is something that some social scientist somewhere is looking at, if they have not done it already.

Fiona Harvey: To pick up Richard's point about delineation of news versus opinion, you can do that quite clearly in a newspaper. You have a page of news and a page of comment. It is different on the web, because people might come to an article from many different angles. They might click on a link from Twitter or wherever, so they might not be aware that they are coming to the opinion part of the website. Maybe it is for the media to make that clearer in the way that we present things, but it probably does blur things in the mind of the reader.

Lewis Smith: There are also inherent biases in newspapers. If you look at wind farms, for example, you are far more likely to find an anti-wind farm story in *The Daily Telegraph* than in *The Independent*. It is never going to be delineated as opinion, but in reality it is opinion; it is the way the newspaper perceives what its readership wants to read.

Q200 Stephen Mosley: James Painter's research suggested that media sources in the UK and US represent 80% of the sceptical voices in his study. I do not know much about Mr Painter's research. Was he looking at just English language sources or across the board, or do you find that British and American journals tend to be more sceptical than elsewhere?

Lewis Smith: I do not have the experience to answer that.

Richard Black: He has looked at more than English language. I cannot give you chapter and verse, but I think the study around Copenhagen involved six countries. I am pretty sure he went into some of the BRIC countries. I am sure he went outside the narrow medium of English. If there is a spiritual home of scepticism, it is in the Anglo-Saxon- speaking world. For example, one of his other findings was that, during the Copenhagen summit in the developing world output he looked at, virtually no climate scepticism was reflected in their newspapers, whereas obviously in British and American papers there was.

Q201 Stephen Mosley: What do you think the impact of that is?

Richard Black: It has a very discernible impact on the politics of some countries in the Anglo-Saxon-speaking world when it comes to climate change. You can probably turn that around and say that the coverage reflects to a certain extent the politics. For example, in the US there is a whole TV channel—Fox—where accepting climate change is not really on. It seems you have to take the opposite point of view. You have newspapers where very little space is given to climate change and you have some very powerful campaigning groups, and there is always a synergy between the media output and the people who are feeding things to the media. It has to be seen as part of one ecosystem. It must have an effect on public opinion and the political process.

This is going to sound very pejorative, but I do not mean it to be. One of the dangers is that it legitimises wavering. If you have a politician who does not know very much about climate science, is not particularly bothered about it but sees that it might be a bit populist to paint him or herself in the anti-climate change clothing, having stuff in the media along the same lines legitimises his stance a little bit. We are definitely seeing that at work in the States and Canada as well.

Q202 Graham Stringer: We were all much amused when recently George Osborne fell out with Ed Davey about carbon targets and wind farms. Do you think that row within Government affected the public perception of climate change?
Fiona Harvey: I think it made, maybe, not just the underlying climate change issues but also the policies around climate change more polarised, because there was a perception that senior politicians were trying to appeal to a certain part of the populace and had the idea that they could win support by being sceptics, contrarians or by bashing renewables or other aspects of climate change policy. That is new in the last three years—in fact since the coalition came to power—because, while they were in opposition, those were not the things that they were saying. That has affected the way stories are written in some parts of the press or the media more broadly, and we as journalists have had to grapple with that in the past two and a half years.

Q203 Graham Stringer: Do you think that generally the Government present a simple, clear evidence-based narrative about climate change?
Fiona Harvey: No, not in the least.

Q204 Graham Stringer: Do you want to expand on that?
Fiona Harvey: You said it yourself. There is a perception of a row within certain sections of the coalition over some of these policies. That row is not just among the three main parties; it is also taken up outside. On the one hand, you have the Green Party and on the other hand you have UKIP. Nigel Farage is very anti-wind farms; he says that at almost every opportunity. This has an effect on the political discourse and what we should do about climate change.
Richard Black: Ministers need to be honest. Ed Davey's recent statements about fracking being consistent with UK climate policy are just not true. About 18 months ago I did a simple piece of maths when I was still working with the Beeb. If you take the projections of the Committee on Climate Change, they build various scenarios. What is the cheapest and most economical way for us to get to our 2050 target? In their view, you do that by virtually de-carbonising—which is their phrase—the electricity supply by 2030.
If you run the numbers and assume there is no coal generation, you can have only 10% of your electricity from gas by 2030; otherwise, you are out of line with their projections. If we frack and continue building gas-fired power stations without carbon capture and storage, we will miss the climate change targets, unless we have a coherent policy in another part of Government. If you say, "That's okay because we've come up with a way of cutting transport or agriculture emissions much quicker," then it is coherent; otherwise, what they are saying is just not real. I do not think the Government do themselves any favours when that sort of thing happens.

Q205 Chair: So when the IPCC publishes its next report, going back to Mr Black's Wimbledon analogy—I do not quite see it as being the same as Andy Murray in the final in terms of journalistic interest—will we see any peaking in coverage on this subject?
Richard Black: Yes, I think we will, but it will not be the same kind of blanket coverage that we saw in 2007 with the IPCC AR4 report, as far I recall, for the first part of it, the BBC even sent Fiona Bruce to Paris to co-present the "Ten O'Clock News". I do not think we will be seeing that sort of depth and breadth of coverage. As Catherine and James said earlier, the basic science story really has not moved on very much. Although there are interesting little angles, the basic story is still there, and interest among editors is not at quite the same pitch as it was in 2007.
Lewis Smith: If there is to be a peak, it will be a very small one. There just is not the interest at the moment.

Q206 Chair: Especially, I guess, because the most likely storyline to emerge is that the climate is still changing. From what all three of you have said previously, in different ways, editors will not buy that as much of a story.
Lewis Smith: It is not much of a story, is it? It is, "Same as last time, boys."

Q207 Chair: But it is a fact.
Lewis Smith: From what we have seen from leaks from the IPCC, they are not going to be saying a huge amount that is new, but the science is already there. We do not really need an awful lot more science to tell us whether or not there is global warming. What we need now are solutions, whether they are miracle solutions from scientists on how to capture carbon or societal changes in how we deal with this and reduce the impacts as much as we can.
Richard Black: There is also austerity in many media organisations. Editors are thinking much more carefully about whether they will pay for flights and hotel rooms than they were back in 2007.

Q208 Chair: So the newspapers are concerned about the carbon footprint.
Richard Black: That would be a turn-around.

Q209 Chair: By the sound of it, the three of you are all saying that what we really need are better editors and politicians.
Richard Black: I would like to move it slightly outside the media framework. There are so many issues, take education, for example. MMR was mentioned earlier. It would be lovely if you had a much more critically scientific public. When I was at school, we learned history with kings, queens and dates. My daughters have learned history by looking at sources and analysing their credibility. What were they trying to spin? What can we deduce from this? What can we corroborate? It must be possible to do something similar with science education, and, from what I have seen, that is not really happening.
Chair: Given the comments that have been made, I am not sure whether any member of the Committee will be in the right place in the food chain and get invited to some of the places where decisions are

made. Can I thank you very much for your contribution? It has been an enlightening session.

Wednesday 11 September 2013

Members present:

Andrew Miller (Chair)

Stephen Metcalfe
Stephen Mosley
Sarah Newton
Graham Stringer
David Tredinnick
Hywel Williams
Roger Williams

Examination of Witnesses

Witnesses: **Tony Grayling**, Head of Climate Change and Communities, Environment Agency, **Phil Rothwell**, Head of Strategy and Engagement (Flood and Coastal Risk Management), Environment Agency, **Paul Crick**, Director of Planning and Environment, Kent County Council, and **Katie Stead**, Environment Officer, Investment and Regeneration Service, Kirklees Council, gave evidence.

Q210 Chair: May I say good morning to our witnesses and thank you for coming today? We have rather a lot to get through in a modest amount of time, so if you feel you have something to add at the end of the session, please drop us a note with further thoughts. For the record, I should be grateful if you would introduce yourselves.

Phil Rothwell: I am Phil Rothwell, head of strategy and engagement for the Environment Agency, dealing specifically with flood and coastal risk.

Tony Grayling: I am Tony Grayling. I am the head of Climate Change and Communities at the Environment Agency.

Katie Stead: My name is Katie Stead. I work for Kirklees council in West Yorkshire and I am an environment officer in their investment and regeneration service.

Paul Crick: I am Paul Crick, director of planning and environment at Kent county council.

Q211 Chair: Thank you very much. Both local authorities and the Environment Agency work at the local level on climate change adaption and litigation. Would you summarise the areas you work in?

Tony Grayling: At the local level, most of our work is done in partnership with others. We have a national Climate Ready Support Service programme, which is looking out to provide support to other organisations to understand the risks they face from climate change and to take action to mitigate those risks.

At a local level we work through climate change partnerships, which have people on the ground working with businesses and local communities, and we work with local authorities. Some of that is done through the Local Government Association and their Climate Local initiatives. Some of that is done working with individual local authorities. For example, we are working with Kent county council to help roll out a tool that they have developed looking at severe weather impacts nationally. We also work with local enterprise partnerships and local nature partnerships. We have a more direct role with the public in relation to flood risk management, and that is Phil's expert area.

Phil Rothwell: The link with local communities directly and through local authorities is key to flood risk management activity, both in terms of incident management when there is a big event and the work we do to raise awareness, led often by local authorities through local resilience forums. It is an extremely important partnership. Through our work we identify those communities that are most at risk from either surface water or fluvial flooding—river flooding—and then work with local authorities and local communities to develop action plans in case of incident. It is a very big area of work and it is the communications arena where I think we have most penetration of our flood risk messages, particularly in raising awareness in the public audience.

We produce a huge amount of data, which is available to the public through our flood maps and coastal erosion maps, identifying those communities that are most at risk. We then put community support officers into those communities to raise awareness. We like to work particularly with not just the local authorities but the voluntary sector. The National Flood Forum, the Red Cross and the WRVS are all part of that mix of communicators and local groups that connect directly with the public about the risks that they face.

Katie Stead: At Kirklees we co-ordinate our environmental strategy, which is the Climate Local framework that the LGA have introduced. We work within the authority with our services to look at both adaptation and mitigation measures across the authority—and with the district partners as well. We also link in with the Leeds city region to identify new investment opportunities going forward.

Paul Crick: We have the Kent Environment Strategy, which sets out our high-level themes on addressing the climate challenge and enhancing the natural environment. As has been said, we work very closely with the Environment Agency. Kent has the highest collective flood risk in the whole country and we work with the EA in terms of the flood risk management in our lead local flood authority role and we are working with the EA on developing our surface water management plans.

In terms of engaging with the public, we have several projects that we engage with them on: for example, our Severe Weather Impact Monitoring System, which was alluded to earlier; Kent Coastal Week; Coastal Communities 2150; our ECO project, which aims to potentially attract over £80 million-worth of investment into residents' homes to improve their energy efficiency; and we have our Climate Local

Kent—as Katie mentioned—which we engage with the public on as well.

Q212 Chair: Because this inquiry is specifically about the communication of some of these very difficult messages and what you described has some degree of overlap and partnership, how do you ensure that there is consistency in the messages that are delivered to the public?

Paul Crick: The public have a good awareness but not the detailed understanding of climate change. Consistency of messages is something that constantly needs work on because there is perhaps a disconnect—there are conflicting messages perhaps from Government policy—with what we are doing locally. But in relation to what happens in Kent, we work very closely with the Environment Agency. It is part of our chief officers' group that is charged with delivering the Kent Environment Strategy, which I mentioned, plus they are involved in an awful lot of action on the ground. So, at a local level, because of the close working relationship we have, we can ensure consistency of message.

Tony Grayling: In the case of the Environment Agency, it is about national co-ordination. We develop our key messages at national level and they are then disseminated on the ground through our officers and the partnerships we work with. Our key messages are in turn based on our understanding of the climate risk. We would go to the national Climate Change Risk Assessment as the foundation of our work, which identifies a number of key risks for the country, notably related to flood risk, water resources, the possibilities of drought and heatwaves, and then we would seek to develop consistent messages that we would use through our work.

Q213 Chair: This question is to the two local authorities. You liaise with your colleagues in other authorities through the LGA and so on. Are Kirklees and Kent here because they are in the vanguard of this, or is what you are describing typical of your experience of other local authorities?

Paul Crick: I will start. I think—

Chair: You all want to say you are the best, I know. Graham used to when he was the leader of Manchester.

Paul Crick: I agree that we are very much in the vanguard. Our Severe Weather Impact Monitoring System is a bespoke tool that officers in my team have developed and it is the first of its kind in the country. It helps in understanding the impact that severe weather has on the local authority and local authority partners—police, fire and so on. We are rolling it out to businesses and then to residents. Perhaps we were invited to give evidence here because it is the first in the country, but certainly we do an awful lot of things in Kent in engaging with the public. Again, as to the ECO scheme that I mentioned, we are the first local authority to attract £80 million-worth of funding—free funding, if you like—from energy companies to invest in residents' homes to make them more energy-efficient. Again, we are the first authority in the country to do that.

Katie Stead: I would add that, absolutely, Kirklees has over a decade of experience of delivering home domestic efficiency projects. We have worked collaboratively with a number of partners, certainly colleagues in neighbouring local authorities and members of our Yorkshire and Humber regional climate change partnership. I would like to say I represent their thoughts and understanding as well.

Q214 Roger Williams: In your opinion and experience, what is the level of interest and understanding among the public about climate change and its implications, and where do you think they get their information from?

Katie Stead: I certainly think we have engaged a number of our residents with the projects we have delivered. The public are interested in climate change, but increasingly, the messages that strike more resonance with them are around how to save money on their fuel bills and how to improve their health and wellbeing by providing more affordable warmth and comfort in their homes. The message has changed, certainly from our perspective, but the main source of information is the media. We do put a lot of information on our website to explain the science behind it, which we refer back to in our projects as well.

Paul Crick: I agree with what Katie said. I think about 98% of scientists have agreed or reached a consensus on climate change, but it is that 2%—which the media offer as a balanced story—that then create uncertainty and scepticism in the public. We have found when we have talked to the public that climate change is seen very much as a far-in-the-future issue and they have more pressing issues to deal with, particularly in the current economic climate. What is important in communicating with the public is saying how it affects them on a day-to-day basis. As Katie said, it is about the money that can be saved through reducing energy, which will helpfully also reduce carbon emissions and climate change. That is almost a by-product. The important message that we have found is as to how it affects them directly, and at the moment it is in their back pocket.

Tony Grayling: I would share that analysis. Most information is got via the media. The data I have seen suggests there is a high level of public awareness of climate change. There is some scepticism, but on the whole there is agreement that action needs to be taken. For many individuals you then have to translate the science into impacts and how they might be impacted by climate change if you are going to change behaviour, and that works with organisations as well. We primarily communicate with organisations rather than the general public, and our communications are primarily around impacts and adaptation rather than the underlying science.

Q215 Sarah Newton: This is for Paul because I notice that you have "planning" in your title. Do you feel that sometimes the whole debate around climate change gets hijacked because some people have issues with some renewable energy? I am thinking about planning applications around onshore wind turbines. Because residents want to object to a particular

technology, they start using and undermining the science to make the case.

Paul Crick: Absolutely. We have an insatiable and growing need to use energy and yet no one wants solar farms or onshore wind farms near where they live. No one wants fracking to take place near where they live, and yet the insatiable demand to use energy does not go away. It is all right if it is in someone else's neighbourhood but not in theirs. Yes, I agree that sometimes the renewable energy and the climate change argument is used to undermine applications for renewable energy.

Q216 Roger Williams: Polls show that the general public are really confused about what scientists agree on as far as climate change is concerned. Is that reflected in your experience in working with communities?

Katie Stead: I would say in a number of our projects, when you advertise domestic home energy efficiency schemes, you often get an interested group of people who already have a strong awareness of climate change and can see the reasons behind why we would do that. A lot of our work with community groups has been around tackling some of the myths behind climate change and that awareness-raising, but I would argue that that sort of behaviour change is quite resource-intensive and not something we can do so much of any more as a local authority.

Tony Grayling: We find that you need to start from where people or organisations are—a people-first or organisation-first approach. Quite often the starting point is extreme weather as we currently experience it, and the potential impacts of that and the potential benefits of taking action to mitigate those impacts now. From there, you can often go on to a more sophisticated conversation about how those risks may increase over time. But I agree with you that there is some confusion and I would reflect that that is partly because the media desires to present, if you like, a balanced argument and therefore appears to give more weight to sceptical views than would be, if you like, the balance of scientific opinion about the risks we face from climate change.

Paul Crick: That uncertainty, as I said a few minutes ago, creates a reason then not to take action. "It's someone else's problem. What can I do at a local level? It is far bigger. It is for national Government to decide or take leadership on."

Q217 Roger Williams: That uncertainty affects your effectiveness in doing your jobs, I guess. It makes it harder, tougher and more difficult.

Katie Stead: To a degree, yes, but I would say that we use different messages so there are different impacts. We know it is all going to benefit and the projects that we are doing all help in terms of reducing carbon emissions, but we would brand the projects differently, if you like.

Q218 Roger Williams: May I ask the Environment Agency, now that there is a different body in Wales—Natural Resources Wales—whether you still work with your colleagues across the border? I am meeting with constituents in Llangammarch Wells on Thursday night to reassure them about some of the messages that have been put over about flood risks in that area, but I am very keen that there is still good co-operation across the border because some of the flood risks associated with river catchment areas cross England and Wales.

Tony Grayling: We do still continue to work together and we have arrangements for particular cross-border issues, because you are right that a number of river catchments cross the England and Wales border. In relation to our Climate Ready Support Service, although it is primarily an England service, the tools and guidance we develop under that are available across the UK. It is available not just to Natural Resources Wales and people in Wales but also to people in Scotland and Northern Ireland. So, yes, we very much collaborate.

Q219 Chair: I have to say, Mr Grayling, that my experience of dealing with those cross-border issues on the Dee estuary shows a degree of inconsistency. Sometimes there are very high levels of co-operation and at others very parochial approaches are adopted. Is there anything you can do about that?

Tony Grayling: I do not know if you have more direct experience on the flood risk side, Philip.

Phil Rothwell: Certainly the change of the last year has been quite challenging, clearly—to create two organisations out of one—but none the less, the operational activity that we do to manage and in forecasting flood risk is very much a shared activity. We have endeavoured to put in place everything that we could to ensure that there is not a break in the service and that there is not something that would cause a problem, certainly at a local operational level. At a national level, we continue to work jointly with NRW and the Welsh Government on things like the Flood Forecasting Centre that we fund. I would commend in NRW and the Welsh Government as to the way in which they have communicated flood risk with communities. It has been extremely good, and in many senses I think in England we have learned quite a bit from what has happened in Wales.

Q220 Hywel Williams: Does any organisation have an explicit role at a local level to communicate about the effects and impacts of climate change?

Paul Crick: In Kent we just take local leadership in doing that. We do not necessarily have a prescribed role in that. As I said, we have a Kent Environment Strategy, which is one of our core corporate strategies to deliver our corporate plan, and we have some clear themes and actions within that. We take local leadership in terms of communicating back to residents and also what we are going to do about it with residents. I think the most effective form of communication, although it is resource-intensive, is face to face. That is what has been most effective in some of the projects that I talked about in the evidence that I submitted.

Q221 Hywel Williams: I was going to ask you this as a supplementary, but is the fact that you have lots of potential flooding problems a help, paradoxically, in that it concentrates minds?

Paul Crick: It is in a way. As I said earlier, we have the highest collective flood risk in the country as an authority, but we also have one of the longest coastlines. We have Kent Coastal Week, which is at the end of October every year, which is attended by about 5,000 people annually. We have a changing coastline, and that gets people engaged. It gets people interested, and, paradoxically, as you say, that in itself makes people more aware and allows us to engage with them.

Tony Grayling: The local climate change partnerships have a specific remit to communicate with businesses and communities locally. There are, I think, nine of those around England, and we partly fund them through our Climate Ready programme and do work in partnership with them. That is in addition to the work that local authorities do.

Q222 Hywel Williams: Can you give us any evidence about what happens in Wales—I am a Welsh Member myself—as far as Cyfoeth Naturiol Cymru is concerned? That is what the NRW is called in Wales.

Tony Grayling: I confess not. Now that we are an England-only body, I am afraid I have not done my homework on Wales, so I cannot answer your question.

Katie Stead: I would echo Paul as well on local authority leadership. In terms of climate change, we did have, through the local area agreements, a number of national indicators that encouraged all local authorities to tackle their carbon emissions, declare their progress publicly and report back to Government. I would also like to say that we have a couple of very enthusiastic transition towns as well in Kirklees that have taken on that role very locally in communicating about climate change.

Q223 Hywel Williams: How effective do you think central Government is in getting its message across about climate change?

Tony Grayling: That is a difficult question to answer because I think communicating about climate change is a shared responsibility. The Government have a particular role but they are not the only ones with a role. There is a role for the scientific community—you are talking to the Met Office next—and I think people like the Hadley Centre and the Tyndall Centre have a responsibility. The Government responsibility is to have a clear policy framework and narrative about what needs to happen across the country both to reduce greenhouse gas emissions and to deal with the impacts of climate change. That is a communications challenge and difficult to do because, as we have discussed earlier, most information that people receive is through the media. The media is another part of civil society that has quite a responsibility here. I think Government are reasonably effective, but they are acting among a number of players in this field.

Q224 Hywel Williams: That is my concern. If Government communication is driven by particular policies rather than an overarching strategy, do you think that is a fair comment?

Tony Grayling: The Government have a low-carbon plan, which sets out an overall narrative and strategy in relation to greenhouse gas reductions, and we have a national adaptation programme, which does likewise on dealing with the impacts of climate change. You can argue the degree to which those have been effectively communicated, but you could equally argue that some of the traditional methods of communication may not be very effective. You could make a case for a big national media campaign, but how effective that would be is open to question. I think that you need organisations with different roles to play their part.

Paul Crick: I agree. What regularly comes up when we are talking to the public is that the roles of local and central Government need better clarification and communication. Also, there is a real leadership issue. Clear messages from trusted sources are what win public support. It does not help, when their national adaptation programme is soft launched, that things like the feed-in tariffs are changed and business cases that we previously had for solar panel installations that had a payback of three to five years all of a sudden have a payback of eight years plus. It is very hard then to make business cases like that work. That conflicting message comes out from central Government. It is about consistency, clear messaging and consistent policy.

Q225 Hywel Williams: Perhaps I could ask your local authority colleagues, who do you think the public think is responsible for taking action? Where do they point the finger when they say, "Something must be done"?

Paul Crick: They see it as a role of national Government. They do not see how they, as individuals, can affect climate change. They can affect it on an individual basis and that is how we engage with them about specific projects—such as Kent Coastal Week—but the public see the national Government as having that leadership role to which they look. I do not know if you would agree with that.

Katie Stead: I agree.

Q226 Hywel Williams: Do individual members of the public think that they have responsibility themselves? I have in my constituency a row of houses facing an 18-inch rise in sea levels and they are going to be flooded. Their capital value is very low, there is just farm land behind them and they are probably going to go, but their owners think something must be done.

Katie Stead: Our latest survey identified that almost 100% of people agreed that they had a part to play in terms of an impact on climate change, but I think they are looking for local government and central Government to tell them what to do and how they can make that difference.

Q227 Stephen Mosley: Throughout the course of this inquiry and, to be honest, previous inquiries that we have done, we have heard that the best way to get complex scientific ideas across to the public is through two-way engagement and dialogue. How practical is that when you are talking about large organisations

like Kent, which has a million people—or however many it is within your area—or the Environment Agency, where you are dealing with 60 million people? Can you do two-way engagement and dialogue?

Paul Crick: You can. It is better on an individual project-by-project basis. As I said, face-to-face communication, although resource-intensive, is the most effective. It is how you engage people at a local level and make something real to them. For example, with our Severe Weather Impact Monitoring System, when we tried to engage with businesses about climate change, they were not really that interested. When we talked to them about the impacts of severe weather and talked directly to 900 businesses, 78% of them became interested and wanted to do something about it. We made it real to them. You need to start that dialogue, and then you get consistent messages and policy and it begins to flow.

Phil Rothwell: That is certainly true, and you are right that there is a huge population out there. There are 6 million people at flood risk, so it is a lot of people to try and communicate with. The work we are doing at the moment is to try and set out who are the communities that are really at high risk and then set about a communication exercise with them. We can do that on a site-by-site, project-by-project basis, and we invest quite a lot of energy in seeking to do that, but it is always tricky and face to face communication is Often expensive. There are cheaper ways of doing it and we increasingly use social media, not just as a way of putting information out to the public but receiving information back and beginning a dialogue about the information that we can give people. We have found, certainly in terms of recruiting people to our flood warning service, that the cheapest way of doing it by quite a long way is to engage people through social media. There is such a penetration now of social media—it might not be common to everyone, but a lot of people now use it—and we have found it very effective in getting our messages across and entering into that dialogue.

Katie Stead: I agree. Obviously our local authority is a lot smaller—we have a population of 400,000 in Kirklees—but we are keeping our website up to date. We have community newsletters and magazines, making sure that we put in our key messages. We recently ran a collective energy switch and used social media, and that was really effective in terms of take-up.

Q228 Stephen Mosley: Mr Crick, Kent county council has recently done a project with the University of Kent—the Climate 2150 Project.

Paul Crick: That is right.

Q229 Stephen Mosley: Why did you carry out that project? How has it affected the way that you operate?

Paul Crick: We wanted to ensure that we were going to communicate with the public on an informed basis, so we worked with the School of Psychology in Kent. There are a couple of reports that I can e-mail to the Committee, but we have two here about the best way of engaging people and the psychology behind communicating something like climate change. The key things in terms of the public were that messages need to come from trusted sources to motivate action; people are generally more motivated by specific local risks, particularly in the short and medium term; scenarios should be as concrete and vivid as possible; and the rationale for engaging with the public needs to be clear. Also, identifying actions for communities where they can make a real difference in terms of preparing for climate change will help to engage them. When we talk in terms of engaging with business, it is about, "Cut costs, cut carbon and win business." Making businesses more energy-efficient and reducing their overheads enables them to be more competitive and more successful. They were the key headlines, if you like, that came out of their report, so we have used that in terms of our communication with businesses and the public, as in Coastal Communities 2150, in our ECO project and with SWIMS and so on.

Q230 Chair: Are there any businesses that you are using to highlight that message, where businesses can demonstrate success by adopting that strategy?

Paul Crick: Yes, there are. On average, businesses in Kent have saved £2,000 a year by adopting more energy-efficient ways of doing their business. There are some leading lights in Kent, which I can let the Committee have further details of after the meeting.

Chair: That would be helpful.

Paul Crick: But certainly using tangible examples helps to engage others and that is what we do as part of Low Carbon Kent.

Q231 Graham Stringer: I think that we are all agreed that trust in the organisation giving the message is important. To the three organisations we have before us, have you tried in an objective way to test whether your organisations are trusted when giving these messages, as opposed to your impression of whether you are trusted or not?

Tony Grayling: I think we certainly have at the Environment Agency on the flood risk side. I believe we are quite trusted.

Phil Rothwell: Yes, we are. The Floodline Warnings Direct service that we give tells us that 71% of people who had received a warning felt it was an effective and valuable way of being warned and found it simple to understand. Half of them then took action. Whether that means we are being successful or not, I am not sure. That certainly seems to work reasonably well. That is not to say we are the first port of call when there is a flood event, in that people generally go to the media, the local radio and television, and then perhaps later go to the agency's website, which is why we work very hard with local media to ensure we get a seamless message going across in times of emergency.

Katie Stead: At Kirklees we have developed quite a strong brand through our Warm Zone scheme, which some of you may have heard of. It was the first in the country to roll out free loft and cavity wall insulation to homes. The funding came to an end for that programme a few years ago, and since then we have devised a number of other smaller programmes to target the homes that we did not treat under Warm Zone. The brand is absolutely what our residents trust. There are a number of pop-up companies. Business

in those energy-efficiency measures is building, and a number of residents continue to ring in and check whether other companies are bona fide. They prefer to come through the council when a scheme is offered. They are unaware of whether the company is legitimate so they will come through to check.

Q232 Graham Stringer: Do you have any numbers as quantification of that measure of trust?
Katie Stead: I suppose only the numbers who take up the schemes each time we roll out. They have been fully subscribed and advertised under the council's brand, but I would have to go back. I may be able to find something more substantial for you.
Paul Crick: I will give you an example of how we turned something round. I mentioned earlier the ECO project and we are rolling it out to pilot areas, over 100 homes each, in areas of fuel poverty, in socially deprived communities. It is the stereotypical situation of a man in a suit with a clipboard coming up the drive and people in those communities do not open the door. The way we have communicated with them is to use the KCC brand, showing that this is a KCC project, and that gives us access. That gets us access to talk to people and say, "Look, this does not cost you anything. This is free insulation and energy-efficiency advice in your home." Then, when the public see those measures—visible measures like external wall cladding—they contact us because they want to be part of it. So it begins, as I said earlier, and gets that snowballing effect. It is that initial face-to-face communication and trusting the county council.

Q233 Graham Stringer: You have all said in different ways that the public engage more if you talk about energy efficiency or if you talk about the particular impact of extreme weather or flooding. In that context, is climate change a useful badge or is it a hindrance?
Paul Crick: I think it is useful because, ultimately, people need to understand why and it is a secondary benefit, the primary benefit being saving money. But I think they still need to understand why. Ultimately you come back to what outcomes you are trying to achieve for a project and the public need to understand that.

Q234 Graham Stringer: So it is for the good of their souls.
Paul Crick: Thinking of CC2150, it is really hard to picture what the coastline and the community might look like in the year 2150—or 2050, let alone 2150. But by talking to the public about local scenarios and how they can mitigate the impact of severe weather, for example, that gets them engaged in climate change.
Katie Stead: I would echo that absolutely.
Tony Grayling: We find that current extreme weather is an entry point, and from that you can start a conversation about whether weather may get more extreme in the future and whether, therefore, you need to take preventive actions now to mitigate risks that you may experience in the future.

Q235 Stephen Metcalfe: A lot of the area I wanted to explore has been covered, which was about business engagement in this whole debate, but perhaps you could just expand. Are businesses interested in the debate at all, or is it just, "Tell us what the problems are. We will do what we need to do and then we will get on with running our business"? Do they want to engage in the science and the wider debate, or are they just looking at how it impacts them individually?
Tony Grayling: I think it starts with impacts, absolutely, and the degree of interest depends on the type of business. Some businesses will have very short-term planning horizons, and their own interest will be dealing with the impacts of current weather variation and climate risks. But other businesses have assets they have invested in for the long term and they will very much want to understand whether they need to take actions to protect those assets for the future. But it is about the organisational interest. It is the organisation-first approach. They are not necessarily particularly interested in the science, only in so far as it helps them to understand what impacts they may face.
Paul Crick: May I re-emphasise the two examples I gave earlier? We have found when we have talked about climate change specifically that levels of engagement with businesses are low. However, when we reframe it around severe weather and business continuity, we get 78% of 900 businesses engaged. That is because it is about how severe weather affects their bottom line and how it can impact that. The other thing, as I said earlier, is our strap-line, "Cut costs, cut carbon and win business," about making businesses more energy efficient. Engaging with them from that angle is what interests them. It is not the climate change side.
Katie Stead: I would echo that as well. We run an environment voucher scheme for our businesses in Kirklees. It has run for the last couple of years. It is designed to increase the resource-efficiency of businesses by offering a 50% matched grant up to the value of £5,000. We have some fantastic results and businesses engaged instantly. We have reduced carbon emissions. We are helping in the fight against climate change, but ultimately, businesses were not engaged in the beginning around the climate change argument. It is about how they can run their business better, more effectively, save money and retain jobs in the current climate.

Q236 Stephen Metcalfe: Are there any particularly hard-to-get-to groups of businesses? Is there a particular sector that does not or has not engaged with this that really should have because of the impact it is having?
Tony Grayling: It is quite a difficult question to answer. In general, the small and medium-sized enterprise sector is harder to get at. But if you look at it analytically, what many of those organisations need to be doing is focusing on the present, not necessarily on the future. Their planning horizons are quite short term. It may not be appropriate to overly engage them in that. There will, of course, be a subset of those that you should engage with and they are quite hard to

reach, whereas I would say if you are dealing with larger organisations—particularly organisations that deal with infrastructure—they tend to have already quite a sophisticated understanding of risk management and climate risks.

Phil Rothwell: Our experience in dealing with flooding, for example, is that for big retail organisations it is high up their risk register: they understand it, they get it, and they are planning for a long future; therefore, they build it in. The organisations that are harder to get to, or harder to get to take action, are the smaller enterprises, SMEs, where we have less penetration, and they think, as Tony has just said, in the here and now rather than where they are going to be. There is evidence that, post-flood, SMEs take time or do not at all recover from a flooding incident. It is something that we are looking at very carefully at the moment, through things like Chambers of Commerce, as to how we get our information across and how we help them.

Q237 Stephen Metcalfe: Can you expand on that a bit? You said you are trying to engage with them through chambers of commerce. Is there any direct engagement—you getting out and literally tracking them down and telling them, "Events like that recent flood we had are possibly going to become more prominent as the climate changes"?

Phil Rothwell: Yes. When we are talking about it and communicating with communities at risk—and of course communities have small businesses within them—we see that as being part and parcel of the interface we have with those communities that may suffer. As to the information we put out on our website and the information that we distribute, we have a floods campaign every year that runs over four weeks, and each week we will take a different sector. This year in November, one week will be devoted to SMEs and small businesses, and we will be working very hard not just with them directly but also with people they rely on such as the insurance companies and the insurance industry, which also have a key role to play in raising awareness and understanding of what needs to be done to reduce risk.

Q238 Hywel Williams: With the 900 businesses you identified, did you have a particularly modulated approach towards very small companies and partnerships? That is the overwhelming pattern in my constituency. I do not have large business organisations.

Paul Crick: Yes. There are an awful lot of SMEs in Kent. We engage pretty much across the board and go through our SWIMS project and our STEM project—which is Steps To Environmental Management—but also I talked earlier about trusted sources and businesses. We have also engaged with the Chartered Management Institute, which we have used to help us in terms of conveying the message. Those 900 are probably much across the board in Kent.

Q239 David Tredinnick: To what extent is climate change the driver for what you do or would most of it be happening anyway?

Tony Grayling: Climate change is quite a big driver for the Environment Agency because we are ourselves in the business of managing risks for the long term. For example, when we are developing our long-term investment strategy on flood risk management we need to make sure that we have factored in our best understanding of how flood risk may have increased or changed in the future. When we are building individual flood defences, we need to build in allowances for climate change because we want those assets to be working at the end of their life as well as when they are being built. When we are working with water companies—and local authorities, actually—we need to ensure that they understand when they are developing their water resource management plans that we review how water availability may be different in the future. So, yes, the current climate is very important to us, but climate change is quite fundamental to our work, particularly because of our responsibilities in flood risk management, coastal change management, water resource management and looking after the water in wetland environments and its quality.

Q240 David Tredinnick: I am thinking of my own Bosworth constituency in Leicestershire, which is 100 square miles, and a lot of it floods at different times. We have just had a huge urban development extension at Barwell, which was very controversial locally, and there were question marks about whether the river system and the drainage system could cope with several thousand new houses. I was wondering how you generally allocate resources when you are dealing with issues like this. What sort of priorities do you give specific local concern?

Tony Grayling: Again, we would give that a high priority. We are a statutory adviser in the land use planning system.

Q241 David Tredinnick: I would like Mr Rothwell to come in on this too, if you would not mind.

Tony Grayling: We will make sure that we advise the local authority on any planning application for a major development. Our advice will include advice on flood risk from all sources, whether that is surface water or from rivers or the sea. If we do not think that flood risk is sufficiently taken into account in the planning application or the development is in an inappropriate place, we will register our objection to the development, and in the vast majority—96%—of cases, our advice is taken by the local authority in the planning decision that they reach. That may be because they persuade the developer to change their plans or it may be because they reject the planning application.

Phil Rothwell: That is entirely right, and I think we invest quite a lot of energy in ensuring that the planning system puts the development in the right place rather than the wrong place. However, I would add that, even in new development, there are things that can be done to reduce the risk of flooding, such as sustainable urban drainage systems—or SUDS, which is the terminology and is now a much more frequently used phrase—which is now applied through the Flood and Water Management Act,

although it is yet to be fully applied. But each new development should have in place a design system that absorbs water rather than just sheds it into the nearest river as quickly as possible.

Q242 David Tredinnick: Is it a fair allegation to say that you do not focus enough on the basics, such as getting landowners to clean out ditches so that water flows away properly? There are statutory obligations on landowners and I have a problem in my area where ditches are just not properly cleaned out or they are overgrown. What sort of a priority do you give that?
Phil Rothwell: Priority depends on flood risk and the scale of the risk.

Q243 David Tredinnick: You prosecute occasionally. Do you ever say to someone, "You must deal with this; it is your duty to do it"?
Phil Rothwell: Where it relates to a main river, which is the responsibility of the agency, that would be the case and we police our main river systems heavily. Maintenance depends on the scale of risk, and maintenance programmes are developed to ensure that risk is managed as effectively as possible. Where those watercourses are not main river but local watercourses, that is the responsibility of the local authorities. We would look to them to be the lead player in local watercourse maintenance.

Q244 David Tredinnick: Fine. I put the question to Mr Crick.
Paul Crick: We do that in Kent. We have information for landowners and we take a hard line with regards to ditch cleaning.

Q245 David Tredinnick: You do.
Paul Crick: Yes, we do. In fact, we have also taken on SUDS. We have adopted SUDS in advance of DEFRA guidance on it. We just decided it was a good thing to do, particularly as part of new developments; we should do it, so we have.
On flooding and severe weather events, I would echo what colleagues from the EA have said in getting messages across and as a medium for engaging with people. That is a big driver. The other big driver, of course, is the financial benefits, which we have talked about earlier. But the overriding thing is to communicate how it affects people and to make it real to people. Whether it is a severe weather event or savings on the bottom line, it is about engaging with people by giving clear examples and clear benefits. However it is done, that is the way to do it.

Q246 David Tredinnick: I have one last slightly different question. Could Coastal Communities 2150 happen without climate change as a driver?
Paul Crick: Because the Kent coast is changing all the time, it makes it real to people. Focusing on an arbitrary date in the future and using local examples, giving those scenarios, engages people. I do not think it would happen without climate change being a driver. That is a key element when we are communicating with people and when we are talking to whole communities about resilience planning and planning for the future, rising sea levels and how it affects their living. You talked about the people living by sea rise. They would be, without a doubt, completely engaged by the CC2150 project and we would be talking to them about how they can do things for themselves in planning for the future and be more resilient.

Q247 Chair: May I ask the Environment Agency a question following on from that answer? In circumstances where you are being forced because of financial constraints to retreat from mitigation projects—and there happens to be one in my constituency where the agency are pulling away from pumping low-lying land that is behind the bunds, or the levees, of the Manchester ship canal, but the Environment Agency's withdrawal is because of financial constraints, not that the need has changed—how does that square with the difficulty that Mr Crick and others have in getting messages across?
Tony Grayling: I cannot comment on the issue in your constituency.
Chair: Curiously, nobody seems to be able to.
Tony Grayling: I would say two things. One is that we are always going to have a limit on the amount of resource that we have available to deploy, so we are always going to have to decide where best to deploy it and it will not be possible to proceed with all good schemes immediately.

Q248 Chair: It has been going for 40 years—no, more than that, a lot longer, 80 years.
Tony Grayling: If you look at the result of the recent spending review, in terms of flood risk management, the settlement for the Environment Agency was a good one, which sees some increase in our resources for flood risk management and a guarantee of resources up until 2020, which is quite unusual. Phil, you would know more about that than I do.
Phil Rothwell: That is right. More money is always welcome and you can always do a lot more, but whether there is ever enough to go round, given the scale of the risk we have to face, is always a problem. Allocating that resource is equally tricky. The case you refer to is in Frodsham marshes, I imagine, an area where the flood risk itself is relatively low and the future investment is allocated on that basis, but we are very aware that there is a local need to manage those watercourses. In that case and in others in the north-west, we are working with colleagues in internal drainage boards, the NFU and local authorities to look at other ways in which the same service might be delivered in time.

Q249 Sarah Newton: I would like to talk a bit about the Climate Ready programme and a more Government-strategic approach. We have had a lot of very good examples of local leadership, with people not waiting for Government and getting on with things, but the Climate Ready programme does seek to have some national strategic oversight in pulling people together on the programme. As part of that, is there any national communication programme?
Tony Grayling: Yes, it is very much about communication but it is targeted. There is more than one element to our Climate Ready Support Service.

The core of it is a web-based facility, where people can choose to come and find information about climate risks, guidance and tools that may help them to understand their own risks and what to do about them. It is primarily targeted at organisations rather than individuals.

On top of that, there is a more tailored proactive service, where we work under the priorities identified by the national Climate Change Risk Assessment and the national Climate Change Programme, and we work with the key sectors and on the key risks that have been identified. Often that is through intermediaries, so we have limited resource and we have to target that. We will work with trade associations, for example, to understand, working with them, what particular risks their sector faces and what they may need to do. For example, we are working with the paper and pulp sector at the minute to help them understand what their climate risks are and to develop the guidance and materials that they can then, as a trusted intermediary, as a trade association, disseminate to their membership.

We have been working with the electricity generation sector to look at how change in the availability of water resources may affect them in the future because they use a lot of water for cooling in power stations. There are lots of examples of that, but it has to be targeted because it is a relatively small amount of resource and we do a lot of it through partnership.

Another example is that we have seconded one person to work with the Local Government Association on their Climate Local initiative to work from the inside to help us understand what it is they need from us and then to develop what they need in partnership. Then, of course, the LGA is more effectively linked with all local authorities than we necessarily are, although we have a lot of direct relationships as well.

Q250 Sarah Newton: That is a very comprehensive answer. The very same professionals that you are dealing with in the trade bodies are also people and consumers of the very same media that we were talking about earlier that is engendering quite a degree of scepticism. How are you tackling them as individuals? For example, a council is led by its councillors and they will prioritise levels of expenditure. You might be giving excellent advice to the officers and the officers are fully engaged, but then some of the key decision makers—or it could be companies within a trade association—are reading *The Mail on Sunday* or are susceptible to a lot of external influences. How do you think about how you can communicate some of the underlying science, which perhaps you did not have to 10 years ago because there was a more general acceptance of the underlying science?

Tony Grayling: I think that the communication of science is primarily for others to do. We communicate about impacts and adaptation, because that is what we find to be most effective in engaging organisations. What they are interested in is whether climate impacts are going to affect their ability to do their job, whether they are a public or private sector organisation. To some extent, arguments around greenhouse gas reduction tend to be better understood because, quite often, there is a clear financial case for investing in energy- efficiency measures. It is a bit more of a challenge in relation to adapting to what the climate might look like in the future in terms of dealing with its impacts. That is why our starting point is usually, "What are your risks from current weather and current extreme weather?" If we get that far, we can then get into a more sophisticated conversation. A lot of our work is through national bodies, though, through trade associations or the Local Government Association, rather than necessarily through lots of individual companies because we do not have the resource to do that.

Q251 Sarah Newton: I understand. If you are really focusing on weather, the Met Office itself is not always that trusted a voice any more because people have heard predictions that we are going to have barbecue summers and then it pours down with rain. Many people have a lot of scepticism about the Met Office's ability to forecast weather. If you are using weather as a hook into both organisations and individuals to try and get them to think they must do something, how useful are you finding that, because of people's scepticism about our knowledge about the weather?

Tony Grayling: We find that it varies over time. We have a lot of extreme weather events over time, so I think there is enough awareness of the risks of flooding and the risk that there may be heatwaves or droughts. But it is undoubtedly the case that interest waxes and wanes according to the weather. You know this very well, Phil, in your area of work.

Phil Rothwell: That is absolutely right, although in support of a lot of the Met Office's work, particularly the joint Flood Forecasting Centre, the daily or weekly forecasts we get have been extremely effective and accurate. We use them a great deal in thinking and planning for flood risk management activity, as do a number of other organisations, infrastructure providers and local authorities. That element of our work, which was put together following the 2007 floods, has been very effective. But if you get a series of what I will call quiet weather years, with no drought and no flood, then undoubtedly public interest dies away and it is more difficult to recruit people into our flood warning service and more difficult to engage with people.

2012 was a horrendous year: it was both the driest and the wettest year on record all in one year, and it was, sadly, very effective at raising awareness. You rely on these weather events to give that burst of energy to the communication. As to the feedback you get, the response to the weather last year in terms of numbers of hits on our website, the number of people signing up for flood warnings, was immense. It was extraordinary and far more effective than any year we have previously had.

Q252 Sarah Newton: I have noticed in my own constituency, of course, that the minute there is flooding people are clamouring, "What more should be done?" But when I am trying to get support for a major flood defence scheme in a part of my constituency, because there has not been any flooding

recently, it is right in the town centre and undoubtedly is going to cause a lot of short-term impact, people are very sceptical about the need for it. Relying on the weather is a very difficult one because it is fine if you are paddling around: people want it now. But saying, "We have a one in 30-year risk event and you need to do this now because it may or may not happen," talking about probability and risk is quite challenging. Among the business people and the public there is a high degree of scepticism, I would say. Unfortunately, it makes it very difficult for the Environment Agency and water companies to invest in these necessary improvements.

Phil Rothwell: Also, because of that, there is always a knee-jerk reaction, "There has been a flood there in this town and therefore we ought to invest," when that might not be the best place to invest. That is very tricky, I agree.

Chair: Thank you very much for your presentations this morning. There are quite a few other documents that we are looking forward to seeing, particularly from the local authorities, and we will be contacting the LGA to see how your assertions that you are the leaders of the field stand up. I am sure we will have hundreds of other local authorities saying they are doing lots of other things. Thank you very much for your attendance.

Examination of Witnesses

Witnesses: **John Hirst**, Chief Executive, Met Office, and **Professor Julia Slingo OBE**, Chief Scientist, Met Office, gave evidence.

Q253 Chair: Good morning. Thank you for coming in this morning. I would be grateful if you would introduce yourselves.

John Hirst: My name is John Hirst. I am chief executive of the Met Office.

Professor Slingo: I am Julia Slingo. I am the chief scientist at the Met Office.

Q254 Chair: What do you see your role as being in regard to the whole issue of climate change, and what other Government bodies do you work with?

John Hirst: Our role is to provide the underpinning science. We are contracted to explore the science and deliver models and predictions of future climate conditions. We are one of the world's leading climate science centres, and I think, from your last inquiry into our operations, you know that, out of 46,500 geoscience research institutes, the Met Office Hadley Centre came out as No. 1 in the world. So we have a worldwide reputation for having deep science credentials. We work with just about every Government Department there is. Most of our climate science work is contracted by DECC and DEFRA, but we also do work for the Department for Transport, the FCO, DFID, the Ministry of Defence and the devolved Administrations and so on. So we are in contact with many.

Q255 Chair: What is happening at a strategic level within Government to help communicate about climate science?

John Hirst: That is a question that is difficult for me to answer because I do not have a role or an influence on the strategic communications of climate science on behalf of the Government.

Q256 Chair: Come on, you are leading the world's No. 1 climate centre and you are saying you are not part of that strategic role. Surely you must be.

John Hirst: I am saying we do not have a mandate for the communication of climate science. We make sure that the climate science work we do is open, transparent and publicised, both in a structured sense from peer reviews in academic journals and also on websites, Tweets and all the rest. We have a responsibility, I think, as leading scientists to make that science available and in the public domain, but we do not have any role in the formation or the communication of policy.

Professor Slingo: It is fair to say that I personally work through the Chief Scientific Advisers Committee, so I have very good relationships with the chief scientific advisers across Government. As John says, we take seriously our responsibility of ensuring that the best science is communicated into Departments and often that is done through the CSAs. In fact, I have just come from Mark Walport's breakfast meeting where I have briefed them on—

Q257 Chair: The breakfast meetings are continuing, are they—the Beddington tradition?

Professor Slingo: Yes. I have just briefed them on the latest findings that will come out at the end of the month from the fifth assessment report with a view to how that shapes their—particularly Sir Mark's—approach to setting carbon budgets and all those sorts of things. We then had a discussion about the energy implications of that. Although we do not have a strategy—as John said, it is not part of our mandate—we do take it very seriously and make sure that, at all sorts of levels of scientific complexity, we communicate the science through certainly the chief scientist's views.

Q258 Chair: Let us put the question slightly differently. If your mandate were amended to include helping to engage with the public on climate science, do you think that would be a helpful change to your mandate?

John Hirst: I think we would extend our work in terms of making things open.

Q259 Chair: Leaving aside minor issues like money—

John Hirst: We would certainly extend our programmes and the resources committed to

communicating the science. That said, we do quite a lot. I hope I did not mislead you in my first response, because you were talking about Government strategy. We do a massive amount of communication of science. Last year alone we tweeted 30,000 times, and scientists did 1,000 radio interviews, 100 TV interviews and 20 documentaries. There is a lot of outreach in broadcast media but also in relationships through other organisations. So we do quite a lot of it already and we would extend that if we were given the role to do so.

Q260 Roger Williams: In the written submission that you made to us, you said that the public display an increasing appetite for detail about climate change. Where would your evidence for that statement come from?
John Hirst: Mostly from the contacts that are made with us and the questions that are posed either directly to us or through organisations we work with, whether that is the Department for Education in schools, business communities, or whoever it is, there is just an increasing—

Q261 Chair: You can demonstrate that over time, can you?
John Hirst: Absolutely, yes.

Q262 Roger Williams: When you say people—individuals—are communicating directly with you, what sort of form does that take?
John Hirst: It is website traffic, social media, in which we are heavily engaged, good old-fashioned letter post, and questions through Freedom of Information requests. All manner of different communications we have.

Q263 Roger Williams: You have touched upon this next point, I think, already, but you are funded by DECC and DEFRA to work on climate science, but you say you do not have a strategic duty as far as communication is concerned. Do you think you ought to have one?
John Hirst: I think we can help. You can separate the communication into communication of science or the communication of impacts and the consequences. Certainly we would welcome a greater responsibility for communication of science. When you get into impacts, you get into political and other business judgments. I think it is good for us to stand back from that so that we keep the science as clean of interference or influence from that source as we possibly can.
Professor Slingo: The other point on this is that, as John rightly says, what we do in the Met Office Hadley Centre is fundamental climate science. The translation of that into impacts often involves other science disciplines. As well as the policy side of it, it is also about linking well to other disciplines, particularly in the academic research council community in the UK and drawing on that expertise, as we currently do in weather forecasting through the Flood Forecasting Centre, as you heard from the EA just now, to translate the science that is our prime function into what it means for the man in the street. That involves partnerships at all sorts of levels, not just at the service end but also at the research end. That is partly why earlier this year we launched the Climate Service UK, which is a partnership between ourselves, NERC and the Environment Agency. It is to start setting in place a forum where those dialogues can go on. I think a key part for the Climate Service UK, going forward, should be about communicating not just the climate science but a much clearer narrative of what that translates into in terms of the risks that society faces. So we are on that road and I think it is not just a mandate for us. I would say it is a mandate for all the agencies, researchers and so forth who work in this space to do that.

Q264 Roger Williams: If you had that greater responsibility, do you think you would be able to do the communications better than the way people are doing it at the moment?
Professor Slingo: Yes, I think so, particularly if you did it within the framework of something like the Climate Service UK. One thing you have to be very careful about is not having too many multiple voices with different messages. That is one of the dangers we have, as we have found on the weather side, where we have created the Natural Hazards Partnership in the same sort of way. We then speak with one authoritative voice. We have opportunities for different views to be expressed. I think a framework like the Climate Service UK, where we can come together and express and communicate not just the science but what it means in a very clear and agreed way—an authoritative way—would be very helpful.

Q265 Roger Williams: Going back to something that Mr Hirst said about not wanting to go down the path of impact of climate change, surely, in a commercial sense, that is what a number of your customers want you to do. They want you to tell them what the impact of climate change may be on their businesses.
John Hirst: What they want to do is to come to us for an authoritative view on the best science available and then we work out with them what the impact is. It is very difficult for us to understand the impact in every single context, so we work with them to contextualise the science.
Roger Williams: I am encouraged to ask you, if you are not doing this, who in Government ought to? But I guess you are making a bid for doing it; so perhaps we will pass on that.

Q266 Chair: As to the data that you spoke about, Mr Hirst, about the patterns of traffic in public interest, it would be very helpful to have some figures on that.
John Hirst: We can let you have that.

Q267 Chair: If it is at all possible, we would like to have it broken down by the types of questions. That might be harder to ask, but I would appreciate it.
John Hirst: It is harder because quite a lot of the questions are overlapping. For example, we get a question about, "Was this storm climate change?" We would have to separate those things and give a fuller explanation, but we will do our best for you.

Q268 Sarah Newton: We are getting the overall impression from the previous witnesses and from others that we have hit on a major problem here. Nobody is strategically owning the authoritative voice, and trying to explain the science and then contextualise it for people. Everybody seems to be assuming that somebody else is doing it. There is a huge desire for clarity that we have seen, particularly from previous witnesses at local authority and Environment Agency level, to try their best to explain to people. But actually they are not; they are pulling away and they are then saying, "As nobody is taking on this fight or this responsibility to communicate the science and contextualise it, we will fall back on things like how you can save money heating your home, why insulation is a good thing and how businesses can save money. Would you agree with me that that is a fair reflection of where we are now—an absence of a trusted voice?

John Hirst: I was kind of with you until the last one, because when you come down to it we would consider that, on the evidence we have, our voice is trusted in these matters. If you do not mind me overlapping from a question to the last panel, you made a statement about the level of public trust in the Met Office. All the measures that we have about the issues we announce—and we do this through the public weather service customer and directly through LWEC and others—show that the level of trust in the Met Office is around 80% from the general public, and it does not vary very much depending on the circumstances. What sometimes happens—and I have my own cab driver's test—is that people criticise the Met Office. I will say, "When was the last time you had a bad forecast?" and people generally cannot remember. While I think that is a natural reaction, the stats and the feedback we get do not quite bear it out. Is there sometimes a set of different approaches that are taken through various partner organisations? Yes, there is. Would there be a benefit from having greater clarity and consistency? Absolutely there would, because we take lessons from our extreme weather forecasts, for example, where, if people get a warning, either through the Flood Forecasting Centre or others, of extreme circumstances, the first thing they do is corroborate it. If they cannot corroborate it, they tend not to take action. This falls into the same kind of context.

Q269 Sarah Newton: So, yes, the trusted voice is the Met Office, but there is more to be done in deploying your skills and your expertise and accepting you are trusted—more than anybody else we have heard so far anyway—with the public, and not only the public but businesses and Government Departments. More work needs to be done to have you out front, to put it crudely, taking on the argument about climate change, explaining and contextualising the science. You believe you would be the best organisation to do that.

John Hirst: I certainly think it would be helpful. You could not do it alone because contextualisation requires partnership work.

Q270 Sarah Newton: You could take the lead.

John Hirst: We could.

Q271 Sarah Newton: Are you thinking about this in relation to the forthcoming international climate change report that is coming out in October? Are you making preparations to take a leading role in responding to that and communicating?

John Hirst: We are taking a role in the sense—they are not reporting until the end of September—that we are preparing. We are not going to make any statements or communication before it happens, but I can pretty much guarantee that, as soon as it happens, there will be a lively debate and we will be fully engaged in that debate through all the mechanisms that we have. Our role, whether it is blogging or communicating in response to other people's questions, is to try and make sure that the science is understood and that misinterpretations or misunderstandings of the science have an opportunity to be corrected.

Sarah Newton: That is very reassuring.

Q272 Stephen Metcalfe: Moving on from the issue of trust and trusted voices, you are trusted. As you said, 80% of the public trust you. However, there are some sectors of the press who have taken it upon themselves to use you as a bit of an Aunt Sally at times and you have come in for some stinging criticism. Why do you think that is, and do you think that criticism is fair?

John Hirst: It is a free press and people can express themselves as they wish. Whether it is fair or not, I can say it is sometimes bruising and it sometimes impacts the self-confidence of some of our scientists. That said, we seek to demonstrate resilience in the face of some of this and bounce back. It is a continuous task and we engage very actively with leading journalists and the press to make sure that if they say things that we believe are incorrect, we seek to get them corrected. We enter into a dialogue, and progressively, that seems to have some impact. But people are entitled to their opinions and they express them.

Q273 Stephen Metcalfe: Why do you think you are a target for those opinions?

John Hirst: I can only speculate about this and I think it is a question that probably should be addressed to them because they will give you reasons why they are doing it. It is not uncommon in areas of science, whether it is medical science or environmental science in which we are engaged, for the consequences of the science to be quite serious and there are interests, whether they have genuine questions about the science or they have issues with the consequences, to challenge that science. I am very happy that the challenge to the science should be structured and through the right kind of channel, and our scientists welcome the challenge. Sometimes that strays into combativeness that is difficult to deal with on a scientific basis.

Q274 Stephen Metcalfe: You do not feel that the level of criticism that at times you have come in for has affected the way in which you communicate climate science to the public? It has not made you

want to step back from communicating perhaps what is a difficult message?

John Hirst: In actual fact, it has made us much more determined to be scientifically robust and objective.

Professor Slingo: In fact, over the last four years we have made a really concerted effort to open up a lot more of our research. We now have very open research pages and there is research news on there. We have started to produce many more in-depth science briefings. One thing that in the past you could have criticised many of us for—not just the Met Office but climate scientists in general—was oversimplifying the message and assuming that the public cannot access the deeper science behind it. That is absolutely not the case. One of our responsibilities as scientists is to produce briefings that are in depth and give the context, which fill the gap between the peer-reviewed literature—which is for the working scientist mostly—and the quite simplified messages that we have put out in the past. We try and cover now a much broader spectrum of communication that includes some pretty in-depth pieces.

A good example was three papers we produced on the recent pause in global warming that has received a lot of attention. As a result of those three papers, we did get much better reporting in the press than we would have done without them. The messages in those papers were picked up, understood and communicated on.

Q275 Stephen Metcalfe: Good; thank you. Has the Climategate affair had any effect on your work or the way you communicate, or have there been any advantages following that?

Professor Slingo: I was involved in this right at the start of my period as chief scientist. Again, I think it just emphasised the real importance of openness, transparency and openness of the data where possible. From that, we did a lot of work, as Committee members will know, around opening up all the observations that went into constructing the temperature series and so forth—and even the methods that we used. Out of that have come the sorts of things that I have talked about, which is our research being much more open to the public; you can see who is working on what and what they are doing. There is much more openness in terms of these in-depth science things. Scientists have never been secretive, but what we clearly did not understand was that, in a situation as important as dealing with climate change, this whole business of openness, transparency, open data wherever possible, was critically important. I do not know, John, whether you want to add to that.

John Hirst: Just to confirm that we took some steps at the time. It is now kind of drifting back in time, but we took a step to write to everybody—every national met service in the world and others—who contributed their observations and requested that they gave us permission to look at their data to publish. With a handful of exceptions—some people said no—most people said yes, so observations and the records have been on the website ever since.

Q276 Stephen Metcalfe: Following on from that, why would a handful of people have said no?

John Hirst: I think because they thought they had value that they wanted to exploit. I do not really know.

Q277 Stephen Metcalfe: But as to this openness and transparency issue, do you think you are, first, achieving that, and, secondly, do you think the message that you—not you specifically, but the community—are now more open and more transparent is getting across to the public and that they trust that?

John Hirst: I think there is work to be done. It would be crazy for me to say that everybody understands and everybody trusts, because it is clearly not the case. What we can do is continue with the work on the transmission, not only just in what we need and its quantum but also the style. We have put in a lot of effort to understand—which is a continuing piece of evidence—how people accept probabilities and uncertainties. We have done worldwide experiments with academics on this kind of thing. We have done focus groups that learn how to communicate better. There is a whole range of things that we are doing, but I think it will take a while before it is a done deal and everybody understands and uses the same thing.

Q278 Stephen Metcalfe: But the direction of travel is right.

John Hirst: We are engaged in it, yes, absolutely.

Q279 Chair: There is a story in *The Times* today that says that the IPCC have appointed a psychologist to join their panel in helping to communicate some of the messages. It is rebutted by Benny Peiser, who says that this will weaken the IPCC. Do you have any comments, please?

John Hirst: You have the advantage over me. I have not read the article.

Q280 Chair: But, generally, do you think that these—

John Hirst: I can tell you that we have worked with experts at Cambridge and Bristol universities on the communication of complex issues and how people deal with them. We have worked with other commentators outside our organisation, who are experts in how to express these things to adjust our expression—not to change the fundamental thing we are trying to communicate but to understand how the message is better delivered. To be honest, if somebody is taking advice outside to get better expertise, it sounds to me like a sensible thing to do. There is a danger in all of the things that we discuss sometimes that we assume that all scientists are exactly the same. There are some scientists who have both a greater interest and aptitude at communicating with others and some scientists who are best talking to scientists.

Q281 David Tredinnick: There seems to be a clear split in the scientific community about how much they should be involved in talking about their work. We were at the Science Museum not long ago and these differences were highlighted there. To what extent should climate scientists become involved in the public debate about public climate change policy, please?

John Hirst: Again, it joins a little bit in part—

Q282 David Tredinnick: How much do you share your thoughts? To what extent should you keep mum and to what extent should you talk about your work? You are a very prestigious organisation. To what extent should you share your views? Here you are with the Select Committee, but what about the general public?

John Hirst: We talk about the science and its contexts with great pride and discipline. Because of the role we have of providing the underpinning science, we seek not to engage as an organisation or as a collective in the discussions about policy. That is a limit, I guess, on the individual roles, but it is a position we take, because the benefit of that is that our science is then taken away and trusted because of the science.

Q283 David Tredinnick: But is there not a clear distinction between policy and policy implications? It is fair enough to say, "Well, we can't create policy. That is a Government task," but surely the implications of certain decisions are something that the public should be aware of. You could actually contribute too that.

John Hirst: Could you illustrate that, because there are quite a lot of policy implications? If you would like to illustrate that with an example, it will help me answer the question better, I think.

Q284 David Tredinnick: I am not sure I can pick a specific example off the top of my head, but what I am suggesting to you is that, when you have an issue that is clearly of public interest upon which Ministers or others in authority will have to determine a course of action, it would be helpful to the public if you set out the options in a dispassionate way.

Professor Slingo: Yes. I think we can talk about the implications. Whether or not it is policy implications, I do not know, but certainly we do not stick just to the basic scientific facts. For example, we know from what we are doing currently that a world that is 4° warmer by the end of the century is possible. Again, for the Foreign Office and other users, we created a very interesting map, which is, "What would a 4°C warmer world look like in terms of issues for food security, water security, health impacts and all those things?" That, in a sense, is the implications of what the science is saying, on which one can then say, "Well, actually, if I am concerned about food security or I am concerned about migration or energy security, I can look at this and take those implications and work through my policy." There is a sort of grey area in there. What I think we cannot do is talk about how people should behave and what they should do on the basis of our science. That is not for us to say. Whatever our personal views are, we are very clear on that.

Another example where I believe we work into policy is a very successful and important programme we did with DECC and the Tyndall Centre, the Walker Institute, and so forth, which is about looking at avoiding dangerous climate change. It says, "What sort of mitigation scenarios should you pursue if you want to stay within 2°?" That is not set in policy, but it has policy implications. It also needs the best climate science to say, "If I am going to follow that trajectory with my emissions of a whole range of things—gases and aerosols—what are my chances of being in this world or in another world, and what then would be the implications of that emissions trajectory for things like water security and food security?" Yes, we do work in that space, and so we should because we are contracted by DECC to provide the best underpinning advice for them to set policy. There is often a very close relationship between the science and the implications. The distinction for me is not saying what Government should do or how people should behave or what people should do.

David Tredinnick: Thank you. That is a very helpful explanation.

Q285 Stephen Mosley: Within the Met Office submission you talk about Climate Service UK. Could you explain what you are hoping to achieve, and why and how?

Professor Slingo: This is a partnership, so it is saying, yes, it is the Met Office who lead on climate science, working with the Natural Environment Research Council, who are very important partners for us in our climate research. But they also bring to the table other environmental science disciplines, and then, at least to begin with, the Environment Agency is very much a delivery organisation. We realise that society is increasingly vulnerable to climate, whether it is climate variability or climate change. There is an increasing need for services around the world that help people manage the risks of climate variability and change. The Climate Service UK, first of all, is the UK's response to the Global Framework for Climate Services, which has been mandated by the World Meteorological Organization as something that national Governments should put in place. So it is the UK's response to that, but, more importantly, it is about translation of the climate science and what will happen in the next year, or the next 10 or 50 years, in terms of advice and services that are relevant to the user. The Climate Service UK must start with the customer. It has to say, "What does the customer need to know for the decisions they have to make? What science can we bring to that? How can we shape and translate that science into what the customer requires?" It is setting in place a framework for a dialogue with the customer and it is working not just across Government but increasingly across the private sector, where we see massive opportunities for the private sector, not only to manage the risks but realise the opportunities of better use of climate science. John, would you like to add something?

John Hirst: In short, it is the creation of a shop window for the science so that people have a destination to go to, to get better access to the science and advice on it.

Q286 Stephen Mosley: I know in the submission you say that it presents a potential for innovation and communication. What do you mean by that?

John Hirst: People can get access to the science and the information and improve the management of their affairs, whether they are supply chain managers or

supermarkets. We know, for example, that there is a lot of food waste around, and people who plan their affairs more effectively, either by weather or climate, will benefit from that. People can get access to that for better planning of engineering projects, for international development projects, a whole series of things that people can get access to. But the interpretation of the data and the science requires some innovation on behalf of us and others to make it accessible and useful for different users.

Q287 Stephen Mosley: How are you doing that? Is it social media, online or—

John Hirst: We hope to be engaging with a whole range of customers directly and indirectly to work up projects. Sometimes we will approach a retailer and say, "Look, here is some work we might be able to introduce to you so that you can manage your affairs better." Sometimes people will come to us and say, "We are working in the field of energy in Africa. Can we work with you to understand the climate change implications so that we can deliver the services better?" There is a whole range. If you want a selection, I can send you some of the projects that we have been working on with others around the world in that domain.

Q288 Stephen Mosley: Turn the clock back a bit. A couple of years ago this Committee did an investigation into the Met Office. One conclusion was that we recommended greater use of probabilistic weather forecasts by broadcasters as a way of improving the general public's understanding of climate projections and weather forecasts. Has there been any progress?

John Hirst: There has been some. We discovered around that time and afterwards that there is a whole series of things to do. First of all, we know that, where in the US they use probabilistic forecasts quite a lot, when you talk to the consumers, not everybody understands. When it is stated that there is a 60% probability of precipitation, people do not really understand—even in the US, although they are used to that term—whether it is 60% of the time, 60% of the places or a 60% chance, which is what it does mean. So there are misunderstandings. We are trying to work through those.

You probably have seen on BBC weather forecasts that, rather than using the word "probability", people have said, "There is a chance of this happening. We are not sure. By the end of the week, this storm could go one route or another." We are introducing the uncertainties quite systematically into the forecasts and predictions, rather than using structured probabilistic expressions, which we find sometimes to be a barrier to understanding.

I use the following example quite a lot. Where people have an intuitive understanding of the subject-matter, it is quite easy. If you ask any football fan in the UK whether Manchester United is likely to be in the top three of the premiership at the end of the season, everybody can have a discussion about it with some understanding. Every time my mother crosses the road, she processes a probability, although not explicitly, otherwise she would almost certainly be killed. It relates to where there are things going on in your life. When you start to talk about something about which people do not have any intuitive feeling or that they have no contact with and you do that in a mechanistic way, sometimes you lose them. We are trying to find ways of expressing those uncertainties that are accessible in both language and terms so that it improves people's understanding. I think it is working.

Chair: We will keep off probability and the premiership and pass over to a Manchester Member.

Q289 Graham Stringer: With regard to psychologists, the IPCC will publish its fifth assessment report this year. What preparations are you making to deal with the public and the media when that report is published?

John Hirst: We have, as I said earlier, a whole series of efforts planned. To some degree, it will have to be reactive, depending on the questions and issues that are raised by the people who respond.

Q290 Graham Stringer: I am sorry to interrupt, but do you have a good idea of what is in the report?

John Hirst: Yes.

Professor Slingo: Yes.

Q291 Graham Stringer: It is not just reactive.

Professor Slingo: No, but it is a question of what end up being the hot topics, in a sense. We have obviously anticipated some of those and we have already done some work. As you know, there are the three papers on the pause in global warming that will surely be raised. I think the Arctic will be another one, and we have done quite a lot of work around climate sensitivity. We have quite a lot of work already well established. We have a number of people, of our scientists, being trained in media because it is really important that we have a whole range of scientists who can talk confidently and clearly in various forums about what the report says. We have a series of briefings to key organisations planned and in the diary. I do not know whether there is anything more, John.

John Hirst: We have the mechanisms in place for all kinds of communications which we will use as the topics arise.

Q292 Graham Stringer: Is a report every seven years—which is big and dense and it is a lot of scientific papers mediated by people representing Government—the best way to deal with the issue? Has the IPCC had its time? Should there be a different way of looking at how all the science is communicated?

John Hirst: We have to take it in the context that most of the science that is done is published as soon as it is available. The IPCC aggregates and draws collective conclusions about those things. While it is a one-in-seven-year event, it is an event in a whole stream of communications and exposure of signs as it goes. I think it is useful in any scientific domain to collect and say where we are now collectively. I would support some method of doing that, but I think it is a mistake to see it as the only thing—the only communication that happens.

Professor Slingo: I would agree with that. I think it has been vitally important in the whole process of the climate change story and the narrative around climate change, and there will be some, I think, very important additions this time. The scale of the activity is immensely challenging and there has to be, as there should, a look at whether this is the right way forward for the scientific community or whether there is a different mechanism we can look at.

John Hirst: It is important also to see it in an international context because the IPCC involves 195 countries, although it is fair to say that around 100 normally attend. We are, in a sense, in the UK quite resource and science-rich and, given that this is a world issue, having a forum in which the 195 countries can be engaged is pretty useful, I think.

Q293 Graham Stringer: We heard earlier that the councils and the Environment Agency, when they were explaining how they were engaging with people on this issue, found it easier to deal with particular weather events and extreme weather events. Do you think that is a fair way to get into the subject of climate change? Do you think you can relate one extreme weather event or even a number of extreme weather events to climate change?

John Hirst: Julia is better on the science. I think it is a fair but not wholly perfect way of beginning a conversation because, as you know, the science of attribution of specific weather events is evolving and we are not in the position of always being able to say, "This specific event is because of climate change." As we all know, there is a lot of climate variability and weather variability as well as changes that prolong through time. Julia will probably say more.

Professor Slingo: Yes. I was listening to what the Environment Agency was saying. When you have an extreme weather event, it raises people's awareness of our exposure and vulnerability to these sorts of things. I think then we have to be very careful about not always saying that there is a contribution from the human-induced climate change. The ability to comment on that is improving all the time, and a very nice paper has just come out in the bulletin of the American Meteorological Society that looks at the extreme events through 2012 and does a very careful attribution of each event. You can show that about half of them—and many of them are temperature-related, of course—have a contribution from human influence. But, for example, that paper also says that, for the 2012 summer rains, there is not a contribution from human influence. We need to be very careful that we do not oversell the climate change story. It has to be a very balanced response. It is a real success now that, scientifically, we are capable of making that distinction in a very objective and robust way. The more we can do that and communicate that, the more important—

Q294 Chair: So you are slightly moving towards the position that the local authorities gave earlier on when they said that, if you just approach it from a science perspective, some people disengage rapidly. They approach it from impact.

Professor Slingo: Yes, but we have to be very clear—we also need to employ the precautionary principle here—that there is evidence and that we understand the fundamental physics of this for things like increasing intensity of rainfall, of high rainfall events, which lead to flash flooding. The importance of that is that we see the impact today and what sort of adaptive measures we need to take for that. We have this overall underpinning science that tells us that heatwaves are very likely to increase in frequency and in intensity. We are beginning to acquire a lot of evidence around intense rainfall events on the sort of hourly/daily duration, and that is distinct from, say, a wet summer that says we need to be concerned about this.

Q295 Chair: But to match the two positions, it is not the precautionary principle we want; it is the impact of doing nothing that needs to be described to people.

Professor Slingo: Yes. I think that is right and we have still, if you are talking about communication to the general public, quite a lot of work to do to create these narratives that people can relate to. That is where it is not just about the climate science, but the translation of that and what its implications are, and then taking it down to the local level. Again, coming back to Climate Service UK, one very important thing that we can achieve there by bringing these different groups together under one umbrella is to create these sorts of narratives that allow people to understand more the risk that they are facing and therefore what sort of response they should take.

Q296 Graham Stringer: There is more energy in the system. When we went to the British Antarctic Survey earlier this year, I put that question to them because they were saying that a lot of the impact of the temperature would be at the poles, which would mean there was less temperature difference. I asked them whether that would mean less rather than more storms, which is usually assumed. They said the word "certain". Do you think the representation that we will get more storms because of higher temperatures is fair?

Professor Slingo: We need to distinguish between more storms and more intense storms.

Q297 Graham Stringer: Yes; sorry, I meant more intense.

Professor Slingo: As to more intense storms, then you come back to this business of the interaction between the water cycle as part of the energy cycle. The fact that warmer air can hold more water means that you can get more intense release of latent heat, which allows the storm to become more intense. Those are some of the arguments around that. It is a lot more subtle than just talking about equator-to-pole temperature gradients, because we know that there are regions where storms form and where storms grow and so forth, and there are some quite interesting local changes that would encourage more intense storms. In terms of taking a very simple view, it is often very misleading. The evidence is probably there that we could have more intense storms. Whether we have more storms is another matter.

Q298 Graham Stringer: I have one final question, which we have asked most of the witnesses. Can you give us a concise definition of climate change?
Professor Slingo: Climate change is, from my perspective, something that transcends the natural variability of the climate on a range of time scales from seasonal to multidecadal. Within, say, our lifetime or longer—say 100 years—is the climate different now than it was 100 years ago when averaged over several decades? That is how I would look at it. We can look at past climate change in that context as well. That is how I tend to look at it.
Graham Stringer: Thank you.

Q299 Hywel Williams: Do you think the way the media reports climate change and policy is changing, and is it for better or for worse?
John Hirst: We track interpretations of our science, both in weather and climate, in the media quite actively to make sure that we understand what is being said and how this is understood. It varies from journal to journal. Most reporting on climate change depends on whether it is written by environmental correspondents or general news correspondents. Most is reasonably balanced. Although there are errors from time to time, it is reasonably balanced. There is some reporting where it appears to be less balanced. Then, of course, you have to distinguish between correspondents and editorial positions. So there is a whole range of approaches here that we monitor. Our sense is that, in recent years, it has been getting somewhat better, but I cannot measure that particular conclusion objectively, I have to say.

Q300 Hywel Williams: Some witnesses have said that the debate is more polarised and more politicised these days. Do you think that is the case? If so, why?
John Hirst: I do not know whether it is more or less politicised. I give quite a lot of speeches at events and breakfasts, lunches and dinners round the place, and I have a slide that I carry with me that says that climate change is not a philosophy, a religious conviction or a question of metaphysics; it is a geophysical phenomenon that we observe scientifically. As I said earlier, the consequences of the science are quite important for the world and us, and therefore it is inevitable that people will take a view—and it is a good thing that we do. Some people in all subjects take views right across the spectrum. Sometimes it is some of the extremes at either end that get more exposure than the body of opinion in the middle because, by definition, being the body of opinion in the middle is less newsworthy.

Q301 Hywel Williams: There is some evidence, lastly, Chair, that the media in the UK and the USA are much more sceptical than in other countries. I do not know if you have any experience of this or if you have any views.
John Hirst: I only have anecdotal views, to be honest. I do not know that I have any structured understanding. People I talk to in the US get concerned and sometimes I hear anecdotal evidence such that, if you ask a Kenyan farmer, he is pretty sure what is going on. But I am not aware of any structured international comparison, I am afraid. Are you?
Professor Slingo: No.
Hywel Williams: Thank you.

Q302 Chair: On this Committee, there are four political parties represented and I think it is true to say for every one of us—although some might not say this as publicly as others—that none of us has ever been 100% in agreement with our ministerial colleagues when in government or in opposition. In your relationship with Government you cross paths with Ministers from lots of different Departments. How do you deal with the issues that crop up that are just like that, where you do not agree with the Minister on the policy implications?
John Hirst: Whether we agree or not, we follow a pretty consistent route. We seek to engage with both Government Ministers and officials. We accept that not everybody is an expert in climate science, or indeed physics, maths or chemistry. We try and invite them to come and see us. We talk about what we do, about the relationship between what we do and their responsibilities, and show how the science we do can be useful to them. To be fair, I cannot think of any particular circumstances where that does not facilitate a much better dialogue and a better understanding of the things that we have in common that we can do together.

Q303 Chair: So there have been issues where you have not been on the same wavelength as the Minister in terms of the policy implications.
John Hirst: If you asked the Ministers, they might say that there were occasions when we were not on the same wavelength as them. Clearly, people start in this usually by sitting on the fence.

Q304 Chair: Give me an example of an issue where that would have been true.
John Hirst: I am not sure it is helpful to give specific examples, but let me give you areas: impact of our services and our science on agriculture, defence, energy and on land use. Right across, there are Ministers in all kinds of areas who start at a different point of understanding of the science we do, and it is almost without exception that in the dialogue we can improve our mutual understanding of how we can be helpful.

Q305 Chair: So you have been successful in educating some of them—in all parties.
Professor Slingo: Yes.
John Hirst: I think through the dialogue comes a much better understanding and it is just a fact of life. I am an economist, for goodness' sake, and you know what they say about economists lying end to end and never reaching a conclusion. We all start off with different levels of expertise, and by discussing things we get a much better understanding.
Chair: Professor Slingo and Mr Hirst, thank you very much for your attendance this morning.

Wednesday 9 October 2013

Members present:

Andrew Miller (Chair)

Stephen Metcalfe	Sarah Newton
David Morris	Graham Stringer
Stephen Mosley	David Tredinnick
Pamela Nash	

Examination of Witnesses

Witnesses: **Rt Hon Lord Deben,** Chairman, and **David Kennedy**, Chief Executive, Committee on Climate Change, gave evidence.

Q306 Chair: Gentlemen, good morning and thank you for agreeing to come this morning. I would be grateful, just for the record, if you would be kind enough to introduce yourselves. I think we know who you are.
Lord Deben: I am John Deben, chairman of the United Kingdom Committee on Climate Change. Previously, I have been involved in these issues since, I suppose, being Minister of State at the Department of Agriculture.
David Kennedy: I am David Kennedy, chief executive of the Committee on Climate Change.

Q307 Chair: On your website it says that you conduct independent analysis into climate change. What do you do, and in what way is that unique?
Lord Deben: Of course, all of this is done within the resources that we have, so there is a limitation on that, but our job under the Climate Change Act is to give the Government advice to set targets and budgets, and one of the things we have to do is ensure that the Government are warned of any change in the science. All that we produce has to be based on the science. Therefore, we need to fill in the gaps where there is no published work and ensure that the published work is properly interpreted and that we as a committee can do that. The committee itself is able to do that partly because of the quality of the member scientists we have.

Q308 Chair: Should that not be just the Met Office's job?
Lord Deben: Not really. First, it is a much wider job than the Met Office does; and, secondly, in the end we have a statutory duty to make sure that the advice we give to the Government is correct. For me, the basis of that correctness is ensuring that we are entirely in line with the science. That is why, for example, when anyone comes up with an alternative view—something that is based upon a piece of research—we feel it necessary to look at that; otherwise, we cannot keep the Government up to date. We have to be constantly sceptical. I insist upon being a climate sceptic, because my job is to ensure that we ask the questions all the time to make sure that we are not led along some line that has not been properly investigated. That is our job.

Q309 Chair: Does that imply that you do not trust the Met Office to do that?
Lord Deben: No. The Met Office is one of the most important sources of our advice, but, if I may say so, any of us who have been a Minister do not just take for granted what people say. We want to be in a position ourselves to judge it properly.
David Kennedy: We work very closely with the Met Office in partnership. When we have done modelling that says, "Here is a climate objective. What are the emissions reductions needed to achieve that objective?", one of the approaches is to use the Met Office models and work in partnership with them. It is not exclusive; we do not work with just the Met, but we work very closely with them.

Q310 Chair: Dealing with other organisations from whom you might get information, what sources do you trust? Let's be blunt and give you the reciprocal of that: who don't you trust?
Lord Deben: If you have to be sceptical, you have to be rather careful about the word "trust", because you have to ask the sceptical questions even of those people whom you have very good reason to trust—at least I think you do. There is a range of organisations with whom we work. We also have a range of issues to deal with. Sometimes we have to say to ourselves, "We are not sure they have covered that as effectively as we need to if we are going to explain that to Ministers." In that case, it is not that we do not trust them, but that we would go out and do some extra work ourselves, or perhaps go to someone else to look at whether that particular position is entirely covered.
David Kennedy: As to trusted organisations, we use work by the International Energy Agency; we take the official statistics in this country. All sorts of people are doing research, whether in the academic community or beyond that. We are very well networked with all of the relevant people working in this area, from industry players to trade associations and NGOs, so there is not anybody that we do not talk to and do not take seriously.
Lord Deben: To give you an example, I once worked for Mrs Thatcher. The one thing you could not say to her was, "That must be right because so and so have said it." You had to say to her, "This is what the evidence is. I've looked at it and this is what I think." You had to be the person who had actually put his head on the block, if you like—and I happen to think that is right. When you give people advice, you have to make sure that you have really done the work. That is what I and this remarkable committee do. We ought

to recognise that we have some really remarkable people giving their time very extensively in order to do this. That committee and the very bright people we have working for us, with the ability to go out and get specialist work, is the right mix, which is why we are copied in the rest of the world, because people see this as a very sensible basis.

Q311 Chair: In essence, you would assert that your reports are entirely evidence-based.
Lord Deben: If there is any part of them that is not, it would say, "The evidence for this is this amount. We think it probably is that." Otherwise, it will be entirely evidence-based, yes.
David Kennedy: It is a statutory requirement that our advice to Government is evidence-based and not otherwise.

Q312 Stephen Metcalfe: Once we have all this information gathered together, obviously it is important that we communicate it to the public. There is conflicting evidence about the best way to communicate it. Local authorities are telling us that there is too much emphasis on the science and not enough on the potential impacts and actions; the Met Office is now saying that there is growing interest in the science itself. What is your view about the best way to communicate it to the widest possible number of members of the public?
Lord Deben: One thing I have found is that usually the answer to a question is "and" rather than "either/or", and in this case that is absolutely true. You will know from other issues that one of the frustrating things in dealing with constituents, for example, is that some are interested in the facts, details and all the rest of it, and others come to you with a view. Somehow or other you have to deal with both of those things at the same time. It is our job to make sure—indeed, we are statutorily required to—that the facts are available within the context of provisionality, because all science is provisional, based on what we know about it at this stage. I prefer that to "uncertain" because it is not uncertain. It is certain but on the facts we know. Then you say, "But all facts are provisional because somebody may come up with something else." So, in that context, our job is to present what we know and to be prepared to look at anything new, and that is part of it.
It is also true that you have to understand that people have another need, which is to connect with it. Our constitution under the Climate Change Act says that we have to involve the public. This is the area on which I am now trying to concentrate because it is the second stage. The first stage was to establish our scientific bona fides, and my predecessor did that brilliantly. My job to some extent is to try to involve people more. That is why we have gone to great trouble to redo the website and I do a great deal of public speaking and encouragement.
As far as our experience with local authorities is concerned, we think that a lot of the connectivity that translates the science into action where people are involved can be done on the local authority side. The comparison is with Germany where, as I understand it, more than half the renewable energy is produced by communities, co-operatives and individuals. That is a country with the largest amount of renewable energy. At one point last month it reached 67% of the generation, and in general it is nearly at the 30% level. One of the reasons it is so successful is that there is real community involvement and understanding. All of those people would not be able to give you the scientific background and probably would not be interested, but they will tell you what they do for their community, how it works and why it is important. That link is important as part of what we should be doing.
David Kennedy: The science narrative is important because, without it, you have not got a motivation to spend large amounts of money on low-carbon technologies. There is more work to do on the science narrative. A significant minority of people do not accept the science of climate change in this country, and the latest evidence is that that significant minority is getting a bit bigger, so there is more to do. But it cannot be just about the science; it has to be about why what we are doing in this country is economically sensible. We think there is a compelling story to tell about investing now and saving a lot of money in doing that rather than delaying and investing later on. That story has not been told—and certainly has not resonated.
There is a quality of life story. People are worried that a low-carbon economy is bad for quality of life and we have to stop doing things that we like to do, whereas low-carbon investments can be good for the quality of life, and, again, that story needs to be developed. As John has said, the last thing is that it is all very well having a good story, but what does it mean for people? What can I do now on the ground today in my life with my family and at work? Again, that is not clear to most people. Most people's take on what you can do in contributing to building a low-carbon economy does not map very well with what we should be doing.

Q313 Stephen Metcalfe: You have covered the next area I want to look at, which is: what more can we do to improve that situation? You said that one of your remits is to get the public more involved in this. How are you publicising the work that you do at the moment? You talked about improvement of the website, but that means someone has to go searching for it rather than taking it to them. Speaking engagements are a good way of communication, but potentially they do not get to a wide enough audience and communicate to them the fact that there are benefits from this.
Lord Deben: We use the internet considerably. The CCC has its Twitter following. I have my own Twitter page and do my best to do that, but we have a very limited budget. The budget is very, very constrained. Therefore, we do not have either the budget or would get much help from the Government if we were to go out with a great advertising campaign, so we have to use what we have. In a sense, we ought to do it that way because we should be providing the information and elements that others then use. In that sense we have customers and not consumers; we are passing it on to people who then use that information. We have

to make sure we do it right across the board from businesses to NGOs and others; and that is what we have to do. Indeed, there is a sense in which we have to be very careful that we are informing and not campaigning. We are not a campaigning group and not an NGO. We are manifestly a statutory body, so I have got to do that.

One other way in which I hope to improve it is that I have one place on my committee. I would like to find the right behavioural scientist to help us talk about these things in the right way. Mr Miller, it is not the easiest thing to do. These are quite difficult people to find, and if you have some ideas I would like to hear them.

Q314 Chair: I completely understand, and in a sense that is the purpose at the heart of this inquiry. In terms of your very limited budget, what proportion is spent on communication versus the rest?

Lord Deben: There is a lot of pro bono. It is not in the budget, but you would know exactly what it is.

David Kennedy: In a team of 35 we have two people who work on communications.

Lord Deben: But all of us are doing as much as we possibly can, well outside anything that anybody is paid for, I must say.

David Kennedy: Somebody needs to take charge of the story. We can provide a story, and we aim to do that. We have done it and we will aim to do it when we report back on the 4th carbon budget review where we can set out a narrative, but in terms of cascading and multiplying that narrative there has to be an important role for the Government. There is more that both central and local government can do once there is a story. They need to run with it and get people to believe that story. I think there is a sense in the Government that we have moved on and we do not need a narrative any more. We are delivering. We are focused on delivery and getting these investments made, but, if you just focus on delivery without having a story to tell people that this is sensible, good for the country and is good economic strategy, you have to question how sustainable that is politically.

Lord Deben: Mr Metcalfe, I cannot tell you what a temptation it is to allow mission creep. In other words, there is nothing, in a sense, I would want to do more than to get out there and explain things. I think I have to be reticent. Our job is to enable others to do that, and perhaps very often remind the Government that they too have a job. We have to do all that. We would easily confuse ourselves if we did not stick to our statutory duties, which is why I am always coming back to that Act.

Q315 David Tredinnick: The Climate Change Committee's submission criticises the Government's failure to communicate "the need for action, and the components of an effective response." What do you think they should be doing?

Lord Deben: It is about this being part of everything they do. The urgency is such that one ought not to be able to make any statement about things in Government which are related to this without reminding people of that and seeing it in that context. The IPCC report, which was much highlighted by the speech of the OECD secretary, is saying, in his words, which I particularly like, that it is not like the banking crisis. You do not have a mechanism to pull people back. If we allow this to happen, we will not be able to do even what we had to do in the banking crisis. Therefore, we have to do things and act rapidly and quickly, so the first thing I would like the Government and other politicians to do—because we are clear that this is an all-party activity—is always to frame what they say in the context of these issues.

Let me take an example. I am on record as saying that I think fracking and the gas produced from it may well play a necessary part, particularly in the non-traded sector, in the future. But when we talk about fracking, all the time we have to say that this has to be within the context of meeting our carbon requirements; otherwise, we undermine this other part of our policies. It is a question of always talking about it in that context so that people, all the time, can understand this as an overall matter

David Kennedy: In terms of economic strategy, the Government have their growth strategy and their low-carbon strategy, and they are seen as separate things. Some parts of Government see the low-carbon strategy as a drag on the growth strategy.

Q316 David Tredinnick: Is the core problem a failure to communicate between Government Departments?

Lord Deben: You will know, as I do, that the problem in all Government, as in businesses, is that you have your job and you get on with it. All the time you have to remind people to look at the bigger picture within which that job is fitted. I do not think it is a simple matter just of different Departments. There are not pro-Departments and anti-Departments; it is just that some Departments, individuals, civil servants and Ministers do not all the time see the need to call people back to the overall principles—the reason we are doing this, why this all fits in, and why something that the DCLG does really has an effect on meeting our carbon budgets, so if you do this or don't do that then you can either contribute or not contribute to it. A greater understanding of that enables the public to have a greater understanding. The real problem with the issues of climate is that it is very easy to put that in a box over here and then look at all the rest of one's life. My children won't mind me saying this. When they were young, they were very keen on the issues of rain forests but they never turned off the lights. They didn't see the connection. That picture is what it is like in Government; I'm afraid it is there as well.

Q317 David Tredinnick: Earlier you talked about mission creep and the need not to stray into policy, but do you not think you have a duty to approach Government Departments to encourage co-ordination? You must have a view about where the problems are.

Lord Deben: Not only do I think we have a duty but it is the thing we seek to do.

Q318 David Tredinnick: Can you give examples of what you have done or what you are thinking of doing?

Lord Deben: Where we feel that a Government Department has perhaps missed a particular action, or often a non-action—I do wish people would understand that not doing something is as powerful as doing something, which is one of those terrible things in life—I do my best to talk to that Minister and go through those details. David is very close to civil servants right across the board, so we try to put that bit in, not as a nannying, annoying thing but simply to say, "If you don't do that, this, this and this happens, and then we've got a problem because we have to meet the requirements." We try to do that as much as possible with a relatively small number of people.

David Kennedy: Probably the best example is electricity market reform. We identified the need to move to a low-carbon power sector back in 2008. We recommended the need to reform the market. We suggested the high-level model, which has since been reflected in the Energy Bill going through Parliament at the moment. More recently, we have suggested the need for a decarbonisation target that sends a very clear signal to investors about the intentions of the Government in order to get those investments going forward. We make lots of different interventions. In terms of mission creep, we do not get involved in the very detailed aspects of policy implementation but tend to focus on whether the high-level designs are appropriate and whether the incentives are there to trigger the kind of actions that we need.

Q319 David Morris: In our last session James Randerson from *The Guardian* told us that science should be apolitical, but, instead, many centre right thinkers and politicians think that climate change "is an issue of the left." Would you agree with that analysis?

Lord Deben: As someone with a long career as a leftie, no. First, factually it is not true. When I stand up in the House of Lords and speak on these issues, there is quite a number of surprising people who take a dismisser, denier kind of view about these things on the other side of the Chamber. So, first, it is factually just not true.

It is a temptation to say that. It is true in some countries—for example in the United States. There is a fallout because there are very clear connections between the climate dismissers and deniers in this country and those who take a strong view in the United States; those links are very obvious. But the real issue should be, and largely is, not party political. Remember that the Climate Change Act was passed with the largest majority of any Act there has been. You can see the eight people; they are still there and they still take the same view. But, in general, this has been accepted by all.

The problem, which I hope the Committee understand, is that if you ask people the general they all put up their hands with enthusiasm. Immediately the general becomes the practical and particular, they say, "Of course, I'm in favour of it in general, but I don't like wind farms in my constituency," or, "I'm not very happy about this in these circumstances," or, "There's a better way of doing it." Then your general agreement becomes a much more complex thing. If you add to that those who have a very strong view that almost any kind of regulation is unhappy and is a disadvantage, there will be a tendency to argue rather more on more of the issues. Therefore, you can make what I think is a rather *Guardian*-esque assessment, if I may say so. I think I would be a little more nuanced.

Q320 David Morris: Would you agree with the view that many—particularly in the media—who are critical of science use this as a proxy for criticism for climate policies?

Lord Deben: I am criticised by some who say that you should not mix it with those who dismiss and deny, because they say they are not prepared to change. I do not know whether or not they are prepared to change. All I do know is that one has to keep on reminding people of what the science is. There is a real difficulty, is there not, because if you do not accept the science you are asking people to take your opinion against the science? You may be right. I always accept there is a possibility that that small percentage of people might be right. Galileo was right, but he was very unusual. There have not been many Galileos, but he was right and therefore we have to recognise that is so.

The real question, therefore, is one of risk. My view is that the basis on which you have to have this discussion is risk. If it is 95% likely, according to the science, that something is going to happen, you would be taking a very peculiar stance if you said, "I'm going to ignore all that and hope that the 5% is right." I much prefer to concentrate on that risk. Science can be used like the Bible. You can take a sentence and say that means Jehovah's Witnesses are right and everybody else is wrong. You can do that with science, so I would much prefer to talk about risk.

Q321 David Morris: Do you think we could ever see what is happening in Australia replicated here if the quality of the debate on the right does not improve?

Chair: This is a Conservative talking to a Conservative answering this question.

Lord Deben: I am an independent, if I may say so. Somebody who is appointed by a Liberal Democrat Minister, a Scottish Nationalist First Minister, a Welsh socialist and a Protestant Unionist in Northern Ireland is very independent. I spent three weeks in Australia lecturing and talking. I had an hour or so with the present Prime Minister. I had a similar series with the Cardinal Archbishop. Australia is a different country from anywhere else. He is the only cardinal archbishop who does not believe in climate change, as far as I understand it, although he is very conservative and will argue with the Pope on the subject, so it is a different place. I am not sure that the argument there ever descended to the point of rationality. It was all about image, attitudes and all the rest of it, and I do not believe it will get like that here. It has not quite got like that in Australia. There are many sensible members of the Liberal party who take a different view. Malcolm Turnbull is a man of very considerable worth. But there is a real problem, because in Australia there are extremes of a sort that we will not see here. The Greens take an extreme view

which you would not see of Greens here, so it is a different world.

Q322 Chair: I see that John Howard will be giving a lecture here in a couple of days supporting the sceptics.

Lord Deben: I have had meetings with John Howard. If you have decided that you are right and you are not going to listen to the science, I am afraid there is not a way in which you can avoid that; also, you have got on a train and it is awfully difficult to get off it. I admit to the principle that I do not want climate change to be true. I would get off this train any day. If I could honestly say that I did not believe in it, I would have no difficulty at all in saying that we must not do these things. I am forced to it by the facts. I wish I were not. In that case, if you face the facts, you have to do something about it. The alternative route is to say, "I don't like these facts. There are one or two people who don't like them and I think they may be right, and it is much more convenient not to believe them." I do not have any grandchildren, but I have the potential given that I have four children. I do not want my grandchildren asking me, "What the blazes were you doing?" That is all.

Q323 Chair: I bet your children changed their view about switching off the lights, the same as mine did, when they had to start paying the bills.

Lord Deben: I think you are allowed to talk about them up to the age of 16; thereafter, their lives are their own.

Q324 Stephen Mosley: Your report says that there are a number of siren voices who are given unjustified attention by the media. Who do you mean?

Lord Deben: I have tried terribly hard not to speak ad hominem, if I may say so, because that is precisely what those who do not believe in this do. They are constantly casting doubt on the bona fides of scientists, the motives of politicians and the rest of it, so I am not going to get into that area.

Q325 Stephen Mosley: Who do you mean?

Lord Deben: I know you want me to say that, but I am saying that I do not think in my role I should be attacking individual people. My point about the media is best exemplified by a particular example where the BBC on Radio 5 live interviewed a person who was a sceptic or dismisser, in the sense they would use it. He was interviewed without anybody else. He was not an expert as a matter of fact, but he was interviewed and that was thought to be perfectly reasonable. I merely ask the question: if the issue had been the connection between smoking and cancer, would they have interviewed somebody who said that smoking did not cause cancer without having some reference outside?

I merely say that the science on climate change is in that context of the same weight. Therefore, you do not get a balance merely by having the people who believe in the science against those who do not believe in it, because that would drive you to an impossible position over whether or not the earth is round, or whether or not we landed on the moon, because you can find people on the other side. In the normal course of debate in the House of Lords, when Lord Lawson gets up I feel it perfectly right, where it is necessary and proper, to argue with him, but I am not going to get into people. I would love to—

Q326 Stephen Mosley: Lord Stern has said that sceptics' voices should just be treated as noise. Would you agree with that, or would you think they have a right to be heard?

Lord Deben: I am a democrat and I want everybody to be heard, and I would not like to say that. It is not a situation of having one person on this side and one person on the other. You have to think about it in the same context as you would smoking and cancer, or any other scientific issue. In a discussion about the moon landing, you would not feel that you had been biased by not having somebody who thought it was all got up by NASA; you wouldn't do that. But you would give a place to somebody who thought that; that would be perfectly reasonable. When you are discussing the science of climate change, you really should not go off to Australia because you cannot find another person who has some scientific credentials to appear because you feel you have to have that balance. You have to recognise that balance has to have some rationality with it.

Q327 Stephen Mosley: Many of the people who are labelled as sceptics agree entirely with the scientific evidence that man-made climate change is happening but they might disagree with the solution, or the need for a solution. What would you say to those people?

Lord Deben: There are two bits to that question. First, I have watched these people and many who say they agree with the science entirely did not start with that; they now accept it, so they have moved from deniers to dismissers. They then say that, although all that is true, either we do not need to do anything or do not need to do much at the moment because it is not as bad as we think it is going to be, or they disagree with the particular solutions put forward. Those are two very different issues.

As to the second one—not agreeing with the solutions—that is a perfectly proper and real debate. I want that because I do not agree with some of the solutions, and I think I have a right and duty to argue with those things. You will see the committee raising questions all the time about whether the particular solutions are working properly, and that is a proper basis for equal argument. As to the first one, the science is clear on the fact that it is dangerous, that there is a real threat and you have to do something about it. If that is the case, that is a different argument. If people are saying, yes, man is contributing to climate change but the effect is nugatory, or you can take the bottom of the range and assume it will be less big than that, the science does not say that. Therefore, that is a different kind of balance. It is difficult for broadcasters and journalists, but it is very necessary, as happens in lots of other parts of life, to have a perfectly proper argument on the practicalities of what you should do—but you have to take some things as the facts.

Q328 Stephen Mosley: Last week the Secretary of State for the Environment, Owen Paterson, had some vitriol aimed at him within the press. I have seen articles in *The Independent, The Guardian* and *The Daily Telegraph*, so it is across the spectrum.
Lord Deben: It is a good range.

Q329 Stephen Mosley: Essentially, he said that climate change should be approached rationally and with an open mind. That was the quote he used. Do you think he deserved that vitriol?
Lord Deben: Climate change is certainly something that should be approached rationally and with an open mind. I approach it rationally and with an open mind. I do not think the vitriol was aimed at him because of that but because of the conclusions he drew from that. Those are his conclusions. I do not think I am going to be drawn, even in so delicate and elegant way, into having an argument ad hominem.

Q330 Graham Stringer: There is a third position, is there not, taken by people who are critical, which is probably represented by Professor Dieter Helm, who wrote "The Carbon Crunch", which I am sure you are familiar with?
Lord Deben: Indeed.

Q331 Graham Stringer: It is not that the science is wrong; it is not that we should not be doing something. It is that what is being done is counterproductive, because by pressing down on carbon emissions we are just exporting them and, overall, the amount of carbon produced is greater. In the literature that you produce I do not see any recognition of that problem.
Lord Deben: I hope there is, and I will point to it.
David Kennedy: We did a full report on it.
Lord Deben: We did.
Graham Stringer: I apologise; I missed that.
Lord Deben: It is a very acute and important question. Dieter Helm does not depart an iota from the science, but he makes a perfectly reasonable argument, which should certainly be ventilated, because it is a real issue about how you ensure in a globalised world that actions you take do not have other knock-on effects. It is perfectly true you can argue that, for example, it is better to pollute in countries that have proper pollution control than export it to countries that do not. I entirely agree with that. But you can also look at his evidence and see whether it is true. That was why we produced a report which showed that, although it is a real danger and you have to look at it all the time, we did not think it should lead us to alter the policies, and we did not think that the arguments put forward were correct. You can go on having that argument and I am happy to have it, but it is a different argument and a worthwhile and valuable one because it ensures that you get the policies right. I want those sorts of arguments, so I do not disagree. The only problem is that, whatever you say in this field, those who are determined to undermine any action at all will pick out three sentences from Dieter Helm, or anybody else, and say that that means the argument put forward is wrong.
David Kennedy: It is a really important area. There is a story which people believe that says we are the only country doing something on low-carbon investment; we are adding a lot of cost to our industry and we will close it down, if we have not already. The evidence is that we are not the only country acting; there are many countries with which we compete that are acting to invest in low-carbon technologies. We are pretty confident that there is no evidence any industry in this country has relocated to another country because of carbon policies. We have to be really careful with our carbon budgets and low-carbon policies that we do not drive industries abroad in the future. Nobody wants that, and the Committee on Climate Change has a statutory duty to ensure that that is taken very seriously in our advice, but there are ways of dealing with these things. The Government are dealing with them. For example, the biggest risk to industry is the electricity market reform and rising electricity prices that would result for industry. Those industries are now exempt from the rising costs, so that risk is mitigated.
Lord Deben: If one were to rank countries according to the amount they are doing, China now would have to be well at the top. The argument that you move industry to China, for example, and therefore that results in greater emissions is increasingly not so. One of the other problems is that there is a time lag here. Around the world you are seeing people doing what we are doing. People talk as if we are in the lead. We are in the lead in the sense that we have fashioned a very sensible mechanism for dealing with this, but, my goodness, looking round the world from Mexico to South Africa to Korea and China, these changes are being made, and that very much affects the analysis that is made. But it is an argument that has to be carried through, and you are right to raise it more widely.
Chair: Lord Deben and Mr Kennedy, thank you very much for the session this morning.

Examination of Witness

Witness: **Rt Hon David Willetts MP**, Minister of State for Universities and Science, Department for Business, Innovation and Skills, gave evidence.

Q332 Chair: Minister, welcome to our session this morning. Unusually, some witnesses on this inquiry have been reluctant to come before us. We are going to write a fairly strongly-worded letter to try to encourage some witnesses, but you wanted to come before us. Why was that?
Mr Willetts: I always enjoy appearing before this excellent Committee, Mr Chairman. I am proud of British science and the contribution it has made to the wider work of the IPCC. There is an important challenge about communicating it, and this Committee's advice on that would be very valuable. I

wanted the opportunity of making an input, because I certainly want to study your report when it is published.

Q333 Chair: At the present time what is your Department's role in communicating about climate science?
Mr Willetts: The lead Department on climate change is, of course, DECC, but we have a wider responsibility for communicating science through our Science and Society exercise. It has a modest budget, but we have been reviewing that and recognise we can raise our game by doing better with new media, for example, and reaching out to younger people. Communication is also part of the remit of our research councils. Therefore, it is part of the remit of NERC—the Natural Environment Research Council—for example, that it should communicate its results and findings; and BIS also has overall departmental responsibility for the Met Office. While the Met Office does not have a specific communication remit, nevertheless it is clearly a very trusted and respected contributor to the debate. You put all that together, and I think BIS does have a significant role.

Q334 Chair: Specifically in relation to your Department, parts of it are responsible for some of the heavy industrial energy users. How do you communicate with them?
Mr Willetts: We do have business collaboration. We have a rather important body Living with Environmental Change—LWEC—which has a group that involves links to businesses for whom climate change and energy are a particular issue. That is not simply energy-intensive users but that is part of it. It is also people maintaining infrastructure that will be affected by changes in the climate. I have had meetings with LWEC. The Secretary of State tends to take specific responsibility for energy-intensive users.

Q335 Chair: You mentioned Science and Society. As to bodies like that—Sciencewise, the Royal Society and so on—do you leave them to their own devices in this area, or is there a joined-up strategy that helps address some of these complex problems?
Mr Willetts: There is a very delicate balance. On the one hand, the evidence we have shows that clearly independent scientists are trusted; university-based scientists are very highly trusted; and scientists working for Government are not trusted quite so much. That is a pity, but that is what the evidence shows. It is quite important that this is done in a way where people do not detect the hand of Government behind individual interventions.
On the other hand, it is clear that the chief scientist, Sir Mark Walport, made a very useful contribution in the period around the launch of the most recent IPCC report. He clearly regards communicating the overwhelming scientific view on climate change as a challenge to which he can contribute, and I encouraged him in that view; similarly, David MacKay at DECC and the Secretary of State in DECC himself. The fact that there were scientists and Ministers all out and active was helpful.

Q336 Chair: You have just given an extra £47 million to the Royal Society to promote public engagement with science, among other things. Given that, were you not surprised that at the outset they were a bit reluctant to come and give evidence to this inquiry?
Mr Willetts: I was not even aware of that, so I do not think I can comment on that.[1]
Chair: We did have very constructive evidence from them in the end.

Q337 Pamela Nash: It is two years since the Government, including BIS, published a paper on the transition to a green economy. That included tackling climate change as part of the reason for developing the green economy, but not the only reason. Can you explain to the Committee this morning a bit more the relationship between trying to mitigate climate change and its effects and developing a green economy in the UK?
Mr Willetts: The main challenge is simply the effect of climate change on the environment around us, but we do believe that there is also a commercial opportunity for Britain if we can establish a leading role in future energy technologies. The most conspicuous example of what we are trying to do is the Green Investment Bank, which is promoting investment in these types of technologies. If you look at our catapult centres, the offshore renewables centre based in Glasgow is a classic example where we see that this is an area where we have a scientific and technological opportunity, at the same time as the nation and the world are facing a very significant challenge.

Q338 Pamela Nash: Do you think those benefits have been well communicated to the public at large but also the businesses that you come into contact with on a regular basis?
Mr Willetts: We can always raise our game, and I am sure this Committee will have advice about what we can do. People follow individual polls, but overall there is a recognition that something very significant is happening to the climate. There are other arguments that we also deploy. There is an energy security argument about being less dependent on imports, sometimes from rather unstable parts of the world. There is a good housekeeping point that it is good not to be wasteful. If we can get more output from a given amount of input in energy as anywhere else, that is an improvement in economic performance; so those arguments run alongside the fundamental challenge of climate change. In what I say, Vince says and Ministers at DECC say, we try to bring together those arguments.

Q339 Pamela Nash: In its annual review the Science and Society's journal suggested that part of the role of your Department should be to communicate core

[1] The Minister later clarified that, the Society receives a grant of £47m pa, most of which is used to support research fellowships for the UK's most outstanding scientists. But it does include £515k to support the Society's public engagement programme, including their highly successful annual Summer Science Exhibition. The £47m is the total grant, it is not "extra" to another amount.

messages on climate science and that you should be encouraging partners and stakeholders to do the same. Is that considered when policymaking is taking place in your Department? Is an improvement in public understanding of climate change and its effects and the work we are doing on the green economy considered a measure of how successful the policy is?
Mr Willetts: For the research councils that do have communication in their original remit, we regard their ability to spread understanding of their research as a key part of it and it is something we look at. Indeed, in separate inquiries by this Committee on open access it is all about improving communication. Almost every day in the media when you read a story about a new finding, new drug or whatever, it is very likely that there is a publicly-funded research council initiative behind it. It is not always badged and obvious to the casual reader that that is where it comes from, but I see the forward plans of the specific material they are putting out, and there is a flow of it.
The Met Office is in a slightly different position, in that its mandate does not explicitly have a requirement to communicate climate change to the public. It obviously communicates with the public on weather. An interesting question, which this Committee may well get us to focus on, is whether there is more that we could expect of the Met Office. What would be reasonable to expect it to do without sacrificing its crucial responsibilities for weather forecasting, and is there anything we could fund? We have no funding available at the moment, but those are issues and I look forward to the Committee's report.

Q340 David Tredinnick: To what extent do you think scientists should be communicating messages? Scientists generally have a high standing with the public and are perceived to be even-handed as experts. How much should we deploy them in the communications and public relations battle?
Mr Willetts: There is a very delicate boundary here. Climate change is just one example, and it applies in other areas as well. Scientists should certainly try to communicate the facts as they understand them, and they must always be open to challenge and dispute because science is ultimately empirical. The Government chief scientist in NERC and NERC-funded scientists can absolutely communicate what they believe to be the findings from their research.
There is then separately a policy debate about what your response should be—what follows as a result of that. That is a public policy decision. Outside, independent scientists will not hazard a view on that, but we all understand—I think the Government chief scientist described this excellently the other day—that that is the point when elected politicians and Ministers take over.

Q341 David Tredinnick: Do you think that somewhere in the Department, or in a related organisation, there ought to be a focus point for communicating scientific matters? It has been described as a portal. Should we be making it easier for scientists to present their research? There is a general reluctance among some people in the scientific community because they will be monstered by the media on delicate matters. Should we not have some facility that helps?
Mr Willetts: We have to be very careful about trying to maintain this at arm's length. BIS makes a modest contribution to the costs of the Science Media Centre. Quite rightly, that centre does not want to be dependent on any one source of financial backing, but it does an excellent job in ensuring that scientists are more media savvy than perhaps they were a decade ago in communicating their results.
We are working on a portal, which is currently a kind of beta. It is not properly functioning, but it will be fully functioning quite soon. We are working on a portal that makes all the research council-funded research and findings more easily accessible through a single user-friendly portal. That is a project under way at the moment.

Q342 Chair: That is not yet in public use.
Mr Willetts: You may be able to get some information, but it is beta. It is still being trialled and developed; it is not yet fully operational, but we hope it will be in a few months.

Q343 Chair: Perhaps we could have a look at it.
Mr Willetts: Yes. When it does go fully live perhaps I could send the Committee a note. It is absolutely aimed at all the different publicly-funded research. We are thinking of groups like SMEs, which may not know that somewhere there is publicly-funded research perhaps on advanced material they are using that they cannot easily find. We want to make it a usable and easily searchable tool for that kind of purpose, and that is what we are working on at the moment.[2]

Q344 Graham Stringer: I was hoping that the chief scientific adviser would be with you to answer this. You may be able to answer it. In a highly contentious area, it is important that the science is of the best quality and is peer-reviewed. Ministers in the last Government and this one in explaining the likely consequences of climate change regularly use the Stern report, which is not peer-reviewed. Is that not a problem?
Mr Willetts: This is where you get into policy. There is a lively debate among economists on some of the methodology and long-term discount rate in Stern.
Graham Stringer: That is right.
Mr Willetts: That is a legitimate subject for discussion. There is a genuine policy question. There is a balance: one is trying to mitigate climate change and slow it down or stop it happening and one is adapting to it. That is an area for rational economic debate. The third option is that we just suffer because nothing happens, but in reality we are seeing a combination of those three responses.

Q345 Graham Stringer: I accept that, but that was not quite the point I was asking. Why do the

[2] The Minister later clarified that, this refers to the 'Gateway to Research'. A beta version is currently accessible (http://www.rcuk.ac.uk/research/Pages/gtr.aspx). The final version is planned to be launched before the end of 2013.

Government consistently use a non-peer-reviewed report?
Mr Willetts: When you are talking about policy proposals—we have not endorsed everything in his report—peer review is not quite the same. We are endlessly drawing on policy proposals, reports and advocacy from a range of groups. When it comes to the more empirical, objective scientific evidence in an area, at that point we do need peer review, but all the time people send in reports to me with their views. I am going to the launch of a Higher Education Commission report later today. That is not peer-reviewed, but I will engage with it because I think it is an interesting piece of work.

Q346 Graham Stringer: You answered 80% of this question when you talked previously about the Met Office not having a role in communicating climate science. Have you actively considered that, and do you think that it should do? Do you think it should change its terms of reference?
Mr Willetts: There has already been a significant step in the climate change service launched in the summer, which brings together the Met Office, NERC and the Environment Agency, to try to provide a clearer user-friendly source of guidance and advice on climate change. That is in its early days; it has just started to function. There is a legitimate question as to whether we should go further and whether the core unit is the right one. That is a genuine question, and that is why this Select Committee's views on all that are matters we will want to consider very carefully. It will probably be at least as much a matter for DECC as for BIS, though two of the three bodies involved—NERC and the Met Office—are within BIS. That is one of the reasons why I did think it right to participate in this inquiry.

Q347 Graham Stringer: One of the drivers of the public's perception of climate change is whether they really agree with what the Government are doing about it. There is some evidence that the Climate Change Act and focusing on emissions is counterproductive because we are just buying goods from abroad that might have been produced here, so the overall contribution to the carbon content of the atmosphere goes up. Do you accept that as a criticism, and do you think that in those terms the Climate Change Act is effective?
Mr Willetts: Your point is a fair one. Ultimately, this is a global process. If we do not do some smelting or some activity in Britain but, instead, we buy products that are the result of that process being done abroad in a less energy-efficient way, the world is not a better place; it has gone backwards a bit. It is a very valid point that needs to be taken into account when trying to work out the best way forward.

Q348 Graham Stringer: Therefore, do you think that the Climate Change Act at the moment is effective or counterproductive?
Mr Willetts: We are working within the framework that we inherit. Going back to the energy-intensive users, we try to make these types of assessments when they say, "If you push up our costs too high in Britain and import the product from China instead, have you really made progress on climate change?" We are aware of that argument.

Q349 Chair: The Committee has just taken evidence from Lord Deben. We had some interesting exchanges about his work. Is there a real buy-in across all Government Departments about the responsibilities here? Are there areas of weakness in your view?
Mr Willetts: Government is obviously perfect in every possible respect.
Chair: I would like that to be peer-reviewed!
Mr Willetts: What I have here, which I think puts it very well, is the coalition agreement. That is the crucial document to which all of us as Ministers work and is the framework within which we function. The coalition agreement on this is very clear: "The Government believes that climate change is one of the greatest threats we face, and that urgent action… is required. We need to use a wide range of levers to cut carbon emissions, decarbonise the economy and support the creation of new green jobs and technologies." That coalition agreement is the framework within which the Government operate.

Q350 Chair: Is it right to assume from that that all of the newspapers which reported on it misunderstood what Owen Paterson was saying recently?
Mr Willetts: I do not know about that. As Ministers, we are all working within the framework that I have just reported to the Committee.
Chair: Minister, thank you very much for your attendance this morning.

Examination of Witnesses

Witnesses: **Rt Hon Gregory Barker MP**, Minister of State, Department of Energy and Climate Change, **Professor David MacKay**, Chief Scientific Adviser, and **David Warrilow**, Head of Science, Department of Energy and Climate Change, gave evidence.

Q351 Chair: Minister, can I welcome you this morning? For the record, it would be helpful if your two colleagues would introduce themselves.
Professor MacKay: I am David MacKay, Chief Scientific Adviser at the Department of Energy and Climate Change.
David Warrilow: I am David Warrilow, Head of SCIENCE in DECC.

Q352 Chair: Thank you very much. First, what do you see the Government's role to be in communicating climate science to the public?

Gregory Barker: First, good morning, Mr Miller, and thank you very much for inviting us to speak. The wider communication of the risks of climate change is essential to informing the debate about the responses to it. For over 20 years the scientific community has been warning successive Governments, as well as the public, about the potential impact of climate change. It is important to note at the outset of this session that we are very clear that over that period the actual science has got stronger and the perception of risk greater. Clearly, that is very relevant now in the immediate aftermath of the publication of the latest IPCC report, which has played a central role in communicating the science of climate change and its risks. The take-out from that is that not only is it happening but it needs a man-made response to mitigate it.

It is certainly important that the public understand the challenge and why we are making these policy choices, and that it is conveyed in as easy a way as possible. It is not always easy to understand a set of quite complex scientific data. They need to understand in the easiest possible way the rationale behind sometimes quite significant policy choices that Governments are making. Unfortunately, we get some mixed messages in the media. To a degree, while there is not complete consensus in the scientific community on the actual science—there very rarely is on any given topic—I think it is fair to say that the science has become a bit of a political football, and that is regrettable.

In this context it is important for the scientific community to be able to communicate the raw data and its evolving understanding of climate change, and it is important that science has an independent voice.

Q353 Chair: The Department has a clear role in communicating. We recognise the quality of the science within the Department, but what skills and resources are there within central Government to ensure effective communication about climate science and policies?

Gregory Barker: They are partly sitting either side of me, so perhaps I can invite Professor MacKay to address that.

Professor MacKay: Going back to your original question about the role of the Government in communicating, one of the principal roles is to fund the climate scientists themselves, which we do through the research councils and direct grants to the Hadley Centre and others, and support those scientists in communicating the science themselves to policymakers and the general public. That is the most important thing we do.

Within DECC we have a team of climate scientists. David Warrilow is a professional climate scientist. We have another staff member with a climate science background. I am not a climate scientist, but I keep in touch with that community.

Gregory Barker: Do you want to give the Committee an indication of your background?

Professor MacKay: I was a professor in physics at the University of Cambridge for the last 15 years.

Q354 Chair: With respect, Professor MacKay—I always start with that when I address physicists—not all physicists are brilliant communicators. Communication of this complex issue takes a special set of skills. Do they exist within the Government machinery?

Professor MacKay: The most important people to do the communicating in our view are the scientists themselves. We do have skilled communicators working for the Government. For example, the Government Chief Scientific Adviser clearly has an important role in communicating science to the public, but our feeling is that the people who are trusted the most—our surveys indicate this—are the scientists themselves. While we do have some skilled communicators around, we try to work by supporting the scientists to do the bulk of the communication of the science themselves.

Gregory Barker: Being very honest, Chair, I think you have put your finger on the nub of it. There is a dilemma. The most trusted sources of impartial information are scientific experts in their field, but you are quite right. With no disrespect to any of my scientific colleagues, they are not always the best communicators of simple messages that can resonate with the public. I sometimes struggle to understand exactly, certainly in a concise way, some of the very complex issues that scientific colleagues will try to get over in the briefing. For the general public, who may be glancing at parts of these messages on the television, radio or newspapers, it can be doubly difficult.

We do have a number of other ways of communicating that, but this is work in progress. I do not think any Government have got it right. The previous Government spent quite a lot of money on their Act On CO2 campaign, which in part conveyed the science. It was not widely applauded. We have some other things, such as a 2050 calculator, for example, which allows people to go online and look at various scenarios of how we meet our climate change objectives. We have a schools toolkit; we have an energy challenge road show. We try to engage with social media. We work together with DFID, and we undertake international work in conjunction with the Foreign Office. We work closely with the Met Office, which is a very trusted voice on this, but I do not think there is any silver bullet to try to reach all of the audiences appropriately and effectively; we just have to work through a number of media.

Q355 Chair: Do you have at your disposal any behavioural scientists who are expert in getting across some of these complex messages?

Professor MacKay: Yes. DECC funded with some partners the creation of a report on "Climate Science, the Public and the News Media, which was recently published.[3] That gives us insights into how the public understand the communications that come to them from the media and scientists, and we are definitely taking this evidence into account as we continue to engage with scientists and the media.

[3] http://www.lwec.org.uk/sites/default/files/LWEC_climate_science_web.pdf

Q356 David Tredinnick: When I asked the Minister of State for Universities and Science, David Willetts, just now about communications, I suggested there should be a portal to make it easier for scientists to communicate. My memory is that he said they were working on something, which has not yet been published. Professor MacKay, despite what you are saying and the report you published, should not some help be given to scientists to get their message out? Should there not be a central focus, maybe cross-departmental, for that to happen, given the trust that is placed in the opinion of scientists?

Professor MacKay: One such organisation that does serve as a portal not just for climate scientists but for all scientists is the Science Media Centre. That is a charity which receives support from several Government Departments, including DECC. Their role is to try to help scientists communicate clearly with journalists and the general public. I am delighted that we are supporting them. They do a good job. When the IPCC's fifth assessment report came out a couple of weeks ago, I spent much of the day at the Science Media Centre with another dozen or so scientists using their premises as a portal. I think the journalists really appreciate the engagement they get there.

Q357 David Tredinnick: Minister, to what extent is the Government's mandate to tackle issues such as climate change dependent on public acceptance of the science?

Gregory Barker: It is iterative. Clearly, the greater the public acceptance, the stronger the appetite for robust action. All the polling suggests that the majority of the public accept that that is not the fundamental problem. Seventy-two per cent of the UK public, according to latest polls, believe that climate change is happening; 80% think that humans are implicated in some way; only 15% polled think it is mainly or entirely caused by natural causes; and 75% of UK adults questioned felt informed about climate change as topping the list of science topics. There is some degree of penetration of public opinion. The public are informed; there is broad support. It is not universal. The minority of those who do not accept the science are particularly vocal; they tend to feel that very strongly, whereas the majority who do accept the science tend to be less fired up about it. There is an issue here about not trying to manage public opinion, but we want to make sure that the public have access to all the facts, and we are constantly looking at the best way to inform them.

Q358 David Tredinnick: I am interested to hear what you say, but, with respect, some other polls out there say that the acceptance of the science is slipping. If that is the case, do you pursue the science anyway, even if the acceptance appears to be weaker than it has been?

Gregory Barker: We are partly hindered by the fact that the IPCC report only once every five to seven YEARS. When they do so, there is one huge report containing gazillions of facts and interesting pieces of data, which are to a certain extent impenetrable to many members of the public. The media will then report that over one or two news cycles and then it is done for another five years, whereas the sceptic press tends to be much better at dribbling out documents, often non-peer-reviewed, or non-robust data, which nevertheless feed into a willing media or parts of the media that are willing. We need to get better at keeping up a steady stream of useful, robust peer-reviewed science rather than just waiting for this big dump once every five years.

The reality is also that the previous IPCC report was less robust than the latest one. To be clear, that did impact on public trust and confidence. Although the issues identified were small relative to the overall scale of the body of evidence in favour of the conclusions that that report reached, nevertheless they were picked out and it had a disproportionate impact on public trust. I think that has had an impact up until recently.

Likewise, we have to be realistic that the whole episode of the leak of e-mails from the University of East Anglia, although the subsequent report largely cleared the individuals in question, nevertheless did a lot of damage. It did even more damage outside this country. It played particularly badly in the USA. As for the new IPCC report, which we took delivery of only about 10 days ago, rather than just explain it in one or two news cycles in the immediate aftermath of publication, we need progressively to unpick it and ensure it is refreshed regularly, even if it will be another four or five years before the next one is published.

Q359 David Tredinnick: One of the ways that we could deal with this problem, surely, is for your Department to make a determined effort to get over that the basic science is settled—that there is a framework, a paradigm, within which we work on these issues.

Gregory Barker: That is absolutely right. Unfortunately, here we are dealing with probability. I am not a scientist. We are dealing with probability and risk rather than absolutes, which would be much easier. Even though the probabilities are extremely high, which are now statistically almost off the scale according to the IPCC—they said they were 95% certain—they are still nevertheless dealing with a range of probabilities, and that can be difficult to convey. It also leaves open an opportunity for doubt—some of it reasonable doubt and some of it just sceptics who take a very contrary view.

Unfortunately, in this country in particular, we have a tendency always to like to see a debate between two polar opposites in the interests of fairness. That appetite for fairness or counter-opinion gives a disproportionate idea to the public that the sceptic view is perhaps more legitimate or more widely held, which is perhaps a better way of saying it, than it actually is. So long as there is any degree of questioning from within the scientific community—and it is always likely to be so—you could be forgiven for thinking, for example, if you were listening to the BBC on the publication of the IPCC report, that the scientific community was a lot more divided on this issue than in reality it is, particularly among the experts.

Professor MacKay: I think what you are driving at is a suggestion that we should devote more departmental resources to the public communication of the science.

Q360 David Tredinnick: I did not use the "r" word; that was not what I said. I did not suggest necessarily spending a lot more money on it but that perhaps there should be a policy direction which, through your media outlets, could make it clear that a lot of this science is firmly settled and that the standard deviations from the mean are way away from the report.

Gregory Barker: In light of the latest IPCC report, there is a lot of sense in what you say, Mr Tredinnick. Are you intending to call, or have you already called, the BBC to see how they respond to criticisms of their reporting? I was struck that, of all the interviews that I did on the day of publication, the BBC was the one that consistently projected the report as being an either/or, or 50–50. For example, when I went on to Sky to discuss it, it was not about the fundamental science. There was a broad acceptance of it, and the debate was around the appropriate response. When I went on to ITV, again it was about the nature of the response and what we were doing in response to this. What are the Government going to do in response to this very clear report? The BBC was still stuck in the groundhog day of debating the science, even though, as you rightly say, the larger part of the scientific community accepts that this is settled and the debate should be about the right response in terms of Government policy.

Q361 David Tredinnick: I do not know whether the Chairman is trying to comment on the BBC, but I have one further question.

Chair: Very quickly—we need to move on.

David Tredinnick: From what you are saying, isn't the way the IPCC report is published a fundamental problem? Every five years a great block of information comes out that is totally indigestible. Would it not be much better if we had a publication perhaps in stages and sections so that people can have a better understanding of it?

Gregory Barker: It is to a certain extent published in stages and sections. In the last 12 months it has been published in certain sections, but it is basically one big media event.

David Warrilow: Actually,the IPCC big report comes out in three stages. The first is just the science; next March we will have a report on the impacts of climate change, which will be another large volume; and in April there will be one on the mitigation response. They are big reports. In between these major reports, they produce special reports that focus on specific issues. One of the things that the IPCC is going to do over the next year and a half is review its products and whether it needs to change what it does in future. The kinds of comments you are making are important for that, because one of the things we are suggesting is that the IPCC should canvass its views from users to see what the most useful product is that they can produce.

Gregory Barker: I entirely agree with your analysis.

Q362 Stephen Metcalfe: You described lots of ways that you are trying to engage with the public. There is a lot of activity going on about getting the message across. Do you think that that constitutes a communication strategy for the Government, or does there need to be a more concise approach that pulls together all the various sources of information and identifies people's roles and responsibilities, whether that is the Met Office or the Committee on Climate Change, so that everyone knows what it is they are supposed to be doing to help present a clear, settled message from Government? Would it help to build trust in that message if it had that wide base underlying it?

Gregory Barker: There is an underlying strategy and a clear acceptance of our respective responsibilities. One of the hampering factors—it is a reality of life—is that, when we came into office in 2010, across Government, all Departments and issues, there was a big cut in advertising and marketing expenditure as part of the deficit reduction programme. So we are spending less money—we are not really spending any money—on the advertising campaigns that the previous Government ran. It is open to quite significant debate whether or not the previous Government's advertising campaigns, which were called Act On CO2, were particularly good value for money in terms of their effect, and whether the greater controversy they incurred by running them in the first place outweighed the benefits that they had on the people they were able to reach and influence, or they just simply reinforced the views of people already predisposed to support action on climate change.

As Professor MacKay said in his opening remarks, our view is that the best advocates for climate science and those who are most trusted in the public's mind are the scientists themselves. It is clearly a challenge to make sure that they speak to the public in language that the public can understand and, ideally, in pithy soundbites. The climate sceptics are very good at alarmist headlines or the aggressive countering of facts. We need to be less cautious and maybe more robust in countering those, and we do that, but there is an overarching strategy. I am sure we can always look to improve the way that we co-ordinate among ourselves. In particular, I would like to see a stronger role, or certainly a stronger voice, for the Met Office, which is internationally respected and I think people do listen to what they say.

Professor MacKay: I would add that we do co-ordinate our comms strategy with both the Committee on Climate Change and the Met Office. We meet them on a regular basis. We also co-ordinate with the science and engineering academies in the UK; so we do try to co-ordinate our communications with each other.

Q363 Stephen Metcalfe: How often is that high-level strategy about the message you are trying to get across revisited, or is it more of a process-driven change? You meet, decide what is current today and then decide what to do about it.

Professor MacKay: We have been having roughly monthly meetings to co-ordinate DECC, the Met

Office and others, so I think "a process" is a good way to characterise it.

Q364 Stephen Metcalfe: We have talked about getting the public and scientists to communicate together. I imagine that is quite a challenge because they live in different spheres almost. One area that seems to be having some success is local authority engagement with the promotion of information on climate change. Do you think they need to be given a more specific role in delivering that strategy and the messages?
Gregory Barker: To a certain extent that runs counter to the prevailing political agenda, which is to stop handing out Whitehall-driven diktats to local authorities. That would run very much against the whole drive of the coalition, which is to push a localism agenda, but you are certainly right that those local authorities that have engaged in this agenda seem to have done so with relative success. North Somerset and Liverpool both ran successful climate change awareness campaigns with a small amount of money, but that came from Defra rather than DECC. These things would undoubtedly be helpful, but in the constrained fiscal environment in which we live there are choices to be made, and imposing another burden on local authorities—

Q365 Chair: In terms of the invest and save philosophy, if we get local authorities to engage with their public, it could potentially mitigate some of the long-term pressures on budgets, on everything from flood defences and so on to power consumption.
Gregory Barker: Indeed. I do not think there is one silver bullet in reaching consumers or the public, however you define them. Certainly, engaging local authorities is definitely the way forward, but this has to be done by means of positive engagement and winning the argument with them that this is an important priority, rather than just setting a target or some such from Whitehall.

Q366 Graham Stringer: The spats of John Hayes and George Osborne with different energy Ministers have added quite a lot to our entertainment and amusement. What impact has that had on your ability to communicate your policies on climate change?
Gregory Barker: Very little, if any.

Q367 Graham Stringer: Do you want to expand on that?
Gregory Barker: Very little, if any.

Q368 Graham Stringer: I am not sure that is completely credible, Minister, but we will take it at that. One of the interesting parts of this inquiry is that we have asked not all but nearly all witnesses what the definition of climate change is. We have had as many definitions as questions, some of them pretty vague. What is your definition of climate change?
Gregory Barker: The definition is that climate change is climate change. I think you would have to—

Q369 Graham Stringer: That is not particularly helpful.
Gregory Barker: No, but it is self-explanatory. Climate change is a changing climate. I do not quite understand the question. It is not a technical term. Professor MacKay may be able to fill in the details.
Professor MacKay: I am happy to add another answer to your question.

Q370 Chair: If you look to the left, the answer has been put in front of you.
Professor MacKay: We need to define climate first. Climate is the statistics of many variables: temperatures; precipitations; wind speeds; ocean currents; ice masses. The climate is the collection of all those variables; it is the averages and the probability distributions of weather and all those other variables, including salinity and acidity of oceans. And climate change is a change in those statistics.
Gregory Barker: Colloquially, it is now taken to mean man-made climate change. We now use it as shorthand for man-made climate change.

Q371 Graham Stringer: It is a very general definition. We have gone from "global warming" to "climate change". Some of our witnesses have said we should change to definitions of climate disruption or the planet's energy balance. That has been the range. Do you think it would be helpful to the debate if we stuck to one of those issues with a very clear definition so that people could refer back to a quantification of those changes?
Gregory Barker: I do not think you are going to get a definition that will roll off the tongue in a short number of words. As Professor MacKay explained, even the most concise definition, if it is to be sensible and correct, will be more than just a few words. We can debate language. For example, climate change is a better shorthand than global warming because, for a lot of people, the impact of global warming will not be to see their temperature rise in a dramatic way, but they could be the victim of extreme weather events, or even a shift in the pattern of their climate. Therefore, climate change in a very shorthand way is probably the best way of expressing this, but the moment you get a slightly larger and more encompassing definition the difficulty is where you put the full stop.
Professor MacKay: My feeling is that climate change is a pretty good title for what we are talking about. Global warming is still one of the most important features of climate change, so I would not want to change these things around. Global warming gets misunderstood. People focus on a particular part of the system, namely the surface temperature, and say, "Oh, global warming has stopped," but that is not the case. The whole globe includes the oceans and ice masses. If you look at the heat content of the oceans and ice masses, that has been steadily increasing, even during the last 15 years when the surface temperature has had a bit of a plateau.

Q372 David Tredinnick: Minister, we touched on the difference between the reporting of issues by the BBC and Sky earlier in the session. To get this on the record, what responsibility do you think public broadcasters and newspapers have accurately and

effectively to inform the public debate on complex issues such as climate science?

Gregory Barker: They have a very real moral responsibility. In the case of the BBC, they have a clear statutory responsibility to inform. I think it is in the original charter, is it not? We need the BBC to look very hard, particularly at whether or not they are getting the balance right, and I do not think they are.

Q373 David Tredinnick: Is it fulfilling its duty as a public broadcaster to inform the public properly?

Gregory Barker: They are fulfilling the duty in the sense that they give it airplay, but there is too much focus on trying to stimulate an increasingly sterile debate on the science, given the overwhelming body of opinion now in favour of the science. If they want an active debate, perhaps they should be talking about the policy responses to that science rather than the science itself.

Q374 Chair: You want the media to adopt the same principles as they do with, say, party politics, so that in your constituency your regional media should not give the Monster Raving Loony Party the same airtime as you.

Gregory Barker: Exactly. I am not trying to ban all dissenting voices, but we are doing the public a disservice by treating them as equal, which is not the case.

Q375 David Tredinnick: This brings us on to the regulation of the press generally.

Gregory Barker: It is way above my—

David Tredinnick: I am sure you will be happy to answer questions on it. As we know, at the moment there is a very limited requirement for the press to correct when reporting factual topics, such as climate science. Will your Department be pressing for more stringent requirements to be put in place when the Press Complaints Commission is wound up and replaced?

Gregory Barker: We do not have a departmental view on that at the moment, but I would hope that in best practice, apart from anything else, we would see better corrections of misleading evidence. It is extremely frustrating to me that a number of stories run very prominently, particularly in Sunday newspapers, which give a very misleading view of science, or dress up opinion as science, and that goes uncorrected, or, if there is a correction, it is a tiny one at the back of the paper somewhere.

Q376 David Tredinnick: Minister, surely, if you hold these strong views, it behoves you or there should be an obligation almost on you to put them forward, because it is becoming quite contentious, is it not?

Gregory Barker: But, with a free press, every single Department would have a view about the fact their policies or views are being traduced. It is the nature of a free press that you will not always be happy with the coverage. We have to tread very carefully in that whole arena. My Department does not have a formal policy on that.

Q377 Chair: For some Departments that is not the case. For example, Dame Sally Davies has been quite outspoken on some erroneous health information that has been published. Professor MacKay, you are an independent chief scientist. Should you not be equally robust as an independent chief scientist, not as a politician?

Professor MacKay: Absolutely. I wanted to answer an earlier question from Mr Tredinnick. Resources are tight. We review the allocation of resources within the science and innovation team in DECC, and we think about how much effort we are spending on communication compared with all the other important priorities.

In terms of my own time, I have many priorities in my job, ensuring that good evidence is being used in DECC and we are quality-assuring our work and analysis. That is an extremely high priority for me. Public communication is part of my role as well. I do a lot of public engagement, including with local authorities. The British Energy Challenge involved me visiting 10 cities in partnership with local authorities to discuss climate change action, so I definitely feel I have a role as a public communicator. I am reviewing with my team right now how much time I spend on climate science. I feel very tempted to devote some time in the next couple of weeks to try to do some clear science communication about the basic science of climate change, so you can watch this space.

Gregory Barker: In response to the point about misleading, inaccurate or downright wrong reports in the press particularly on the science, I am not happy with the way that DECC to date has handled the whole issue. In the past there has been a tendency to argue for right of reply or try to put in a piece from a Minister in the following week's newspaper. It is not particularly fruitful to get into arguments or match assertion with assertion. Often, people do not read those pieces anyway, by which point the horse has bolted.

We have just appointed a new head of communications at DECC, who totally gets this, as does the new permanent secretary, Stephen Lovegrove. There is a need for us to be much more nimble and immediate in responding to factual errors, not to the arguments made by commentators or columnists, particularly in the weekend papers where it seems to be more prevalent, but we need to respond on the same day, or in the same news cycle, taking advantage of social media—particularly Twitter, for example—to identify not the arguments per se but the facts on which they are based. Quite often, facts are used selectively or inaccurately, or they are just downright wrong. Often, simply rebutting or correcting one or two facts in a few words in a tweet of less than 140 characters can be more effective than a right of reply two weeks later in an article buried in the back of a newspaper that people will not read. We need to get on the money in correcting factual inaccuracy.

Q378 Graham Stringer: Lord Stern takes a different view and says that sceptics are just noise and should be treated as noise. Do you agree with that? While we are on Lord Stern, given your robust statement before

on peer-reviewed papers, are you not embarrassed about quoting Lord Stern's work, which is not peer-reviewed?
Gregory Barker: I have huge admiration for Nicholas Stern. He is one of a range of people to whom we listen carefully. I have never heard the allegation that his work is not peer-reviewed before.

Q379 Graham Stringer: His report has not been peer-reviewed. It is not an allegation. We are dealing with facts; it is a fact.
Gregory Barker: Are you referring to his report in 2008?
Graham Stringer: Yes.
Gregory Barker: I think it was in 2008, or it may have been earlier. It was fundamentally a work of economics rather than climate science. Lord Stern is an economist, not a climate scientist, but certainly on issues of economics we listen to Lord Stern not exclusively but very carefully.

Q380 Graham Stringer: What about the point about treating sceptics as just noise?
Gregory Barker: I do not agree with him there. That is to a certain degree wishful thinking. Politicians in particular have a duty to engage in the debate. The question is how much of the debate you allow them to dominate. I think it is right that we should reply, as we do in Westminster Hall or the House of Commons, to sceptics from within and outside Parliament. Of course, we listen to their views and treat them with respect, but we should not let the views of a relatively small minority dominate the whole agenda.

Q381 Graham Stringer: You did a bit of a body swerve previously when I asked you about disagreements between Ministers. Do you think all Ministers have an obligation to be on message when Owen Paterson has recently been criticised for what he said? Do you think all Ministers should be on message?
Gregory Barker: Most Governments strive to have all Ministers on message at all times, but, when you are dealing with a collection of dozens of politicians, that can be slightly stretching.

Q382 Graham Stringer: The two books that I have found most useful in thinking about climate science are Professor MacKay's and Dieter Helm's. First, do you get people in your Departments and Ministers to read your book? I think it would be very helpful if they did. Secondly, Dieter Helm's thesis is that the Climate Change Act in essence is counterproductive because it focuses on emissions and not the overall carbon budget. On the first question, I would be interested in your reply.
Gregory Barker: You gave me a copy the first time I met you.
Graham Stringer: It would show the education level of Ministers and officials.

Q383 Chair: Have you read it?
Gregory Barker: It was my summer homework in 2010.

Q384 Graham Stringer: On the second point, do you believe that the Climate Change Act is working, or is Dieter Helm right and it is counterproductive?
Professor MacKay: In answer to your first question, as the Minister said, the moment anyone senior arrives in DECC I personally give them a copy of my book. That goes for all Ministers and senior civil servants.

Q385 Graham Stringer: Do they read it?
Professor MacKay: I have had very positive feedback from many of the people in the Department who have read my book.

Q386 Graham Stringer: It is a very good book. What do you say on the "Dieter Helm" point?
Professor MacKay: On your question about Dieter Helm, he has a political point.

Q387 Graham Stringer: It is not political. He is saying, quite simply, that the Climate Change Act focuses on reducing the emissions of carbon in this country and that by focusing on that you are increasing the amount of carbon dioxide going into the atmosphere, because we import already produced goods so you pay for the transport and probably less efficient production in the third world.
Professor MacKay: It is certainly a matter of fact that, if you look at our consumption emissions and compare them with our production emissions, our consumption emissions, according to the people we employ to estimate them for us, have been rising. The only way in which successful climate change action will happen is if all countries engage in mitigation policies to reduce emissions. I think Dieter Helm has a good point, as I have said this before, but the Department is committed to trying to achieve a global deal on climate change action.

Q388 Graham Stringer: My question is that in the short term by pressing down on emissions are we not having a counterproductive impact?
Gregory Barker: Do you think we should encourage emissions?

Q389 Graham Stringer: No, that is not the point I am making at all. I am saying that, if you reduce emissions here and import already produced goods, the overall budget for carbon dioxide will increase, whereas if you had allowed the production here you may well have less carbon dioxide going into the atmosphere.
Professor MacKay: The Department is very conscious of the effect you are describing, so we take careful measures to try to avoid the export of energy-intensive industries to other countries.

Q390 David Morris: We have been told about the particular difficulty in separating science and policy. What difficulty does this cause your Department in its work?
Gregory Barker: I am sorry—I do not quite understand that.
David Morris: I will repeat that.

Gregory Barker: No; I heard the question. I could explain the difficulties that we have. Is there a particular point, because we have trotted round this?

Q391 David Morris: The point is that sometimes it can be misconstrued that policy often masquerades as science. What difficulties does this cause your Department in its work? Do you get the two remits mixed up sometimes, or is it perceived to be mixed in that particular way?

Gregory Barker: There is no doubt that I am a politician and not a scientist, so I steer clear of trying to inform anybody too heavily on the science. I think politicians should take the science from the experts.

Professor MacKay: Maybe I can give a partial answer to your question. People do mix up the science, which is factual, with the policy response, which is and ought to be subject to political argument. An example of someone who has deliberately mixed up these things is Nigel Lawson, who, in a recent newspaper article insulting the IPCC's work, alleged that the IPCC was calling for a phase-out of fossil fuel use. That is not the IPCC's role at all. They are scientists reviewing the science literature and describing what is happening, the consequences of continued emissions and, if policy were to have a particular target for climate change, what emissions would be compatible with that target. That is not their role and they do not recommend any particular policy. They just say, "If you emit this much, this is what will happen," with error bars. It is unhelpful for people like Nigel Lawson to mix up and allege that the IPCC are a political organisation, when their role is clearly to describe science as honestly and factually as they can.

Q392 David Morris: Information for the public of some of your policies—the Green Deal for example—does not explicitly make the link to climate change. Was this a deliberate approach?

Gregory Barker: Yes. I think there is a willingness by the public to act on climate change and all other environmental imperatives, but that is limited to a certain amount of the public. For most people they will not act in a way that will cost them money when they have many other competing demands on family budgets, particularly in the current environment with the pressures on the cost of living.

As far as concerns the Green Deal, we have to be very clear that, while there are obvious advantages to the environment and climate change in particular, specifically helping to reduce emissions from the built environment, the real driver for most consumers in taking up the Green Deal should be that it will help them save money on their energy bill; it will help them to live in a warmer, healthier, cosier home. Although individual polls vary slightly, we know that there is a significant body of opinion—20% to 30%—who will do it for environmental reasons; a slightly larger number will do it for financial reasons; but, even in the current climate, the largest single body of those willing to make changes to their homes and install measures will do it effectively for home improvement to make their homes nicer, warmer, cosier and improve the fabric of their homes. When communicating messages, particularly when there is a call to action, it is important that we go with the grain of public aspirations and consumer behaviour rather than try to oblige people to act when we are looking to them to act on their own initiative.

Q393 Chair: Sometimes those things run in parallel, do they not?

Gregory Barker: Yes, absolutely; they are not mutually exclusive.

Q394 Chair: If you take the advertising of modern cars, the fact that a vehicle produces less than 99 g/km, or whatever, is an advertising feature. It is a climate change message as well as being a fiscal incentive, because it is a lower tax band.

Gregory Barker: But you tend to find that, given a like-for-like product at a similar price, a lot of consumers will say, "If there's not really much between them, I will go for the more environmentally friendly." That is right. But if you say, "You can have either the old polluting model, which will be cheaper, or pay extra for the cleaner version," very few people—not very few but fewer—will say, "I will pay up to have the cleaner one." I am glad to say there are people who do do that, but we have to make it easy for the public. We have to make public policy at the macro level a "no regrets" policy for the economy as a whole, and we have to make individual consumer choices attractive for them. We cannot allow this debate to be polarised into expensive climate action versus cheap fossil fuel habits. That does not reflect the reality of consumer choices anyway. Often, the more energy-efficient and innovative technology choices are the ones that will benefit the consumer across a number of metrics.

Q395 David Morris: Is it better to ignore the science completely to encourage action by the public and focus on other messages, such as energy security and efficiency and impacts such as flooding?

Gregory Barker: I certainly would not ignore the science, but we can run these issues in parallel, and I see no contradiction or difficulty in doing that. If you are in an area at risk of coastal flooding in the near term, that will be very much on your mind rather than the longer-term implications for global climate change. That will resonate with you much more directly. Issues around energy security are equally valid, and we need a measured approach across the board. We need to keep the lights on; we need national energy security; we need to keep prices down; and we need to manage the low-carbon transition. These are all important factors and we cannot play one at the expense of the other.

Q396 Pamela Nash: I would like to return to the IPCC report. Could you expand a bit on how that might affect UK policy on climate change?

Gregory Barker: In terms of the impact on policy, I do not think there is a major policy shift to come from the UK as a result of this. It is more likely that we will see a drive for greater action on the part of our international partners. I was in New York representing the UK in the Major Economies Forum, which is a

smaller group of nations that come together to discuss international climate negotiations on an ad hoc basis through the year in the run-up to the annual COP, which this year will be in Warsaw. Unfortunately, we had the meeting of the MEF just days before the IPCC released their report but we had already anticipated it. It is very useful to be able to present that body of work on an objective basis to that forum, given the large number of contributors from a number of different nations. It is undoubtedly going to be a factor in convincing other more important economies than ours in the climate change agenda to take more aggressive action to bear down on emissions.

The fact of the matter is that the UK is an international leader on climate change. Our emissions are down 25% to 26% on 1990 already. I cannot think of another major economy that is able to make that statement. If you are talking about developing economies, you are talking about lessening of carbon intensity and limiting their growth—not absolute reductions. It is welcome that the United States has seen a reduction in its net carbon inventory in the last couple of years, largely as a result of the shift to shale gas, but obviously there are impacts there because, unless there is a wider take-up of gas in other economies around the world, all that will happen is that you will displace coal from the US into other markets, so there will not be a global net benefit.

The IPCC report is a useful piece of evidence to encourage global action. I do not want to sound complacent, but we already have a statutory obligation to reduce by 80%. Only a handful of countries have similar unilateral commitments. We need to see meaningful action on the part of the largest emitters, and that is where the IPCC report will, I hope, have its greatest impact.

Q397 Pamela Nash: That was really helpful. I want to talk a little before we finish about the reporting of the IPCC report and your role and that of your Department in that. What preparation took place in the Department for that report being published and your response in the media to that?

Gregory Barker: We started planning for it some months in advance. It was flagged up in my diary back in June that I should be available on a Friday. Normally, I would not be in London on a Friday; I would be in my constituency. Obviously we cannot control the media, so there has to be a degree of responsiveness, but we certainly had one of the biggest operations as far as the Department is concerned that I can remember for some time in anticipating and trying to manage it as best we could. There was a very comprehensive briefing for the Minister, albeit we got the final report only a few hours ahead of its release. But there was excellent support from the science team in the Department. Professor MacKay and I hit the airwaves; Ed Davey hit the airwaves from China. I thought that was rather good given the importance of developing economies, particularly China, in this whole agenda. It was pretty comprehensive. I am sure we can improve on it.

Q398 Pamela Nash: Did that strategy extend beyond the actual day of publication? Is there a strategy going forward even now?

Gregory Barker: Absolutely. This goes back to the earlier point that we were both discussing about not allowing the IPCC's big lump of evidence to impact and for it to be unpicked only for a couple of news cycles and then put to one side. We need to do a better job—we will endeavour to do that—of pulling out evidence and introducing it where possible into the media in a way that is topical and relevant as we go through the year and beyond, but there is an imperative. If you want the thing to get coverage, you have to have a hook or angle, so we need to keep pressing the refresh button. The publication of further reports next spring will be very helpful, but we certainly will continue to talk about it and be heard as best we can before then.

David Warrilow: We had public presentations of the report at the Royal Society last Tuesday to a mixture of industry, NGOs and the public, and also presentations to Whitehall. Nearly 200 civil servants turned up for a briefing from the co-chair of the IPCC who dealt with this particular report. We also gave advice to the Foreign Office to inform posts round the world so that they could talk about the report in their own embassies and with the people they deal with abroad. We have undertaken quite a wide range of activities to explain what the report is about, to comment on it and make sure the information is out there. The IPCC are also doing quite a lot of work to promote the report, as you might expect.

Q399 Pamela Nash: Thank you for that information. We heard evidence earlier this morning that, whereas we are always talking about how much scientists are trusted in the press, there seem to be different levels of trust in scientists who work for the Government compared with independent scientists or university academics. I would love to hear all your views on who is trusted by the public and how we can use that better to communicate this to the public.

Gregory Barker: I have some statistics here. The trust is highest in scientists working at universities. The latest data show it is 93%; so universities rank highest. It is followed by those working for charities, where it is 76%; for environmental groups it is 72%, which is the same as Government actually.

Pamela Nash: You look surprised, Minister.

Gregory Barker: For industry, it is 56%. You are right that those who are independent of Government in universities rank the highest. Then charities, environmental groups and Government are all pretty much of a muchness, and industry is quite some way below. I will make sure you get that.[4]

Q400 Pamela Nash: Do you see a greater role for the Met Office, research councils and other organisations?

Gregory Barker: Professor MacKay may like to expand on this. We are actively in discussion with the Met Office on how we can better use their expertise.

Professor MacKay: To go back to your original question, it is a sad truth that apparently coming to

[4] http://www.ipsos-mori.com/researchpublications/researcharchive/2764/Public-attitudes-to-science-2011.aspx

work for Government has decreased the fraction of people who trust me.

Q401 Pamela Nash: I am afraid you will not get sympathy from politicians.
Professor MacKay: We are working actively with the Met Office to try to enhance their communications.

Q402 Chair: Do those statistics mean that, given the correct public perception of the independence of some of our research scientists, even though they are funded through public money at places like the Hadley Centre, research agencies like the National Oceanography Centre, universities and so on, there is a strong argument in this field for maintaining the perceived independence of those bodies by keeping them out of the private sector? The private sector has much lower buy-in according to those figures.
Gregory Barker: I am not quite sure I know what you mean by "out of the private sector."

Q403 Chair: There have been discussions, have there not, about the long-term future of Wallingford and institutes like that? Is this not an argument against that?
Gregory Barker: Our survey was based on industry, which is not synonymous with the private sector. So the nature of the funding of these institutions was not something that really worried the public. How they are endowed is not something that weighs heavily on their mind; it is about the calibre and independence of the institution. When they see industry, it means that, if you are in the business of making money out of smelting metal, extracting coal, or you are an oil company, obviously that will weigh heavily on whether or not you are seen as an independent arbiter of the science. I do not think even the most robust advocate of privatisation would advocate that the Hadley Centre, or any other of these research institutes, should go into the business of prospecting for oil.

Q404 Chair: You have not listened to all the cases, obviously. This is worrying. Minister, we have covered a lot of ground. You and your very impressive colleagues have a huge responsibility in this. If there are areas we have not covered that you feel would help to inform this inquiry, we would be grateful if you dropped us a formal note. We have determined this morning that, although ministerial sessions are usually the last ones in an inquiry, unusually we are going to take one more in an attempt to persuade some of those people who have contrary views on the science to come and explain to us where they are coming from.
Gregory Barker: Thank you. It has been very useful from our point of view. I reiterate that we do not pretend we have the silver bullet, and it is a constantly evolving challenge to communicate this effectively. I will be very interested to see your final report and its recommendations about how you feel we can do this better, and also the submission of institutions like the BBC, so that we can move on from that slightly sterile debate around the science.
Chair: Thank you very much.

Wednesday 6 November 2013

Members present:

Andrew Miller (Chair)

Jim Dowd	Graham Stringer
Stephen Metcalfe	David Tredinnick
Stephen Mosley	Roger Williams
Pamela Nash	

Examination of Witness

Witness: **Professor Sir Mark Walport**, Chief Scientific Adviser to HM Government and Head of the Government Office for Science, gave evidence.

Q405 Chair: Good morning, Sir Mark, and welcome in your not so new capacity; I think you have been in post seven months. We previously met you when you were director of Wellcome. It is a pleasure to have you back in your new capacity.

We are fascinated to understand how you are dealing with this very complex issue of climate change and advising Government. As you know, we are particularly looking at how climate change messages need to be communicated. A couple of us were at John Howard's lecture last night. My notes of last night said, to paraphrase slightly, that "All of us know that all of the science is never in on any subject. Policy makers are being bullied by zealots." Are you a zealot?

Professor Sir Mark Walport: No, I am not. My job is to advise the Government on the best state of the science as it is. Of course there is always uncertainty in science, but the almost unique feature of the world of climate change is the depth of meta-analysis that is going on through the Intergovernmental Panel on Climate Change. In many ways that makes all of our jobs easier when it is about communicating the science.

I come, as you know, from the world of medicine, and medicine was transformed when people started doing the meta-analysis—in other words, looking very rigorously at the evidence that had been collected from a whole variety of sources. The Cochrane reviews in medicine are an example of meta-analysis, which takes disparate evidence, distils it and provides the best advice on the current state of the evidence. In the case of climate, we have the IPCC, and to some extent, the current discussion has been triggered by the fifth report, which is on the physical science basis of climate change. It is a meta-analysis where there have been 259 lead scientific authors and 39 countries, and they have reviewed literally thousands of papers, each of which has been peer-reviewed in its own right. The distillation of the IPCC report, which is an extremely good piece of communication, is one and a half sides of paper—the headline statements from the summary. This is an area where it is possible to communicate extremely clearly. While of course there are questions about the future, the present state of knowledge about climate change is very, very clear indeed. The headline statement from the IPCC is: "Human influence on the climate system is clear."

Q406 Chair: It is often the case that newspapers and some of the people who are sceptical about the anthropomorphic aspect of climate change pick on narrow headlines. How do you convince the public about that meta-data, which is a very difficult word for non-scientists to comprehend? How do you get that across to people? You cannot just simplify it in a note.

Professor Sir Mark Walport: I have characterised this previously, and I have spoken about it very actively over the last couple of months: the challenge of communication is one of big numbers and small numbers. The big number problem is that humans are emitting into the atmosphere approximately 10 gigatonnes of carbon each year. The term "gigatonne" does not mean anything to most people; 10 billion tonnes starts to mean something, or 10 thousand million tonnes. There is a real challenge in getting our minds around the very large numbers. The small number problem is that the average surface warming of the planet since about 1900 has been about 0.9°C, and that seems like rather a small number. But of course the issue is not that it has warmed evenly but that the warming is occurring very unevenly, and what we are really talking about, rather than global warming, is climate disruption. That is what we are starting to see. There is a challenge of communication around both that big number problem and the small number problem.

Q407 Chair: Is that what you mean on your website, where you talk about the focus on science being especially important given the misunderstandings about climate change?

Professor Sir Mark Walport: Yes. One of the other issues is the confusion between causation and correlation. It is very difficult, I think, for almost everyone to distinguish weather from climate, and that is a very important issue. We go through a spell of cold or warm weather and people start drawing conclusions which are not warranted, because we all know we go through season cycles, the climate is variable and we are talking about a very long period. Julia Slingo provided you with a very good definition of climate change and, to anticipate the question, I cannot do better than Julia's definition.

Q408 Chair: Do you think that is the biggest misunderstanding, or are there others that you would rank up there?

Professor Sir Mark Walport: It is difficult to say what the biggest misunderstanding is. Again, people need to realise that the evidence for climate is more than simply that 0.9°C. It is all of the things that go with it: it is more water in the atmosphere; it is warming at the surface of the oceans; it is the expansion of the oceans and the rising of sea levels; it is the reduction in ice levels in the Arctic; it is the melting of glaciers. All the signs are pointing in exactly the same direction. But I repeat that I do not think we can do better than to communicate that science as clearly as we possibly can. All the scientists involved in this who are capable of clearly communicating need to do so.

Q409 Graham Stringer: I have asked every witness who has been here for a definition of climate change, and we have had as many definitions as people who have been questioned. The most precise and most useless was from the Minister, who said that climate change was climate change. What is your definition?
Professor Sir Mark Walport: As I say, Julia Slingo had it exactly right. The climate is the average of the weather over a long period of time, and, if you compare two different periods of time and you see that the climate has changed, that is climate change. The issue here, of course, is the human contribution to that over a very short time scale.

Q410 Graham Stringer: One of the advantages of talking about global warming, or the global warming of the surface, was that it could be measured. Science is a lot about measurement.
Professor Sir Mark Walport: Absolutely.
Graham Stringer: It is much more difficult to define what we are measuring if you take that definition of climate change, is it not?
Professor Sir Mark Walport: No, with respect, I disagree with that. As I have already said, it is not simply one set of measurements. It is measurement of the temperature in a variety of different locations, measurement of water temperatures and measurement of sea level rises. If you look at the graph of sea level rises, you can see that it is rising relentlessly at about 3 mm per year. That sounds like a rather small number, but, if you sum that over a long period, it has significant effects. There are very many measurements and the IPPC report has a whole collection of graphs which all point in the same direction. We are not basing this on a single set of measurements by any means.

Q411 Graham Stringer: In the written submissions, we heard that there is background climate change, natural variation. One of the submissions we heard is that nobody knows how to separate the natural variation from that caused by the carbon dioxide that human beings are putting into the atmosphere. If you are saying those are your many measurements, how do you then make that accurate to know what is natural variation and what is man-made?
Professor Sir Mark Walport: It is the speed of the change that is unprecedented here. Of course there have been climatic variations over very long time periods—for example, associated with changes in the earth's orbit—but it is the speed of what is going on that is unprecedented. If you simply look at the change in concentrations of carbon dioxide, which have gone up dramatically from 280 to around 400 parts per million, you can see that it has happened over an extraordinarily short time period in geological terms.

Q412 Graham Stringer: That does not quite answer the question, does it? We can measure accurately the increase in the carbon dioxide. How do you measure the difference between—and how do you get it to a level of precision that is useful—the background variation and that induced by human beings putting a lot of carbon into the atmosphere?
Professor Sir Mark Walport: The answer is that you can look at the sources that give you very long time periods; for example, you can look in ice cores. There are ways of looking at climate over very long periods.

Q413 Graham Stringer: I enjoyed your speech yesterday at lunchtime.
Professor Sir Mark Walport: Thank you.
Graham Stringer: You talked about the levels of discounting impact.
Professor Sir Mark Walport: Yes.
Graham Stringer: What level of discounting would you have?
Professor Sir Mark Walport: I probably need to explain the background to that. We are now moving to a different part of the discussion, in a sense, which is that the way I talk about this is in three parts. There is the science, there is the communication of that science and then there are the policy decisions that follow that. Those policy decisions are for all of us, and they are not policy decisions where science has special expertise. The challenge is to communicate the impacts that climate change is likely to have if we continue to emit carbon dioxide at the same rate. In a sense the challenge for policy makers is that the real impacts are going to be felt for future generations, so the question in an economist's terms is, "What would be the discount rate for a grandchild?" Most of us would have a very low discount rate for our grandchildren because they are very tangible individuals to us. The question for society is how much we are prepared to invest now for a world that is going to be a better environment for our grandchildren's children, their children and their children. That is where there are interesting questions about how we all think about future generations. Turning those emotional and moral questions about our duty of care to future generations is a different set of questions, and it is a set of questions for all of society.

Q414 Graham Stringer: That was the question I asked and I would be interested in your answer to it. You defined my question much better than I did and I would be interested what your—
Professor Sir Mark Walport: I can give you a personal view.
Graham Stringer: I would be interested in your own personal view.

Professor Sir Mark Walport: My personal view is that I do care about my grandchildren's grandchildren. But that is a personal view; I would not say it was a scientific view. That is a view for all of society.
Graham Stringer: Thank you.

Q415 Stephen Mosley: Following on from that, for me there are four key stages in the communication. First, is climate change happening? The answer is clearly yes.
Professor Sir Mark Walport: Yes.

Q416 Stephen Mosley: Second, is it man-made? Again, there are elements of it that are clearly man-made.
Professor Sir Mark Walport: The answer to that is yes, it is.

Q417 Stephen Mosley: Thirdly, what should be the aim of policy? Fourthly, what should we do about it? When it comes to the aim of policy, we have a decision. We could look at climate change and say, "Is it beneficial? Is there a chance of it being beneficial? Should we try and reach a situation where there is no climate change whatsoever? Should we just eliminate the man-made portions?" There is a whole range of options around that. What should be the Government's international aim in our policy towards climate change?
Professor Sir Mark Walport: There are several questions embedded in that. The key issue around this, of course, is that the policy decisions are about energy. Those are the policy decisions. If we are to mitigate the human contribution to climate change, we have to reduce carbon emissions, and that involves changing how we use fossil fuels. We tend to think on the energy generation side, but there is also the demand side issue, which is "How can we change our demand?" The challenge for policy makers is that when you are looking at energy policy you have to look at it through three different lenses. Again, this is something I have talked about publicly: you have to look at it through the lens of security of supply, because if the lights go out that is very bad news; you have to look at it through the sustainability lens, in other words the lens of the health of the planet for humans; and then you have to look at it through the affordability lens, and that is the challenge for policy makers.
On your question about whether it has benefits, the short answer is that in the short term the wetter parts of the world are tending to get wetter and the drier parts are tending to get drier. So while there might be minor climate benefits in some parts of the world, they are matched by disbenefits in other parts of the world. Again it depends on the extent to which we as individuals, electorates and politicians take a global view. That is always the challenge. It does require a global solution, but that is very difficult if the countries that historically have not been major emitters of carbon do not show a leadership role.

Q418 Stephen Mosley: I agree with you entirely, but I know that 20,000 years ago my constituency was under a kilometre of ice.
Professor Sir Mark Walport: That is correct.

Q419 Stephen Mosley: So as far as I am concerned, in terms of where I live currently, climate change over the past 20,000 years has been beneficial.
Professor Sir Mark Walport: That is absolutely right.

Q420 Stephen Mosley: The question is, going back to the third point that I raised, what should be the aim of policy? I am not talking about what we should do about it, but what should be the aim? Should we eliminate man-made climate change? Should we seek to eliminate climate change altogether? Or should we seek to alter climate in a way that is beneficial?
Professor Sir Mark Walport: We cannot alter climate change caused by natural causes that are outside human mediation. Again it comes back in a funny kind of way to the discount rate question, which is what will the climate or the planet be in another 20,000 years, in 100,000 years or in a million years? Leaving aside the carbon emissions question—because of course if we continue to emit carbon at this continuous rate, we will have had a dramatic and extraordinary effect on the planet—there are some things that we cannot do anything about. You have to distinguish the 20,000 and the 100,000-year time horizon from the 100-year and 500-year time horizon.

Q421 Stephen Mosley: In the evidence that the Government sent us, they told us, "It is essential to have a simple, clear evidence-based narrative about climate change, its causes and likely impacts in the public domain."
Professor Sir Mark Walport: I could not agree more.

Q422 Stephen Mosley: Do you think the Government do that?
Professor Sir Mark Walport: When you say "the Government," there are people who speak on behalf of the Government, and that takes us, to some extent, to the topic of this session. Part of my job is to give that very clear communication; it is to work with my colleagues—with David MacKay, for example, who is the chief scientist at DECC—and with other chief scientists. Sir David King has now been appointed as the Foreign Secretary's envoy on climate change. There are a group of us who have, I think, a duty as part of our jobs to provide a very clear narrative.

Q423 Stephen Mosley: You have a duty, but do you do that? That is the question.
Professor Sir Mark Walport: Yes is the answer. I have here a talk that I first gave at a public meeting in Cambridge, and I have planned a series of occasions when I am going to give this talk to public audiences around the country. I have also, interestingly, because I was in the United States and Canada a couple of weeks ago, given this talk in Houston and in Ottawa as well.

Q424 Stephen Mosley: Do you think there is one individual or one body that should be the clear voice of Government on climate change?
Professor Sir Mark Walport: No, I don't think there can be one. Putting all one's eggs in one basket would

be a mistake. We have a duty for as many people as are competent to deliver the message to do so.

Q425 Pamela Nash: Sir Mark, could you clarify for the Committee what you think the Government's responsibility is exactly when it comes to communicating science, putting that in relation to other scientists and academics in the country and their responsibility to do so?
Professor Sir Mark Walport: The answer is that Government seek scientific advice. We have probably the best embedded system of scientific advice to Government of any country that I am aware of, in that we have a chief scientific adviser and we have scientists—a chief scientist in almost every Department. We have numerous scientific advisory committees, and all of us speak. In a way, Government are communicating science through the scientists in Government. I think that it is our job to communicate.

Q426 Pamela Nash: Do you think there are enough resources devoted to the communication of science at the moment?
Professor Sir Mark Walport: There is more resource devoted to communication of science than there has ever been in the past. As you know, my history has been in the funding of medical research, and during the time I have been in that world there has been a stronger and stronger emphasis on the public communication of science. We have seen a transformation in the media overall as well. We are seeing much more science in the public media than we used to. There are certain misconceptions, such as that the public are not interested in science. They are. Science well expressed is absolutely fascinating and people are interested in it.

Q427 Pamela Nash: But is it enough?
Professor Sir Mark Walport: You can always do more.

Q428 Pamela Nash: Thank you. I thought you might say that. I was looking at quotes from your speech in October to the Centre for Science and Policy, and some of the reaction to that. Someone said that the Government sometimes find it difficult to separate when they are communicating science and fact and when they are communicating policy. Is that something you recognise as an issue?
Professor Sir Mark Walport: No, they are different issues. My job as a scientist is to comment on the science; it is not to externally criticise the policy, because the policy is made by politicians and it is we the electorate that vote for them. It is worth saying that that speech at CSaP was web-streamed at the time, and I think it is available on YouTube or somewhere like that for anyone to watch.

Q429 Pamela Nash: Yes, we have seen it. Just to be clear, you do not think there is a problem at the moment. You think the Government are quite effective at separating communication on science and policy.
Professor Sir Mark Walport: I am very clear on separating the communication on science and policy, but—
Pamela Nash: Just to be clear, this is not a criticism of you.
Professor Sir Mark Walport: For the politicians themselves, it is how the science feeds into the policy. That is the big question.

Q430 Pamela Nash: Do you think there is anything else that Government could do to feed the debate more effectively?
Professor Sir Mark Walport: This is a topic that is being extraordinarily actively debated in political circles at the moment, given that it is energy—where there are major policy changes—and our consumption of power where the issues are. There is a great deal of political debate about that and I am not going to comment on it.
Pamela Nash: Okay, thank you.

Q431 Jim Dowd: People talk about the need for a national debate or conversation, but, by its nature, politics is about debate. Surely what really matters are conclusions being drawn from that.
Professor Sir Mark Walport: Absolutely.

Q432 Jim Dowd: It is no use talking about things for ever. Do you have any feel as to the kind of conclusions we are reaching?
Professor Sir Mark Walport: The challenge at the moment is that we would be having a very easy discussion if decarbonised energy was as cheap as fossil fuel. There is a big technological challenge that we face. We have globally to put an enormous amount of effort into the technological challenges of, for example, how we sequester carbon. One way of dealing with carbon emissions is to capture them and bury them deep underground. It is a technology that is possible but still relatively expensive. We have, for example, to work on battery storage. There are all sorts of solutions where we need a technological investment. That is a particular scientific focus that I have at the moment, which is actually identifying the key areas—and I am working with others—where we need to do the research globally, because it comes back to the three lenses. It comes back for energy to the lenses of security of supply, affordability and sustainability.

Q433 Jim Dowd: Contained within that answer as I understood it was the idea that technology can contribute to this.
Professor Sir Mark Walport: Technology has to, yes, absolutely.

Q434 Jim Dowd: But that then brings its own problems. When I was on the Health Select Committee we carried out an inquiry into obesity. While there was a recognition that it is—pardon the phrase—a huge problem and growing, it is one where a lot of people felt that it was up to the scientists, clinicians or medics to provide us with a solution; it is a pill we need so that we do not change our lifestyle or do anything ourselves. Others do it for us.
Professor Sir Mark Walport: That is a fair point. Another part of the equation has to be around our consumption. But again technology can make it easier

for us to modify our consumption. For example, when I was in the US a couple of weeks ago I visited a project in Austin looking at smart metering of houses. I have to emphasise that this was an experimental project where they were looking in great detail at volunteer households, monitoring every single electric circuit in the household and seeing how people consumed electricity. Part of the challenge is to give us the information that enables us to make the choices that we need to make. You are absolutely right—the metaphor is not a bad one, I think—that one of the challenges for obesity is behaviour change, and one of the challenges in the world of energy is behaviour change as well. But we have to make it easy for people to change their behaviour, and that will require a lot of technology. For example, decarbonising transport would be an important thing but we have to make it an affordable thing for people to do; we have to provide the wherewithal, for example, for people to recharge battery-powered cars. There is a lot of technology required to enable people to make choices. That is one of the challenges around smart metering. Done well, it will enable people to know more about their energy consumption and to start making choices.

Q435 Jim Dowd: But the primary incentive in smart metering is cost, isn't it?

Professor Sir Mark Walport: It is quite interesting to take the electric car model in the States. People's energy consumption at home was low during the day, as you would expect, and then they would drive home from work, plug their car into the electricity, turn the air conditioning on and turn the microwave on. All the consumption would be done at once, as opposed to in the middle of the night when they were asleep and could have been charging the car then. There are ways in which technology can even out our use of consumption, and obviously that then means that you can use energy at times when the tariffs are cheaper. You can win on all fronts if you get this right, but it requires very significant technological investment.

Q436 Jim Dowd: Stephen and Pamela have already touched on most of the other questions I was going to ask. One of the Government Ministers we had before us said that the role of the Government was just to stand behind the scientists on this matter. Mind you, Government Ministers wanting people to stand behind is nothing new. Is that your role?

Professor Sir Mark Walport: No. Surely the role of Government is to make the policy decisions that follow from scientific and other evidence. Politicians have to take it all into account.

Q437 Jim Dowd: I was thinking in particular of advocating the issues around it.

Professor Sir Mark Walport: It is worth saying that I have had the opportunity to present the IPCC report to the full Cabinet, so the Government have been listening very carefully indeed.

Q438 Jim Dowd: Why then do you think, given the prominence of the issue, that all recent polling seems to indicate that the public's belief in "climate change" is declining? It is still overwhelming, but it is declining.

Professor Sir Mark Walport: That is exactly the point I was about to make. Let me challenge the use of the word "belief". Ultimately, this is not a matter for opinion or belief. It is a matter of fact whether humans are altering the climate or not. There is a correct answer to this question. You can believe what you want, but there is, ultimately, a correct answer. On your specific question, which is about public comments about this, it is perfectly true that about 10 years ago, more than 90% would have answered that they were clear that humans were modifying the climate. The figure is now something like 72% or 73%. So there has been a decline, although, as you point out, that is still a very significant fraction of the population; I have somewhat flippantly said that most politicians would be happy with a majority like that. We do not have a big problem.

Why has opinion moved? We do not know is the short answer. There are groups in the UK—for example, the group in Cardiff led by Nick Pidgeon—doing a lot of social science around this. There is no doubt that hard economic times—fuel bills—are going to affect people's views. There may also be a sense that this has been going on for a long time and nothing has obviously changed. There are likely to be all sorts of reasons. There have been some loud, sceptical—though wrong—voices, and it is quite difficult for a public faced with two apparently equal and opposite views to make the judgment between them. But of course the reality is that they are opposite views but they are not equal views. I think it is a combination of "It's been around for a long time and apparently the world hasn't changed," sceptical voices and the economic environment.

Q439 Jim Dowd: In my experience, Sir Mark, I would say that politicians are quite happy to accept a majority of one, let alone anything more extravagant than that.

Professor Sir Mark Walport: That one is for you to comment on, yes.

Q440 Jim Dowd: Is there not a conundrum or a paradox in what you are saying? When you said there is a right answer to this, that is perfectly true, but science is not a democracy any more than mathematics or anything else. The fact that 90% of people believe something to be true does not make it true.

Professor Sir Mark Walport: Correct.

Q441 Jim Dowd: You cannot simply discount the other 10% because they happen to be in the minority.

Professor Sir Mark Walport: Hang on a second. That is the sort of argument of the scientific outsider. There comes a point when the overwhelming consensus is such that we can be as confident as we can that the science here is correct. While I am perfectly happy to agree that there are all kinds of uncertainties about the precise details of the future, I go back to the IPCC statement: "Human influence on the climate system is clear." There are a number of others that are very strong: "Warming in the climate system is

unequivocal." "Human influence has been detected in warming of the atmosphere and the ocean." There are a whole series of statements. It is not a matter of "The sceptical voices might be right," in this case.

Q442 Jim Dowd: The vast majority of the population are scientific outsiders, and what we are trying to deal with in this inquiry is how they appreciate the issues.
Professor Sir Mark Walport: Yes.
Jim Dowd: You mentioned the Arctic ice cap shrinking, which has major implications for a number of people. But at the same time the Antarctic ice sheet is growing.
Professor Sir Mark Walport: Yes. There is—
Jim Dowd: I know what you said about climate disruption and I appreciate that as a definition, except that it seems to say there are a lot of things going on for a wide variety of reasons and we cannot really just analyse the lot.
Professor Sir Mark Walport: It is an enormously complicated system, and there are perfectly good explanations; there is more water in the atmosphere, and at very cold parts of the world it will turn into snow and ice. There are explanations, but of course there are things we still do not understand. What tends to happen is that people cherry-pick the piece of evidence that suits them, and that is not the way to do science. What you have to do is look at the bulk of the evidence and put it all together. That is the basis on which the IPCC have done their work, and they have done it extremely well.

Q443 Chair: Isn't the conclusion of your comments to Mr Dowd about the change in public perception—public belief—that the science you are arguing is now clear, that the scientific advice to Government, as I am sure you would say, is very clear, and that it therefore needs strong political leadership to carry the public in the right direction so that the correct policy decisions can be made?
Professor Sir Mark Walport: I do not want to stray too much into the world of politics, but it is an iterative process, where politicians need to, as it were, show leadership and persuade the electorate, but then the electorate need to elect the politicians they want. There is a sort of virtuous circle potentially.
Chair: Some of us think so. We shall not stray too far into that.

Q444 Stephen Metcalfe: In your responses to Stephen Mosley, you talked about the need for a clear narrative and said that you thought it was better not to have one voice but a number of voices communicating the same thing. Does that approach constitute a Government communications strategy, and is it something that has just grown out of the desire to communicate or is it a planned approach?
Professor Sir Mark Walport: I do not think there is a formal Government strategy as such. However, I work with a community of scientists, both inside and outside Government, and we certainly discuss communication. It is our collective view that we need to communicate this, and indeed other scientific stories, very clearly.

Q445 Stephen Metcalfe: I agree with that, but does the Government need a strategy that is formalised, that identifies where the sources of information are coming from, and that is visible and accessible so that people can see what is behind the communications?
Professor Sir Mark Walport: I am more concerned about function than I am about form. As long as the communication is happening effectively, that is what matters. It is always one of the challenges. It is the function that matters.

Q446 Stephen Metcalfe: Can you expand on what activity is going on behind the scenes—with David MacKay, as you mentioned, or as he has mentioned to us? Is there a process that takes place that engages in this communication?
Professor Sir Mark Walport: There is informal work, in that we meet as a community every Wednesday morning. I had a meeting at 7.45 this morning with other chief scientists. We talk about these matters. Another very good example of what I think is Government communication is the 2050 calculator, which is on the DECC site. That is an extraordinary tool for communication because it gives anyone—a policy maker, and in fact there is a young person's version of it as well—the opportunity to play around with the parameters to see what changes in both supply and demand would be needed to reduce our carbon emissions by 80% by 2050. There are quite a lot of tools. The interesting thing about the 2050 calculator is that it is gradually globalising. There is a Chinese version available in Mandarin on a Chinese website, and now a global 2050 calculator is being prepared. The UK 2050 calculator is for the UK and the Chinese one is for China, but a global one is being prepared. That is an example showing the diversity of communication that is needed and the sort of tools that are needed. They have to be very user-friendly.

Q447 Stephen Metcalfe: That global tool being developed—is that us?
Professor Sir Mark Walport: We are doing it in collaboration. It was launched recently at DECC and it is a group, so it is not just the UK that is involved.

Q448 Stephen Metcalfe: That leads on to the question: is there any formal communications collaboration with other countries?
Professor Sir Mark Walport: There is not a formal global strategy in any sense at all, but the Prime Minister's Council for Science and Technology met the President's Council of Advisors on Science and Technology in the United States—PCAST—a couple of months ago. The scientific community, and particularly the scientists who advise Government, do talk among ourselves. But again it is worth emphasising that the UK should be proud that it has one of the best systems in the world for providing scientific advice to the Government.

Q449 Stephen Metcalfe: Going back to those discussions between countries, is there general acceptance that there needs to be more public engagement, and that communication to the public needs to be a priority?

Professor Sir Mark Walport: I think it would be very hard to find a scientist involved in this subject anywhere in the world who did not think that more public communication was needed.

Q450 Chair: Following on from that, and thinking of your comments to Mr Dowd as well, presumably there is some harm done if a Cabinet Minister does not toe the line. Prime Ministers always want collective responsibility, but we have seen plenty of examples of people straying off-piste. That must do a huge amount of damage.
Professor Sir Mark Walport: I am not going to comment on that point. There is obviously a strong diversity of views on this as on any other subject, and that is a matter for the Prime Minister and his Cabinet.

Q451 Pamela Nash: Can I turn that question around, Sir Mark? It does not have to be an announcement, but if there was a Government policy that you or one of your other adviser colleagues in other Departments felt was contrary to the scientific evidence available, would you be able in your role to talk publicly about that and make it known?
Professor Sir Mark Walport: My primary job is to provide advice to Government, and I make that advice very abundantly clear in Government. My job is not to go out and criticise the Government. I am a public servant. I am a civil servant and I am bound by the civil service code. I think have expressed my views on the science pretty clearly.

Q452 Pamela Nash: Just to be clear, in that instance, if there was a policy that you were extremely unhappy with—I am not suggesting that you are at the moment—you would be able to seek a meeting with the Government about that.
Professor Sir Mark Walport: Yes. I am very satisfied that I have extremely free access to the most senior members of the Government.

Q453 Pamela Nash: But you would not be able to communicate that at this stage or publicly.
Professor Sir Mark Walport: I would never, as it were, communicate the contents of an individual conversation with a Government Minister.

Q454 Pamela Nash: I do not mean the conversation. If you remained unhappy, that is not something that would be in your role to communicate publicly.
Professor Sir Mark Walport: It would not be in my role to go to the media and say that I am dissatisfied with X's view on Y. Absolutely not.

Q455 Chair: The Prime Minister gave me a commitment in the Liaison Committee that in circumstances like that it is important that the Minister is clear in making the policy pronouncement that he did hear the scientific advice but chose, for other policy reasons, to adopt a course of action. Have there been examples of that in your tenure yet?
Professor Sir Mark Walport: That was in a slightly different context, when an advisory committee gave a particular piece of advice on a particular aspect that reflected policy to a Minister—if they disagreed there. There has been one example, in relation to drugs policy, where there was that communication, and it did happen properly.

Q456 Pamela Nash: Moving on slightly, clearly you are a very publicly visible figure.
Professor Sir Mark Walport: Yes.
Pamela Nash: Do you think that the Government could do better in using all the scientific advisers to communicate to the public? In written evidence, we have had the comment that scientific advisers are not visible enough and could be made better use of.
Professor Sir Mark Walport: I think this is a work in progress, to be honest, and it goes back to the point I made earlier: we can always do better, and we will.

Q457 Pamela Nash: Is there any blockage on that at the moment or is it just a change of culture?
Professor Sir Mark Walport: I do not believe so. No, I do not think there is a blockage.

Q458 Pamela Nash: We are not just looking at people who are working directly for the Government; we are looking at scientists who are publicly funded in their research. Do you think there should be a commitment or an expectation for them to communicate their findings publicly?
Professor Sir Mark Walport: I think increasingly there is that expectation. We are now moving into the territory of the research councils, for example, and I think there is a far higher expectation that there should be public communication. I am well known for saying that I do not think that scientific research is complete until the results are communicated. Part of that communication is communication to the general public as well as to the specialist audiences that scientists normally communicate with.

Q459 Pamela Nash: Should that be a condition of funding?
Professor Sir Mark Walport: With all these things there needs to be proportionality, so where it is appropriate. Not every piece of research is of overwhelming interest to public audiences, so I would say it needs to be—

Q460 Pamela Nash: Our meeting today is on climate change so I am thinking about those climate change elements that are of public interest.
Professor Sir Mark Walport: Yes. We also have to be very careful about individual studies. The great thing about the IPCC process is that it looks at the whole array of science and puts it all together. There is the slight danger that individual studies can show effects that are out of kilter. One just has to be careful. You can mislead if you overemphasise the results of a particular study as well. One has to be very careful about that. We do not want to get into the position of at least one paper, where all foods either cause cancer or cure cancer. I think that is an issue.

Q461 Stephen Metcalfe: When the Met Office gave us evidence, they indicated that they did not have an explicit role in communicating climate change/climate science but would be willing to take that on. David

Willetts also seemed to be quite supportive of that. Are any discussions taking place towards that end?
Professor Sir Mark Walport: Yes. I talk to the Met Office frequently at the Hadley Centre, with Steve Belcher and Julia Slingo, and, although they do not have it as a written requirement, they are doing an enormous amount of very effective communication. Implicitly, they have been communicating very effectively, and I hope they will do more.

Q462 Stephen Metcalfe: When you say they are doing that very effectively at the moment, could you give us some examples? I think on their website there is only one page, following the publication of the IPCC report, and a couple of blog posts. How are they communicating?
Professor Sir Mark Walport: Julia Slingo speaks frequently. She is someone who you see in the media; she does talk. Steve Belcher communicates. Is there more they can do? Yes, of course there is.

Q463 Stephen Metcalfe: Any suggestions about what that might be?
Professor Sir Mark Walport: The short answer is that there is no single thing. I have been involved in the public engagement world for a long time, and sometimes different people like different forms of communication. There is no single magic formula. It is about speaking, writing, very good animations, illustrations, art and plays. There are all sorts of ways to communicate.

Q464 Stephen Metcalfe: The Met Office is obviously a Government agency.
Professor Sir Mark Walport: Yes.
Stephen Metcalfe: If they were to get more involved in the communication of climate science, do you think their lack of independence from the Government might compromise the way that that communication is seen?
Professor Sir Mark Walport: I honestly cannot see why it should. They may not always get the weather forecast right, but do people say they get it wrong because they are a Government agency? The climate forecast is the weather forecast over a very long period, as it were—maybe that is not specifically right—so I do not see why they should. They are excellent scientists. None of us in this has any axe to grind. I would be absolutely delighted if humans were not responsible for climate change, but I am sorry to say that we are.

Q465 Stephen Metcalfe: I would tend to agree with that point of view quite strongly, but we have to communicate to those who might not be as involved as we all are in examining this and weighing up the evidence. It is about the kind of mass communication that we need to engage in with the public, and I am concerned that we are not very good at doing that.
Professor Sir Mark Walport: But it comes back to the point that it is not one individual that needs to communicate. All sorts of people need to communicate. You are slightly getting on to the issue of trust: are they not trusted because they are Government- funded? But trust is always context-specific as well. Any scientist can be trusted when they are talking about the Higgs boson but might not be trusted when they are talking about something of more direct policy concern.

Q466 Graham Stringer: They might not be understood if they were talking about the Higgs boson, but that is a different matter. I agree with the essential thrust that nobody is entitled to their own facts even if they are entitled to their own opinions. Do you think the current policies are working? One of the reasons I ask is that the Climate Change Committee's report in April said that our carbon footprint is increasing and we have one of the largest carbon footprints in the world, whether you measure it per capita or not. I hear very little communicated about that. That is a measure of the success or failure of our policies, is it not?
Professor Sir Mark Walport: I would comment that we are one of the very few countries in the world that has legislative targets for 2050. We have carbon budgets set by the Committee on Climate Change, and we are currently within those carbon budgets. But, as I said, Government policy is a matter for our elected politicians and for all of us as electors. I can only emphasise again and again the clarity of the science.

Q467 Graham Stringer: I am not questioning the clarity of the science. I am saying that the policy at the moment in the Climate Change Act and in various European directives is to talk about emissions, but, when you look at the carbon footprint, either of this country or Europe, it is increasing partly because we are importing goods that we used to manufacture and therefore they have a bigger carbon footprint. That is very serious. If you take the policy seriously, that is ineffective if not counter-productive.
Professor Sir Mark Walport: But the scientific role here is to relentlessly point out the data, the point about the carbon emissions. Then it is for us, the electorate, collectively to hold policy makers to account.

Q468 Graham Stringer: But that is slightly avoiding it. If the objective of the policy is to reduce the amount of carbon dioxide going into the atmosphere, and the policy that we have is actually leading to our carbon footprint being greater, should you not, as a scientific adviser, be saying, "Take a look at this policy; it is not doing quite what we want it to"? I do not hear that voice.
Professor Sir Mark Walport: The first thing to say is that the UK is continuing to reduce its carbon emissions. There need to be loud and clear voices on the science and the data, but as I said, it is for the policy makers to decide. This morning, I have the privilege of talking to a group of MPs; you have a political role to act on the science.

Q469 Graham Stringer: Can I ask a similar question? I agree with you completely that there would not be a difficulty if renewables were cheaper than fossil fuels. Everybody would be happy with lower bills. Is there a case, and should you be making it, that, if we put a lot more research into renewables

now, we would be able to make that leap to, if not cheaper sources of energy, comparable sources of energy in terms of cost?

Professor Sir Mark Walport: Absolutely. As I said earlier, I believe that I am making that technological case. We are making it as a community. I think it is a global imperative for the science, engineering and technology community to work as we have never worked before as a collective to take on some of the challenges of both affordable and low-carbon sources of energy.

Q470 Graham Stringer: There is a paper going about—it does not matter in one sense whether it is accurate to a few billion pounds or not—which is saying that the replacement of our power sources, our energy sources, at the present time with renewables is, over 16 years, going to cost us an extra £250 billion. I think that is a lot of money; Lord Stern does not seem to think it is, but I do. Would it not be sensible to be arguing that, rather than going for those alternative forms of energy production now, we should grab some of that money and put it into research, so that we get more effective and efficient forms of energy production?

Professor Sir Mark Walport: I am not going to get into the either/or. I am going to reiterate that global investment is needed in the R and D to give us affordable decarbonised sources of energy, and that is a global grand challenge. I am struck that there have been over the past 70 years or so a series of grand challenges. The first one, sadly driven by war, was the Manhattan project. There was the Apollo project, which was driven, in a way, by competition between nations; and the genome project, which was driven by scientific opportunity and collaboration. I believe that now is the time for a further set of grand challenges driven around the imperative to find sustainable sources of energy. I would not put all my eggs in one basket either. It is not a question of solar, or CCS or batteries. There is a whole series, and I believe that political leadership is needed here because this is a global grand challenge.

Q471 Stephen Mosley: During the course of our inquiry, we found it difficult to get evidence from sceptical voices. We put out an open call for evidence. We have written—I do not know whether you are aware of it—to a couple of the national newspapers that tend to have a more sceptical stance, asking for evidence, but we have not been able to engage them, or they have not engaged with us. Does that surprise you at all?

Professor Sir Mark Walport: It speaks for itself, does it not? I think it is quite interesting.

Q472 Stephen Mosley: If that is the case, why do you think that the sceptical voices have such a high profile in the media?

Professor Sir Mark Walport: You would need to ask the newspaper editors that, but of course I would also say that channels for communication have been democratised, and it is difficult to argue that that is anything other than a good thing, so now it is easier for anyone to publish anything on the internet and for people to have access to it. While it has created enormous opportunities technologically that simply were not there before, it has created a new set of challenges, and one of the difficult challenges is, "How do people who do not have a certain level of expertise judge the veracity of what they read?" That is difficult. It is a different question for those who are responsible for the traditional modes of publication, and I cannot answer it. I can only say that if I was in their role I would be behaving differently.

Q473 Stephen Mosley: Lord Stern recently said in an interview—I think it was with *The Guardian*—that the sceptical voices should be treated as noise and ignored. Would you agree with that?

Professor Sir Mark Walport: The point is that they are not ignored, although we should not glorify them by believing that people take too much notice of them. I think we could over-emphasise their importance. They are not insignificant, and some voices are more effective than others, but at the end of the day, it comes back to the fact that we have to make sure that the evidence-based science has a very loud voice. It goes back to my point that it is not about one person communicating; it is about lots of people communicating.

Stephen Mosley: Especially scientists, I guess.

Professor Sir Mark Walport: Yes.

Q474 Stephen Mosley: Do you think that the effects of scepticism in the media, things like the "Climategate" problems at the university of East Anglia, have affected the willingness of scientists to speak about the future of the climate as such?

Professor Sir Mark Walport: No, I do not think so. The lessons that have been learned around the communication of science are that we need much more transparency of data. I come from a world where I was very influenced by having been involved in the aftermath of the genome project, but of course that was done completely in the open, so I find it difficult to understand why measurements—the data—should not be made available. There is no reason why scientific data should not be made available to anyone to scrutinise.

Q475 Stephen Mosley: A lot of the issues round UEA and the "Climategate" thing were over access to data and information. Do you think UEA got it wrong at that time?

Professor Sir Mark Walport: I am not going to comment on the past, but I would say that the inquiries did not, at the end of the day, show that there was any problem with the data itself.

Q476 Stephen Mosley: But it was the publication of the data that caused it.

Professor Sir Mark Walport: I will just make the point again—and the Royal Society did a good report on open science which I was involved in—that science is at its best when the data are made as widely available and as early as possible.

Q477 Jim Dowd: A couple of final questions occurred to me. In your response to Stephen's first

question in that round about those who do not share the orthodoxy of the human effect or the human influence on climate change and why, you said it speaks for itself and did not really elaborate what you thought the reason was. Is it because they think inquiries like this, being attached to, or in a part of, Government, cannot be trusted, that the report has already been written and that we are only listening to one side of the argument? Is that what you were referring to?

Professor Sir Mark Walport: You would have to ask them why they were not showing up, but maybe people are not prepared to deal with the tough scrutiny of a Select Committee.

Q478 Jim Dowd: One of the difficulties of the Select Committee system is that we cannot ask questions of people who do not turn up. We have to ask them of those who do, like you.

Professor Sir Mark Walport: Indeed, yes, absolutely, but it is very difficult for me to put myself in the head of other people.

Q479 Jim Dowd: The final question is this. How useful is it for, as you said earlier, the scientific outsider community—which is the vast majority of the population, as I said—in what seems to be a utilitarian term of abuse, to accuse somebody of being a climate change denier? It seems to attract the kind of opprobrium that, within scientific circles and more broadly, many other insults have? Is that a very useful way of approaching it?

Professor Sir Mark Walport: As far as possible, it is always best to avoid abuse. People obviously get heated and emotional about this. There is another term that I intensely dislike, which is "warmist", which I believe is intended to denote the idea that there is some kind of cult around "warmism". I do not think these terms are helpful. But we have to be clear that those who argue against the human contribution to climate change are wrong.

Q480 Jim Dowd: Sure, and I do not dispute that. But it is not just a term of abuse, although it is that: it is actually a way of closing down argument, because the assumption is that the vast majority of "right-minded" people would automatically understand that anything else coming from this source or from this individual must be wrong.

Professor Sir Mark Walport: Yes, but there does come a point in any discussion where you have to say, "Okay. We have discussed this endlessly. This is the point at which we must just agree to disagree." It is the proportionality question always.

Q481 Chair: Finally, so that we are clear, you relied heavily in your presentation to us, and indeed to the Cabinet, on the robustness of the IPCC report. It has been suggested in other circles that the IPCC report is not scientifically driven. Would you refute that?

Professor Sir Mark Walport: I would say that is completely wrong. It is led by scientists and conducted by scientists, but it is not my sole source of information on climate change. It is well known that my background is as a medical scientist, and that has had some advantages because I have come at this with no axe to grind. As you can imagine, I have spent an enormous amount of my first seven months in office becoming well briefed on climate science. I have spoken to many, many climate scientists during that period. I have read a great deal, not only the IPCC report but the peer-reviewed literature, so I have had a lot of opportunity to brief myself. I do not base this solely on the IPCC process. There is a lot of extraordinarily good science that lies behind it, and we have to acknowledge that climate systems are incredibly complicated.

Q482 Chair: Thank you very much for your attendance today, Sir Mark. You may be interested to see, as you walk out, that there is a good exhibition with Bloodhound on promoting young engineering skills, and I hope you will show your face there along with members of the Committee.

Professor Sir Mark Walport: I will. It is timely because of John Perkins's report earlier this week on the supply of engineers.

Chair: We thought it was a very good report, especially the bits that were lifted from our Select Committee observations.

Professor Sir Mark Walport: Excellent.

Chair: Thank you very much for attending.

Written evidence

Written evidence submitted by Andrew Montford (CLC004)

1. I am a writer and editor and I run a widely read discussion blog with a focus on dissenting opinion in the climate and energy debate. I am thus well positioned to inform the committee about dissenters from the climate change "consensus". My evidence will focus on those whom politicians and activists seek to persuade of their erroneous beliefs.

2. I derive a small income from my blog and occasional work for the Global Warming Policy Foundation.

Terms of Reference

3. The committee's terms of reference state that:

> Foresight cautions that "should scepticism continue to increase, democratic governments are likely to find it harder to convince voters to support costly environmental policies aimed at mitigation of, or adaptation to, climate change."

4. The chain of logic from climate science to "costly environmental policies" is long and fraught with difficulty and the task of persuading the public that each link in the chain is sound is therefore equally problematic.

5. In 2005, government PR consultants Futerra proposed that the way to deal with this problem was to take a short-cut:

> …interested agencies now need to treat the argument as having been won, at least for popular communications. This means simply behaving as if climate change exists and is real, and that individual actions are effective. The "facts" need to be treated as being so taken-for-granted that they need not be spoken"

6. This approach was adopted in practice but has been an abject failure.

What is the current state of public understanding of what is meant by climate change? How has this changed in recent years?

7. Many come to scepticism because they realise that the climate is a vast complex system and therefore one in which the idea of "settled science" has no place. They see themselves as being misled.

8. Others realise that the media is only telling them the environmentalist side of the story, which again makes them suspicious. It is notable that the BBC has never allowed a sceptic programme on climate change to be aired. Mainstream media coverage of climate change is almost always by "environment correspondents", who accept majority views uncritically and who rarely have expertise in science or economics.

9. The Climategate affair made the public much more suspicious of the climate change message, providing compelling evidence that some scientists were misleading the public and that the academic literature had been "gamed". The failure of the inquiries into the affair to investigate the substantive issues have only increased these concerns.

10. Professor Hulme of the Tyndall Centre has recently wondered whether the IPCC should issue a dissenting report, something he believes would help that organisation's credibility. Such a report would certainly deal with some of the concerns raised in the last three paragraphs, but would leave politicians, activists and the scientific establishment with the problem of having to explain what happened to the scientific "consensus" that they have been trumpeting for the last ten years.

Which voices are trusted in public discourse on climate science and policy?

11. Official voices are all subject to perverse incentives and there are therefore few, if any, that are trusted:

- Few people today are likely to give politicians the benefit of the doubt on any issue. In the climate change debate, where politicians from all parties signed up to the Climate Change Act despite the government's own figures showing that the costs greatly outweighed any plausible benefits, this suspicion is only magnified.
- DECC is viewed (correctly I believe) as closely linked to the environmental movement. Ministers meet only with representatives of industry and environmentalists. Officials are vocal in their support of greenery.
- The Committee on Climate Change is also viewed as a branch of the environmentalist movement. The appointment as chairman of Lord Deben, with his ongoing conflict of interest, has only confirmed suspicions of its trustworthiness.
- Government chief scientific advisers give the impression of being political activists rather than even-handed advisers. They are seen as having brought the office into considerable disrepute.

— The Met Office has similarly been tainted strong and continuing bias. The overwrought nature of its public pronouncements on climate have damaged its credibility.

— As to universities, the standing of climate science and its academic allies has been damaged not only by the Climategate emails but also by the inadequate response of the inquiries: the lack of a meaningful investigation into allegations of journal threatening has left a question mark over the integrity of the scientific literature of climate change and the IPCC reviews.

12. Some mainstream scientists are, however, seen as honest brokers. These individuals tend to be low-profile, to speak in nuanced terms, and they do not move in the political circles occupied by the well known scientist-advocates to whom politicians tend to listen.

What role should Government Departments, scientific advisers to Government and publicly funded scientists have in communicating climate science?

13. Many individuals and publicly funded organisations have destroyed their credibility in trying to adhere to the objective of convincing the public that the science is settled.

14. Government departments should have no role in communicating climate science; they have little or no expertise in these areas. Science needs to stand aloof from the policy process. To do otherwise risks public trust.

15. Scientific advisers to government again need have no specific expertise in climate. For example, Sir John Beddington is an biologist, Sir David King is a chemist and Lord May a physicist and population biologist.

16. Publicly funded scientists should explain their work—social media is useful for this—but should be reticent to take an active role in promoting it to the public. Science has been damaged by scientists hyping their work with a view to increasing their "policy relevance" and funding.

How could public understanding of what is meant by climate change be improved? What are the main barriers to this? Does the media have a positive role to play?

17. The Earth's climate is an immensely complex non-linear system, as is widely realised. Efforts to speak of scientific consensus, settled science and so on are therefore futile since they send out a clear signal that what is being delivered is propaganda rather than information. Public understanding will be enhanced by explanations of the controversies rather than a foolish pretence that there are none.

18. The media could, if it wished play a part in this. However, this is unlikely to happen in practice. Media outlets that stray outside the bounds of the IPCC consensus are subjected to campaigns of vilification by (often public-funded) green activists. The Press Complaints Commission has been used to discourage the appearance of dissenting views.

19. Many parts of the media are heavily reliant on green-minded advertisers.

20. The BBC views climate change as one of the issues on which it does not need to be even-handed. Scandals such as accepting free programming from green activists and the "28gate" affair demonstrate that the corporation has failed to treat these issues in a professional way. Over the thirty years of the global warming debate it has almost never allowed dissenting views on the science or economics of climate change to be aired in anything more than brief soundbites.

21. In business, "red team" reports are common. These involve preparation of a separate, dissenting report that seeks to systematically challenge everything in the official report. Adoption of this approach in public policy would lead to policymakers with a better understanding of the science and a better informed public.

22. The public is tired of being lectured about climate change and is unlikely to be receptive to further admonishments from wealthy environmentalists and green industrialists while the economy remains so fragile.

How important is public understanding in developing effective climate change policy?

23. Wider public understanding of climate science and economics, linked to a more impartial treatment of the issues by scientists, the media and government would strengthen the basis of policy.

What evidence is there that public attitude to climate science affects their engagement with energy policies or initiatives?

24. In my view, the public can be divided into two groups:

— those who have swallowed the Futerra line—settled science and settled economics—in full and who therefore accept the purported need for far-reaching "decarbonisation" and policies to bring this about; and

— those who do not accept it and may therefore question the science and/or the economics and/or the policy reponses.

25. If one is unconvinced by current scientific claims then one will, perhaps be disturbed at the costly and largely futile measures such as wind farms and biofuels targets, that have been adopted by politicians or imposed upon us by the EU Commission.

Does the Government have sufficient expertise in social and behavioural sciences to understand the relationship between public understanding of climate science and the feasibility of relevant public policies?

26. No response.

Can lessons about public engagement with climate change policy be learned from other countries?

27. No response.

April 2013

Written evidence submitted by the National Centre for Atmospheric Science (NCAS) (CLC019)

1. About NCAS and Declaration of Interests

1.1 The National Centre for Atmospheric Science (NCAS) is one of the Natural Environment Research Council's (NERC) 6 research centres. The mission of NCAS is to pursue internationally leading research in atmospheric science and to provide national capability and leadership to the UK atmospheric science community. NCAS performs research to increase knowledge of key environmental issues including climate variability and change, weather, and atmospheric composition. NCAS is a distributed organisation in which the research activities are embedded in UK Universities. The Universities with the largest involvement in delivering NCAS research are (in alphabetical order): Cambridge, Leeds, Manchester, Reading and York.

1.2 NCAS receives the majority of its funding from the NERC. Other funding sources include the European Union, businesses, and charitable trusts.

1.3 NCAS collaborates with the UK Met Office under the umbrella of the Joint Weather and Climate Research Programme, which is a strategic partnership between NERC and the Met Office.

1.4 NCAS has Memoranda of Understanding with similar organisations in other countries, eg the National Center for Atmospheric Research (NCAR) in the U.S.A.

1.5 The climate directorate of NCAS (NCAS-Climate) provides a core programme of fundamental science, technical support and training to enable world-class scientific research into the global climate system. NCAS-Climate has particular strengths in analysis, understanding and numerical simulation of the processes that govern climate variability and change. NCAS-Climate is based primarily at the Universities of Reading and Cambridge, with additional staff at the Universities of Edinburgh, Leeds & Oxford.

2. Response to Committee Questions

2.1 Our responses are restricted to those questions where NCAS has relevant expertise and experience. However, we would like to make the additional observation that a key aspect of improving public understanding about climate change is appreciating, understanding and addressing the many different reasons *why* members of the public are sceptical. It is highly likely that different responses will be appropriate to address these different reasons. We would therefore encourage the Committee to include this important issue in the scope of their inquiry. The need to clarify what members of the public are actually sceptical about should also be taken into account, as answers to surveys are often highly sensitive to the specific question asked.

Which voices are trusted in public discourse on climate science and policy? What role should Government Departments, scientific advisers to Government and publicly funded scientists have in communicating climate science?

2.2 Publicly funded scientists have a responsibility to communicate scientific knowledge and the results of research accurately, stressing what is known with confidence, whilst acknowledging where there is uncertainty and incomplete understanding. This responsibility is particularly important in an area such as climate science where there is obvious policy relevance and strong public interest.

2.3 It is not the role of publicly funded climate scientists to advocate any specific policy responses, but it is part of our role to explain the likely or potential consequences of alternative policy choices, based on current scientific understanding. One of the most common reasons heard for scepticism is that climate science is incorrectly perceived to be—or is misleadingly presented as being—policy prescriptive. In this situation, those arguing for or against a particular policy sometimes seek to criticise or misrepresent the science rather than debate the policy choice. It can be very difficult for members of the public to distinguish legitimate and well informed scientific debate from "false debate" that is generated to advance specific political agendas.

2.4 The experience of NCAS-Climate is that the public value the opportunity to engage directly with the scientists doing the research, and that this engagement improves trust. This type of direct communication activity takes time, and is generally not accorded high value in academic reward systems. However, NCAS has actively encouraged the involvement of its scientists in public engagement activities and many NCAS staff members participate in a range of public events.

2.5 The internet also has an important role to play in providing the public with information about climate science. NCAS climate is in the process of developing web pages designed to communicate climate science in ways that are accessible to a broad audience. An important aspect of these pages is the aim to *place new research results in context* (which is often hard for the public to do) by explaining the broader questions that drive our research.[1]

2.6 Another web-based initiative with which we have experimented in recent years is the "Climate Lab book".[2] This blog is an experiment in "open source" climate science. It is written by climate scientists, for climate scientists, but open to anyone to see and comment on. One aim is to increase the transparency of climate science, so that interested members of the public can see the scientific process in action. We have also found that Twitter can play a useful role in this context.

How could public understanding of what is meant by climate change be improved? What are the main barriers to this? Does the media have a positive role to play?

2.7 The media clearly has a very important role to play, and there is much good reporting of climate science. However, it still appears acceptable to write articles or present reports which are not scientifically accurate, and/or to selectively and misleadingly present scientific results in order to advance a particular agenda (which may be political or commercial, and may exaggerate or understate climate related risks). Easier recourse for scientists to achieve prominent corrections of such scientific inaccuracies would be helpful. Bodies such as the Science Media Centre have produced very helpful journalistic guidelines for scientific stories.

2.8 Activities such as those outlined under 2.4–2.6 could potentially be scaled up. 2.4—direct engagement between climate scientists and members of the public—is probably one of the more effective mechanisms, but also one of the more costly. Were they available, greater resources could be devoted to this work.

2.9 Climate science is actually a very old science—the existence of a "greenhouse effect" was first suggested in the 1820s and experimentally measured in the 1860s, for example. Emphasising that this basic physical understanding predates any more modern environmental concerns has been found to be useful in communicating the science. Discussing what is known about non-anthropogenic climate change and variability (eg glacial cycles, El Nino, the jet stream) and the differences in time-scale (eg 100 years or 10,000 years) is also an effective way of engaging the general public, rather than focusing exclusively on anthropogenic climate change.

2.10 There is a major need for all parties (scientists, media, politicians) to more clearly and consistently distinguish apolitical climate science from highly political climate policy.

2.11 The teaching of climate change in schools is clearly an important issue for public understanding, especially in the medium and long term (with specific relevance to the next point, 2.12). Whilst NCAS has no specific expertise on the National Curriculum, we note with concern recent proposals which appear to reduce and narrow the attention given to climate science in the National Curriculum for under 14s.

How important is public understanding in developing effective climate change policy?

2.12 In a democracy it is hopefully self evident that government policies can only be sustained if the public has an adequate understanding of the reasons why the policies are appropriate. In the climate area, this requires some public understanding of climate science (especially because climate evolves on a timescale that is long compared to a government term of office) as well as—crucially—public trust in the science and scientists involved.

April 2013

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[1] http://www.ncas.ac.uk/index.php/en/climate-public-engagement
[2] http://www.climate-lab-book.ac.uk/

Written evidence submitted by the Royal Meteorological Society (RMetS) (CLC028)

1. The Royal Meteorological Society is the professional and learned society for weather and climate. The Society serves not only those in academia and professional meteorologists, but also those whose work is affected in some way or other by the weather or climate, or simply have a general interest in the weather. The membership includes scientists, practitioners and a broad range of weather enthusiasts.

2. We administer the national vocational qualifications of the profession and under our Royal Charter pursue our purpose of the advancement of meteorological science. As meteorological science has developed it has come to include not just the science of weather and climate itself, but the application of this to disciplines such as agriculture, aviation, hydrology, marine transport and oceanography, as well as the impacts of climate change and the interaction between the atmosphere and the oceans.

3. The Society was established on 3 April 1850 as "The British Meteorological Society", and was incorporated by Royal Charter in 1866, when its name was changed to "The Meteorological Society". The privilege of adding "Royal" to the title was granted by Her Majesty Queen Victoria in 1883.

What is the current state of public understanding of what is meant by climate change? How has this changed in recent years?

5. Public understanding of climate change and how these perceptions have changed have been in the subject of a number of studies in recent years. A series of polling results from 2005 to 2011 consistently find that more than three quarters of the UK population think that the climate is changing and that there is at least in part a human cause (Shuckburgh et al, 2012).[3] These polling results also show that there has been a decrease in concern about climate change over this time period, with a drop from more than three quarters of the population agreeing that they were at least fairly concerned in 2005 to just less than two thirds of the population in 2011.

6. Pidgeon and Fischhoff (2011)[4] found that over more than a decade of public polling in the US the majority of those asked believed climate change was occurring. Percentages ranged from 48% in 1998 to a peak of 65% in 2006 but then a relative decline to 52% was seen in 2010. Those "unsure" in 2010 (36%) rose to near the peak level recorded in 1998 (39%) along with a rise of those who believed climate change was not occurring peaking at 10% in 2010 (up from 3% in 2006).

7. Therefore there is evidence to suggest that, while the majority of the public believes climate change is happening, in recent years the size of that majority has dropped. There is less certainty around the causes of climate change and its potential impacts.

Which voices are trusted in public discourse on climate science and policy? What role should Government Departments, scientific advisers to Government and publicly funded scientists have in communicating climate science?

8. Shuckburgh et al. 2012 presented polling results from 2006 to 2011 concerning which groups the public trust to give correct information on climate change. There has been a decrease in trust in all groups over this time period, but "independent scientists" have consistently been scored as the most trusted group with 68% agreeing they could be trusted in 2006 and 51% agreeing in 2011. "Government scientists" were trusted by 21% in 2006 and just 13% in 2011, whereas "The government" was trusted by 14% in 2006 and 10% in 2011.

9. Shuckburgh et al., 2012 indicated that 2011 views on whether climate scientists could be trusted were split. Over one-third of the UK public agreed that they could trust climate scientists to tell the truth about climate change and slightly less (about one-third) disagreed.

10. It is evident that there is potential for climate scientists to continue to build on this trust. The RMetS is actively engaged in a number of initiatives to help support this.

11. Professor Tim Palmer FRS (and RMetS President 2010–12) states: "*The enormous interest in climate change does not, of course, arise from any inherent fascination in the science of the problem. Rather, interest stems from the perceived way that climate change will affect society. Some people worry about the impact on their freedom and prosperity, of policies that aim to reduce our carbon footprint. Others worry that without policy to curb emissions, the freedom and prosperity of future generations will be impacted even more. As a scientist I try to separate these from the science issues, especially when speaking in public. I believe that the public's confidence in climate science and climate scientists may increase if it is felt that the scientists can take a mostly disinterested view on climate policy. From such a disinterested scientific perspective, the threat of substantial, even calamitous, climate change is unequivocal. However, at the same time, I myself do not believe we are yet doing all that is scientifically and technically possible to really understand and quantify the nature of this threat.*" (http://www.rmets.org/weather-and-climate/climate/climate-change-simulation-tim-palmer)

[3] Shuckburgh E F, Robison, R and Pidgeon, N (2012) Climate Science, the Public and the News Media. Summary Findings of a Survey and Focus Groups Conducted in the UK in March 2011. LWEC Report.

[4] Pidgeon, N F and Fischhoff, B (2011) The role of social and decision sciences in communicating uncertain climate risks. *Nature Climate Change*. 1, 35–41.

12. Government needs to have a unified and well articulated view on climate change both internally and externally. It needs to be based upon robust independent scientific evidence.

How could public understanding of what is meant by climate change be improved? What are the main barriers to this? Does the media have a positive role to play?

13. The public understanding of climate change is significantly affected by the media, both positively and negatively. Much of the RMetS's work with newspapers, radio and television, as well as handling public enquiries, relates to clarifying misunderstandings and misreporting by the media. Climate change is no exception. Effective communication to the public of climate science by the government and by professional organisations like RMetS is essential. Certainly the media have a positive role to play.

14. The main route to enhancing public understanding must be through improved treatment of it in schools through the National Curriculum. In its submission to the Department for Education's consultation on reforming the English National Curriculum for Key Stages 1–3 (ages 5–14) the RMetS welcomed the increased focus on physical geography, including weather and climate. However, the Society argued strongly for the retention of climate change in the Geography curriculum, as well as some improvements to the coverage of weather and climate. It also argued for the introduction of basic physics relevant to climate change into the Science curriculum at KS3. The Society considers that the potential environmental, social and economic ramifications of climate change should be discussed in the core curriculum by all children and not left as options to be taken at a later stage. This will allow the next generation to make informed decisions about their future.[5]

How important is public understanding in developing effective climate change policy?

15. Public understanding of climate change is fundamentally important. Public support for funding decisions and policy priorities based around climate change can only be achieved by effective communication of the reasons behind those decisions. Individual actions by members of the public, either voluntarily or as a result of policy initiatives, can only work effectively if members of the public acknowledge the value of changing their behaviour to help climate change policies succeed.

16. Research conducted on behalf of the RMetS in 2009 highlighted that 100% of the general public surveyed on weather and climate matters were either "interested" or "very interested" in a *"plain English explanation of the causes and effects of climate change"*.

What evidence is there that public attitude to climate science affects their engagement with energy policies or initiatives?

17. The study by Shuckburgh et al 2012 found that: "Measures of public interest, engagement and trust associated with climate science are positively correlated, while the belief that climate change is exaggerated is negatively correlated, with concern about climate change and willingness to change behavior." However, whether this means that public attitude to climate science affects their engagement with policies or initiative, or the other way around, could not be determined from the data.

18. Researchers who study public attitudes to science used to think that providing more facts and figures—increasing knowledge—was the way to improve public engagement with scientific issues. This approach is known as the "deficit model" of science communication—it was assumed that opposition to a particular scientific development was based on a deficit of knowledge. However, it soon became clear that public engagement was more complex than this and requires a two-way dialogue.

Does the Government have sufficient expertise in social and behavioural sciences to understand the relationship between public understanding of climate science and the feasibility of relevant public policies?

19. The Society would welcome an increased representation in Parliament and in the civil service of those with a background in science.

Can lessons about public engagement with climate change policy be learned from other countries?

20. International engagement with other nations about climate change policy can only be advantageous to the UK.

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[5] http://www.rmets.org/sites/default/files/pdf/comments_nc.pdf

Written evidence submitted by Carbon Brief (CLC030)

1. Carbon Brief[6] is an organisation which analyses and reports on media coverage of climate change and climate science, and its effect on climate politics and public perceptions of climate issues. Our funding comes from the European Climate Foundation.[7]

2. We report on new scientific research and areas of scientific discussion in the media, and have analysed many examples of how the media reports climate change.[8] At the start of this year we conducted polling examining public attitudes to climate change and energy policy.[9]

3. *The committee asks: "What is the current state of public understanding of what is meant by climate change? How has this changed in recent years?"*

4. One common measure of public opinion on climate change is "belief"—to what extent people agree with scientists that the climate is changing and human activity is largely responsible. This might be taken as a basic measure of public understanding of the issue.

5. The leak and subsequent media coverage of emails from the University of East Anglia's Climatic Research Unit, dubbed "Climategate" in the media, is often presented as a watershed in public acceptance of climate science. At roughly the same time the Copenhagen climate summit was widely presented as a failure in the media, and this may have had an impact on public opinion on climate change. Polling in 2010, shortly after both events, indicated the number of people who said they believed climate change was "definitely" happening dropped from 40% to 33%.[10]

6. But despite concerns that "Climategate", Copenhagen or other factors have reduced climate science's credibility in the eyes of the public, it appears that "belief" in climate change has stayed fairly steady over the years since. A 2009 ICM poll showed 89% of respondents accepted some degree of climate change is happening.[11] When ICM repeated the poll in 2012, 87% said the climate is changing. Similarly, polling we conducted this year indicates 89% of respondents believe climate change is happening.[12]

7. A comparison between the ICM polls and Carbon Brief's survey also indicates public understanding of what is causing climate change has not changed significantly. 56% of people asked in 2009 said climate change is real and human caused according to polling by ICM[13] for the Guardian. ICM asked the question again in 2012, and the figure was 57%. 33% in 2009 and 30% in 2012 said climate change is due mostly to natural causes, according to ICM's data. Carbon Brief's 2013 polling shows 52% of respondents to our poll said climate change is mostly caused by humans. 31% said climate change is mostly caused by natural processes.[14]

8. As a broad measure, levels of "belief" in climate change appear to have reduced somewhat in 2010, but to have now returned to around the same level as before the "Climategate" leak and Copenhagen conference. Belief in climate change appears to have stayed fairly steady in recent years, as has people's view of whether humans are causing climate change or not.

9. *The committee asks: "Which voices are trusted in public discourse on climate science and policy? What role should Government Departments, scientific advisers to Government and publicly funded scientists have in communicating climate science?"*

10. To focus on the trust issue: Our polling shows the public trusts scientists most highly to give them information about climate change. 69% of respondents said they trusted scientists in this context[15]—significantly higher than any other group. In contrast, politicians poll joint last with blogs and social media—at seven%. This finding tallies with Ipsos Mori's veracity index,[16] which indicates scientists are one of the most trusted groups in society. Here again, politicians come last.

11. Polling by Living with Environmental Change (LWEC) suggests differently—that the public does not trust climate scientists to give information about climate science.[17] LWEC's polling found only 38% of respondents said scientists could be trusted to "tell the truth" about climate change. ("Tend to agree" or "strongly agree".)

12. But analysis by polling expert Leo Barasi, published on Carbon Brief,[18] suggests aspects of the way the poll was constructed may have influenced this low result. Barasi says:

6 http://www.carbonbrief.org/
7 http://www.europeanclimate.org/index.php/en/
8 http://www.carbonbrief.org/blog?issue=1120
9 http://www.carbonbrief.org/blog/2013/04/polling-reveals-public-trusts-scientists-most-on-climate
10 http://www.guardian.co.uk/environment/2010/feb/23/british-public-belief-climate-poll
11 http://www.guardian.co.uk/environment/interactive/2012/jun/26/guardian-icm-poll-economic-climate-change
12 http://www.carbonbrief.org/media/160742/carbon_brief_full_climate_poll_spring_2013.pdf
13 http://www.guardian.co.uk/environment/interactive/2012/jun/26/guardian-icm-poll-economic-climate-change
14 http://www.carbonbrief.org/blog/2013/04/how-does-carbon-briefs-polling-fit-in-with-other-research
15 http://www.carbonbrief.org/blog/2013/04/polling-reveals-public-trusts-scientists-most-on-climate
16 http://www.ipsos-mori.com/researchpublications/researcharchive.aspx?keyword=Veracity+Index
17 http://www.lwec.org.uk/sites/default/files/LWEC_climate_science_web.pdf—See appendix.
18 http://www.carbonbrief.org/blog/2013/04/how-does-carbon-briefs-polling-fit-in-with-other-research

13. *"The phrasing of the LWEC question—"we can trust climate scientists to tell us the truth"—is a very high bar. At a time when trust is low, expecting people to say they trust anyone to tell them the truth, without more reassurance, is asking a lot. I'm also not a fan of the way the trust question came after questions about exaggeration of climate change and agreement among scientists.*

14. *"Add to this Mori's trust index, which finds scientists are among the most trusted groups, and that trust in them has gone up over the last decade. So I don't think we should be particularly surprised that the new poll showed scientists are the most trusted to deliver information about climate change by a massive margin. The mistake was ever to doubt that they were."*

15. Polling suggests scientists are the group the public trusts most to give information about climate change. In terms of increasing public understanding of the issue and engagement with it, this suggests there is an opportunity for scientists to contribute to informing discussion about the issue. In our view scientists should establish themselves as voices in the debates around climate change that take place in the media and politics. There are a range of views on how they should do so, reflected in the active academic debate around how scientists should inform policymaking and the public.

16. *The committee asks: "How could public understanding of what is meant by climate change be improved? What are the main barriers to this? Does the media have a positive role to play?"*

17. To focus on media coverage of climate change: In our view it is very likely that how the media covers climate change informs public views and understanding about climate change. The media help shape how climate change is discussed by the public and politicians, and media coverage also reflects how the issue is discussed—particularly in the political sphere.

18. There are many examples of media coverage of climate change that does a good job of reflecting and explaining scientific debates around the issue. At its best, such coverage can inform the public and policymakers and equip them to engage with questions about climate and energy policy. To take one recent example,[19] ITV addressed the UK's cold winter in a series of segments that presented a range of scientific views on the degree to which climate change is affecting UK weather. The reports gave a picture of the issue, presented the views of different scientists, and reflected scientific uncertainty about the question.

19. On a larger scale, the BBC's Frozen Planet series provided a good example of entertaining and informative science programming. Climate change is leading to significant changes at the poles, and the series illustrated the long-term effects of warming rather than engaging in complex scientific questions. Extra and more detailed information was also made available through resource packs and via scientific institutions the British Antarctic Survey and the Open University. The programme may have increased interest in and understanding of this issue.

20. However, our experience suggests that some media coverage of climate change and climate science in particular is confused or misleading, and does not do a good job of representing scientific understanding or scientific debates accurately. In particular, scientific uncertainty can be over-stressed to cast doubt on areas of climate science where there is broad scientific agreement. This may lead to confusion and disengagement in the public.

21. To some degree coverage of climate change in the media has become politicised. The Reuters Institute at Oxford University recently produced a report, "Poles Apart",[20] which suggests "right-leaning" media outlets are more likely to print uncontested climate sceptic views—reflecting a small minority of scientific opinion. The report suggests this aspect of climate change coverage is most prominent in the "Anglophone countries"—the UK, Australia and the US. It found "a strong correspondence between the perspective of a newspaper and the prevalence of sceptical voices within it, particularly on the opinion pages." Politicisation of the issue in the media may reflect the politicisation of climate politics in these countries.

22. The BBC is probably the most influential media outlet in the UK. The organisation's editorial convention of promoting balance—favouring neither one view or another—has been suggested proving challenging when covering scientific areas where there is broad agreement. The BBC Trust's 2011 review of science coverage by Professor Steven Jones[21] highlighted that in scientific areas such as climate change, genetic modification or MMR which become controversial for whatever reason, this convention can have the effect of suggesting there is an even-sided debate between proponents and dissenters, when in fact there is significant agreement between scientists.

23. The BBC issued a report last November[22] expressing satisfaction that the corporation has made progress in portraying where the weight of opinion on scientific topics lies. But we have seen prominent examples of programmes in which the BBC has framed climate change as a debate between "sceptics" and "believers". These include an episode of the Daily Politics in June 2012[23] in which climate sceptic blogger James Delingpole debated with Friends of the Earth's Andrew Pendleton about whether an apparent slowdown in

[19] http://www.carbonbrief.org/blog/2013/04/itv-and-channel-4-cover-the-link-between-climate-change-and-cold-winters
[20] http://reutersinstitute.politics.ox.ac.uk/?id=687
[21] http://www.bbc.co.uk/bbctrust/our_work/editorial_standards/impartiality/science_impartiality.html
[22] http://downloads.bbc.co.uk/bbctrust/assets/files/pdf/our_work/science_impartiality/science_impartiality_followup.pdf
[23] http://www.carbonbrief.org/blog/2012/07/why-does-the-bbc-insist-on-discussing-climate-change-as-believers-versus-skeptics

global surface temperature rise meant global warming had "stopped". It is a subject that, arguably, neither party is qualified to discuss. Instead of investigating the scientific arguments about the subject, the report reinforced the idea that climate change is a political argument, not a subject on which scientists agree. Similar discussions were also found on Radio 5's Your Call, the Today programme and Newsnight.

24. We focus on the BBC due to its influence on public opinion—it is also more trusted by the public than other media. But there are many other examples of coverage that creates a confusing picture of climate science and also conflates relatively detailed issues of uncertainty in climate science with broad arguments about climate policy. The Daily Mail has recently published a series of articles under headlines claiming that global warming had "stopped", which went on to attack government policies to reduce emissions[24]. Most recently Channel 4 news ran a segment that nominally aimed to address whether climate change caused the UK's recent cold weather, but the discussion soon turned to whether scientists can account for the apparent slowing in global temperatures and then to whether climate policies are justified. Rapid jumps between detailed scientific specifics, broad scientific conclusions and pundits or politicians arguing about climate policy are unlikely to increase understanding in audiences.

25. *The committee asks: "What evidence is there that public attitude to climate science affects their engagement with energy policies or initiatives?*

26. Although useful to indicate broad trends, polling about belief in climate change is unlikely to give a full picture of public understanding of climate change, and the complex question of how people's understanding of the issue interacts with support for climate policies. Our polling, for example, found a significant proportion of those who say they don't believe in human-caused climate change still say they want the government to invest in "green" policies. Unpacking exactly why this might be is beyond the scope of broad polls.

27. 11% of those Carbon Brief polled said they do not believe in climate change, and 33% believe it is mostly due to natural causes. But a large proportion of this group still appears to support measures aimed at reducing emissions.

28. 67% of those we polled said that they want to see the government tackle climate change through policies such as promoting renewable energy or energy efficiency. Of those who think climate change or global warming is mostly caused by natural processes (about a third of the total), 45% think that tackling climate change should still be part of the government's economic programme. This may indicate indicate that belief or understanding of human-caused climate change is not an accurate indicator of whether or not people support policy measures to address and limit climate change.

29. This result mirrors the outcome of an Angus Reid poll[25] conducted in the UK, which was released just after the Copenhagen climate summit and the "Climategate" leak—events that are widely reported in the media as being the cause of scepticism in the public. The poll shows that even among those who said they did not believe climate change was happening, a majority said they wanted global action to tackle climate change.

30. Another recent poll in the US is also interesting[26]—it indicates that while just 52% of Republicans and Republican-leaning independents said they thought climate change was happening, 62% said the US should take steps to address the issue and 77% thought the US should use more renewable energy.

31. Although the results are limited, they suggest that the factors influencing how people answer questions about the causes of climate change are more complex than merely being about belief or understanding.

32. Writing for Carbon Brief, Barasi says a possible explanation for the discrepancy between statements of belief in climate change and desire for action is that some people react to the question of whether they believe in human caused climate change as though they are being asked whether they buy into a vision of environmentalism.[27] Barasi says: "[They] say no to that question but still want the government to do something about climate change'.

33. Attempts to measure public belief in climate change appear to be at best an imprecise indication of whether the public will accept climate policy. Increasing public understanding of climate science is important, as it can enable people to hold informed opinions and make good choices about climate policy. However, there is evidence to suggest that the public already wants to see the issue addressed. Focusing on the level of understanding as an analogue for acceptance or desire for policy may not give a full picture of whether the public supports energy and climate change policies.

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[24] http://www.carbonbrief.org/blog/2013/03/scientists-set-straight-mail-on-sundays-latest-climate-contortion

[25] http://www.angus-reid.com/polls/40169/most-britons-satisfied-with-copenhagen-climate-change-accord/

[26] http://www.newscientist.com/article/dn23365-republican-voters-want-action-on-climate-change.html

[27] http://www.carbonbrief.org/blog/2013/04/how-does-carbon-briefs-polling-fit-in-with-other-research

Written evidence submitted by Research Councils UK (RCUK) (CLC036)

1. Research Councils UK is a strategic partnership set up to champion research supported by the seven UK Research Councils. RCUK was established in 2002 to enable the Councils to work together more effectively to enhance the overall impact and effectiveness of their research, training and innovation activities, contributing to the Government's objectives for science and innovation.[28]

2. This evidence is submitted by RCUK and represents its independent views. It does not include, or necessarily reflect the views of the Knowledge and Innovation Group in the Department for Business, Innovation and Skills (BIS).

OVERVIEW

3. The RCUK Public Engagement with Research Strategy outlines a strategic commitment to identifying public attitudes and values to be considered throughout the lifecycle of research, and to foster debate that will enable public aspirations and concerns to help inform Councils' policies and research strategies. The term "public understanding" is considered an outdated term. Instead "public engagement" encompasses the notion of "two way dialogue" with the public. It is important that the public can access the knowledge generated and have their say. Engaging the public in this way helps empower people, broadens attitudes and ensures greater relevance, accountability and transparency to society and wider social concerns. It is therefore more likely to have a positive impact.

4. Through their network of science communications professionals, the Research Councils and their component institutes develop and deliver strategic science communications designed to inform and engage the public on global environmental issues including climate change. This is alongside two-way engagement and dialogue with the public.

5. Many Research Council-funded climate scientists are actively involved in climate change communication, engagement and dialogue with the public and wider stakeholders. Those scientists regularly provide specific expertise to Government departments to inform policy development. The RCUK led Concordat for Engaging the Public with Research has over 50 signatories and supporters and provides a single unambiguous statement regarding the importance of public engagement from the UK funders of Research, including the Research Councils. It sets out clear expectations to ensure that researchers are recognised, rewarded and supported for their public engagement.

6. The Beacons for Public Engagement[29] and RCUK Catalysts[30] also aim to facilitate culture change to embed public engagement and science communication within the Higher Education (HE) sector. Practical support is available through the National Coordinating Centre for Public Engagement (NCCPE) and researchers can apply for resources to support their public engagement as part of their Pathways to Impact within research grant funding.

7. RCUK, their component institutes and researchers keep abreast of how issues are reported in the media, within parliament and in wider society. They exchange knowledge and ideas about public attitudes to and engagement with climate science by working with Government departments, the media, the science media centre, science centres, museums, NGOs, learned societies and the public. They analyse and discuss public surveys and academic reports, carry out public dialogues and engagement activities, commission focus group research and hold internal workshops on communicating climate science. These help shape climate engagement and dialogue strategies and activities.

i. *What is the current state of public understanding of what is meant by climate change? How has this changed in recent years?*

8. Several UK and US surveys have captured information about this issue, including the 2012 *Living with Environmental Change*-sponsored report "Climate Science, the Public and the News Media" by Shuckburgh, Robinson and Pidgeon. Findings are reasonably consistent across these surveys, indicating a range of public understanding of what is meant by climate change and an increase in scepticism regarding the human causes and the risks of climate change in recent years. For example, the UK Polling Report April 2013—"*Global Warming" or "Climate Change*"[31] summarises as follows:

(a) In 2008, 55% thought human activity was making the world warmer, 25% thought the world was getting warmer, but not because of humanity, 7% thought the world was NOT getting warmer. 13% weren't sure.

(b) In 2013 39% think human activity is making the world warmer, 16% think the world is getting warmer, but not because of humanity, 28% think the world was NOT getting warmer. 17% weren't sure.

9. The 2011 "Public Attitudes to Science" (PAS) Survey (carried out by Ipsos Mori for BIS) reports that:

[28] Further details are available at www.rcuk.ac.uk.
[29] http://www.rcuk.ac.uk/per/Pages/Beacons.aspx
[30] http://www.rcuk.ac.uk/per/Pages/catalysts.aspx
[31] UK Polling Report: "Global Warming" or "Climate Change" http://ukpollingreport.co.uk/blog/archives/7222

(a) Of the science topics explored in the survey, people felt most informed about climate change, with 16% feeling very well informed and 59% feeling fairly well informed.

(b) In terms of weighing up the benefits and risks of Climate Change research, the number who felt that the benefits are greater doubled between 2005 and 2011 and the number who felt that the risks are greater almost halved in the same period.

ii. *Which voices are trusted in public discourse on climate science and policy? What role should Government Departments, scientific advisers to Government and publicly funded scientists have in communicating climate science?*

10. Government must draw on the advice and expertise from within the research community to contribute to evidence based policy making. The 2012 RCUK review of Public Dialogues showed that successful public dialogue can play a key role in supporting more open research governance and decision making, which is recognised to be a condition of wider public confidence in the research system. Therefore, government departments, scientific advisors and individual researchers have a key role and responsibility in communicating and engaging with the public on climate science issues in order to inform research and policy.

The Living With Environmental Change (LWEC) research synthesis on "Public Attitudes to Environmental Change: a selective review of theory and practice" (Upham et al 2009)[32] showed that:

(a) The literature on UK public attitudes to environmental change is highly variable in quantity. Notably, there is substantially more literature on UK attitudes to climate change and energy infrastructure than on UK attitudes to landscape and species change. The literature is not organised in terms of an environmental change or adaptation theme: it is scattered across disciplines, with a wide variety of theories or no explicit theory at all.

(b) Climate change is perceived as a remote issue, with other issues more pressing; impacts befalling future generations and other regions; others' actions as primary causes; responsibility for tackling it assigned principally to government.

(c) There is no simple relationship between attitudes, engagement and behaviour change. If engagement is undertaken for the purpose of changing attitudes and/or encouraging behaviour change, a wider range of contextual factors will need to be addressed.

(d) While public support for mitigation action is high, willingness to change personal behaviour (particularly travel) is limited by various perceived individual, social and structural barriers.

(e) In respect of specific climate change impacts, most existing research relates to public perceptions of flooding. There is very little research on public attitudes to sea-level rise or abrupt climate change.

(f) The existing research literature suggests that place attachment, environmental values and ideas of what is "right and normal" are closely involved in the formation of attitudes to ecosystem, landscape and species change.

(g) Well-known renewable energy sources, such as wind and solar, are viewed positively by the general public. Although public attitudes to lesser-known renewables tend to be less favourable, they are still more positive than attitudes to fossil fuels and nuclear power.

12. According to national surveys and focus group research a reasonable number of people trust independent scientists and climate scientists. For example: "*Climate Science, the Public and the News Media*" (Shuckburgh et al. 2012) indicated that views on whether climate scientists can be trusted were quite polarised in 2011 with just over one-third of the UK public agreeing that they could trust climate scientists to tell the truth about climate change and about one-third disagreeing. A recent poll by the British Science Association[33] has indicated a significant increase in trust in 2013 with 52% agreeing that climate scientists can be trusted and only 19% disagreeing.

13. As part of the Ipsos MORI Climate Week poll on public attitudes regarding climate change (February 2012),[34] in response to the question "*Which of the following, if any, would you trust the most if they were giving views on climate change*" 66% said "*Scientists*".

14. These polls (and others) suggest that there is scope for climate scientists and their Research Councils to continue to build on this trust. However, whilst most publicly-funded climate scientists will acknowledge that their research is relevant to society, engaging in what can often be a challenging dialogue about controversial issues can be a daunting task. Continued support from RCUK will be essential in encouraging researchers to overcome these barriers.

15. One of the aims in the RCUK Public Engagement with Research Strategy is to support researchers to engage with the public. The RCUK-led Concordat for Engaging the Public with Research provides a single unambiguous statement regarding the importance of public engagement and sets out clear expectations to ensure that researchers are recognised, rewarded and supported for their public engagement. The Beacons for Public Engagement and RCUK Catalysts also aim to facilitate culture change to embed public engagement and

[32] http://www.lwec.org.uk/audiences/society

[33] http://www.britishscienceassociation.org/news/national-science-engineering-week-new-survey- results-showing-changing-public-attitude-climate

[34] http://www.ipsos-mori.com/researchpublications/researcharchive/2916/Public-attitudes-regarding-climate-change.aspx

science communication within the HE sector. Practical support is available through the National Coordinating Centre for Public Engagement (NCCPE) and researchers can apply for resources to support their public engagement as part of their Pathways to Impact within research grant funding.

16. Specialist media training and support from communications teams to "translate" complex and complicated scientific knowledge into a language and form that is meaningful and relevant to different sectors of society are other examples of activities that facilitate the flow of climate science into the public domain.

17. It would be beneficial if Government Departments and science advisors to Government continued to emphasise strongly the importance and value that it places on "independent" climate knowledge generated by publicly-funded scientists, and that the effort that climate scientists make to explain their findings to the public and to engage in dialogue is vital and valued at the highest level.

iii. *How could public understanding of what is meant by climate change be improved? What are the main barriers to this? Does the media have a positive role to play?*

18. Research Councils (RCs) and their component institutes and many RC-funded researchers within the university sector engage in science communication and public engagement activities targeted at all sectors of society from school children to MPs. There are many examples of successful partnership working between RCs and leading UK museums, science centres, learned societies where the common goal is public awareness, engagement and understanding of climate science. For example the "Atmosphere" exhibition at the Science Museum[35] involved many publicly-funded researchers in the preparation of exhibition content and online interactive resources.

19. With regards to improving public understanding of Climate Science, the LWEC research synthesis on "Public Attitudes to Environmental Change: a selective review of theory and practice" (Upham et al 2009) found that:

(a) There is a need for targeted communication about climate change, to dispel misperceptions and highlight the benefits of specific behavioural changes, mitigation and adaption options, as well as to open up debate around change to infrastructures and societal arrangements.

(b) As a priority there should be focus on improving understanding amongst key groups and there is potential for addressing specific behaviours.

(c) There is a major gap in the understanding of attitudes to small-scale renewable energy and the decision-making processes involved in purchasing small scale renewable energy systems.

(d) Positive experiences of renewable energy projects and development processes should be investigated so that both support and opposition are more fully understood.

20. The media has an important role to play in this debate. Evidence from polls and surveys reveal that most people get their information about climate science from the media. One of the barriers for many publicly-funded scientists is the challenge of competing with the voice of the sceptic. The media may try to report a "balanced" view of a topic, by ensuring the voice of the sceptic is included equally even though the balance of scientific evidence may not be equal.

21. RCUK and its component institutes invest resources in proactive media engagement. Media training for scientists (including dealing with climate-skeptics), briefings at the Science Media Centre and direct dialogue with journalists and editors take place continuously

22. The BIS-commissioned expert report on science and the media[36] Action Plan makes many recommendations to support the accurate reporting of science that provide an effective framework for improving public understanding of and engagement in climate science.

23. The issue of how inherent risk and uncertainty are handled in scientific research (ie that it's not always about having definitive answers) is highlighted within the BIS Science and Trust report. The report calls for greater openness, transparency and a greater acknowledgement around the risks and uncertainty of the scientific process. This issue is being addressed, for example by, Sense about Science.[37] NERC contributes to their work on "Making Sense of Uncertainty".

iv. How important is public understanding in developing effective climate change policy?

24. It is common to assume that the root of public distrust is a lack of understanding. However, there is a body of evidence to suggest that this is not the case. The public, alongside other key stakeholders should be consulted within policy.

25. Some of the positive impacts of public dialogue are reported as:

(a) *Better policy solutions* that are more robust, legitimate, socially informed and socially acceptable as they are based on a richer and wider evidence base. Dialogue has provided "political" confidence to

[35] http://www.sciencemuseum.org.uk/ClimateChanging/AtmosphereGallery.aspx

[36] http://scienceandsociety.bis.gov.uk/media/

[37] Sense about Science is a charitable trust that equips people to make sense of scientific and medical claims in public discussion: http://www.senseaboutscience.org/

policy makers by clarifying public views on difficult decisions (eg stronger regulation), and by identifying and testing levels of public concerns and aspirations, why they hold those views and what affects them. It has also provided "practical" confidence by drawing on public knowledge and experience to find new ideas for policy and services that better meet public needs.

(b) *Better policy and decision-making processes* that are more open and transparent, and subject to public scrutiny. Public input can help improve communications planning (identifying more appropriate messages), risk management (identifying potential areas of conflict and consensus early) and better internal communications by providing a focus for considering how issues can best be discussed with the public.

(c) *Savings of time and money* in launching and implementing policy solutions by finding appropriate and acceptable policies that can be easily and quickly implemented with minimal conflict and controversy.

(d) *Spreading public awareness and understanding of science issues*. Dialogue has provided a depth of learning and understanding through which participants internalise and effectively retain the knowledge they develop. It has enthused participants so they spread their new interest in the subject to others. They also often develop a better understanding of the practical and political pressures on policy makers.

26. This is similar to the findings of the 2012 RCUK Review of Public dialogues. This review looked at lessons learned from RCUK dialogues and found that found that Research Council public dialogues with research have been carried out to high standards and have led to important and productive impacts on Research Council work. It also highlighted international recognition for RCUK's commitment to public dialogue and innovation in upstream engagement. The review identified six main areas where public dialogues have provided value and made tangible positive impacts to the work of the Research Councils:

(a) Better understanding of public attitudes relating to an emerging area of research;

(b) Better understanding of publics as potential end-users or consumers of research;

(c) Researchers stimulated to reflect on the social implications of their research;

(d) Directly inform Research Council thinking, strategy and decision making;

(e) Promote stronger stakeholder engagement with NGOs and civil society; and

(f) Contribute to wider public debate about emerging research and technologies.

v. *What evidence is there that public attitude to climate science affects their engagement with energy policies or initiatives?*

27. No specific input from RCUK. Government Departments will be in a better position to comment in detail on policy implications.

vi. *Does the Government have sufficient expertise in social and behavioural sciences to understand the relationship between public understanding of climate science and the feasibility of relevant public policies?*

28. The Sciencewise Expert Resources Centre (Sciencewise-ERC) provides co-funding and specialist advice and support to Government departments and agencies to develop and commission public dialogue activities in emerging areas of science and technology. This Government funded centre which also provides advice to policy makers, should be used by more Government Departments.

29. The Research Councils have worked directly with Sciencewise to run public dialogues in areas of high potential public interest. The NERC-sponsored geoengineering public dialogue—"Experiment Earth?"—was helpful in influencing further research in this area, and highlighting the need for continued public engagement in it. It informed the Government position on geoengineering research going forward, published by DECC in 2012. It also revealed how participants viewed climate science, the scientific method and scientists.[38]

30. RCUK also supports the researchers it funds to communicate and share their findings with Government Departments. The Economic and Social Research Council's (ESRC) recent Climate Change Leadership Fellows showcased their research findings with various Governments Departments. For example, Professor Nick Pidgeon, Cardiff University specifically focussed on "Risk perception, Climate change and public engagement" and Professor Simon Caney researched "Equity and Climate Change". They presented their work at policy symposiums, policy network conferences and policy seminars.

31. RCUK also supports high level policy placements which enable individuals to feed their particular scientific expertise into the work of Government Departments and other organisations, for example the ESRC has placement opportunities between social scientists and government departments with the most recent to start in May. The Fellowship is a partnership between ESRC, DEFRA and the Environment Agency and Professor Frances Bowen of Queen Mary, University of London will be considering "Regulating for a sustainable economy". NERC has also placed a number of scientists in Government Departments under its policy placement scheme, the most recent being Professor Lorraine Maltby of Sheffield University who is working directly for Defra's Chief Scientist, Professor Ian Boyd.

[38] For details see www.nerc.ac.uk/about/consult/geoengineering.asp.

vii. *Can lessons about public engagement with climate change policy be learned from other countries?*

32. The Sciencewise report "Evidence Counts: Understanding the Value of Public Dialogue"[39] states that Research Council public dialogues with research have been carried out to high standards and highlights international recognition for RCUK's commitment to public dialogue and innovation in upstream engagement.

33. However, the issue of engaging the public in climate science is global and many countries have developed tools and guidance for scientists and citizens (eg the American Chemical Society Toolkit) [40] which may offer different perspectives on the issues.

April 2013

Written evidence submitted by the Understanding Risk Research Group, Cardiff University (CLC042)

BACKGROUND

1. Cardiff University is a leading Russell Group University where the social and behavioural aspects of the environment are a particular focus of internationally competitive research.

2. The Understanding Risk Research Group at the School of Psychology Cardiff University[41] is a centre of expertise for the study of public risk perception, risk communication, and public engagement with science, technology and the environment. It has been supported in its work on attitudes to climate change primarily by grants from the Economic and Social Research Council (ESRC) and the Leverhulme Trust, but with additional support from NERC, EPSRC, the US National Science Foundation, European Commission, and the Living With Environmental Change Programme.[42]

3. We have unique expertise in British attitudes to climate change, having collected multiple empirical data sets of public responses using both quantitative and qualitative methodologies. In particular, we have conducted major nationally representative surveys with Ipsos-Mori in 2002, 2005, 2010 and 2012, as well as extensive focus group and interview research to understand more detailed nuances of everyday public discourses. Between 2008 and 2012 Professor Pidgeon held a Climate Leader Professorial Fellowship from the ESRC and in this role also prepared the expert review on public attitudes for the UK Foresight International Dimensions of Climate Change (IDCC) project,[43] a document which subsequently prompted the main Foresight conclusions on this matter.[44]

4. We believe that the Committee has set a very challenging brief. Some of its questions (eg the current status of attitudes and recent changes) can be answered with recourse to existing empirical evidence, but others are more difficult to resolve (eg the relationship between public understanding and policy). However, the group strongly believe that public engagement with climate change is one of the most pressing environmental policy issues for the UK government today. *The government should take an evidence-based approach, and treat the issue with the due seriousness and resources that it merits. However, achieving this will not be simple—society and individuals are complex entities and understanding their attitudes, practices or behaviours is a significant challenge.*

What is the current state of public understanding of what is meant by climate change? How has this changed in recent years

5. The empirical evidence on public understanding of climate change in the UK is summarised in a number of key review papers.[45,46,47] Our evidence in relation to knowledge, awareness, concern and engagement draws primarily from UK experience, but many results can be generalised from studies elsewhere, in particular from the USA and Northern Europe. However, one key difference between the USA studies and other countries, including the UK, is the recent emergence of very strong polarization along right-left party political lines, with

[39] Evidence Counts: Understanding the Value of Public Dialogue—Summary Report (Sciencewise)

[40] Launched late last year, the American Climate Society Climate Science Toolkit, available at http://www.acs.org/climatescience is a web-based tool to enhance understanding and communication of the science underpinning global climate change. The toolkit was developed for ACS' more than 163,000 members and others.

[41] Details of the *Understanding Risk* research programme and a number of its key policy and survey reports may be found at: www.understanding-risk.org

[42] However, the views in this submission represent those of the authors alone, and not of any of the listed funding agencies.

[43] Pidgeon, N F (2010). *Public Understanding of and Attitudes Towards Climate Change.* International Dimensions of Climate Change Programme, Government Office of Science/Foresight Programme, www.bis.gov.uk/assets/bispartners/foresight/docs/international-dimensions/11–1021-public-understanding-of-climate-change

[44] In particular see pp 112–114 of the International Dimensions of Climate Change project Final Report.

[45] Lorenzoni, I & Pidgeon, NF (2006). Public views on climate change: European and USA perspectives. *Climatic Change*, 77, 73–95.

[46] Upham, P, Whitmarsh, L, Poortinga, W, Purdam, K, Darnton, A, McLachlan, C & Devine-Wright, P (2009). *Public Attitudes to Environmental Change: A Selective Review of Theory and Practice*. Economic and Social Research Council/Living with Environmental Change Programme, UK.

[47] Pidgeon, N F (2012). Public understanding of, and attitudes to, climate change: UK and international perspectives and policy. *Climate Policy*, 12 (Sup01), S85–S106.

Republican voters far more sceptical about the reality of climate change than Democrats.[48] Given the gridlock in US climate policy that this has been associated with, this is an issue with potentially significant implications for the UK as we discuss below.

6. Early studies highlighted a lack of public knowledge regarding climate change and some misperceptions, such as the absence of a distinction between weather and climate, and confusion with other environmental issues (notably ozone depletion).[49] This research exposed the ways in which people make sense of climate change using already familiar ideas and experiences, such as the generic idea of "air pollution".[50] Public awareness has grown steadily in line with increasing media coverage,[51] with awareness of the terms "climate change" and/or "global warming" being near-universal in many countries since the early 2000s (eg, 99% in the UK).[52] While confusion with ozone depletion has diminished in recent years, many people continue to conflate the concepts of "climate" and "weather".[53] Perhaps not surprisingly people tend to lack detailed knowledge of the underlying physical mechanisms driving climate change.[54]

7. Studies show that people's immediate associations with climate change tend to be direct physical impacts (eg hotter temperatures, flooding, melting ice) rather than either indirect impacts (eg ocean acidification) or its causes.[55] Those impacts are also typically perceived to be distant in space and time, threatening people in other places of the globe or occurring far in the future.[56] Consequently, people do not always view climate change as relevant to them personally, a process described as "psychological distancing".[57] This may be a reflection of the very real "commons dilemma" that climate change poses: while each individual's actions may be personally beneficial, the totality of humanity's actions has diffuse and uncertain future global consequences.

8. Climate change has also been described as an attenuated or "hidden hazard" for the general public.[58] As a risk signal buried in highly variable natural climatic processes, it is perceived as less concerning than more obviously human-caused risks that tend to be more feared.[59] The implications of anthropogenic climate change are also uncomfortable for many, since they imply a need to change lifestyles and therefore challenge assumptions about consumption, progress and "quality of life".[60] As such, its reality and severity may be questioned by some in order to reduce the psychological threat it poses for them.[61] And, while we know that direct experience tends to be more influential than second-hand information in shaping attitudes and behaviour,[62] climate change is learnt about almost exclusively through the mass media.[63]

9. Changes in UK attitudes over time are not easy to chart, in part because good quality tracking polling (ie using identical questions, samples and methods) is not available further back than about 2005–06, although some earlier EU-wide "Eurobarometer" polling does exist. The Department for Transport (DfT) performed a series of polls containing several important items between 2006 and 2011, while in 2011 DECC instigated a regular tracking survey, but this only contains two climate measures. A limitation of all of these studies is the relatively restricted question set asked. The media have sponsored many one-off polls over the years, but the questions asked there tend to be ad hoc (ie not repeated subsequently) or at times very poorly worded. Our own survey series dating back to 2002 asks a much wider range of questions, and while we fully expect our surveys to extend into the future this is always subject to short-term availability of Research Council (RCUK) funding. To summarise, UK climate attitudes polling is currently conducted on an ad hoc basis and a more consistent approach would be desirable, perhaps incorporating combined DECC, DEFRA and RCUK funding.

[48] Dunlap, R E & McCright, A M (2008). A widening gap: Republican and Democratic views on climate change. *Environment,* 50, 26–35

[49] Bostrom, A, Morgan, M G, Fischhoff, B, & Read, D (1994). What do people know about global climate change? 1. Mental models. *Risk Analysis* 14, 959–970; Lofstedt, R (1996). An evaluation of a UK energy conservation programme. *Energy & Environment* 7, 41–49.

[50] Ungar, S (2000). Knowledge, ignorance and the popular culture: climate change versus the ozone hole. *Public Understanding of Science* 9, 297–312; Defra (2007). *Survey of Public Attitudes and Behaviours toward the Environment: 2007*. London: Department for Environment, Food and Rural Affairs; Whitmarsh, L (2009). What's in a name? Commonalities and differences in public understanding of "climate change" and "global warming". *Public Understanding of Science* 18, 401–420.

[51] Boykoff, M & Mansfield, M. *2004–2010 World newspaper coverage of climate change or global warming.* Boulder, CO: University of Colorado (2010).

[52] Defra (2007) op cit.

[53] Borick, C P & Rabe, B (2012). Belief in global warming on the rebound: National survey of American public opinion on climate change. *Issues in Governance Studies* 44.

[54] Somerville, R C J (2011). How much should the public know about climate science? *Climatic Change*, 104, 509–514.

[55] Lorenzoni, I, Doria, M F, Leiserowitz, A, Poortinga, W & Pidgeon, N F (2006). Cross-national comparisons of image associations with "global warming" and "climate change" among laypeople in the United States of America and Great Britain. *Journal of Risk Research*, 9(3), 265–281; Smith, N & Joffe, H (2012). How the public engages with global warming: a social representations approach. Public *Understanding of Science*, 22, 16–32.

[56] Uzzell, D (2000). The psycho-spatial dimensions of global environmental problems. *Journal of Environmental Psychology*, 20, 307–318; Lorenzoni & Pidgeon (2006) op cit.

[57] Spence, A, Poortinga, W & Pidgeon, N F (2012). The psychological distance of climate change, *Risk Analysis*, 32(6), 957–972.

[58] Kasperson, R E & Kasperson, J X (1991). "Hidden hazards", in: D. G. Mayo and R. D. Hollander (eds) *Acceptable Evidence: Science and Values in Risk Management*. Oxford University Press, Oxford, UK, 9–28.

[59] Slovic, P, Fischhoff, B, & Lichtenstein, S. In R Schwing & W A Albers (Eds.), *Societal Risk Assessment*. (Plenum, 1980).

[60] Hulme, M (2009). *Why We Disagree About Climate Change*. Cambridge University Press.

[61] Whitmarsh, L, Corner, A & Xenias, D (2012). Is climate scepticism a psychological defence against threatening information? *Planet Under Pressure International Conference,* London, 26th–29th March.

[62] Fazio, R H & Zanna (1981), M P. Direct experience and attitude-behavior consistency. In L. Berkowitz (Ed.) *Advances in Experimental Social Psychology*, 14. New York: Academic Press, pp. 161–202.

[63] Whitmarsh, L (2009). op cit.

We also stress that opinion polling only takes one so far in understanding beliefs, and always has to be complemented by suitably designed and analysed qualitative research to understand the shifting details of people's interpretations and understandings.

10. UK public concern about and belief in climate change reached a peak at the publication of the Stern and 4th IPCC reports in 2006/7. It then declined gradually year-on-year until 2010.[64] In our own surveys 78% of British respondents considered that the world's climate was changing in early 2010 (and 15% did not) compared to fully 91% (and only 4% who did not) in 2005.[65] Similar trends have been reported in Europe,[66] the USA,[67] and elsewhere globally.[68] Declines in concern are accompanied by rising expressions of scepticism about climate change and climate science, albeit amongst a small minority (currently about 15% in the UK) of those asked. These trends sit at odds with the increasing certainty amongst the scientific community over this period.

11. Since 2010 concern and belief in the UK have remained much more stable in nationwide polls[69] but with one possible exception—the issue of trust in climate scientists (discussed below).

12. The reasons for the decline in concern prior to 2010 are complex: a combination of factors including economic worries suppressing concern about the environment, "climate fatigue", rising distrust of communicators, changes in media and political attention, and the "climategate affair". It is however important not to overstate this small decline in public concern, particularly considering that most polls since 2010 show that a great majority (about three quarters) of the UK general public still accept the reality of anthropogenic climate change and many also see the need for significant action.

13. Much was made of the potential impacts on public beliefs at the time of the extensive media controversy surrounding the release of e-mails from the University of East Anglia in November 2009 (subsequently dubbed "climategate"). Our analyses of these events suggests that when the underlying trends (2006–10) are taken into account the impact of "climategate" was relatively small (although as we discuss below, there seems to have been an impact on levels of trust).

14. Recent academic research has focused on the rise of climate scepticism. US and UK segmentation studies expose distinct attitudinal clusters, ranging from the most concerned, to the disinterested, to the active deniers, indicating multiple "publics" in respect of climate change engagement.[70] For example, women tend to be more concerned about climate change than men[71]; in the UK, increasing age is associated with increased scepticism.[72] Values and worldviews are also predictive of climate change concern[73], while political ideology appears to have become important. Reflecting the trends found in the USA, albeit to a far less polarized degree, in the UK conservative voters are now significantly more likely to express scepticism than those with left-of-centre political views.[74] Indeed, at least in the USA[75] and UK[76], scepticism seems to be linked far more to political ideology and worldview than to any other factor, including education and knowledge—with knowledge in the USA highest amongst both the most sceptical and most concerned groups.[77] Coupled with the limited influence (at least in the short-term) of scientific information on public attitudes to climate change,[78] this undermines assumptions that interventions focused on explaining the facts of climate science are in themselves likely to reverse the apparent divergence in view between some segments of the public and expert opinion.

[64] Shuckburgh, E, Robison, R & Pidgeon, N F (2012). *Climate science in the media: a public attitudes study.* Living with Environmental Change Programme, UK.

[65] Spence, A, Venables, D, Pidgeon, N, Poortinga, W & Demski, C (2010). *Public Perceptions of Climate Change and Energy Futures in Britain: Summary Findings of a Survey Conducted in January-March 2010.* Technical Report, Understanding Risk Working Paper 10–01. School of Psychology, Cardiff University, Cardiff, UK.

[66] Eurobarometer (2009). *Europeans' Attitudes Towards Climate Change. Eurobarometer* 69 [http://ec.europa.eu/public_opinion/archives/ebs/ebs_322_en.pdf ; also Ratter, B M W, Phillipp, K H I & von Storch, H (2012). "Between hype and decline: recent trends in public perception of climate change". *Environmental Science and Policy*, 18, 3–8.

[67] Dunlap & McCright (2008) op cit.

[68] HSBC (2009). *Climate Confidence Monitor 2009*. HSBC Climate Partnership, London

[69] Shuckburgh *et al* (2012) op cit; also Demski, C, Spence, A & Pidgeon N F (2013). *Transforming the UK Energy System: Public Values, Attitudes and Acceptability: Summary findings of a survey conducted in August 2012*. Working Paper, Cardiff University and UK Energy Research Centre.

[70] Maibach, E W, Leiserowitz, A, Roser-Renouf, C & Mertz, C K (2011). Identifying like-minded audiences for global warming public engagement campaigns: An audience segmentation analysis and tool development. *PloS ONE*, **6**; Defra. (2008) *A Framework For Pro-Environmental Behaviours London.* Department for Environment, Food and Rural Affairs.

[71] Poortinga, W, Spence, A, Whitmarsh, L, Capstick, S & Pidgeon, N (2011). Uncertain climate: An investigation into public scepticism about anthropogenic climate change. *Global Environmental Change* **21**, 1015–1024.

[72] Whitmarsh, L (2011). Scepticism and uncertainty about climate change: dimensions, determinants and change over time. *Global Environmental Change* 21, 690–700.

[73] Poortinga *et al* (2011) op cit.

[74] Poortinga *et al* (2011) op cit.; Whitmarsh (2011) op cit;

[75] Dunlap & McCright (2008) op cit; Leiserowitz, A, Maibach, E, Roser-Renouf, C, Feinberg, G & Howe, P (2012). *Climate Change in the American Mind: Americans' beliefs and attitudes in September 2012.* Yale Project on Climate Change Communication, Yale University; Kahan, D M, Jenkins-Smith, H & Braman, D (2010). Cultural cognition of scientific consensus. *Journal of Risk Research* **14,** 147–74.

[76] Poortinga *et al* (2011) op cit.; Whitmarsh (2011) op cit.

[77] Kahan, D, Peters, E, Wittlin, M, Slovic, P, Ouellette, L L, Braman, D, & Mandel, G (2012). The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nature Climate Change*.

[78] Brulle, R J, Carmichael, J & Jenkins, J C. Shifting public opinion on climate change: an empirical assessment of factors influencing concern over climate change in the U.S., 2002–2010. *Climatic Change* (2012); also Kahan *et al* (2012) op cit.; Whitmarsh (2011) op cit.

15. There is an emerging international debate, and some evidence now, that the extreme weather events that would be expected in a warming world may be starting to affect local beliefs about climate change.[79] In the UK people who report having experienced significant flooding in their localities are more concerned about climate change and more prepared to take action.[80] Although no single event can be unambiguously attributed to climate change, this does suggest a way of overcoming psychological distancing. For policy this implies that climate-related events such as extreme precipitation or flooding will need to be accompanied by a consistent policy narrative (or storyline) linking the increased risk of local impacts with rising global emissions.

Which voices are trusted in public discourse on climate science and policy? What role should Government Departments, scientific advisers to Government and publicly funded scientists have in communicating climate science?

16. The DfT tracker surveys of 2006–10, and follow-up studies that we were involved with in 2011[81] and 2013[82] asked about trust in a variety of institutions to provide correct information about climate change. A pattern consistent with that seen for other issues is found. Independent scientists tend to be trusted most (by over 50% of the population), followed by environmental organisations (by 30–40%), then government scientists (15–20%). These figures are supported by very recent polling from the climate change media organisation Carbon Brief which found that scientists were the most trusted of any group to provide information about climate change.[83] According to the DfT research "government" (15%), the media (10%), and business (5%) tend to be much less trusted. There is also some limited evidence that trust in the more specific category of "climate scientists" to tell the truth was particularly low in the 18 months following "climategate"[84] although the more recent 2013 polling by the British Science Association suggests that this may now have recovered substantially.[85]

17. We firmly believe that both Government Departments and publicly funded scientists have a critical role to play in communicating climate science. The former as the agents which the public see as primarily responsible for dealing with the issue,[86] the latter in the role of even-handed experts. Communication is made more difficult in the absence of trust, and that trust can derive from demonstrations of expertise, perceived even-handedness, or a sense of shared values.[87] A serious dilemma arises now, recognised by many independent (ie University or Research Institute) climate scientists. In seeking to put the science and its implications for society across, they might then be viewed as partisan advocates for a particular policy position, possibly eroding their much valued status as unbiased experts. Some argue that scientists should adopt a stance of "non-persuasive" communication—in effect trusting the evidence to speak for itself while allowing recipients to arrive at their own inferences.[88] Others within and outside the science community feel that scientists, as recipients of public funding, also have a special responsibility to take a more proactive stance about this issue.

How could public understanding of what is meant by climate change be improved? What are the main barriers to this? Does the media have a positive role to play?

18. While climate literacy is clearly a very desirable thing, a recurrent theme of research on public understanding of science issues is that merely making people more concerned about impacts, or more knowledgeable about the science, is unlikely to lead to changes in behaviour.[89] The research shows that there are a range of powerful influences over and above lack of knowledge, which act as barriers to public engagement with climate change. And the relationship between greater knowledge and attitudes is complex: typically quality of argument improves as people gain more information, while views also become more polarized with stronger opinions voiced on all sides to a debate.[90]

19. Barriers to engagement over and above lack of knowledge include individual factors such as perceived uncertainty, ingrained habits and practices, feelings of fatalism and helplessness, and social factors such as lack

[79] Weber, E U (2013) seeing is believing. *Nature Climate Change*, 3(4), 312–313.

[80] Spence, A, Poortinga, W, Butler, C & Pidgeon, N F (2011). Perceptions of climate change and willingness to save energy related to flood experiences. *Nature Climate Change*, 1, 46–49; Capstick, S B, Pidgeon, N F & Whitehead, M S (2013). *Public perceptions of climate change in Wales: Summary findings of a survey of the Welsh public conducted during November and December 2012.* Climate Change Consortium of Wales, Cardiff University.

[81] Shuckburgh *et al* (2012) op cit.

[82] http://www.britishscienceassociation.org/news/national-science-engineering-week-new-survey-results-showing-changing-public-attitude-climate

[83] http://www.carbonbrief.org/blog/2013/04/how-does-carbon-briefs-polling-fit-in-with-other-research

[84] Demski, C (2011). *Public Perceptions of Renewable Energy Technologies: Challenging the Notion of Widespread Support*. PhD Thesis, Cardiff University; Shuckburgh *et al* (2012) op cit.

[85] http://www.britishscienceassociation.org/news/national-science-engineering-week-new-survey-results-showing-changing-public-attitude-climate

[86] Pidgeon (2012) op cit.

[87] Siegrist, M, Earle, T C & Gutscher, H (2007). *Trust in Cooperative Risk Management*: *Uncertainty and Scepticism in the Public Mind.* London, Earthscan, pp117–142.

[88] Fischhoff, B (2007). Non-persuasive communication about matters of greatest urgency: climate change. *Environmental Science and Technology*, 1 no 41.

[89] Spence, A & Pidgeon, N F (2009) Psychology, climate change and sustainable behaviour. *Environment: Science and Policy for Sustainable Development*, 51(6), 8–18.

[90] Kahan *et al* (2012) op cit.

of enabling initiatives, prevailing social norms, and lack of visible political or government action.[91] Experience from the health behaviours domain suggests that multi-component programmes that both address social/ individual barriers to change and provide key messages are the best way to foster different practices and behaviour.[92]

20. We would argue that the public do not need to engage with all aspects of climate science to grasp the significance of the issues involved. However, people will need at least some appreciation of three things: (1) The broad underlying mechanisms of climate change to help build a sufficient "mental model" of the issue and why it is important; (2) The established "core" conclusions from climate science—that the greenhouse effect is real, that gasses are accumulating in the atmosphere, recent warming is at an unprecedented rate and cannot be accounted for solely by natural forcings, that warming increases the potential for undesired impacts and that the vast majority of scientists agree on these conclusions;[93] (3) An appreciation of the scale of increasing risks of climate impacts both globally and for the UK.

21. Media reporting of climate change is exceptionally important, and we note the very positive role played by the Science Media Centre in ensuring that the media have the opportunity to be properly briefed by leading climate scientists. However, there is some evidence from the Reuters Institute at Oxford that ideological polarization in public attitudes worldwide occurs primarily in countries (including the UK) with adversarial coverage in their local media.[94]

22. A persistent question with media reporting of climate change is whether the standard journalistic norm of ensuring "balanced reporting" (always providing conflicting counter-arguments or comment) is appropriate where the scientific evidence is so overwhelming.[95] After all, one would not cover every new cancer discovery today by also including commentary from people who might just happen to believe that cancer does not exist.

23. Ultimately the impacts of media reporting on attitudes may be less important than the actions and statements of the elite commentators (politicians, prominent personalities, business and NGOs, and government departments) which prompt that reporting.[96] For example, media comment and public concern in the UK about climate change both rose in the wake of important speeches on the topic in the 1980s by the then Prime Minister the late Margaret Thatcher.[97]

How important is public understanding in developing effective climate change policy?

24. This is an exceptionally important question, although the relationship may operate in both directions. First, a policy development may make inappropriate assumptions about what the public thinks, or the ways people may respond, and be less effective as a result. Many of the existing decarbonisation scenarios make untested assumptions about public(s) responses.[98] Therefore policy development should always be tested against empirical evidence of actual public acceptability and views.

25. There is also a reciprocal relationship between public views and the extent to which politicians believe they can enact policies; that is, whether a "social license to operate" exists amongst the majority of the population, which gives support under appropriate conditions to effective policy measures. The evidence from the UK and elsewhere suggests that such a mandate does indeed exist, and that the people would respond positively were decisive leadership to be provided by government.[99] This evidence also suggests that lack of knowledge is not a fundamental barrier to support for low-carbon policies. People do not necessarily show more support for low carbon policies because they know more about the science of climate change, and conversely, a lack of knowledge does not preclude support for low carbon policies.

26. Our surveys in 2005 and 2010 revealed that high numbers of people in the UK are concerned about climate change and wanted action, but regarded powerful institutional actors, in particular governments, as primarily responsible for delivering the necessary change.[100] Our complementary qualitative data has highlighted how people pass responsibility to government because they believe climate change is too difficult

[91] Lorenzoni, I Nicholson-Cole, S & Whitmarsh, L (2007). Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environmental Change*, 17(3–4), 445–459; Gifford, R (2011). The dragons of inaction: psychological barriers that limit climate change mitigation and adaptation. *American Psychologist*, 66(4), 290–302.

[92] Spence and Pidgeon (2009) op cit; House of Lords Science and Technology Select Committee. (2011). *Behaviour Change*. 2nd Report of Session 2010–12: HL Paper 179.

[93] Lewandowsky, S, Gignac, G & Vaughan, S (2012). The pivotal role of perceived scientific consensus in acceptance of science. *Nature Climate Change 3,* 399–404; Ding, D, Maibach, E W, Zhao, X, Roser-Renouf, C & Leiserowitz, A (2011). Support for climate policy and societal action are linked to perceptions about scientific agreement. *Nature Climate Change 1*, 462–466.

[94] Painter, J (2011). *Poles Apart: The international reporting of climate scepticism.* Oxford: Reuters Institute for the Study of Journalism.

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[98] Spence & Pidgeon (2009) op cit.

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[100] Spence, Venables *et al* (2010) op cit.

a problem for them to tackle alone.[101] However, despite good intentions and rhetoric, UK politicians have often failed to act decisively, fearing punishment at the ballot box if bold but unpopular long-term climate measures were adopted. This presents a self-reinforcing "governance trap", whereby the public ascribe action on climate change to government, but politicians fail to act decisively because they believe legislation would in the short-term prove unpopular with the electorate.[102] A desire to overcome this state of affairs, and to develop the necessary long-term thinking and policy, was the motivation in 2006 for forging a cross-party consensus on climate change in Parliament,[103] to bring forward the Climate Change Act of 2008 and with it the establishment of the independent Climate Change Committee to foster long-term decision making. The very existence of this consensus at a political level (something so glaringly absent in the USA) is undoubtedly one of the reasons why ideological differences amongst the UK general public have remained relatively modest. In our view it would be a very serious retrograde step, for both policy formation and public attitudes, were the existing UK political consensus on climate change to break down.

What evidence is there that public attitudes to climate science affects their engagement with energy policies or initiatives?

27. There is a consistent positive relationship between levels of concern about climate change and support for renewable technologies such as wind and solar power (as well as with opposition to fossil fuel sources)—at least when levels of support are assessed in general rather than for specific site-based proposals.[104] Support for new nuclear meanwhile is more complex, with people concerned about climate change expressing a "reluctant acceptance" at best.[105] As current political debates regarding the siting of onshore wind turbines also demonstrate, public views about specific energy developments can provoke very different responses, and are likely to be influenced by wider political views, personal values, threats to local identity, the perceived unfairness of siting processes, and geographically specific factors.[106]

28. Our recent work for the UK Energy Research Centre on public attitudes to whole energy system change has demonstrated that individuals with climate sceptical attitudes can still support low-carbon policies: for example, because they see these as consistent with a more desirable, less polluted future.[107] Equally, other UK research suggests that people who have already adopted genuinely lower-carbon lifestyles do so out of a range of motivations, including a sense of social justice or personal integrity and frugality, not just out of concern about climate change.[108] Whilst those who don't accept the reality of climate change are currently a relatively small proportion of the population of the UK, there is some evidence regarding how to engage sceptics. Interestingly, the advice offered by Bain et al. based on research with those least concerned about climate change in Australia draws conclusions not dissimilar from the UK research with those most concerned, noting that: "[t]o motivate deniers' pro-environmental actions, communication should focus on how mitigation efforts can promote a better society, rather than focusing on the reality of climate change and averting its risks."[109]

29. In summary, research suggests that good practice in developing low-carbon policies is to (i) make the links with climate change explicit, but also (ii) offer positive rationales and objectives that are not confined to climate change and its risks alone.

Does the Government have sufficient expertise in social and behavioural sciences to understand the relationship between public understanding of climate science and the feasibility of relevant public policies?

30. Responsibility for the social and behavioural science aspects of climate change and climate policy—like many of the natural science issues—is divided between DECC (for mitigation policies) and DEFRA (for adaptation policies) although in practice the divisions are less clear cut. There is also some responsibility for these matters devolved to the Scottish and Welsh Governments.

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31. Relevant social sciences expertise has existed in DEFRA for many years, while DECC has only more recently sought to develop a social sciences team with the expertise to tackle, for example, climate change communications and public engagement with the 2050 pathways work. In DECC there is potentially more work to be done in ensuring that the internal expertise which it is developing has a greater reach across DECC and other relevant departments, and draws upon significant external academic input (eg, the Climate Change Communication Advisory Group[110]). A very welcome development in this regard was the establishment in early 2012 of a joint external expert advisory panel (the Social Sciences Expert Panel, SSEP) by DECC and DEFRA, an innovation which appears to be working well.

32. If we are to engage people fully with climate change issues and policy a more *strategic approach* is needed, something which is is sorely lacking in the UK as elsewhere. In a paper published in 2011 in *Nature Climate Change* with Baruch Fischhoff of Carnegie Mellon University, we argued for such an approach to climate risk and uncertainty communication and decision making.[111] A strategic approach to risk communication—as our evidence to the *Devil's Bargain?* inquiry in 2012 also made clear—comprises two elements: (1) strategic listening—which treats communication as a genuine dialogue, and seeks to thoroughly understand intended audiences and their decision needs prior to communication design; and (2) strategic organisation. The range of skills needed for such an effort would include natural scientists, decision scientists, social scientists and communications specialists, through to programme designers and evaluators. It should aim to meet basic research needs in risk and uncertainly analysis, risk perception, and risk communication as well as immediate policy goals—in effect operating as a "boundary organisation" between academia and public policy.[112] It should be resourced so as to provide continuity of career progression for its scientists, alongside responsiveness to emerging risk communication needs, so suggests a model which has substantial RCUK support and is independent of day to day government business. Good models for such an interdisciplinary boundary organisation might be the RAND Corporation (US), IIASA (Austria) or the Tyndall Centre (UK). Such capacity is important not least because risk communication—not just regarding climate change or energy—has become central to a number of critical public policy issues (eg in public health more generally[113]).

33. The Select Committee's *Devil's Bargain?* report of 2012 contained several sensible recommendations (4, 5 and 6) regarding a more integrated Government approach to risk communication. Our personal view is that the Government's response to these recommendations was at best ad hoc, particularly given the scale of the challenges and the need for a joined-up strategic approach. The Select Committee might therefore usefully explore the scope for a more substantial, independent approach to climate change engagement (and other risk communication challenges) as described in the preceding paragraph.

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Written evidence submitted by UCL Communicating Climate Science Policy Commission (CCSPC) (CLC045)

Introduction

1.1 UCL is a leading research-intensive UK university, with c4,500 researchers across the spectrum of academic disciplines producing more than 9,000 research publications annually.

1.2 We are committed to sharing our expertise, knowledge, discovery, insight and analysis in order to improve the UK's economic, social, intellectual and cultural circumstances, and do so primarily through scholarly outputs, education, public engagement, translational research, commercial and social enterprise activity, and engagement with public policy and professional practice.

This Submission to the Committee has been prepared by members of the UCL Communicating Climate Science Policy Commission:

[110] Climate Change Communication Advisory Group. (2010). *Communicating climate change to mass public audience.* Public Interest Research Centre. http://www.pirc.info/projects/cccag/

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[113] For example, see British Medical Association (2012) *Risk: What's Your Perspective? A Guide for Health Professionals.* London: BMA Board of Science Publications

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Background

1. Evidence from climate science shows that the modern world is founded on a false assumption—that it can be powered by fossil fuels with impunity. Reworking this "ultimate stranded asset", whilst adapting to the climate disruption to which past human activities have already committed us, represents a massive challenge. It requires myriad tailored actions on the part of a large fraction of the peoples of the world in their personal, professional and public lives, at all levels, and in all sectors, of society.

2. There are many barriers to galvanising the appropriate and necessary actions. Key steps are to convince both a critical mass of individuals with influence, and the general public, to recognise the priority and urgency of the issue, and to motivate them to not only act within their remit, but to establish the framework and vision within which massive devolved action can take place.

3. While a majority of the general public broadly accept that climate change is occurring, and that human activity plays at least some role in this, the severity of the threat and the urgency of individual and collective action, as well as exactly what we need to do, is not widely appreciated. Neither is the extent to which individual and collective action is needed to prevent serious climate disruption.

4. Increasing public scepticism about climate change, as well as diminishing concern about its effects—as noted in the Select Committee's Terms of Reference—have been well documented in public opinion research, both in the UK and internationally. However, recent survey data indicate that these beliefs and attitudes may have stabilised (eg Shuckburgh *et al*, 2012; Leiserowitz *et al*, 2012).

5. Many reasons have been put forward to help account for the period of increasing scepticism, and scepticism about the issue more generally. These include the technical nature of the evidence, a high degree of disconnection between people's daily lives and the problem ("not me, not now"), issue-fatigue, the impact of the global financial crisis, distrust—especially following "ClimateGate", "false balance" in the coverage by the media, and the deepening politicisation of the issue (see Pidgeon, 2012 for a review).

6. While surveys of representative samples of influential figures and groups are not available, observation of their rhetoric and actions strongly suggests that, in general, these have no greater understanding of the urgent need for action than the public, and possibly less.

7. There is copious evidence for a well-funded, well-organised and resolute campaign by vested interests to undermine the credibility of climate science and climate scientists, and to sow doubt and confusion about the subject, with a view to delaying or preventing action to address it (see Oreskes and Conway, 2010 for example).

8. Scientists are generally unfamiliar with mischievous challenges, or forms of attack operating outside academic rules of engagement, and they are ill-equipped to deal with them.

RESPONSE TO THE COMMITTEE

9. We are delighted with the Select Committee's enquiry. At University College London (UCL) we have recently established a policy commission on the communication of climate science, which we explain more about below. The commission is Chaired by Professor Chris Rapley CBE, who has developed satellite instrument techniques to study the Earth, and has directed the International Geosphere-Biosphere Programme, the British Antarctic Survey, and the Science Museum. His focus of interest at UCL is the communication of climate science and the psychology of climate change dismissal. The membership of the commission draws on a wide range of expertise from the psychosocial and behavioural sciences, both within and without UCL. The commission is keen to work with the committee to advance our overlapping interests.

10. The Committee's Terms of Reference focus on indications of increasing UK public scepticism about climate change as well as diminishing concern about its effects, and a consequent risk that, should these trends continue, "democratic governments are likely to find it harder to convince voters to support costly environmental policies aimed at mitigation of, or adaptation to, climate change". Specific questions raised include issues of public understanding of climate change, trust, the role of government departments, government scientific advisors, publicly funded scientists and the media as communicators of climate science, and the link between public understanding and the development of effective climate and energy policy.

11. These are important areas of inquiry. However, they betray some assumptions that merit further consideration.

12. Firstly, there is no single "public" to consider when it comes to climate-related policy. Although the views of the general public can be important, especially during policy implementation (for example during the planning process), the views and conversations of influential individuals and "elites" in business, politics, the media and in major public sector organisations such as the health service, security services and local government, can be critically important during policy formulation. Little information is available as to the understanding and views of these groups, nor of their trends, and it would be helpful if this were rectified.

13. Secondly, more than two decades of social and behavioural science investigating science-society relations tell us that a "deficit model" of communication, in which experts treat non-experts as "empty vessels" to be filled with facts, is flawed. Where the assumption was once that indifference or scepticism result from a lack of knowledge and understanding, it is now appreciated that the one-way delivery of information does not in itself solve the problem. *Ex cathedra* statements from scientists are rarely sufficient to persuade or compel particular viewpoints or actions.

14. Even the use of traditional debate can be unhelpful, since the objective is combative—to win the argument—not to move the discussion forward. The "rules of engagement" can differ markedly between proponents constrained to an academic approach of impartiality and truth-seeking, and those adopting the tactics of political barnstorming and rhetoric, placing the scientists at a disadvantage.

15. Dialogue is more effective, since it is collaborative, assumes that all participants have something to offer, seeks to find common ground, explores assumptions, aims to discover new possibilities, and—above all—recognises and accommodates the reflexive nature of communication.

16. The use of dialogue is especially pertinent in the case of climate change since the "unwelcome messages" of climate science have the capacity to arouse emotions of anxiety, fear, guilt, loss, interdependency, and helplessness. The insights of the cognitive and behavioural sciences show that these can drive reactions of dismissal (using intellect and knowledge to justify this), disavowal (the simultaneous belief of two contradictory facts), or discounting (in which the facts are accepted but arguments are used to justify a low level of attention or action). Anger towards the messenger is a common consequence.

17. In such circumstances, narratives that "make one self feel better" are attractive to the listener. These may focus on undermining the science (temperatures have flat-lined/carbon dioxide is plant food/it's the Sun), or the scientist (incompetent/dishonest/seeking funding and influence; perpetrating a conspiracy/hoax), or authorities and governments (it's a way to control you/it's a way of raising taxes). Ideas such as these offer the means to ease emotional stress, to undermine belief in the need for action, and facilitate the task of those who would maintain the status quo. Unless the approach to public understanding takes account of these emotional stresses, it is likely to fail.

18. In addition, reactions to information and the position adopted on a topic are influenced by personal disposition, cultural values, and pre-existing world-views, narratives and beliefs.

19. An understanding of the mental processes by which people use narratives to make sense of the world and deal with the feelings generated is thus central to "effective" engagement with the subject. A substantial body of knowledge exists on these topics. We provide a bibliography of selected references at the end of this document.

20. Currently there are four central approaches to climate change engagement; behavioural, socio-cultural, psychosocial and social innovation (resilience and systems theories). Each provides a lens and makes valuable contributions to how we understand and implement effective practices. Our view is that an *integral* approach, combining the power all four lenses, would achieve greater impact. With this in mind, psychosocial researchers, recognizing the inseparability of psychological, affective and social dimensions, are beginning to interface with

climate researchers in new ways (ie UCL Energy Institute Workshop, *Psychosocial Dimensions of Climate Change,* convened November 2012), illuminating how understanding *affect* can inform effective communications.

21. Digital technology offers new research opportunities to understand how narratives form, spread through networks, change and sometimes co-ordinate to create a prevailing climate.

22. It is our experience that awareness and knowledge of these important results from the social and behavioural sciences are uncommon amongst natural scientists. Yet they constitute the main body of climate expertise, and are the primary means by which the climate science narrative is conveyed. A central hypothesis of the UCL policy commission, to be tested by experiment, is that a deeper awareness and understanding of how the human brain makes sense of the world would assist both climate scientist communicator and their audience to achieve a more fruitful exchange of knowledge and ideas.

23. There are a wide range of people and groups who can offer relevant experience, insights and knowledge in the art of effective communication, including marketeers, journalists and programme makers, and the arts, music, and theatre communities. By partnering with these, climate science experts can attract and engage an audience with scientifically rigorous and defensible material in ways that can disarm unhelpful psychological and cultural defences.

24. An example is the Science Museum's "atmosphere" climate science gallery. This provides an immersive, yet rigorous learning experience, designed to engage, inform and allow people to make up their own minds. It has been highly successful, having been visited by over 1.7 million people, with much positive visitor feedback. The associated "climate changing" series of events allows the more controversial aspects of the subject to be explored, including "dialogue events" in which non-experts and experts discuss issues constructively together.

25. Thirdly, the profound policy implications of climate change mean that public discussion often constitutes policy debate masquerading as science. Under such circumstances, science is used as a weapon to promote the interests of a particular agenda. This confusion between the science and the politics bedevils the public dialogue. Scientists' understanding of the public and policy is as important as the public and policymakers' understanding of the science, and all too often both are lacking.

26. This raises the question of the role of climate scientists. Pielke (2007) identifies four idealised roles—namely (i) pure scientist (pushing forward the frontier of knowledge and understanding to the highest professional standards of competence and behaviour), (ii) science arbiter (explaining the meaning of facts and evidence, since these can often be interpreted in many ways), (iii) issue advocate (alerting society to issues and their implications—such as risks and threats) , and (iv) honest broker of policy alternatives (in which the scientist works with other experts to map out and evaluate options for action and recommend which may be most appropriate). He warns against the danger of "stealth advocacy" in which the science is inadvertently or deliberately expressed in a manner which narrows the policy debate. It is important for a scientist to understand and make clear the role they are adopting in any given circumstance.

27. Finally, increased awareness and understanding alone are insufficient to achieve action. Michie *et al* (2011) have sought to develop a rigorous and comprehensive methodology to underpin the design of effective behaviour change interventions. Their "Behavioural Change Wheel" identifies capability, opportunity and motivation, and subdivisions within each, as essential factors in achieving targeted results. Climate awareness can be especially challenging, since the nature of the desired behaviours are often knowable only through detailed analysis by those directly involved, and are not amenable to top down instruction. The objective therefore is to promote and incentivise an overall behavioural culture in which specific behavioural changes are identified and pursued. The nature of climate change mitigation or adaptation is that to be effective they require myriad interventions by people at all levels and within all sectors of society, worldwide. We are confronted with the ultimate collective action challenge.

28. In light of the above, our response to the question "Does the Government have sufficient expertise in the social and behavioural sciences to understand the relationship between public understanding of climate science and the feasibility of relevant public policies?" is "almost certainly not!" To which we would add our opinion that further research and the communication of results in this area is at least as important as continued work in investigating the workings, state and likely future trajectory of the climate system, notwithstanding the importance of the latter to underpinning well-judged practical interventions to mitigate, adapt to and remediate climate disruption.

29. This forms the basis of the approach we have adopted with the UCL policy commission on climate science communication, where we are focussing firmly on the insights available from the social and behavioural sciences. The mission of the initiative is "To explore and recommend how climate scientists can more effectively communicate with policy-makers, businesses and the public". Specific issue being investigated are (i) the role of climate scientists in contributing to public and policy discourse and decision making on climate change, (ii) the insights that social and behavioural scientific research and professional practice provide into how people process and assimilate information and how such knowledge offers pathways to achieve more effective engagement and action, and (iii) the approaches climate scientists can adopt to more effectively execute their roles. The main output of the policy commission will be a short final report which will seek to provide an analysis of practical value to climate scientists, communicators and policy makers alike. The

commission may also produce short policy notes on specific aspects of their discussions. The timescale for completing the commission's work is the autumn of 2013.

30. In closing we offer the following observations:

— Changing human behaviour requires that people know what to do and how to do it. It also requires the necessary skills and the opportunity. Finally, it requires a sufficient desire or need. One factor contributing to this is understanding why the behaviour is important, but other factors matter too. So that the behaviour becomes "the norm".

— Changing the behaviour of influential elites and the general public will require interventions on all these fronts. Improving public understanding is important, but it is only one small part.

— Climate scientists need to do more than repeat their messages and complain that they are not being heeded. To play a fuller role in shaping the future they need to work with psychosocial and behavioural scientists to arrive at engagement strategies that go beyond the "information deficit" approach, to motivating and enabling those developments to occur.

— Whilst recognising the role and impact of the messenger, the audience, the process adopted to communicate climate science and so forth are important, opportunities exist to communicate the issue through other schemes, policies, and practices. The aim is to build a context around climate that is relevant to different audiences, different messengers and different political contexts.

— The UK's Green Deal policy is an example of a missed opportunity. The policy seeks to increase uptake of energy efficiency measures in UK homes to reduce carbon emissions and increase the energy efficiency of the UK housing stock. This is aligned with the government's commitment to tackle climate change. Yet no mention of it exists in the communication and marketing of the policy to the numerous public's involved (eg householders, Green Deal Assessors, Green Deal providers, energy companies). Aligning the aim of the Green Deal with how it links to global climate change and the reduction of greenhouse gas emissions would help people "join the dots, make up their own minds, and lessen perceptions of a lack of government resolve and leadership".

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Written evidence submitted by Government Departments (CLC047)

EXECUTIVE SUMMARY

1. The government is committed to helping the public understand the issue of climate change and its impacts, bringing to bear the best social science research on these issues in order to make our approach to addressing them as cost effective as possible. Our evidence suggests that:

— Most adults in the UK tend to believe climate change is happening and most (over two thirds) believe human activity is implicated in some way.

— Most people (some surveys estimate over 90%) do not automatically see the link between activities in their daily lives and the causes of climate change.

— Around two thirds of the UK public trust scientists to give them accurate information about climate change, with politicians and social media the least trusted sources (fewer than 1 in 10 trust them).

— It is essential to have a simple, clear evidence-based narrative about climate change, its causes and likely impacts in the public domain and regularly reported in the media.

— Several studies suggest that the proportion of the public expressing concern about climate change has fallen over recent years. Barriers to improving public understanding include people's pre-existing political values and the difficulty of generating a consistent narrative about the climate challenge across a range of actors. The activities of pressure groups and authors who deny the evidence on climate change science, and their prominent and often sympathetic treatment in the media, makes communicating such messages difficult.

— The media clearly have a very important role. The public's most common sources of information on science tend to be traditional media, particularly TV and newspapers.

— We take the view that improving public understanding is necessary but not sufficient for developing increasing action to tackle climate change.

— There is evidence that those who are concerned about climate change are more likely to support policies to mitigate it. However, stated willingness to act does not necessarily lead to behaviour change.

— Government's community of social research experts ensure we develop an understanding of public attitudes and the public acceptability of our policies.

— With respect to international experience, the Department of Energy and Climate Change (DECC) works closely with the Foreign and Commonwealth Office (FCO) and its network of climate attachés and we are aware of some national-scale and international initiatives.

Introduction

2. Government departments gather evidence, commission scientific research and have a role in communicating the science issues that are relevant to policy decisions informed by their evidence-gathering. DECC is responsible for developing and implementing UK climate and energy policies, working with the Department for Environment Food and Rural Affairs (Defra), FCO, Department for International Development (DfID), Department for Transport (DfT) and other departments. Thus, government pays close attention to public attitudes and opinions on the subjects of climate science and climate change.

3. For example, DECC and Defra fund the work of the Met Office Hadley Centre Climate Programme, Avoiding Dangerous Climate Change (AVOID) and Climate Ready research programmes, amongst others. Other departments also support a range of fundamental and applied research, for example DH on the health impacts from climate change.[114] All these communicate the outcomes of research on climate science and climate change and impacts that underpins climate policy.

4. The government is committed to helping the public understand the issues we face as a nation and bring to bear the best social science research on these issues in order to make our approach to addressing them as cost effective as possible. This includes ensuring that climate-relevant science and issues around climate are included in the National Curriculum.[115]

5. The £13 million Department of Business, Innovation and Skills (BIS) Science and Society programme[116] delivers a foundation programme of national initiatives which enable Government and the science community to monitor, understand and react to public attitudes to science in general. This underpins work on more specific scientific policy areas, such as climate. The programme works with external partners to increase public involvement in science and innovation, as part of a skilled and diverse workforce and as active scientifically-literate citizens. It includes attitudinal tracking and other research, for example three-yearly Public Attitudes to Science surveys,[117] public engagement and dialogue on public policy issues through Sciencewise[118] and national scale communication initiatives such as National Science & Engineering Week.[119] It also aims to inspire students through access to Science, Engineering, Technology & Maths (STEM) role models, eg STEM Ambassadors[120] and the National Science + Engineering Competition.[121]

6. The Government Chief Scientific Adviser and departmental chief scientists have important roles in explaining science and advising government and to a lesser extent, the public on policy implications of scientific research. The government recognises the critical importance of the wider scientific and socio-economic communities in the UK and world-wide in influencing public opinion on climate issues. It is their subject expertise and effective communication that should deliver the lead in informing the public. Finally, the government accepts the importance of traditional and evolving new media in influencing public understanding of these highly technical issues.

7. It is on this basis that we present the following brief evidence that has been prepared by DECC with contributions from BIS, the Government Office for Science (GO-Science), Defra, FCO, DfID, DfT, Department of Education (DfE), Department of Health (DH) and Department of Culture, Media and Sport (DCMS).

Question 1: *What is the current state of public understanding of what is meant by climate change? How has this changed in recent years?*

8. Various studies indicate that the overwhelming majority of climate scientists support the proposition that emissions of greenhouse gases from human activities are a primary driver of global climate change.[122,123,124]

9. According to the DECC Public Attitudes Tracker 2013[125] 65% of the UK adults are concerned (very/fairly) about climate change, and 35% are not concerned (not very/not at all). However, climate change is not among the public's biggest concerns—just 2% regard it as the biggest challenge facing Britain today compared

[114] Health Protection Agency Health Effects of Climate Change in the UK 2012 available at www.hpa.org.uk/hecc2012

[115] http://www.education.gov.uk/schools/teachingandlearning/curriculum/nationalcurriculum2014/b00220600/consultation-national-curriculum-pos/draft-pos-subjects

[116] https://www.gov.uk/government/policies/engaging-the-public-in-science-and-engineering—3

[117] http://www.ipsos-mori.com/researchpublications/researcharchive/2764/Public-attitudes-to-science-2011.aspx

[118] http://www.sciencewise-erc.org.uk/

[119] http://www.britishscienceassociation.org/national-science-engineering-week

[120] http://www.stemnet.org.uk/content/ambassadors

[121] http://www.britishscienceassociation.org/national-science-engineering-competition

[122] W. R. L. Anderegg, "Expert Credibility in Climate Change," Proceedings of the National Academy of Sciences Vol. 107 No. 27, 12107–12109 (21 June 2010); DOI: 10.1073/pnas.1003187107

[123] P. T. Doran & M. K. Zimmerman, "Examining the Scientific Consensus on Climate Change," Eos Transactions American Geophysical Union Vol. 90 Issue 3 (2009), 22; DOI: 10.1029/2009EO030002

[124] N. Oreskes, "Beyond the Ivory Tower: The Scientific Consensus on Climate Change," Science Vol. 306 no. 5702, p. 1686 (3 December 2004); DOI: 10.1126/science.1103618

[125] https://www.gov.uk/government/publications/public-attitudes-tracking-survey-wave-4

to issues such as unemployment and inflation. 38% see climate change as mainly or entirely caused by human activity while 15% think it is mainly or entirely caused by natural processes.

10. Several reports commissioned by Government and its Agencies provide insights into this area:

- The 2012 Living With Environmental Change (LWEC), DECC and Defra-funded report: *Climate Science, the Public and the News Media:*[126]
- The Foresight *International Dimensions of Climate Change* project summarises much of the research in this area:[127]
- The DfT *Climate Change Omnibus Survey*[128] which was undertaken annually between 2006 and 2011
- The *British Social Attitudes Survey*[129] (BSA) run by the National Centre for Social Research, which contains a few questions from different years of the survey, asking about people's beliefs about causes of climate change.
- The results from the most recent BIS-funded *Public Attitudes to Science Survey*[130] (conducted in 2010) were published in 2011 and set out views on climate change in context with other areas of science. Climate change topped the list of science topics survey participants felt most informed about (75% of respondents felt informed about climate change).
- The first year of DECC's Public Attitudes Tracker (2012)[131] found that those very concerned about climate change tend to be in the AB social grade.

11. These documents support the following general statements:

- Most people are confused by what is meant by climate change, many linking it to pollution, the "ozone hole" or "the weather".
- Most adults tend to believe climate change is happening and most (over two thirds) believe human activity is implicated in some way. The 2011 DfT omnibus survey found that 76% of adults were at least "fairly convinced that climate change was happening" while 6% were "not at all convinced".
- Most people (some surveys estimate over 90%) do not automatically see the link between activities in their daily lives and the causes of climate change.

12. To address properly how this understanding has changed in recent years requires continuous data on the same issue asked in the same way, preferably in part with the same individuals. Although DECC established a Public Attitudes Tracker in 2011, it is too soon to draw conclusions about changes in understanding over time. Therefore, to date, the closest relevant data are collected by the BSA—though this has mostly focused on degree of concern on transport-related aspects of climate change causes covering the years 2005–11. For example, recent BSA data show an overall fall in the proportion of the public recognising transport emissions as a major cause of climate change—implying an overall reduction in understanding of one of the major causes of man-made global warming in the developed world. The DfT climate change omnibus survey also provides some supporting evidence for this trend.

13. This conclusion is supported by the Foresight report[132], where they piece together different surveys asking general questions about the level of concern members of the public have about climate change. They refer to a 2006 DfT study that found around 80% were very or fairly concerned about climate change. By 2009 this had dropped a small amount to 76%. As we report above, the DECC Tracker survey now shows the proportion of the public expressing concern about climate change is down to 65%. Overall, these studies suggest a fall in both public concern and understanding.

14. In contrast a Eurobarometer poll[133] carried out in June 2011, found that a greater proportion of the European public was concerned about climate change than in 2009 (from 64% to 68%) though this change may not be statistically significant.

Question 2: *Which voices are trusted in public discourse on climate science and policy? What role should Government Departments, scientific advisers to Government and publicly funded scientists have in communicating climate science?*

15. A poll for the Carbon Brief[134] this year suggests that around two thirds of the UK public trust scientists to give them accurate information about climate change, with politicians and social media the least trusted sources (fewer than one in 10 trust them). They also found that "Green" charities such as Greenpeace and

[126] http://www.lwec.org.uk/sites/default/files/LWEC_climate_science_web.pdf
[127] http://www.bis.gov.uk/assets/foresight/docs/international-dimensions/11–1021-public-understanding-of-climate-change.pdf
[128] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/11508/climate-change-2011-report.pdf
[129] http://www.natcen.ac.uk/series/british-social-attitudes
[130] http://www.ipsos-mori.com/researchpublications/researcharchive/2764/Public-attitudes-to-science-2011.aspx
[131] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48446/5707-decc-public-att-track-surv-wave1-summary.pdf
[132] http://www.bis.gov.uk/assets/foresight/docs/international-dimensions/11–1021-public-understanding-of-climate-change.pdf p34
[133] http://ec.europa.eu/clima/news/articles/news_2011100702_en.htm
[134] http://www.carbonbrief.org/blog/2013/04/polling-reveals-public-trusts-scientists-most-on-climate

Friends of the Earth were trusted by a third to two fifths of respondents, with BBC journalists and commentators trusted by around a third of the population.

16. The Foresight report also finds that people regard scientists as "trusted" and politicians, media and major companies as "less trusted". In addition, increased prominence of these "less trusted" actors in the public debate on climate change has led to the "politicisation and distrust" of climate change communications.[135] The research project on *Climate Science, the Public and the News Media*[136] suggests that trust in science on climate change interacts with beliefs held about the causes of climate change itself. It reports that 57% of those who believe that climate change is caused mainly or entirely by nature alone (ie not human activity) distrust climate scientists. This contrasts with those who believe that climate change is mainly or entirely due to human activity, where less than 25% distrust climate scientists.

17. There remains, however, considerable trust in healthcare professionals who are also in contact with nearly everyone in society. By incorporating actions on climate change as NHS organisations and with individuals leading by example, the health sector could have a role in promoting understanding of climate change impacts and promoting the health benefits of a low-carbon society.

18. Government Departments, scientific advisers and publicly funded scientific bodies have clear roles which should be continued:

- Government departments have clearly defined roles, providing non-partisan support to the government of the day. Government departments have a role in ensuring the best available evidence supports advice given to ministers—and to the public—so they take decisions in the best long term interest.
- The primary role of scientific advisers to Government is to provide science and engineering advice to inform the policy-making process. Communicating issues such as climate science to a wider audience is therefore not their primary purpose and any public communication they do undertake will be in accordance with their responsibilities as civil servants. However, because of their position, Government scientific advisers have significant standing, independence and authority which provides both a platform and implicit responsibility for communication of scientific issues. Many scientific advisers do undertake public engagement on science issues and view it as an important part of their role. One recent example related to climate change is an opinion-editorial co-authored by Sir John Beddington and Jane Lubchenco (Administrator of the US National Oceanographic and Atmospheric Administration) on ocean acidification[137] to raise public awareness of the issue. Another example is the DECC's Chief Scientific Adviser's discussion of climate change during a presentation[138] about renewable energy.
- The Royal Charters require Research Councils to communicate with the public on research findings. Publicly-funded scientists are encouraged to engage with the public on their research through the Concordat for Engaging the Public with Research[139], a set of principles drawn up by the Funders of Research in the UK, and through considering pathways to realising the potential impact of research within Research Council grant applications.

Question 3: *How could public understanding of what is meant by climate change be improved? What are the main barriers to this? Does the media have a positive role to play?*

19. Researchers are starting to understand what is important in terms of "public understanding". In order to move the debate forward, some experts suggest[140] that it is essential to have a simple, clear, evidence-based narrative about climate change in the public domain (ie regularly reported in the media), its causes and likely impacts. It is also clear that the whole field of science communication has moved on from the deficit model of public understanding[141] prevalent in the late 1990s, to one of engagement, dialogue and collaboration between science and the public to develop socially acceptable policies.[142]

20. For example, a 2010 report[143] by the Climate Change Communication Advisory Group for the independent charity "Public Interest Research Centre"[144] gives some advice about what is most likely to be beneficial in terms of raising the level of understanding of the risk of climate change in the public mind. This report suggests actions such as being honest and forthright about the probable impacts of climate change without provoking fear or guilt. This includes communicating in a balanced way about downsides and upsides, promoting "pro-environmental social norms" and exploiting the fact that as humans we are all part of social groups which can provide a reinforcing context for messages.

[135] http://www.bis.gov.uk/assets/foresight/docs/international-dimensions/11–1021-public-understanding-of-climate-change
[136] http://www.lwec.org.uk/sites/default/files/LWEC_climate_science_web.pdf
[137] http://www.nytimes.com/2012/06/19/opinion/acid-test-for-oceans-and-marine-life.html?_r=0
[138] http://www.ted.com/talks/david_mackay_a_reality_check_on_renewables.html
[139] http://www.rcuk.ac.uk/documents/scisoc/ConcordatforEngagingthePublicwithResearch.pdf
[140] N. Pidgeon & A Corner, personal communication (2012)
[141] The deficit model attributes public scepticism or hostility to a lack of understanding, resulting from a lack of information
[142] Outgoing Chief Executive of the British Science Association, Sir Roland Jackson, reflects on ten years of public engagement with science: http://www.britishscienceassociation.org/people-science-magazine/march2013/ten-years-public-engagement
[143] http://pirc.info/downloads/communicating_climate_mass_audiences.pdf
[144] www.pirc.info

21. Education also has a role to play. The revised National Curriculum[145] has been designed to make sure that all pupils will be taught about climate change. They will develop an understanding of the key concepts that underpin the study of climate in both science and geography.

22. In terms of the main barriers, the research in this area gives some insight, though much remains unclear. As suggested above, with reference to research by Dan Kahan *et al* (2011),[146] one type of barrier is people's values—for example, those who hold political values opposed to government action on the scale required may never be convinced. In addition, this research suggests that generating a consistent narrative about the climate challenge across a range of actors is difficult to co-ordinate. Coupling this with the activities of pressure groups and authors who deny the evidence on climate change science, and their prominent and often sympathetic treatment in the media, makes transmitting such messages difficult.

23. The media clearly have a very important role in providing clear, accurate and consistent messages to the public about the causes and impacts of climate change. A 2010 University of Leeds survey[147] showed that the media (including the internet) was the primary source of information about climate change for nearly two-thirds of those surveyed. In addition the 2011 *Ipsos-MORI Public Attitudes to Science Survey*[148] for BIS indicates that people's most common sources of information on science tend to be traditional media, particularly TV and newspapers, which suggests that the mainstream media still has a key role to play in disseminating scientific information.

24. Public service broadcasters have obligations to report news in an unbiased manner and impartiality is at the heart of licensed broadcasting services. This guarantees the availability of accurate and impartial news services and political impartiality in programme making. The Communications Act requires Ofcom to apply a standards objective that "news included in television and radio services is presented with due impartiality" and that news is also reported with due accuracy. The BBC retains similar duties under its Charter and Agreement. It is for the regulators to decide whether a particular broadcaster is or is not complying with its obligations regarding impartiality. Accuracy and impartiality in news is the bedrock of broadcasting ensuring that high levels of public trust in broadcast news are maintained.

25. To support this further the Science and Media Expert Group have explored some of the issues around science journalism generally and made a number of recommendations in their 2010 report on *Science and the Media: Securing the Future.*[149] Among these recommendations were suggested actions on training on science reporting for journalists and media training for scientists, which BIS has subsequently taken forward,[150] and for making scientific material and research findings more accessible.

Question 4: *How important is public understanding in developing effective climate change policy?*

26. We understand that some expert commentators[151] refer to a "stand-off" between the public and the political leadership with regard to climate change action: that in order for the public to support action, they should see it as important. They take their cue for importance from visible action by political leaders. However, some experts note that political leaders may only act if they see a push from the public to act. This interpretation is supported by qualitative research published by DfT (King et al. 2009a).[152]

27. Greater understanding of climate change may result in a greater public voice to demand action and overcome this, in turn delivering a political mandate for greater action by political leaders. Thus improving public understanding may be necessary, but not yet sufficient, for developing increasing action to tackle it. However, the public may also expect their government automatically to work towards protecting them from harm—without the need for a specific mandate to do so.

28. Achieving the UK's target to reduce greenhouse gas emissions by 80% by 2050 will require significant changes in the technologies we use and our behaviour patterns. To help persuade businesses, households and non-governmental organisations to adopt these changes, improved public understanding of climate change issues is needed. DECC uses the 2050 Calculator as a tool for engaging the public in this debate—linking it to direct action we can take through transforming our energy system. To date around 80,000 individuals have used the Calculator web tool[153] or My2050 simulation aimed at a younger audience.[154] DECC has also developed a toolkit that teachers can use to help integrate education on climate change into school lessons.[155]

[145] http://www.education.gov.uk/schools/teachingandlearning/curriculum/nationalcurriculum2014/b00220600/consultation-national-curriculum-pos/draft-pos-subjects
[146] http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1871503
[147] http://homepages.see.leeds.ac.uk/~lecac/ejournal/Issue%205%20articles/5,%20185–205.pdf Table 3
[148] http://www.ipsos-mori.com/Assets/Docs/Polls/sri-pas-2011-main-report.pdf
[149] http://scienceandsociety.bis.gov.uk/media/2012/09/04/september-2012-review-of-science-and-the-media-action-plan/
[150] http://scienceandsociety.bis.gov.uk/media/2012/09/04/september-2012-review-of-science-and-the-media-action-plan/
[151] For example N. Pidgeon, personal communication (2012)
[152] http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/pgr/scienceresearch/social/climatechange/
[153] http://2050-calculator-tool.decc.gov.uk
[154] http://my2050.decc.gov.uk
[155] https://www.gov.uk/government/publications/my2050-schools-toolkit

Question 5: *What evidence is there that public attitude to climate science affects their engagement with energy policies or initiatives?*

29. There have been several studies over recent years that have considered how environmental attitudes, including to climate change, affect people's reported willingness and ability to act in ways that help us tackle climate risks.

30. The first year of DECC's Public Attitudes Tracker (2012)[156] found that:

- Those who are concerned (very/fairly) about climate change are more likely to say they would be happy to have a large scale renewable energy development in their area (61% of those concerned agree, versus 44% who are not concerned).
- People concerned about climate change are more likely to agree strongly that the UK needs a mix of energy sources compared with those not concerned (51% versus 37%).
- 50% of people who strongly support renewables are very concerned about climate change and 45% give a lot of thought to saving energy.
- Those who are very concerned about climate change and support certain renewable energy developments are less likely to waste energy at home, but there is a gap between attitudes and actual behaviour, with 32% of AB adults admitting to energy wasting behaviours, at least occasionally.

31. It is too early to say whether DECC's 2050 Calculator or *My2050* has influenced public attitudes to energy policy.

32. DfT deliberative research (King *et al.* 2009b)[157] highlighted that information provision can strengthen the relationship between feelings of personal responsibility and intention to change. At the same time, this evidence demonstrates clearly that an attitude-behaviour gap exists, with stated willingness to act not necessarily leading to behaviour change given the complexity and range of barriers to change that exist (eg habit; infrastructure). The 2011 DfT segmentation study[158]—along with many other studies in the field—demonstrates the disconnection between attitudes and behaviour and provides further insights into the reasons for this attitude-behaviour gap.

Question 6: *Does the Government have sufficient expertise in social and behavioural sciences to understand the relationship between public understanding of climate science and the feasibility of relevant public policies?*

33. All Whitehall departments have a community of analytical specialists who are members of the Government Social Research profession (GSR) or experts in Customer Insight. These specialists are engaged in the policy development and implementation process to ensure we develop an understanding of public attitudes and the public acceptability of our policies. In support of these specialists, DECC and Defra have developed a joint Social Science Expert Panel (SSEP) to support social science evidence-based advice. The SSEP brings together 13 different academics covering a range of social science disciplines as well as a range of policy relevant topics of interest to DECC and Defra. Members of the panel are regularly drawn on to provide direct advice to policy officials developing their thinking in a number of areas.

34. DECC has also assigned a role to a GSR member of "Head of Social Science Engagement". Their role includes specific responsibility for engaging with external expertise in the academic social science community and ensuring that policy development can take account of the latest expertise where relevant.

35. In addition, the BIS funded *Sciencewise Expert Resource Centre*[159] provides specialist advice and support to Government departments and agencies to bring public insights into the development of policies involving science and technology by helping public bodies to use public dialogue and other engagement techniques.

Question 7: *Can lessons about public engagement with climate change policy be learned from other countries?*

36. FCO and the International Climate Change (ICC) group in DECC work closely with FCO's network of climate attachés. In terms of lessons learned from other countries, there are areas for engagement in the form of social media, commissioned studies by local experts, tailored messaging to the local audience and some limited government initiatives. For example, in South Korea, a climate change themed "webtoon" was successfully launched, targeting the younger audience, by developing public awareness and ultimately support, for their climate policy, through the use of a picture/narrative format.

37. UNFCCC has summarised international action in this field[160] and indicated relevant activities, which may be used as a basis for good practice sharing.

[156] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48446/5707-decc-public-att-track-surv-wave1-summary.pdf
[157] http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/pgr/scienceresearch/social/climatechange/
[158] https://www.gov.uk/government/publications/climate-change-and-transport-choices-segmentation-study-final-report
[159] http://www.sciencewise-erc.org.uk
[160] http://unfccc.int/resource/docs/2012/sbi/eng/03.pdf

38. The annual World Health Assembly in May, Geneva, includes updates and discussion on climate change for monitoring of the World Health Organisation's (WHO) Climate Change and Health Resolution and WHO Regional Frameworks for Action,[161] providing an opportunity for 193 member states to be aware of each other's initiatives, including those on public engagement, and work together to tackle this global issue.

April 2013

Written evidence submitted by the Committee on Climate Change (CLC049)

I understand that you have recently launched an inquiry into public understanding of climate change and its policy implications. It may be helpful if I provide a high level perspective of these issues from the point of view of the Committee on Climate Change.

The Committee was, of course, established by the Climate Change Act 2008 with duties in particular:

— to provide advice to the Government on the level of carbon budgets to be set in the UK, on track to an 80% reduction in emissions of greenhouse gases by 2050; and

— to provide an annual report to Parliament setting out our views on the progress that has been made towards meeting carbon budgets and the 2050 target.

In providing our advice in relation to carbon budgets there is a number of matters which we are required to take into account. These include scientific knowledge about climate change, relevant technology, economic and social circumstances. Whilst public understanding of climate change is not directly identified as a separate matter for us to consider, it clearly plays in to acceptability of carbon budgets and how they are met—through issues around acceptance of the science, costs, and views about technologies. It is therefore an important consideration in our work.

Our own perspective is that whilst evidence on public levels of concern about climate change have shown some variation over time, overall public acceptance of the reality of climate change is strong and views are supportive of actions to reduce emissions. Nevertheless, our perception is that there is a good deal of variation in levels of understanding and once we get below the highest level of concern, a degree of confusion exists about what are the most appropriate steps to take.

There is some evidence (eg from UKERC supported work into public values, attitudes and acceptability) that there is broad public support for energy system change away from high hydrocarbon dependency; and that, when information is presented objectively and deliberatively, then concerns about affordability need not translate straightforwardly to rejection of paths with higher short-term costs. But it is also clear from this research area that public acceptability is complex, and influenced by a wide range of factors.

In relation to the science of climate change and cost of taking actions, there are a number of siren voices, given unjustified attention by some parts of the media, which confuse matters (indeed, that is partly their aim). It should not therefore be a surprise that messages received by the public are sometimes confused.

The Government has not succeeded in presenting a compelling narrative to the public over the need for action, and the components of an effective response. It has at times been alarmist, and has given mixed messages. For example, on the one hand it is the intention of the Government to be ''the greenest Government ever'', and it has put in place a short-term framework, broadly consistent with required actions to 2020. On the other, it seems willing in its Gas Generation Strategy to countenance a ''dash for gas'' and includes a scenario for investment in gas generation that would be inconsistent with achievement of the 4th carbon budget. And it has not yet put in place a set of polices to provide the incentives for people and businesses to act.

We have set out our assessment of cost-effective measures to meet carbon budgets and the 2050 target. Failure to meet those scenarios would make reaching carbon targets more costly. It is therefore important to understand what barriers exist to the acceptance and take-up of those measure and new technologies. As we develop our analysis further, we are also now working hard to develop the narrative to communicate effectively why it is economically sensible to invest early in low carbon technologies, so as to build a resilient energy system, insuring us against risks of dangerous climate change and rising energy bills. This must take in the international context, the impact of shale gas, and it must address affordability and competitiveness concerns.

While we will be able to go some way to communicating this to the wider public, it will ultimately be for the Government to put low-carbon investment at the heart of its economic and growth strategies, to communicate the benefits of such strategies to the public, and to back this up with policies and incentives to turn a positive narrative into action on the ground.

April 2013

[161] http://apps.who.int/gb/e/e_wha66.html Progress reports, agenda item 18

Written evidence submitted by the Met Office (CLC050)

SUMMARY

— The Met Office has recognised both a need and appetite for increased and informative communication on climate change that allows the public to increase their understanding of the issues, the basic science, and the latest challenges of climate change research. It has developed information and activities on its website and elsewhere to address some of these needs.

— The availability of objective science interpretation from a trusted, authoritative and transparent source is crucial to ensure that confusion about the science is dispelled, questions are answered and erroneous reporting is identified as such by the public and can be challenged. A number of trusted institutions, including the Met Office and NERC invest time and effort in producing accessible resources and comment.

— All scientists have a role in communicating their own science within the science community, and to a greater or lesser extent to a public audience. It is within this context and the public importance of climate science that the Met Office communicates its science. It does not, however, have a remit or the resource to educate the wider public or provide comprehensive communication on climate change science.

— The Met Office has developed and established a sophisticated communications network capable of reaching the public across a number of platforms—both traditional and social media.

INTRODUCTION

1. Climate science, and more particularly, climate change science, is a relatively new area of the family of environmental sciences but shares strong interfaces with a number of other disciplines. The complex interactions between the atmosphere and the surface of the Earth means the climate system is in essence composed of, and influenced by, five elements: the atmosphere, the ocean, the land surface, the cryosphere (sea ice, glaciers and ice sheets) and the biosphere where life occurs.

2. Each of these climate elements is driven by its own chemical, physical and biological processes and each has a relationship with, sensitivity to, and influence on, the others. Climate science is therefore a highly complex discipline requiring a focused understanding and communication of the often delicate and subtle interactions both within and between the various elements and their scale of influence on the climate as a whole. This is particularly important when researching and modelling climate change scenarios, impacts and attribution, and means communicating and imparting an understanding of the science behind such research is challenging.

3. The Met Office has recognised both the need and appetite for increased and informative communication on climate change that allows the public to increase their understanding of the issues, the basic science, and the latest challenges of climate science research:

— the main Met Office website has a set of pages dedicated to helping the wider public find out more about climate and climate change;

— we provide authoritative comment and interviews to environmental correspondents;

— we provide a range of information, videos and blogs across a number of traditional and social media platforms, including twitter, Facebook and YouTube;

— we work in partnership with EDF to deliver climate science to schools via their "Pod" project to 9.5 million pupils across 17,000 schools;

— the new social media channel http://www.myclimateandme.com/is being piloted by the Met Office to provide young people direct access to Met Office climate scientists, who can answer their specific questions; and

— direct public participation in climate and weather science through the WOW site http://wow.metoffice.gov.uk/and Old Weather.

4. In addition, the Met Office is keen to encourage the uptake of STEM subjects (Science, Engineering, Technology and Mathematics) in education. Interesting young people in science at an early stage in the education process is vital to encourage the flow of STEM graduates through university and into UK science research institutes. The Met Office has a volunteer network of staff acting as STEM ambassadors to schools. It is important to note that these initiatives, however important and valued by the Met Office, are not seen as the core activity of scientists.

Q2. *Which voices are trusted in public discourse on climate science and policy? What role should Government Departments, scientific advisers to Government and publicly funded scientists have in communicating climate science?*

5. Changing climate patterns and incidence of extreme weather events have far-reaching socio-economic impacts. Robust, evidence-based science advice can therefore underpin UK policies of numerous Government departments and, because the effects of a changing climate will be felt on a global scale, international

investment and policy. Public interest in these policies, and on the underpinning science, is therefore likely to continue, if not grow.

6. Met Office science is focused on the needs of decision makers. The big policy questions of mitigation of, and adaptation to, climate change need sound science in order to make informed choices. Our science is therefore not specifically aimed at the public. However, it is of public interest and as such Met Office science findings are published into, and are available in, the public domain. This transparency is increasingly common across all science disciplines, especially as traditional publishing formats expand to take advantage of technology advances in presentation and delivery and online access methods.

7. However, as high profile science-based issues such as climate change generate significant interest, particularly when used to underpin policy, there is a significant risk that the science is interpreted to serve a specific agenda or particular lobbying position, especially in the media. The Met Office is privileged to enjoy high levels of public trust and is conscious that a key driver behind these results is the public trust in our impartiality in undertaking and presenting weather and climate science. The availability of objective science interpretation from a trusted, authoritative and transparent source is crucial to ensure confusion is dispelled, questions are answered and erroneous reporting is identified as such by the public and can be challenged. A number of trusted public research institutes, including the Met Office and NERC for example, invest time and effort into producing accessible, topic-based articles and resources for the public. As a world-leading science institute in the field with well developed relationships with environmental correspondents, the Met Office is often called to provide comment on topical climate change issues.

8. All scientists have a role in communicating their own science within the science community, and to a greater or lesser degree to a public audience. The Met Office publishes papers and reports, through the formal peer review process into the public domain singly and in collaboration with scientists in other institutes and academia. Due to the factual and objective nature of science, scientists need to remain independent of influence of particular partisan views, including political, economic, social or commercial concerns. Transparent and open scrutiny of science, both within the formal peer-review process and by wider audiences, allows real progress in understanding to be made, and advice to be given—whether to policy makers or in wider communications. This independence and transparency is essential for confidence to be maintained in public scientists and institutions such as the Met Office and the Met Office Hadley Centre. Indeed, impartiality is consistently cited as a key driver behind the responses of "trust a lot" in a quarterly survey by the Met Office to measure levels of public trust.

9. Policy makers, decision makers and the public at large need access to a trusted source for the latest scientific advice on climate change. The World Meteorological Organization under the auspices of the UN therefore set up the Intergovernmental Panel on Climate Change (IPCC) in 1988. The UK followed closely in setting up the Met Office Hadley Centre to focus on policy relevant science developing its own climate models and using these and those from other institutions to produce projections of future climate.

10. The IPCC has a role in communicating climate science findings. It reports roughly every 5 years on the latest science relevant to policy associated with the physical science, the impacts of climate change and economic and technology implications. The UK led working groups in 4 out of the 5 IPCC Assessment reports, with technical support units being hosted at the Met Office Hadley Centre. The UK also makes a significant contribution to the IPCC providing a large number of lead and convening authors as well as contributing authors. The IPCC Assessment reports form the basis of climate change negotiations of the United Nations Framework Convention on Climate Change (UNFCCC) and of policy development in the UK. The reports are publicly available on the web (and in printed form) together with review comments and the response of authors. Climate science is therefore unique in science in having a single trusted source for the latest policy relevant science.

11. Communication is developed from this for specific audiences and for the public. The scientists and institutions that contribute to IPCC (including the Met Office) update their science and related communication between reports so that there is access to the latest science.

Q3. *How could public understanding of what is meant by climate change be improved? What are the main barriers to this? Does the media have a positive role to play?*

12. Funded primarily by DECC and Defra the Met Office Hadley Centre was established in 1990 bringing together and building upon a number of separate strands of climate research work within the Met Office. The Met Office Hadley Centre provides a scientific focus in the UK on issues relating to climate and provides robust, science-based evidence and advice to policy makers across Government. The Met Office's research in climate change science.

13. Unlike the Met Office's work in operational weather forecasting, which is delivered directly to the public, the science research being undertaken on climate change is mainly presented and shared within the global science community through the peer-review process and delivered to policy makers in a number of Government departments. Trust in our impartiality as a science institute when reporting climate science to the public is strengthened by our extensive expertise in public communication of weather.

14. Communication of climate messages that the public can more directly relate to is becoming increasingly possible as a result of developments in climate science. The breakthrough in capability for decadal forecasting, for example, brings climate issues to the shorter term and to the regional scale, seasonal climate forecasts will become increasingly important to provide early indicators of high-impact weather and developments in attribution science are helping us to better understand the links between climate change and hazardous weather.

15. A key area of development in the Met office is therefore the delivery of a seamless operational forecasting service from weeks to decades ahead, and the interpretation and communication of those forecasts. In June 2013, the Climate Service UK will be launched in partnership with the EA and NERC. One specific aim of this service is to translate scientific information on climate variability and change into outputs of relevance and value to users.

16. Public understanding of the uses and limitations of climate services will be a key aspect in maintaining trust in climate change science and in the science institutes forging these breakthroughs. The Met Office believes this initiative also presents opportunities for innovation in communication and we are keen to explore these further. In this context, there are some interesting parallels in the communication of climate risk and weather risk. Although the Met Office hasn't explored in detail the public impact of methods of communication of climate risk, we have, in association with the Universities of Bristol and Cambridge, undertaken the largest meteorological survey of its kind in an online game. The results from data gathered from over 11,000 plays showed that, across all age and education groups, the public made better decisions when presented with complex uncertainty information. We recognise, however, that this is a highly intricate issue which is the subject of a number of social science studies looking at the links between rational understanding and the emotional drivers behind behavioural responses.

17. The media obviously has great reach and therefore can play a role in communicating climate science to the public. Making science and research open to public scrutiny is a strength of the Met Office and the science process in general—but it can also create vulnerability to sensationalist headlines. However, there are many examples of science and the media working together in an appropriate and balanced way. As well as encouraging better understanding of complex issues, this approach also has the power to enthuse the next generation of British scientists.

April 2013

Joint written evidence submitted by Professor Greg Philo and Dr Catherine Happer (CLC51)

Executive Summary

1. There are two crucial points which we want to make. The first is that the key to changing environmental behaviours lies in the imposition of constraints on public actions. We found widespread sympathy with the issue of climate change, and broad acceptance that certain behaviours Fimpact of encouraging changes in individual behaviour. Change would therefore come from new public constraints to which everyone must accede—as, for example, in the case of the compulsory wearing of seat belts. In the same way people would accept, say, constraints on air travel if it were seen as a public good and applying to all.

2. To generate a consensus around such policies requires a new approach to media and the dissemination of expert knowledge. Our research shows that politicians as a group are burdened with a very low level of public trust. New messages on climate change are likely to be seen as merely the expression of private interests. Yet the input of politicians is crucial since they as a group can set agendas in terms of media coverage and can command regular access to key information providers such as the BBC. The solution to this problem is to form a close bond with scientists, who still enjoy a high level of public trust. The scientists must be seen as stimulating the debate and informing the political actions. This was the key to the success of the AIDS/HIV campaigns and to long term changes in health related behaviours such as smoking. This model provides the possibilities of successful political action based on a high degree of social consent.

About

3. For over thirty years The Glasgow University Media Group (GUMG) has promoted the development of new methodologies and substantive research in the area of media and communications. Professor Greg Philo has been the Research Director of the group for 20 years. In that time it has pioneered research methods focussing on the use of language in news and other media formats and has investigated how meanings are established for audiences. The studies are used extensively across the social sciences and by researchers in areas such as risk analysis, mental health and other areas of social policy. Greg has presented findings at both the Institute of Biology and the Royal College of Psychiatrists. The work has been widely published and Greg has been invited to present our studies at a range of international fora, including Paris 2004, Sorbonne nouvelle and Paris VIII universities, Amsterdam 2004, International Documentary Festival, national conferences of the Media and Cultural Studies Association of Britain, 2008 and Images of Islam international conference, Manchester University, 2008. Other lectures by invitation include, Fudan University, Shanghai, China, 2009 and Al Jazeera Forum Qatar 2011.

4. Dr Catherine Happer was awarded a First in Sociology from the University of Glasgow and the Adam Smith prize as the top student of her year, then went on to complete a PhD in communications from Lancaster University. She worked in the BBC audience research department and later as a Television Researcher/Assistant Producer before returning to the University of Glasgow as Research Associate at the Glasgow University Media Group to work on a UKERC-funded project along with Chatham House looking at communications around climate change and energy security. This work has been presented to representatives of the Foreign Office, the Department for Energy and Climate Change and from many other NGOs, think tanks and activist groups. In 2013 she was invited to present the work to the European Climate Communications Officers Network (ECCO) conference in Oslo. Along with Professor Philo, she is currently co-authoring a book called Communicating Climate Change and Energy Security: New Methods in Understanding Audiences, to be published by Routledge in October.

FINDINGS FROM THE UKERC-FUNDED STUDY:

5. The current state of public understanding of climate change is one of high confusion and low understanding. There is blanket awareness of the term but only a small minority can give a clear and consistent explanation of the potential causes and risks without prompting. Whilst the majority (86%) see human behaviour as a cause of climate change, there is no consensus on it being the primary cause. Just over a tenth of our sample (14%) did not believe that anthropogenic climate change was happening. The main reason for scepticism was the belief that changes in climate take place historically, and the current changes are simply part of natural cycles. However, the large majority (88%) believe that action on climate change is important, even if they are not sure exactly what that might mean.

6. We also found a marked tendency to use climate change as an umbrella term for a number of other environmental issues such as pollution and population growth. There is a widespread causal connection with climate change and the ozone layer. For example, in our research, the ozone layer was associated with climate change with far greater frequency than, say, CO2 emissions. The most frequently made association across our sample (by 30%) was with weather changes directly experienced such as changing seasonal patterns and wetter Summers, though extreme weather at the local and global level, most often drawn from media accounts, was also named.

7. In terms of changes over time in public understanding, a very useful overview of the British public's attitudes and understandings has been done by Upham el al (2009)[i] which shows that awareness and self-reported knowledge of climate change has been rising over the last two decades. However a confusion of depletion of the ozone layer with climate change, for example, has remained fairly consistent in this time.

8. The attribution of trust and credibility in relation to sources of information on climate science and policy is a complex process in an environment in which there are multiple voices engaged in the debate across a range of media. We found that television news is still the first place that people hear about what is happening in the world, though they sometimes follow TV reports with independent research on the internet in order to provide clarity or to substantiate what has been reported. In this sense, credibility is weighed up in relation to consistency of information and the accountability of the individual speaker. However, we found that the BBC, across media, remains a highly trusted source—it was felt to be the least partial, and most serious about addressing the issues.

9. A further group to which a high level of trust was attributed was the scientists, academics and other experts—speakers who are directly involved in research, and possessed of the expertise and knowledge which other sources such as journalists and television producers would draw on in producing media accounts. However, in spite of the trust invested in the scientists and other experts, questions were raised about the validity of the science of climate change. There were two aspects to this: the first is the suggestion that the arguments around climate change are theoretical and cannot be easily proved or disproved, and the second is that, as a result, the scientists contradict each other and there is a lack of consistency within the science community. We found that, without prompting, participants rarely referred to the existence of any consensus amongst the scientists, although a recent survey showed that 97% of peer-reviewed scientific papers agree that man-made climate change is happening.[ii] Instead the perceived "woolly" nature of the evidence led to a belief that the science was open to interpretation. It was further widely believed that a range of speakers, such as politicians and representatives from the business community, interpreted the science to meet their own agendas. The view that media coverage was agenda-led—and, in the extreme, mere "propaganda"—was widely expressed.

10. Politicians were most named (by 28%) as the source not to be trusted on climate change, which reflected a wider sense of distrust and cynicism about public figures in general. The expenses scandal of 2009 was cited as a key reason for this, but broken manifesto pledges and the lack of attention paid to public protests were also mentioned. The lack of trust in political players in general was transferred to their handling of climate change and implementation of policy. The low level of public trust combined with the belief in the lack of solidity of the scientific evidence led to difficulty in knowing who to trust, which our research showed had a direct impact on levels of engagement with the issue.

11. In view of the role of Government Departments and members of the scientific community in communicating climate science, it is our strong belief that there should be a shift in focus with the latter taking

a more public role and propelling the arguments forward in the public sphere. The arguments need to be contextualised by the scientific knowledge, de-politicised and presented as evidence-based rather than as conjecture. There are however difficulties associated with this. Firstly that the science is complex and journalists struggle to find ways to engage audiences which is, of course, their primary concern. Further, partially as a result of this aim, the media have often drawn on "experts"—sometimes called climate sceptics—without the appropriate credentials to speak on climate science to fuel debate. There is evidence that these sceptics are a well organised and well funded group with the aim of discrediting climate science and downplaying the need for action[iii]—as a result they are vocal in publicising their views. This stands in contrast to climate scientists and other experts in the area of climate change who are reluctant to do so. However if the scientists developed high profile public roles, it would reduce the capacity for the sceptics to challenge their credibility. This would make it simpler for audiences to identify those sources of trust and to focus on accurate information. Our research also showed the importance of the reinforcement of media messages suggesting a key part of building these public roles is to be prolific in spreading their knowledge.

12. The role of the political speakers in this process lies in their agenda-setting powers. In recent years an equal if not more significant problem in climate change communications is that there has not been enough of it. Since 2010 there has been a global and national decline in the coverage of climate change[iv] and our research showed that this impacts on the public's sense of it being a pressing problem. Simply if it is in the news, it is more likely to be thought of as a priority and to play on people's minds. This decline is due to a number of factors but one reason is that the media take their lead from the official sources upon which they are reliant on for their information. Politicians are the most significant of this group. The BBC, in particular, sets its agenda on the basis of the political debate as a key aspect of its role is to present the range of views in a democracy in which parliament is seen to represent the will of the people. In essence therefore the boundaries of parliamentary debate form the core of the political arguments which it features. Climate change has not been a major priority of the coalition government—and the dissent over climate change and related issues was exposed through the internal conflict over the Energy Bill and the lack of promotion of the latter from the major political players including the Prime Minister since coming into office, suggest a real lack of political will in this area. The media therefore has reflected that lack of priority.

13. Whilst we would argue the scientists should take centre stage in the coverage, it therefore lies with the politicians to open up the media landscape. Politicians need to promote the issue and raise the profile of the scientists and independent experts, such as engineers, as a unified group who are arguing the case for evidence-based policy. Central to this is the communicative relationship between scientists, Government Departments and journalists from the full range of media, but the evidence must be seen to be coming from the scientists. In relation to the aforementioned difficulties that journalists face in covering as complex an issue as climate change, leading figures, such as Professor Lord Stern, have argued for a communicative approach that frames the issue in terms of risk rather than uncertainty, which is something both journalists and audiences struggle to grapple with. Simple messages about risks in relation to extreme weather events, for example, which centralise the scientific arguments about risks may be a potential way forward.

14. With climate change, perhaps more so than any other policy issue, it is imperative that the public understand the issues and the importance of action to be taken. Improved understanding and greater sympathy with the issue can both legitimise policy action and therefore facilitate change at the collective level. This is particularly important in the context of austerity in which any investment and expenditure need to be justified. The reduction in carbon emissions—by 34% by 2020 and at least 80% by 2050—enshrined in law through the 2008 Climate Change Act will not be met without individual action. The likelihood of effective collective action happens in the intersection between sympathetic attitudes and structurally imposed and supported behaviours. Our research showed that there is currently little faith in the power of individual behaviours conducted in isolation. The cynicism about public figures, and resultant feelings of distrust, found in our research indicates that initiatives which rely on voluntary behavioural changes are unlikely to be widely engaged with. However, we did find in our groups, in the majority, a clear sense that decisive action would have to be taken. There was an acceptance, for example, that air travel might have to be curbed or made more expensive. Such action was expected to be initiated at the governmental or local authority level. It seems likely that if a clear lead was given then the public would, however grudgingly, accept it. This is actually the history of public acceptance of legislation on issues such as wearing seat belts in cars or motor cycle crash helmets, but it does require organised collective action. Counter to this, in relation to the role of public communications about climate change policy and initiatives, there is little point in driving home the message about behavioural change unless there are simple, effective and supported solutions open to people from which they can see the real benefits.

15. In relation to the question of the knowledge and expertise that the Government have in the area of public understanding of climate science and the response to public policies, there has been some criticism of the way in which DEFRA, and other agencies, attempt to motivate social behaviours by the use of external drivers such as pro-environmental materials which does not take account of broader systemic issues.[v] But whilst these issues are clearly significant—people are unlikely to take up cycling to work without the protection of a network of cycle lanes—we argue this does not sufficiently account for the way the media shape possibilities within those bounds. The range of the work of the Glasgow University Media group has showed the conditions under which new information produced sometimes radical changes in behaviour—for example, in our work on HIV/AIDS, we analysed the differing effects of the government campaign on changes in condom use and sexual behaviour.

The link between smoking and cancer has also clearly produced substantial behavioural change. But there are also examples in which new information does not produce such changes and the literature illustrates that information on climate change often fails to do so. Our research would strongly suggest that one of the reasons is that the information in the area of climate change is so widely contested that there is no simple understanding which could lead to engagement with or without all the other cultural and social considerations. There is also a lack of research looking into the kinds of information, and factors such as source, context and media, which might lead to commitments to alter behaviour—which would also allow for the potential impact of other factors which might overwhelm responses to information, as well as those cases in which the opposite is the case. It is this lack that our research sought to redress and the related question of what would be the most effective approach to communications about climate change—which we have addressed in this statement to some degree—we believe needs further research.

Notes

The project report is available at: http://www.chathamhouse.org/publications/papers/view/188145

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June 2013

Written evidence submitted by the Science Media Centre (CLC52)

1. Introduction

The Science Media Centre (SMC) was set up in 2002, in the aftermath of public controversies on BSE, GM crops and MMR, and in response to recommendations in the House of Lords Science and Technology Select Committee's 2000 report on science and society. Its aim is to support and encourage more experts to engage with the media more effectively in times of crisis and controversy, to ensure that the public get access to accurate and evidence-based information through the news. In over 10 years of responding to stories such as "Climategate" and working with scientists to communicate complex science to the media we have built up a huge body of expertise.

2. Communicating Climate Science to the Public

As an organisation we support openness and transparency in all areas of science, particularly where there is media controversy. We run press briefings for journalists, produce fact sheets on controversial scientific areas and seek quotes and interviews from scientists when their subject is in the headlines. We ran the press briefings for all three of the inquiries into UEA and "Climategate". Our 11 years' experience working with climate scientists to communicate climate science is summarised in the following paragraphs.

2.1 *Get the science out there*

The main contribution researchers can make to the public understanding of climate change is to publicise and shout about all the research taking place. Scientists are filling in the gaps in knowledge and reducing uncertainty every day through research, but often it is published in obscure journals without drawing the media's attention to it. The SMC works regularly with the UK's top climate scientists to ensure the translation from university lab to newsroom is accurate and responsible, and we urge climate researchers to work with press officers to identify more studies that will be of wider media interest.

2.2 *Every crisis an opportunity*

The SMC sees all issues in the headlines as opportunities to inform the public and policymakers about key issues, and we encourage experts to engage, irrespective of how complex or controversial a story becomes. "Climategate", when the emails of climate scientists were hacked and made public, was the perfect example of this. Science was under attack but it captured the media's attention for weeks and was therefore the ideal opportunity to talk about climate science to a captive audience. The SMC ran a number of media briefings during this time, including an emergency background briefing with three of the UK's top climate scientists on the state of climate science, to keep channels of communication wide open and journalists well informed. Indeed, as the four separate inquiries concluded, the science itself was sound and robust. Science has nothing to hide and should be transparent and forthright at all times.

2.3 *Correct bad and exaggerated science*

In September 2011 the Times Atlas published new maps of Greenland which misinterpreted scientific data and incorrectly showed ice loss to be worse than it really was. This was a publisher's error and the first people to spot it were glaciologists—who know that ice loss from warming is indeed fast and alarming, but who were concerned that false information was being presented to the public in these maps. The SMC helped them communicate this to the press. Incorrect information must be corrected wherever it is found and scientists are the best people to do that; if it is left unchallenged it undermines trust in science.

2.4 *Don't gloss over uncertainties*

Uncertainty is a normal feature of every branch of science, particularly when we are talking about prediction. It is sometimes used by climate sceptics to foment doubt over global warming, just as tobacco companies did with smoking and cancer, and such hostility can make scientists fearful of "admitting" to uncertainties or gaps in knowledge. But those uncertainties should never be papered over or dismissed; that would (a) be dishonest and (b) risk overclaiming. There is a huge difference between uncertainty in science and simply "not knowing", so how those uncertainties are explained is of high importance and scientists should be supported in their efforts to explain highly complex findings to the mass media.

2.5 *Shout just as loud when new science shows reduction in warming*

The picture of man-made global warming becomes clearer every time a new paper is published, but sometimes data show that predictions have to be revised downwards—such as the Met Office data which was posted to their website on Christmas Eve 2012. It was brought to the attention of the press by sceptic groups and made to appear that "bad news was being buried"—it was not, this was an honest mistake on their part, but damage was done to the image of climate science. Once again, science does not take sides, and there is nothing to be ashamed of about such evidence. Scientists should always be the ones bringing these stories to the media and should have no fear of doing so.

2.6 *Stop obsessing about sceptics and address the reasonable majority*

The majority of the public are honest and pragmatic. We want to be told the truth so we can make up our own minds. Climate sceptics shout very loud and are given disproportionate media attention but they are not representative of public opinion. Climate scientists should always feel able to face the sensible, neutral majority when communicating their work.

2.7 *Beware of looking like campaigners*

The SMC tries to ensure that public debate is informed by the most accurate, evidence-based science. Of course it's perfectly alright for scientists to campaign about any issue of importance to them if they choose. But science does not exist to win arguments or be on message. Scientists are not campaigners, and they should always be allowed to stick to the evidence. Climate data tell an important story but science is neutral; it is important that climate science is presented to the media accurately, and scientists should be unconcerned with the "message" beloved of green NGOs or environmental campaigners.

2.8 *Be on the front foot*

When climate science or the integrity of scientists are unfairly threatened it is important that the media present a fair assessment, not just rumours and hearsay. The Intergovernmental Panel on Climate Change (IPCC) frequently comes under fire in an attempt to call its science into question. When the work of IPCC author Prof Martin Parry was under scrutiny in a Dutch Environment Agency report, we arranged for him and his colleagues to meet journalists to anticipate and tackle the criticisms head-on, resulting in more balanced coverage at a febrile time. Similarly when the emails of Prof Phil Jones' were dumped on the internet for a second time we rushed him to the SMC to take reporters' questions on the same day. These activities help ensure the press receive the full story. It is essential that scientists, assisted by communicators and press officers, are prepared for any attempts to discredit their work, particularly in advance of the IPCC's Assessment Report 5 whose publication begins in September 2013.

2.9 *Disagree openly*

Science is an argumentative profession; indeed it progresses by trying to prove itself wrong. Scientists should be able to freely express disagreement in public and we believe this strengthens science, not diminishes it. There exist a million genuine, intelligent disagreements about the details of climate change, but these are often overshadowed by the essentially false debate over whether climate change is real.

3. Climate Change and the Media

Science is at the heart of almost all the major challenges we face as a society: how to treat incurable diseases, how to feed the growing population, how to tackle climate change. Surveys continue to show that the public get most of their information about science from the mass media, including television and newspapers[1].

Climate sceptics—those with a view contrary to that of the mainstream climate science community—have sought to undermine public confidence in the science by misrepresenting studies and cherry-picking data, and this conflict has fuelled media reporting.

Yet there is overwhelming agreement among climate scientists publishing in peer-reviewed journals that climate change is real and man-made[2], and it is important that this is reflected in media coverage. The media has a crucial role to play in the understanding of this area of science but it has become a highly political issue, confusing (sometimes deliberately) our societal response to climate change with the reality of climate change itself.

Climate change is a slow process whose trends are reflected over decades not days and whose impacts are not immediately apparent; this makes it an unattractive subject for regular media coverage and appetite for reporting since Climategate has dropped dramatically. But when it is covered, the specialist science and environment journalists at the majority of national newspapers and broadcasters have helped ensure that climate science gets fair representation. The BBC is particularly good, especially so since the Trust Review which rightly recommended they avoid the "false balance" created by giving equal weight to sceptics and scientists.

But many of the underlying values remain in newsrooms: the appetite for a scare story, the desire to overstate claims made by one individual, the reluctance to put one alarming story into its wider context, "journalistic balance" that conveys a divide among experts where there is none, and so on.

4. Who to Trust?

Public trust in scientists remains extremely high among the professions.[1] Much of this is down to an expectation that scientists stick to the evidence and tell it straight. The SMC supports scientists in their efforts to communicate the science and impacts of climate change accurately to the news media and not get embroiled in political differences or messaging; scientific evidence is not a tool to change behaviour. Science does not work by consensus, but consensus is a strong indicator of scientific confidence to journalists and the public. It should underpin government policy and public confidence, just as we expect in medicine.

Part of public trust in scientists comes from many experts independently coming to the same conclusion. It is therefore essential that all climate scientists, especially those advising government and at arms-length bodies, are supported at all levels of government in communicating their science openly and transparently to journalists.

The UK is lucky to have such a huge number of excellent specialist science and environment journalists, across news outlets from tabloids to major broadcast organisations and much accurate, evidence-based reporting can be traced back to them. These specialists are a dedicated and skilful group of journalists who, despite the pressures of the newsroom and editorial lines, take pride and responsibility in getting science stories right.

Finally, much has been made of the lack of increase in average surface temperatures since 1998, despite this being well within most predictions and a too short a time frame to draw new conclusions. It is sometimes used to suggest that global warming has stopped, disregarding all the other clear indicators such polar ice melt. Similarly, the idea that the world will gradually get uniformly warmer is am often exploited myth. Climate science is a complex, emerging field and scientists need to be able to speak confidently without fear that their comments will be undermined for political gain, and parliament can assist with clear, cross-party recognition of the reality of human-induced climate change even when differences remain over the policy response.

June 2013

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[1] BIS Public Attitudes to Science 2011: http://www.bis.gov.uk/policies/science/science-and-society/public-attitudes-to-science-2011

[2] Quantifying the consensus on anthropogenic global warming in the scientific literature, Cook et al, Env Res Letters, May 2013

Written evidence submitted by the Science Museum, London (CLC53)

Introduction

1. The Science Museum is one of the UK's leading cultural institutions, and occupies the interface between science and public. As such, we can offer unique insights into public understanding of scientific issues, public trust in science and its institutions, and strategies of communicating science to the public.

2. The Science Museum's mission is to make sense of the science which shapes our lives, help create a scientifically literate society and inspire the next generation. Our ambition is to be the leading international museum championing the understanding, enjoyment and prestige of science in modern society.

3. We receive around 3 million visitors each year. Children and young people are a key target audience. 37% of visits are by children aged 0–15. Education groups account for 409,000 visits annually (14% of total), which is the highest recorded number of annual visits to a UK museum by people in education groups.

This Submission to the Committee has been prepared by:

- *Alex Burch,* Director of Learning, Science Museum.
- *Roger Highfield,* Director of External Affairs, Science Museum.
- *Alex Johnson,* Exhibition Development Manager (climate change), Science Museum.

Background

4. Since 2002 the Science Museum has been delivering exhibitions, events and online activities to engage families, adults and school groups with climate change. Looking forward, climate science and sustainability remain key themes in our strategic engagement framework for the next decade.

4.1 When it comes to public understanding of climate science, one recent programme stands out. In 2010, we launched a new exhibition, *atmosphere…exploring climate science*, and an accompanying programme of exhibitions, installations, events, schools outreach and web content.

4.2 The mission for the atmosphere exhibition was to "Deliver an immersive, enjoyable and memorable (life-enhancing) experience that increases interest, deepens understanding and is robust against deeply held critical convictions". The exhibition is aimed at families with children aged 8+, KS3 & 4 students and their teachers, and adults (non-subject matter specialists).

4.3 Since opening, the gallery has been visited by over 1.7 million visitors. The gallery received 737,000 visitors in its first year, far exceeding its 400,000 visitor target. An estimated 134,000 of these came in education groups.

4.4 We launched a three-year programme of schools outreach around climate science in 2010. Working with 4 partner museums (National Railway Museum in York, Museum of Science and Industry in Manchester, At-Bristol science centre, Catalyst Science Discovery Centre in Runcorn) we have engaged 3,193 secondary-school students with issues of climate science and its communication over the course of the project. In the programme's second year, during which participating students produced a magazine called *ATMOS*, 10,000 copies of the publication were distributed—and feedback was received from the then Secretary of State for Environment, Food and Rural Affairs, Caroline Spelman.

4.5 To accompany the gallery, we launched an online education game about risk management, *RIZK*. This appears on 1,306 websites, and has been played 3.3 million times since launch. The top countries accessing the game are the US (768,040) and China (492,667), followed by the UK (248,892), enabling us international outreach.

4.6 Detailed content from the gallery is also available on the Museum's website. To date, this *Climate Science Info Zone* has received 122,448 visits and 556,427 pageviews.

4.7 A suite of resources for teachers was also launched for use in the classroom. These have been downloaded 27,365 times, and have been reproduced on other sites including *TES Online* and *Guardian Online*.

4.8 We have been exploring, in conjunction with the British Council the possibility of offering our online content (Info Zones and teaching resources) in Portugese.

4.9 Additional temporary exhibitions have enabled us to explore climate-related issues in more depth. *Water Wars*, a future-looking exhibition showcasing technological solutions to problems of water security, launched in 2012 and received 800,000 visitors.

Response to the Committee

5. The Science Museum conducts qualitative research before, during and after development of major projects. The role of this is to identify barriers to engaging with the subject matter in order to ensure the results are engaging, accessible and educational. This research together with broader research conducted is highlighted below.

6. Our research coupled with that from elsewhere suggested that for many people climate change was something that happened elsewhere, to other people and in the future (eg see Weber 2010). Additionally, agreement that climate change is real and happening doesn't necessarily translate into concern.

6.1 Ipsos-MORI research from 2007 indicated that whilst people viewed climate change as important on a global scale, it wasn't as important on a national or local scale.

6.2 In a 2011 nationwide survey 80% of respondents felt that the world's climate is changing and two-thirds of respondents were at least fairly concerned. However the same report also highlights that the percentage of people not at all concerned has risen from 3% in 2005 to 13% in 2011 (Shuckburgh et al. 2012)

6.3 Evidence suggests that attitudes and levels of concern are influenced by policy and major climatic events (Ipsos-MORI 2007; BBC 2010) and that concern about environmental risks fluctuate over time in relation to other risks (Ipsos-MORI 2007; Weber 2010, Eurobarometer 2009). People in Europe who identify themselves as being informed about climate change (its causes, consequences and ways of tackling it) are significantly more likely to consider it one of the most significant problems we face today (Eurobarometer 2009).

6.4 The Ipsos-MORI report of 2007 also showed that for the UK population 38% thought that climate change would have a great deal of effect/quite a lot of effect on them personally, compared to 89% of respondents who thought it would have a great deal/quite a lot on future generations.

6.5 A report for Defra (COI 2008, cited in Poortinga et al., 2011) indicated that around 1 in 10 young people rejected the notion of human-induced climate change. Our own research conducted during a five year project with teachers also indicated that some teachers are uncomfortable teaching this subject and supporting discussion around it.

7. Our qualitative research with adult visitors indicated that understanding of the science was patchy and disconnected (Dillon & Hobson 2013). These findings are supported by other research, eg in a nationwide survey conducted by ESRC (2003 publication), 54% of respondents linked the role of greenhouse gases to thinning of the ozone layer and 66% identified the ozone hole as having a role in climate change.

7.1 41% of UK respondents felt they know a fair amount/a lot about climate change (Shuckburgh et al. 2012).

7.2 Of concern, two large surveys found a high proportion of the public believe nuclear power contributes to climate change—44% in the ESRC survey (2003) and 39% in a 2005 survey (Poortinga et al., 2006)

7.3 There is evidence that the public don't understand many key terms—eg "adaptation", "anthropogenic", "aerosol", and are confused by caveats such as "may, likely to" (Dillon & Hobson, 2013; Shuckburgh et al. 2012).

7.4 Research indicates that people want to understand more about the science and the mechanism of climate change rather than just the impacts (Brehault et al. 2009; Shuckburgh et al. 2012).. However, evaluation of visitors post-opening identified a significant barrier—some people perceived themselves to be well-informed about certain areas of climate science, even if, objectively, they were not. As a consequence, these visitors did not engage with sections of the exhibition and did not deem the experience to have deepened their understanding (Clipson and Hobson 2011).

8. Research reveals that while the public generally trust scientists as a source of information about climate change, there is evidence that negative stereotypes of scientists (eg poor communication skills, remoteness) are a barrier to direct public engagement with researchers. This indicates an important role for trusted institutions such as the Science Museum that occupy the interface between the scientific community and a diverse, non-specialist audience. The Science Museum is the public face of UK research and it is our role to showcase and communicate the latest scientific research and technological innovation in its galleries, through its events and through its online channels.

8.1 A recent survey by Ipsos-MORI (2012) found that of 1,021 respondents, 66% considered that scientists were the most trusted source of climate change information. In comparison, only 3% of respondents would trust politicians. Similarly, quantitative data from 2007 (Ipsos-MORI) showed that journalists and politicians were the least trusted professions, suggesting implications for communication. However, Shuckburgh et al.'s (2013) large scale survey found that whilst around one-third of respondents would trust climate scientists to tell the truth about climate change, another third wouldn't trust them to tell the truth.

8.2. Shuckburgh's research reveals the value people place on hearing directly from those conducting research. The Science Museum regularly runs events in which the public interact directly with scientists, and we have conducted surveys of participants to assess the impact. Of those surveyed, 70% of participants stated that they discussed their experience with someone else after their visit, suggesting the experience was memorable and had a lasting impact. In particular, 31% of online survey respondents reported that their understanding of what scientists do had increased "greatly" as a result of their experience (Paynter 2011). In addition, our

evening Lates programme has run 4 climate-science-themed evenings, engaging over 11,000 adults in total. Speakers at these events have included high profile scientists and policymakers.

8.3 Shuckburgh's research also highlights that the poor communication skills of scientists is perceived as a problem amongst the public. Focus group participants cited negative stereotypes such as remoteness as a barrier to their engagement with scientists. The Science Museum regularly partners with scientific organisations to share our experience in public engagement, building capacity in communication skills within the next generation of scientists and researchers. Building on the format of a successful public engagement project with early-career engineers in 2012, we are piloting a project in 2013/4 which will provide training opportunities and practical public engagement experience for doctoral students conducting climate research, in partnership with Imperial College's Grantham Institute and the Climate Change Consortium of Wales.

9. Levels of public trust in museums are high, providing opportunities for the sector to play a key role in climate science/climate change communication.

9.1 A 2009 survey of 2100 Australian and US residents revealed that public trust in museums was "second only to science organizations and way ahead of the mainstream media and government as places to communicate climate change and raise awareness of climate change" (Cameron et al, 2013)

9.2 These findings are consistent with our research on our own visitors. In 2008, we conducted 6 focus groups with representatives from key target audiences. Participants viewed the Science Museum as a highly appropriate place to provide factual engagement with the issue of climate change. They expected us to provide clear, definitive information about the topic (TWResearch 2008).

9.3 These focus groups revealed 3 key factors that compromise people's level of trust in institutions delivering messages around climate change (TWResearch 2008; Dillon and Hobson 2013).

9.3.1 Hypocrisy. Participants needed institutions to "practise what they preach", and did not want to be told to take actions without evidence of others doing the same.

9.3.2 Profit. Participants were highly dubious of information from sources that they perceived to be profiting from the issue. This applied equally to individuals (eg a scientist funded by government or business) and to organisations (eg a company selling green technologies).

9.3.3 Inconsistency. Participants expected sources to have a consistent stance, rather than appearing to follow trends.

9.4 In recognition of hypocrisy as a potential barrier to trust among our visiting public, the Museum undertook various measures during the development of the *atmosphere* project. These include employing a Sustainability Consultant, and setting up a Carbon Reduction Working Group that reduced the organisation's carbon footprint by 17% between 2009 and 2010.

9.5 It is our belief the Museum has a responsibility to showcase best practice in sustainability. Our new Hempcrete storage facility at our Wroughton site won Museum and Heritage's Sustainability award and the Best Workplace New Build category at the Greenbuild Awards. We also aim to generate energy from our sites both for our own use, and to send to the grid. An example of this is the proposed 40MW solar array at the Wroughton site which will provide electricity for around 12,000 homes.

9.6 Mindful of profit interests as a potential barrier to trust, full editorial control of content was retained by the Museum—as is the case with all our projects. We were transparent about who funded the project, and a full list of external expert checkers involved was prominently displayed.

9.7 Regarding public mistrust of sources appearing to deliver inconsistent messages, our focus group findings suggested that people struggle to reconcile their understanding of science (objective and fact-based) with the reality that scientists often disagree, and that future climate projections vary. This misunderstanding about the nature of science is widely documented in science communication and science education literature (eg Lederman 2007).

9.8 In our research we found that visitors were largely unaware of the actions Government—and business—was taking around climate change. Without understanding this they were reluctant themselves to adopt actions, feeling that whatever they did it couldn't have the same scale of impact and Participants in visitor focus groups identified a number of barriers to engagement with the subject of climate change (Dillon & Hobson 2013). These included boredom, confusion, powerlessness and fear, and a lack of personal relevance.

9.9 Both the Science Museum's research and that of Shuckburgh et al.(2012) demonstrated the need for clarity in language, use of simple images, need for relevance to the visitor, perceived neutrality; explanation of underlying mechanisms; value of introducing new more hopeful stories, and need for a strong narrative to take visitors/readers through. A museum environment provides an opportunity to achieve this—an exhibition is a visual medium; we're able to introduce objects that are used in multiple areas of climate science research together with stories

of the scientists; interactives provide active engagement with science fundamentals and the opportunity to see cause and effect and play out scenarios.

10. Our research reveals that the atmosphere gallery is popular with visitors, and indications suggest they are having meaningful learning experiences. In addition, the gallery has received positive attention from representatives from the scientific, political and business communities.

10.1 The majority of visitors' perceptions of the gallery are positive. In evaluation surveys, visitors described the gallery as "interesting" (88% of surveyed visitors), "enjoyable" (79%) and "educational" (76%). In addition, our qualitative research provides evidence of learning among those who visit. For instance, interviewees reported greater confidence expressing views about climate change, and being inspired to learn more about the subject—both of these are measures that we attribute to visitors having had a meaningful learning experience (Clipson and Hobson 2011; Science Museum 2009).

10.2 To date we have given over 50 tours of the gallery to organizations and high profile individuals from political, business and cultural spheres. The gallery has been visited by international visitors including Al Gore, the Chinese Ambassador, and a delegation of MP's from India, Bangladesh and Sri Lanka. All have been interested in how the Museum has successfully communication this complex issue.

11. One quarter of all visitors to the Science Museum visit the atmosphere gallery. However, despite its success, we know that many people will not choose to visit a gallery dedicated to climate change. In addition, there are many more people who are unable to visit our London building. In order to reach a larger, broader audience, we run a diverse programme of exhibitions, events, art installations, outreach and online content relating to climate change.

11.1 Our online educational game, *RIZK*, allows millions of visitors across the world to explore risk management and investigate the relationship between probability and frequency.

11.2 The role art can play in obliquely communicating complex messages is well documented (eg Cameron et al. 2013) and the Science Museum's Arts Programme has played a growing role in the way we engage our visitors with scientific and technological issues. One innovative offer that launched in 2010 is our Cockroach Tour, a participative art piece by Danish collective Superflex. Visitors explore the Museum and the story of human history and society from the perspective of cockroaches. Though offbeat, this project has proved highly popular (receiving 84 unsolicited positive feedback responses in its first year) and provides a new way of engaging with the issue. Another example is the art commission within the *atmosphere* gallery itself—most recently Tony White's new novel *Shackleton's Man Goes South* (launched 2013).

11.3 Through a current project *Climate Changing Stories*, we seek to demonstrate that every object in our collection has the capacity to tell a story about climate change. A trail of exhibits runs through the museum, consisting of reinterpreted objects from our collection and provocative art installations. Some examples include the Bersey cab, which is an early electric taxi from the 1890s, and artist Thomas Thwaites's Toaster Project, a comment on the hidden side of mass production.

11.4 Our Dana Centre, a pioneer in using dialogue events (adult, face-to-face forums) as a method of engaging the public in science and technology, has received 1219 adult attendees to climate-themed evenings since December 2010.

12. Museums are perceived as impartial, "safe" spaces where a variety of voices can be heard and diverse interactions can occur (Cameron 2013). This suggests opportunities for museums to bring together scientists, the public, government and business during policymaking.

13. We believe that international networks of museums have great potential for coordinating and promoting communication and action on climate change, as the public view them as a source of authoritative and neutral information. In 2007, the US-based Association of Science and Technology Centres (ASTC) launched IGLO (International Action on Global Warming), a 2-year project that coordinated public engagement events across 541 international member organisations. We believe that in future, similar networks provide powerful opportunities to reach broad, diverse publics.

June 2013

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Written evidence submitted by The Royal Society (CLC054)

1. The Royal Society welcomes the opportunity to respond to the UK Science and Technology Committee's Inquiry on "Climate: Public understanding and its policy implications".

2. The Royal Society is the national Academy of science in the UK. It is a self-governing Fellowship of many of the world's most distinguished scientists. The Royal Society's Science Policy Centre (SPC) draws on the expertise of the Fellowship to provide independent and authoritative scientific advice to UK, European and international decision makers.

3. The Royal Society works on a wide range of issues related to climate science, with a particular emphasis on communicating accurately the most up-to-date science to non-specialist audiences.

4. The report *Climate science: A summary of the science*[162] produced in 2010 was a compact summary, which described in terms of level of certainty the current state of knowledge. Similar reports following this pattern were subsequently produced in other countries.

5. The Society is currently preparing a new report on climate science in conjunction with the US National Academy of Science. The report will addresses key questions of public interest and communicate new developments in climate science. It will articulate the key elements of current scientific understanding about how the Earth's climate system is changing and why, discuss where significant scientific uncertainties remain and highlight and discuss recent observations and results.

6. Royal Society reports have also been produced on related issues of geoengineering the climate[163] governance of research into solar radiation management,[164] ground-level ozone,[165] and ocean acidification.[166] The Royal Society also holds meetings on subjects relevant to public understanding of climate science, such as discussion meetings on handling uncertainty.[167,168]

7. It is essential that the very best independent scientific advice from across all pertinent disciplines is utilised in policy-making and that scientific uncertainty is openly acknowledged and communicated in a clear and understandable way. In keeping with the government's own guidelines on scientific advice, scientific evidence and expert judgement should be given in an open and transparent manner in order to ensure both technical robustness and public credibility.

8. Government departments, scientific advisers to Government and publicly funded scientists all have a role in communicating science and technology issues. It is essential that communications on all science and technology issues, including climate science, are aligned with the following core principles: openness and transparency; representing the best expertise across all relevant disciplines; independence; accurately reflecting the latest science, and; clarity around any scientific uncertainties.

9. Many factors besides science feed public perceptions and inform policy development, but it is essential that communication about climate science accurately reflects the latest peer-reviewed science. However, public debate about climate change is not always founded on accurate science. Poor quality science and assumptions based on poor science, are likely to cause problems. (This is also true of other, non-climate public interest issues such as MMR vaccination). Examples of poor science include excessive, exclusive or undue emphasis on certain aspects of science or data (often called "cherry picking") and, in some cases, misrepresentation or public misinformation. The risks of misinformation or miscommunication can, to some extent, be countered by adherence to the principles set out above (see paragraph 8).

10. In his 2012 Anniversary Address,[169] Royal Society President Sir Paul Nurse FRS considered the characteristics of bodies that should be trusted to give good scientific advice. He said: "It is always useful to look at the scientific advice from different bodies because it is good to be exposed to a range of opinions. However, some types of bodies are likely to be more reliable at giving scientific advice. In general terms the characteristics to look for are as follows: they should be broadly based, be impartial, understand the methods and values of science, respect openness, and carry out proper peer review."

11. The Government's "Guidelines on scientific advice" recognise the importance of public dialogue on issues involving science and technology. Public and stakeholder dialogue is vital in broadening understanding of science and technology issues and in developing appropriate policy responses. Open engagement with the public on a range of subjects, including climate science, will increase awareness of scientific issues that can impact on societal well-being, enrich public debate and, ultimately, inform policy responses. Public engagement also informs expert scientists about matters which concern the public that might not occur to them. On this subject, Paul Nurse has noted: "One anxiety I noticed was frequently expressed during public consultation exercises over GM crops was a concern at 'eating food containing genes'. This was an issue a scientist was unlikely to have considered but was a perfectly reasonable one for a member of the public to express."[170]

[162] http://royalsociety.org/policy/publications/2010/climate-change-summary-science/
[163] http://royalsociety.org/policy/publications/2009/geoengineering-climate/
[164] http://royalsociety.org/policy/projects/solar-radiation-governance/
[165] http://royalsociety.org/policy/publications/2008/ground-level-ozone/
[166] http://royalsociety.org/policy/publications/2005/ocean-acidification/
[167] http://royalsociety.org/events/2010/uncertainty-science/
[168] http://royalsociety.org/events/2012/uncertainty-weather-climate/
[169] http://royalsociety.org/uploadedFiles/Royal_Society_Content/about-us/history/anniversary/2012–11–30_Anniversary%20Address.pdf
[170] Ibid.

12. Climate change is a global issue and as such national policy development and public understanding should also be considered in the international context. The Society has collaborated with other Academies around the world to develop interacademy statements—at both G8+5 and global levels (through the IAP global network of academies). These have set out clearly the consensus among the international scientific community on wide-ranging issues, including climate change,[171] energy efficiency and climate protection,[172] ocean acidification[173] and tropical forests.[174] In 2010, Sir Peter Williams FRS FREng (then Treasurer and Vice President of the Royal Society) participated in an InterAcademy Council Committee to Review the Intergovernmental Panel on Climate Change.[175]

13. These international (often collaborative) undertakings can help to shed light on public perceptions abroad. A good grasp of public perceptions in different international settings is important because there may have to be some convergence of public attitudes across the world if international agreements of any significance are to be reached.

14. That is to say that the global nature of climate change means that national policy actions (including those of the UK), if they are to have any worthwhile effect, should take account of likely actions by other nations, which can be affected by public awareness abroad. Useful lessons about public engagement on climate science (and other issues) may also be gleaned from other nations' experiences.

June 2013

Written evidence submitted by British Sky Broadcasting Limited ("Sky") (CLC055)

INTRODUCTION

— Sky welcomes the opportunity to respond to the Committee's inquiry on Climate: Public understanding and policy implications. As a company whose TV, broadband and home telephony services are at the heart of 10.7 million homes we are aware of our role in public awareness and understanding of climate change issues.

— Sky believes that climate change is one of the world's greatest challenges and having millions of customers watching our channels and using our internet services provides us with the opportunity to create deeper engagement and dialogue around the issue. Harnessing our wealth of experience and expertise as a media company, Sky has developed a wide-ranging strategy aimed at raising awareness and understanding of the impact of climate change. This approach encompasses our factual programming output, wider communication with our customers and management of our physical footprint.

— For the purposes of this response we have limited our comments to how we see our role as a media company in raising public awareness and informing our customers on the issues surrounding climate change.

ENVIRONMENTAL PROGRAMMING

— Sky's approach to factual environmental programming is based on the belief that climate change is a reality and as such the nature and tone of our content reflects this. Sky's wider perspective does not extend to Sky News' coverage which, is determined by the independent editorial judgement of its news teams. How it chooses to cover stories is wholly down to its own internal processes and judgement based on the merits of the information available.

Factual Programming

— Sky's factual team commissions an extensive number of environment programmes. In addition to year round commissioning, Sky also commits to a week of programming, twice a year, called *Rainforest Week*, which is dedicated to raising awareness of deforestation in the Amazon rainforest. Since 2010 there have been six *Rainforest Weeks* with 120 hours of programming aired on Sky 1 and Sky Arts.

— We aim to make our environmental programming as insightful, engaging and relevant to its audience as possible. It is carefully produced and targeted to ensure that it engages our viewers, many of whom might not necessarily be interested in environmental issues. Rather than creating content that is science focused our commissioning focuses on programming that is accessible, using engaging formats and household names as presenters in order to capture people's imagination.

[171] http://royalsociety.org/policy/publications/2005/global-response-climate-change/
[172] http://royalsociety.org/policy/publications/2007/sustainability-energy-climate/
[173] http://www.interacademies.net/10878/13951.aspx
[174] http://royalsociety.org/policy/reports/statement—tropical-forests/
[175] http://reviewipcc.interacademycouncil.net/

— For example programmes such as *Lilly Cole's Amazon Adventure*, in which model and environmentalist Lilly Cole travelled to the Amazon to see first-hand the projects created by Sky's Rainforest Rescue campaign to stop deforestation in the Brazilian Amazon, and *Rooftop Rainforest*, where a rainforest was constructed on top of Westfield shopping centre in time for Earth Hour in 2012, have allowed us to raise serious environmental issues in a more understandable way.

— This commissioning approach is mirrored across all our environment programming, with the aim of creating formats that stimulate interest and content that people can relate to. For example *The People's Rainforest* was a two part programme highlighting the consequences of continued rainforest destruction, using a series of challenges and stunts, people discovered more about the natural resources the rainforest provides and an invited audience was able to experience a specially built rainforest in the studio.

— We are also able to use household names to good effect to highlight climate change related issues. For example Ross Kemp in *Battle for the Amazon* explored the socio and economic problems facing the rainforest, such as oil spillages and illegal logging in Peru and Bolivia. Similarly the presenter Steve Jones and his brothers were able to show how important the Amazon's habitat is for the indigenous people in *The Jones Boys Amazon Adventure*. Ben Fogle will also present a four part series *Storm City* in which advanced engineering technology and science is used by a team of experts to recreate (in 3D) the impact of natural forces on the human environment. The programme, which is yet to air, will explain how each natural disaster (earthquakes, floods, extreme winds and avalanches) relates to real events.

— Sky also seeks to reinforce the information contained within programming and its impact through social media and other corresponding customer initiatives or experiential activities. For example, we engage viewers through Facebook and Twitter in the run up to and during the programmes being aired, encouraging the 18,000 followers on our dedicated rainforest Facebook page and 6,000 on the corresponding Twitter account to actively engage with climate change issues. *The People's Rainforest* also used Zeebox, a social media and social television platform, to engage the audience during the programme itself around facts on the rainforest.

— Other examples include The *Rooftop Rainforest* installation on the top of the Westfield shopping centre that attracted 2000 visitors over the week it was filmed and a limited edition wild rubber jewellery collection was created alongside Lilly Cole's programme, using rubber harvested by rubber tappers in the Rainforest Rescue area. The jewellery, which sold out in a week, was accompanied by literature explaining the importance of developing a sustainable economy and how the wild Amazonian rubber used in the jewellery helps farmers in Brazil obtain an income from the forest instead of cutting down the trees.

News Programming

— As an independent breaking news service with a deserved reputation for offering impartial, insight and analysis on the latest stories, Sky News' programming is very different from the programming described above. As a rolling news broadcaster it is predominantly concerned with stories that are immediate and fast moving. Whatever the subject matter, stories are developed based on the judgement of output teams and editors who shape the direction of coverage and interviews over the day. Like any issue a climate change story will be treated on its merits and in the context of the wider news agenda that day. Underlying this is a strong tradition of providing distinct, fair and impartial news with a focus on presenting all the facts and points of view, explaining to viewers how and why a story is relevant to them and the possible consequences.

— Sky News also produces feature packages when editorially appropriate. For example earlier this year Sky News covered the 10th Annual International Antarctic Expedition, using it as an opportunity to take a more in depth look at the Antarctica issue specifically and climate change more generally. To make their coverage accessible the Sky News team developed a multi-platform approach and in addition to television reporting, they also produced a specifically designed iPad app and online resource with interactive map, a live web blog, specially made video explainers on climate change and the Antarctic Treaty, plus numerous pre-recorded YouTube interviews with climate change experts—giving the viewer/reader a chance to explore the subject in real depth.

Sky's Wider Impact as a Media Company

— As a subscription based media organisation Sky's ability to contribute to awareness and understanding around climate change goes far beyond programming. Using our relationship with our customers and suppliers Sky employs a range of activities to engage and inform and we hope through leadership in this area we can not only raise awareness but help encourage change.

Customer Engagement

— Sky's flagship Rainforest Recue campaign was developed in part as a result of dialogue with our customers and feedback that the rainforest is an important issue to them. The project, in partnership with the WWF, was launched in 2009 and aims to protect 1 billion trees in the state of Acre, northwest Brazil. We believe the project can make a real and lasting contribution not only through efforts on the ground on Brazil but also by using our influence as a broadcaster and media company to drive greater awareness and understanding of deforestation and climate change issues at home.

— Sky uses a range of communications channels to drive engagement with the campaign and understanding of the issues it seeks to raise. Sky uses its own promotional airtime, TV adverts and social media to drive awareness and donations to the campaign. Should they wish to people can even adopt a Jaguar or an acre of rainforest. We have also partnered with the Forestry Commission to create Sky Rainforest Discovery Trails which aim to inspire visitors to visit their local forest and learn why it and the Amazon rainforest are so special. The campaign also encompasses a schools strand, I Love Amazon Week, aimed at pupils aged 7–11 which provides schools with a week of rainforest-themed and curriculum based activities.

Operations

— From an operational perspective Sky also believes that our efforts to proactively manage our own environmental footprint and our advocacy around it also provide an opportunity to provoke thought and where possible take our customers, suppliers and business partners along with us.

— We are always looking for ways to improve our products and services and make them more sustainable. For example, we have made our Sky+HD box 29% more energy efficient than the previous model, saving over 90,000 tonnes of CO_2 a year and £20 million a year for our customers. To reduce waste and emissions, Sky makes it easy for customers to return, repair and recycle of all our products.

— We also have tools in place that help us manage aspects of our supply chain. We use the Carbon Disclosure Project (CDP) Supply Chain Programme to help us encourage our top 50 most carbon intensive suppliers to reduce carbon emissions.

Production

— Sky also looks at the impact our television productions have on the environment and again aim through advocacy and leadership to raise awareness of the practical implications of climate change within the media industry and beyond. A good example of this is the Sky Studios, Europe's most sustainable broadcasting facility which is powered by a combined cooling heat and power plant, it reduces our reliance on fossil fuels, with any remaining electricity purchased from renewable sources. This high profile project has stimulated a great deal of commentary and recognition and we have undertaken a great deal of communication around the environmental issues and benefits.

— We are also part of BAFTA's Albert Sustainability Working Group which gives us the opportunity to work with others from within the media industry to identify ways of reducing the environmental footprint of programmes. More directly we are also seeking to help our independent producers to identify environmental efficiencies.

July 2013

Written evidence submitted by Channel 4 (CLC056)

INTRODUCTION

Channel 4 has been asked to give evidence to the Science and Technology Select Committee inquiry on public understanding of climate, in particular in relation to the role of media in raising awareness of such issues. While it is important for the preservation of editorial independence that specific issues concerning editorial coverage are not subject to political interference, Channel 4 is happy to provide the Committee with information on the broader media landscape that it operates in—including our regulatory framework, our broad approach to science programming and how it delivers to our remit, and examples of specific programmes that relate to climate issues. The below note outlines these points in further detail below.

CHANNEL 4

Channel 4 is an independent publicly-owned, commercially-funded public service broadcaster, with a statutory remit to be innovative, experimental and distinctive. Unlike the other commercially-funded public service broadcasters, Channel 4 is not shareholder-owned: commercial revenues are the means by which Channel 4 fulfils its public service remit. In addition, Channel 4's not-for-profit status ensures that the maximum amount of its revenues are reinvested in the delivery of its public service remit.

Channel 4's remit specifically states that it must provide "*a broad range of high quality and diverse programming*" including "*programmes of an educational nature and other programmes of educative value.*"

This remit was updated by the Digital Economy Act 2010 which, among other requirements, states that Channel 4 must support and stimulate well-informed debate on a wide range of issues, as well as promoting alternative views and new perspectives.

We recognise that the media, including broadcasters, has an important role to play in improving public understanding, and raising awareness, of key issues of national and international interest, including scientific and environmental issues. Channel 4 regularly commissions programmes that cover these topics, including over the past few years, a number of programmes looking at the impact of, and reasons behind, changes to our climate.

As a commercially-funded public service broadcaster, Channel 4 must also ensure that its programming is as engaging and compelling to viewers as possible. Viewers appreciate genuinely bold and distinctive content that takes a unique and alternative look at scientific issues. In recent years, we have sought to maximise the impact and scale of this content through a number of ambitious formats—including live broadcasts, second-screen interactive experiences, and studio debates—thereby further helping to attract audiences that may not otherwise traditionally watch science-related programming.

Channel 4's Approach to Scientific Programmes

Factual programmes in areas such as science, including climate change, are important aspects of the traditional bedrock of public service television. Channel 4 recognises that such content needs to be both interesting and accessible in order to reach large audiences. In recent years it has sought to achieve this by focusing on issues that directly affect viewers (such as weather extremes) while ensuring that individuals with a real understanding of the scientific issues under discussion are featured often. This approach has proved popular with our target audience, with 95% of the UK's most popular factual programmes amongst 16–29 year olds in 2012 being original Channel 4 commissions.

In line with our remit, Channel 4 is also committed to demonstrating innovation and creativity in its wider approach to science programming and has, on a number of occasions in recent years, broadcast ambitious programmes that have sought to explore key scientific issues in imaginative and distinctive ways. These include:

- *Plane Crash (October 2012):*
  - A spectacular documentary that followed an international team of scientists, experts and elite pilots as they deliberately crash landed a 170-seat Boeing 727 passenger jet to provide a once-in-a-generation chance to study the mechanics and science of a plane crash in real time.[176]
- *Drugs Live: The Ecstasy Trial (September 2012):*
  - In a UK television first, two live programmes examined the neurological effects of MDMA and followed volunteers as they took the pure form of ecstasy, as part of a groundbreaking, ethics committee approved, clinical study. The programmes, presented by Channel 4 presenters Jon Snow and Dr Christian Jessen, aimed to cut through the emotional debate surrounding the issue and accurately inform the public about the effects and potential risks of MDMA. 84% of viewers questioned agreed that the programme helped to explain the clinical effects of ecstasy use.[177]
- *How to Build a Bionic Man (February 2013):*
  - This programme followed psychologist Bertolt Meyer, who has a bionic hand himself, as he met scientists working at the cutting edge of research to create a complete "bionic man" for the first time. The "man" was later displayed at London Science Museum and was also featured on Channel 4 News.[178]

Examples of Channel 4 Programmes Relating to Climate Issues

In recent years Channel 4 has provided a number of programmes aimed at improving public knowledge of the debate surrounding climate change. While some of these programmes have investigated the very issue of climate change itself, including a live studio discussion examining the best approach to tackling climate change in the long-term, much of our programming in this area has taken a broader look at the day-to-day effect of changes to our environment, such as changes to our weather systems, which we believe play an equally important educational role. In addition, *Channel 4 News* regularly provides coverage of climate change issues, both through its day-to-day analysis of policy developments and within its special reports.

Below is a list of examples of programmes that Channel 4 has broadcast in recent years on this issue—either directly examining the case of climate change or looking at changes to our climate and the scientific reasoning behind it.

- *The World's Weirdest Weather (April–May 2013):*

[176] http://www.channel4.com/programmes/the-plane-crash
[177] http://www.channel4.com/programmes/drugs-live-the-ecstasy-trial
[178] http://www.channel4.com/programmes/how-to-build-a-bionic-man

- Television weatherman Alex Beresford explored the mysteries behind some of the world's most climatic extremes for this series, using dynamic demonstrations to explain the science behind these events.[179]

— *The Year Britain Flooded (February 2013):*

- This documentary looked at the reasons behind the numerous incidents of flooding that took place in Britain in 2012, and provided expert interviews with climate scientists in its effort to analyse why 2012 was the second wettest year ever recorded in the UK.[180]

— *Is Our Weather Getting Worse? (December 2012):*

- This series examined a number of extreme weather conditions that occurred in Britain in 2012 and placed them in the wider context of climate change, asking whether the year was a one-off or a sign of climate change in action.[181]

— *The Year the Earth Went Wild (December 2011):*

- Using eye-witness footage, interviews with survivors and rescuers and analysis from geological and weather specialists, this documentary charted the major climate and geological events that took place in 2011 and sought to explain their cause.[182]

— *Up in Smoke (September 2011):*

- Filmed over four years, this *True Stories* documentary followed British scientist Mike Hands as he sought to find an alternative to slash-and-burn farming in equatorial rainforests, one of the biggest contributors to global warming.[183]

— *What the Green Movement Got Wrong (November 2010):*

- A group of environmentalists advocated radical solutions to climate change in this programme, including GM crops and nuclear energy. The film was accompanied by a live studio event, chaired by Krishnan Guru-Murthy and involving leading policy makers, commentators, scientists, environmentalists and economists, who debated the impact the green movement has had on global climate change.[184]

— *Man on Earth (December 2009):*

- Tony Robinson travelled back through 200,000 years of human history for this series to find out what happened to our ancestors when climate change affected their environment, and outlined what this taught us as we face our own climate changes.[185]

Channel 4 News

Channel 4's flagship news programme—*Channel 4 News*—can also play an important role in informing our viewing audience about developments in the climate change sector, which, in turn, helps to promote greater understanding of the wider climate change debate.

Channel 4 News has, in recent years, covered a number of climate issues, with our dedicated Science Editor, Tom Clarke, providing insight and analysis into these issues both on-screen and online. In addition, the *Channel 4 News* website provides a dedicated "climate change" webpage collating all our coverage on related topics.

As a daily news programme, *Channel 4 News* keeps viewers up-to-date with the key policy developments relating to climate change as and when they are deemed to be editorially relevant. In recent months, for example, the programme has covered events such as the extension of the Kyoto Protocol to further nations,[186] the announcement that Arctic ice levels have reached an all-time low,[187] and the publication of the Energy Bill.[188] A wide range of specialists on climate change are interviewed as part of these news articles in order to ensure that viewers are well informed about the broad range of views in this area.

In addition, *Channel 4 News* has also sought to provide viewers with further analysis of key issues in this area through a series of special reports focused in part on the effects of climate change. These have included:

— *Green and Pleasant Land (May 2013):*

- A series of special reports looked at the plight of Britain's nature, with a number of environmental issues covered including the effects of climate change on wildlife. Channel 4 News was given exclusive access to the first official scientific report by Britain's top 40 environmental scientists which showed how Britain's landscape and wildlife are being threatened by climate change and extreme weather.[189]

[179] http://www.channel4.com/programmes/the-worlds-weirdest-weather
[180] http://www.channel4.com/programmes/the-year-britain-flooded
[181] http://www.channel4.com/programmes/is-our-weather-getting-worse
[182] http://www.channel4.com/programmes/the-year-the-earth-went-wild
[183] http://www.channel4.com/programmes/up-in-smoke
[184] http://www.channel4.com/programmes/what-the-green-movement-got-wrong
[185] http://www.channel4.com/programmes/man-on-earth
[186] http://www.channel4.com/news/climate-change-kyoto-protocol-extensions-for-the-rich
[187] http://www.channel4.com/news/arctic-ice-levels-at-all-time-low
[188] http://www.channel4.com/news/energy-bill-the-short-term-cost-of-a-greener-future
[189] http://www.channel4.com/news/british-countryside-nature-wildlife

— *Whatever Happened to Global Warming? (April 2013):*
  — A stand-alone report asking why, after such a long spell of cold and wet weather, the drastic temperatures that have been predicted as a result of climate change have failed to materialise. Several experts in this area, including leading climate change scientists, were interviewed as part of the discussion.[190]
— *Al Gore interview (January 2013):*
  — *Channel 4 News* broadcast a wide-ranging interview with former US Vice-President and prominent green campaigner Al Gore, asking about his views on the current policy approach to tackling climate change.[191]
— *Tom Clarke in the Arctic (October 2012):*
  — The *Channel 4 News* science team spent five days filming in Greenland at the start of October and produced a number of news clips analysing the reasons behind the area's melting ice-caps.[192]
— *Climate Change: Environment crisis? (Ongoing)*
  — *Channel 4 News* provides a webpage focused specifically on analysis of the science of climate change, as part of an ongoing special report in this area. The page includes a wide range of material examining the causes of climate change, including relevant videos, articles and blog posts.[193]

Channel 4 believes that this in-depth news coverage, in addition to our wider programming outlined above, plays an important role in helping to improve public understanding of what is meant by climate change. The wide range of contributors included in this content also helps to ensure that viewers are provided with a plurality of views in this area, thereby further benefiting their understanding of climate change.

Ofcom Broadcasting Code

As with all of Channel 4's content, our coverage of scientific and climate-related topics is subject to the Ofcom Broadcasting Code, which requires programmes to meet a number of rigorous rules aimed at protecting viewers and contributors.

In particular, the Code requires all broadcasters to ensure "due accuracy" in its news coverage and wider programming. In addition, broadcasters must ensure that there is "due impartiality" on matters relating to current public policy and, where it applies, on matters of political or industrial controversy. Channel 4's experienced Legal and Compliance team provides expert advice to commissioners on the application of the Ofcom Broadcasting Code across all of our content to ensure that we comply fully with its rules regarding "due impartiality".

In addition, the Code also includes rules relating to "fairness", which governs how broadcasters treat the individuals or organisations directly affected by programmes. Contributions must be represented fairly following editing of a programme, and steps must be taken by broadcasters to ensure that material facts have not been presented, disregarded or omitted in a way that is unfair to an individual or organisation. If a programme makes significant allegations regarding individuals or organisations, those concerned should normally be given an appropriate and timely opportunity to respond.

This Code, in addition to Channel 4's own internal legal and compliance procedures, helps to ensure that our coverage of sensitive and polarising issues, such as climate related issues, is fair, accurate and balanced.

Channel 4 hopes that this submission is of assistance to the Science and Technology Select Committee.
July 2013

Written evidence submitted by James Painter (CLC057)

1. The Reuters Institute for the Study of Journalism (RISJ) is part of the Department of Politics and International Relations at the University of Oxford. It was established in 2006. The RISJ aims to serve as a leading forum for a productive engagement between scholars from a wide range of disciplines and the practitioners of journalism. It aims to bring the depth of academic scholarship to major issues of relevance to the practice of the news media.

2. The RISJ regularly publishes reports and books on various issues affecting the media. On the specific issue of climate change, it has published three recent works: *Summoned by Science: Reporting Climate Change at Copenhagen and Beyond* (2010); *Poles Apart: the international reporting of climate scepticism* (2011); and *Climate Change in the Media: reporting risk and uncertainty* (forthcoming, September 2013).

[190] http://www.channel4.com/news/whatever-happened-to-global-warming
[191] http://www.channel4.com/news/al-gore-uk-putting-business-before-green-short-sighted
[192] http://www.channel4.com/news/tom-clarke-in-the-arctic
[193] http://www.channel4.com/news/climate-change-environment-crisis

3. James Painter is the author of the above three publications. In an individual capacity, he has also published extensively on the theme of climate change and the media, including a recent academic article on the relative presence of climate scepticism in the UK print media compared to the media in five other countries. He also teaches the MSc module on the media and the environment at the School of Geography, Oxford University.

4. This submission focuses on the role that the UK media play in portraying climate change, the affect that this may have on public understanding, and recommendations that may help journalists, scientists and government bodies improve the communication of climate science.

5. *The committee asks: Which voices are trusted in public discourse on climate science and policy? What role should Government Departments, scientific advisers to Government and publicly funded scientists have in communicating climate science?*

6. Even though various surveys show different results about the trends in the *absolute* level of trust in climate scientists (for example, Poortinga *et al*, 2011 and Shuckburgh *et al*, 2012), two recent surveys which focus on *comparative* levels of trust in different sectors clearly indicate that climate scientists in the UK are significantly more trusted than other sectors such as politicians, environmental groups/charities or the media to talk about climate science (Donald, 2013; Shuckburgh *et al*, 2012).

7. In this context, it is worth pointing out that even though they are the most trusted group, scientists are often not the most vocal group to be heard in the media. A RISJ 2010 study on the media coverage of the Copenhagen summit in December 2009 showed that when the climate science was being reported in newspaper articles, university scientists represented only 12% of those quoted on the science, compared to 11% for representatives of environment or development NGOs (Painter, 2010). This was despite the fact that around 2,000 members of delegations from 250 universities around the world were present at the summit, including 280 professors.

8. Part of the explanation for this is that NGOs and governments had far more communication officers or media relations personnel at Copenhagen than universities. For example, Greenpeace alone had more media people there than all the universities put together (20 compared to 12). The Intergovernmental Panel on Climate Change (IPCC) had just one paid media officer at the time, although at the time of writing this has since been increased to two.

9. There is plenty of scope for climate scientists from government departments, universities and other publicly funded bodies to receive more training in effective public engagement, including how to deal with the different types of media. There are well-run organisations offering excellent training (such as the Science Media Centre). But it remains the case that often scientists are not good communicators with a wider audience beyond their peer group and/or are (understandably) reluctant to engage with the media through fear of misrepresentation, or being asked to comment beyond their area of expertise or engage in adversarial debate (amongst other factors). More institutional recognition needs to be given to those scientists who do engage with the media, as it requires time, experience, commitment and skill.

10. *The committee asks: How could public understanding of what is meant by climate change be improved? What are the main barriers to this? Do the media have a positive role to play?*

11. To focus on the media coverage of climate change, it is worth stressing that the degree to which media coverage of any particular issue affects or changes individual attitudes, understanding or behaviour change is a disputed area in academic circles. Many scholars argue that the media may only have a minor impact, when compared to other factors such as wider cultural, social or political values and the views of peer groups, family or friends. However, there is much more agreement that the media have a huge role in setting the agenda for what people talk or think about, even if they have much less of a role in shaping their views.

12. In the specific area of science coverage, most people in the UK get their information from the media, so the way the media report and frame climate change is one significant input into public understanding of the topic.

13. It is also important to point to the strong evidence that in their consumption of news, the UK public have markedly different levels of trust in different media organisations and platforms. In a 2013 report on the digital consumption of news, the RISJ found that despite the advance of new and social media such as blogs, Facebook and Twitter, the web sites of the UK broadcasters were by far the most trusted for news by 79% of those surveyed (Newman and Levy, 2013). These were followed by UK newspaper sites (60%), news-related blogs (11%), Twitter (10%) and Facebook (8%).

14. Of the UK broadcasters, the BBC's coverage of science topics is recognised around the world for its high quality. Part of the reason for this is that the BBC for the most part takes considerable pains to follow its editorial guidelines of aiming for "due impartiality" in reporting climate science, in other words asking its correspondents and reporters to reflect the mainstream consensus on climate science while not ruling out the presence of climate sceptics when their presence is deemed to be appropriate (for example in discussing policy options of how to tackle climate change, rather than the science of climate change).

15. However, there have been recent examples from some BBC output such as the Daily Politics Show where the programme might have been better served by inviting climate scientists, rather than advocates, onto the programme. In June 2012 for example, Friends of the Earth's Andrew Pendleton was invited to debate with the well-known sceptic blogger, James Delingpole, the significance of the apparent slowdown in global temperature rises since 1998. Both invitees were not disinterested parties to the debate or experts on the science. It would have been more appropriate to invite two climate scientists with differing views on the significance of the slowdown.

16. A more pressing issue than the BBC's coverage is the presence of climate sceptics (of different types) in the UK print media, and in particular the right-leaning tabloid press. The RISJ 2011 study (Painter, 2011) of 5,000 articles in six countries in 2007 and 2009–10 showed that the UK's press is similar to that of the USA in giving much more space to sceptical views than in the other four countries examined (Brazil, China, France and India). Together the UK and the USA represented more than 80% of the times sceptical voices were quoted across all six countries.

17. Other key findings of this study relevant to the select committee's questions are:

- In the second period examined (2009–10), half of all the articles in the Daily/Sunday Express on climate change and nearly half of all the articles in the Daily Mail/Mail on Sunday contained sceptical voices.
- The data suggested a strong correlation between the ideology of a newspaper and the prevalence of sceptical voices within it. Many of the uncontested sceptical voices or opinions were to be found in the opinion pages rather than the news pages of certain right-leaning newspapers. These were particularly present in the Sun, the Daily/Sunday Express and the Sunday Telegraph.
- The Daily/Sunday Express stood out for including sceptical voices: in the second period, it had the highest percentage of articles which included sceptical voices, the highest number of sceptical voices quoted in its news reporting (more than any broadsheet), the highest number of direct quotes of sceptics, the highest number of editorials questioning the mainstream consensus, and the highest number of sceptical opinion pieces of any tabloid.
- The Global Warming Policy Foundation (GWPF) was particularly effective in getting its voice heard across most of the ten newspapers. The two most quoted sceptics by far in the second period were Lord Lawson and Benny Peiser (more than 80 times between them), both from the GWPF. This compares with the 13 times of the most quoted sceptic climate scientist.

18. The second period under examination (2009–10) was a time when a significant amount of media inclusion of climate sceptic voices could have been expected as it covered the time of "Climategate" (when scientists at the climatic research unit at the University of East Anglia in the UK were accused of manipulating results and keeping critics out of science publications) and the questioning of some aspects of the 2007 IPCC reports. However, further examination of articles on climate change in the UK press from a later period (2010–11) suggests that the presence of sceptic voices remained high at about one in five of all articles, despite a marked drop in the total number of articles covering the topic (Painter and Gavin, unpublished 2013).

19. There are several reasons why it is important to reflect on the high presence of climate sceptic voices in the UK print media, and particularly the opinion pages. The first is that much of the uncontested sceptic opinion is written by in-house columnists and not climate scientists. This could give the impression to a general audience that climate science is a matter of opinion or merely "a point of view", in the same way as many political issues are, without giving the readers a sense of what most climate scientists say is the case about rising temperatures and the causes of them.

20. A second important aspect to consider is the effect on readers of the promulgation of uncertainty, and in particular the view often put forward by sceptics that there is significant disagreement amongst scientists. There is evidence from a recent study carried out with focus groups in the UK that many people believe that there is a lack of consensus in scientific opinion, partly because this is frequently the way climate science is presented in the media. The participants thought that scientists are often in disagreement with each other or change their mind over time (Shuckburgh *et al*, 2012).

21. Moreover, research carried out by communications scholars in the USA suggests that uncertainty generated—deliberately or not—in peoples' minds about the level of agreement amongst scientists can make a big difference for engagement. People who (wrongly) believe that scientists disagree on global warming tend to feel less certain that global warming is occurring, and show less support for climate policy (Ding Ding *et al*, 2011). Likewise, the lead author of the research done by the Glasgow Media Group found that in their focus groups in the UK, "the uncertainty of the science left the evidence open to interpretation by a range of experts. Participants said they were very reliant on these interpretations due to the complexity of the subject, and yet found it difficult to place faith in any of them—hence stalemate, and disengagement." (Catherine Happer quoted in Painter, 2013)

22. A 2013 study by the RISJ (Painter, 2013) suggests that risk language can in certain circumstances and with certain groups be a more helpful of talking about climate change than uncertainty, and particularly for policy makers. It is certainly the language now being used by a wide variety of politicians and scientific reports on climate change.

23. Part of the challenge is that scientific uncertainty is often misunderstood, particularly by the general public, and misinterpreted as ignorance. For example, many people fail to recognise the distinction between "school science", which is a source of solid facts and reliable understanding, and "research science" where uncertainty is engrained and is often the impetus for further investigation. Risk on the other hand is an essential part of everyday experience, including the worlds of insurance, health and investment.

24. The RISJ 2013 study, which looked at more than 300 articles on climate change in the print media in six countries, found that the media on the whole overwhelmingly use a narrative of "disasters" and "uncertainty", when reporting climate change. The language of risk (and of opportunity) was much less prevalent. Studies show that disaster and uncertainty frames—at least in their more extreme forms—are not usually seen as enhancing public understanding, engagement or behaviour change (Moser and Dilling 2004, O'Neill and Nicholson-Cole, 2010).

25. *Recommendations*

More research is needed into the effect of certain messages about climate change in the media and elsewhere on public understanding, engagement and behaviour change. It is often wrongly assumed that simply giving the public more information about climate science will promote "better" engagement, when most communication theory suggests that most people filter information about climate science through their cultural values. Dialogue and discussion are often more effective than top-down information.

Scientific uncertainty about climate change (for example, the timing, severity and location of future impacts) is particularly difficult to convey without confusing the public. More work needs to be done on testing what sort of messages and language might help with what sectors of society, and whether risk is a more productive language.

In the specific area of risk and uncertainty communication, for the media,

- More familiarity and training for journalists about numbers and probabilities could improve coverage of climate risks.
- There is also more scope for inclusion in website articles details and discussion about how uncertainty can be quantified, and given a confidence level.
- The use of more info-graphics to illustrate the concepts of risk and other aspects of climate change needs to be explored.
- The media could help the public to be more aware of probabilities by the greater use of probabilistic forecasting in public weather forecasting on television in the UK.

For scientists,

- They should stress early on in interviews with the media where there is broad consensus about climate science, and then later on where there are degrees of uncertainty. They should also try to explain that uncertainty does not usually mean ignorance.

In general,

- Using the language of risk in the context of uncertainty can be a helpful way of presenting the problem to policy makers; but more research is needed about the effect on the general public of different types of risk language to test when it is effective, under what circumstances, with what groups and with what metaphors.

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August 2013

Written evidence submitted by Kent County Council (CLC058)

EXECUTIVE SUMMARY

Kent County Council is providing written evidence to the Committee in response to a request for information from Elena Ares (Committee Specialist) on the following:

1. Our views on the level of understanding about climate change science amongst the public, and whether it matters.
2. What Kent is doing on climate change and why; what the focus is when it comes talking to the public, together with our experience of what is effective or not when communicating at a local level.
3. Whether Kent engages, and how, with other LA's and Government bodies on this.

This will be followed by an oral submission by Mr Paul Crick, Director of Planning and Environment, Kent County Council on 11 September 2013.

Kent County Council is one of the largest councils in the country and provides more than 300 services for around 1.6 million residents. The Council runs a number of programmes relating to climate change, interacting with communities and businesses on a regular basis.

In the main we find that the public have a good awareness of climate change and this is very much based on information provided through the mainstream media and where it is taught in schools (and passed on within families). However, we have found through our engagement that although communities are aware, detailed understanding of climate change and the influences upon it are often very mixed.

Although the vast majority of scientists have reached a consensus on climate change, there is often a disproportionate focus in the media on uncertainty and scepticism, which although crucial to meaningful debate, to a layperson gives the impression that it is a confused picture and doesn't motivate action. This has been backed up by our engagement on the subject with many residents citing uncertainty as a reason to not take action.

In general however, we have found that the majority of the public accept that climate change is an issue and one that needs to be addressed. Where there is significant confusion is *who, how* and *when.* Climate change is still very much seen as a far future issue whilst people have very immediate and pressing concerns now.

It is important to note that in our experience people in the main view climate change as a responsibility of Local and Central Government and struggle to see what they can do on an individual level.

We have found a key part of making climate change a more immediate concern is to increase our understanding of how we are currently impacted by severe weather events and use this as a conduit to wider discussion on how an increase in occurrence and severity of these events may influence Kent.

Kent County Council has increasingly found the need to provide an interface between the science and our partners and residents. We use the science and national and local drivers to identify key priorities for Kent and communicate those appropriately as the resource is not always available across partner organisations to be able to do this.

It is very clear from our engagement is that people are not overly interested in the detail, they know the headlines and they want to know what they can do about it. In fact we have developed detailed local information on the science but it disengages the majority of those we have worked with.

We have found that the most successful tools and techniques for engaging on this issue are:

— Focussing on the outcomes and tailoring the messages appropriately. Is the detailed science needed to reach the aims?

— Keeping information very local to make it relevant to an individual or community.

— Local maps and aerial photos work well to draw people into wider conversation.

— Messages on change, historically as well as into the future to highlight that we are always adapting to changes.

— Looking at potential future scenarios to make it more tangible.

— Identifying example actions for communities to build on for their area so that clear steps can be seen in how we prepare for change. A report we commissioned from University of Kent, School of Psychology clearly highlighted that it is vital that communities have some tangible actions they can take to ensure that it is a "challenge" that can be addressed and not a "threat".[194]

Kent County Council is focussed on the delivery of outcomes and would question whether it is necessary for the detailed climate science to be fully understood by everyone in order to achieve carbon savings and build resilience. It is important that we understand the science to inform our work programmes and priorities but, once identified, how we communicate will vary.

What is essential is for Central Government to be very clear on their priorities, based on the climate science, and have strong focussed messages and policies which Local Government can then apply in a locally appropriate way.

Introduction

1. Kent County Council is one of the largest councils in the country and provides more than 300 services for around 1.6 million residents. The Council is committed to ensuring that our services are resource efficient, use energy smartly and prepare for a changing climate. We also recognise that we have an important role to help our residents and businesses to capture the opportunities and benefits of action on climate change. These include saving money on energy bills, generating income from renewable energy, attracting new jobs and investment in "green" industries, supporting new sources of energy, managing local flood-risk and water scarcity and protecting our natural environment. Our Kent Environment Strategy[195] lays out our approach to ensuring we meet our commitments publicly laid out in Climate Local Kent.[196]

2. Kent County Council runs a number of programmes relating to climate change, interacting with communities and businesses on a regular basis. The level to which climate change science is discussed is dependent on whether this level of information would influence the outcome. For example, an SME does not need detailed understanding of climate science to save money on their energy bills through being more resource efficient or to build resilience to flooding. Further information is provided throughout this document.

3. *Our views on the level of understanding about climate change science amongst the public, and whether it matters.*

4. Kent County Council is focussed on the delivery of outcomes and would question whether it is necessary for the detailed climate science to be fully understood by everyone in order to achieve carbon savings and build resilience. It is important that we, as a local authority, understand the science to inform our work programmes and priorities but, once identified, how we communicate these will vary.

5. What is essential is for Central Government to be very clear on their priorities, based on the climate science, which Local Government can then apply in a locally appropriate way. For example, Kent County Council has been involved in the development of the National Adaptation Programme (informed by the national CCRA) and is addressing the recommendations through the Kent Environment Strategy.

6. Kent County Council recognise that the impacts of climate change will not be the same across the UK and so local expertise to build the evidence base and take forward priorities identified is important, however increasingly limited resources and lack of statutory drivers from Central Government can make this difficult.

7. Kent County Council is a partner in an Interreg IVA 2 Seas project entitled Coastal Communities 2150 (led by the Environment Agency).[197] This project looks to engage local communities in planning for future environmental and coastal change and as such, the project looks to provide communities with the information they need to make decisions for their area, including locally relevant information on climate change.

8. Officers attend events in three priority communities (identified through a review of vulnerability around the Kent coastline) to gather input from a range of community members. Events include carnivals, open days and fetes to try and capture as much input as possible. Through this we have spoken with at least 500 people on climate change, presented at meetings and seminars to another 500 and have had 2,400 hits on our website. In addition, pop ups are placed in areas of high footfall such as supermarkets and community centres. From working with the public in this way, we have had the opportunity to interact with a wide range of community members and get their insight into their areas and what climate change might mean for them.

9. In the main we find that community members have had a greater awareness of climate change than had been anticipated and this is very much based on information provided through the mainstream media. However, we have found that although communities are aware, detailed understanding of climate change and the

[194] Sutton R *et al* (2012), Engaging coastal communities in climate mitigation and adaptation measures. Unpublished report commissioned by Kent County Council for the CC2150 project.

[195] http://www.kent.gov.uk/environment_and_planning/environment_and_climate_change/kent_environment_strategy.aspx

[196] https://shareweb.kent.gov.uk/Documents/environment-and-planning/environment-and-climate-change/Climate%20Change%20web%20pages/New%20climate%20change%20pages/Climate%20Local%20Commitment.pdf

[197] www.kentcoastalcommunities2150.org.uk

influences upon it are often very mixed with people taking away the messages from the media that align the most to their viewpoints.

10. Although the vast majority of scientists have reached a consensus on climate change, there is often a disproportionate focus in the media on uncertainty and scepticism, which although crucial to meaningful debate, to a layperson gives the impression that it is a confused picture and doesn't motivate action.

11. From our experience there are four apparent groupings around views on climate change (in descending size order):

(a) Those who are aware of climate change, our influence on it and what the main implications are likely to be.

(b) Those who are aware of climate change but do not see it as something we influence and we therefore cannot control it. Often stating that this is part of longer climate cycle and is inevitable.

(c) Those who do not accept that climate change is occurring or an issue.

(d) Those who are not aware of climate change at all (very rare).

12. The different groups influence how we engage. For instance, both of the first two groups are interested in building resilience as, regardless of human influence, there is acceptance that change is occurring and we need to plan for this. However, when it comes to mitigation it is the first group who are more likely to be interested in energy efficiency and renewable energy deployment in relation to climate change, for all other groups the messaging becomes more around saving (and generating) money.

13. For the third group, in addition to saving money we use messages a lot more around severe weather and its implications. That is, we are not currently as well prepared as we could be and the need to plan better for flooding, drought, heat waves etc.

14. In general, we have found that the vast majority accept that climate change is an issue and one that needs to be addressed. Where there is significant confusion is who, how and when. Climate change is still very much seen as a far future issue whilst people have very immediate and pressing concerns now.

15. The fact that we are *currently* seeing changes and need to prepare for these is not getting through, although recent severe weather events around the world (despite it being unclear whether these can be wholly attributed to climate change), is increasing this awareness. Many are also seeing change in their areas, highlighting growing patterns and biodiversity in particular.

16. It is clear from our engagement is that people are not overly interested in the detailed science, they know the headlines and they want to know what they can do about it. In fact we have developed detailed information on the science for our projects, but it disengages the majority of those we have worked with. However it is useful for us to have so we can answer questions as they arise and build trust with our residents.

17. This is supported by the report by University of Kent whereby it was clearly highlighted that to engage on this issue, it is vital that communities have some tangible actions they can take to ensure that it is a "challenge" that can be addressed and not a "threat".[198]

18. It is important to note that in our experience people in the main view climate change as a responsibility of Local and Central Government and struggle to see what they can do on an individual level.

19. *What Kent is doing on climate change and why; what the focus is when it comes talking to the public, together with experience of what is effective or not when communicating at a local level.*

20. At a strategic level, Kent Leaders have committed to Climate Local Kent, building on the LGA's Climate Local initiative. This is a public commitment with targets relating to carbon, water, waste and resilience to climate change and this, along with our Kent Environment Strategy, commit us to delivering on actions that relate to climate change. Our Environment Strategy is also a priority for delivery in *Bold Steps for Kent,* our community strategy, and as such is committed to at the highest level.

21. To inform our priorities in relation to climate change we have used climate change science to focus our work and identify those areas we need to address, but once the evidence base is identified we communicate in a different way in order to get buy in to actions. When communicating at a local level we are informed by the audience concerned to ensure that messages work for them.

22. In addition, there are a number of wider drivers for action on climate change, such as our role as Lead Local Flood Authority in place through the Flood and Water Management Act (2010); the National Planning Policy Framework; the CRC Energy Efficiency Scheme and the Natural Environment White Paper amongst others.

23. Below is a summary of some of our projects and how we interact with the public and the main focus for communication. These projects are examples with significant public or partnership interaction but this is by no means an exhaustive list of the work of Kent County Council in relation to climate change. We would

[198] Sutton R *et al* (2012), Engaging coastal communities in climate mitigation and adaptation measures. Unpublished report commissioned by Kent County Council for the CC2150 project.

be happy to provide further examples on request in relation to any of our projects within the Kent Environment Strategy.

24. *Severe Weather Impacts Monitoring System (SWIMS)*

25. We have found a key part of making climate change a more immediate concern, not just for the public but for our own services, is to increase our understanding of how we are currently impacted by severe weather events across our organisation and those of our partners. To this end we have developed SWIMS to capture the impacts and responses as and when severe weather events occur.

26. We also use the information gathered with the UKCP09 weather generator to identify potential cost avoidance into the future. This requires quite specialist knowledge and skills and we find that the weather generator is not overly accessible unless the resources are available in an organisation to spend time interrogating the data.

27. The information we gather informs our programmes, partnership working and also messages and information across our projects in Kent.

28. SWIMS is now being rolled out nationally through ClimateUK as part of the Climate Ready programme.

29. *Messages used:* We are not currently as prepared as we could be; severe weather costs us over £862,000 per year; building the evidence base; cost: benefit analysis of action; cost avoidance from preparing for increased frequency and severity of events; better use of resources and partnership working.

30. *Our website and Kent View:*[199]

31. Our website is our front face to the public in relation to climate change. Our pages cover a range of information and we have tried to cater for varying degrees of interest. There are opportunities to find out more on the climate science but this is introduced in a basic way, covering what it means for us locally. Links are provided to the more detailed science and to recognised experts in the area such as the Met Office, Defra and UKCIP. In addition we ensure that there are tangible steps residents can take to prepare.

32. We have also mapped out the climate projections (UKCP09) on to our systems to 25km^2 in order to make it more locally appropriate to our residents (Kent View) and these maps are interactive and available to all either through Kent View or the CC2150 website.

33. *Messages used:* Varies as there is the opportunity to go as deeply into the science as a resident would like. What it means for Kent and what can be done to prepare are also key areas.

34. *Warm Homes*

35. The Warm Homes programme is related to the Energy Company Obligation (ECO) and Green Deal and through partnering with Enterprise and NPower the programme aims to bring £80 million of ECO funding into the county, as well as supporting and encouraging low carbon businesses. This programme directly relates to climate change mitigation through the reduction of emissions in the domestic sector (in the main, although some community buildings are being retrofitted).

36. Mitigating climate change would only appeal to a minority of our residents and so has not been the focus of our communications. Regardless of whether we discuss climate change or not, the outcomes from the project are the same and so we do not feel that it needs to be specifically referred to and could turn some people off.

37. *Messages used:* The Warm Homes programme refers to *Saving Energy, Saving Money* and uses phrasing such as *Take your first steps to a warmer, more comfortable home.* We have found that these kinds of messages are more likely to be taken up rather than carbon saving or climate science.

38. *Coastal Communities 2150*

39. This project has been detailed previously but during the initial stages of developing communications we have worked with the University of Kent's School of Psychology to review the barriers to communication on climate change. This resulted in some core principles which have underpinned the project overall:

40. Uncertainty in community engagement can be overcome by:

(e) Provision of authoritative yet accessible (visual) science.

(f) Outlining specific, local examples of impact to provide context and assign responsibility.

(g) Highlighting specific opportunities and benefits to the community (if any).

(h) Publically acknowledging any uncertainties and attributing a cause.

41. The threat of perceived change can be overcome by:

[199] www.kent.gov.uk/climatechange

(i) Communicating the evidence and inevitability of change in a local context and therefore acting to demonstrate a proven ability of communities to adapt.

(j) Communicating the "challenge" and not the "threat" of climate change to highlight a solvable problem rather than impending ruin.

(k) Encouraging adaptation rather than mitigation approaches to highlight that action would still be needed to maintain the status quo (if indeed this is possible).

42. We have found that the most successful tools and techniques for engaging on this issue are:

(l) Keeping information very local to make it relevant to an individual or community.

(m) Local maps and aerial photos work well to draw people into wider conversation.

(n) Messages on change, historically as well as into the future to highlight that we are always adapting to changes.

(o) Looking at potential future scenarios to make it more tangible.

(p) Identifying example actions for communities to build on for their area so that clear steps can be seen in how we prepare for change.

43. It has been key to make clear, concise messages to maximise engagement, where we have used more detailed science it has proven off-putting to the majority.

44. *Low Carbon Kent*

45. Kent County Council has identified the low carbon sector as a priority growth area, but in addition to this, we work to improve businesses' opportunities to reduce costs and build resilience. Businesses are given the opportunity to influence policies to enhance Kent's economic potential as well as become part of a Low Carbon Kent network, currently at 1,270 members. In addition a Steps to Environmental Management (STEM) scheme is offered to help businesses develop and implement environmental management systems and this has resulted in cost reduction for businesses of £962,000 and 2,000 tonnes of CO_2e saved. This also incorporates building resilience to climate change.[200]

46. In 2013, Kent County Council ran a survey of over 5,000 businesses on their attitudes to severe weather (part of a project funded through Defra on whether SWIMS would be appropriate for businesses). 78% of businesses were concerned by the impacts of severe weather but felt it was not relevant and saw it very much as the responsibility of Central and Local Government. Again, like the general public, businesses (and in particular SMEs) wanted to know what the main impacts are, how it affects them financially and the actions they should take. They also responded that they would like a clearly defined approach from Central Government. The detailed science was not of interest to the majority.

47. As part of the Low Carbon Kent Programme, we have historically looked to run workshops on building resilience to climate change but have found that interest in this is very limited with reasons similar to those raised by community members, ie, more pressing concerns.

48. How we have looked to address this is through linking climate change to business continuity and focussing on those areas at greatest risk or with more opportunities, either geographically or through the sector they work in. It is also important to draw in information from recognised sector experts, such as the Chartered Management Institute (CMI).

49. We would not at this stage say that these interactions are as successful as we would like them to be and so are moving our focus to our supply chains and those of the partners we work with. It is imperative that KCC can deliver services now and into the future, and our supply chain is a key component of that.

50. *Focus used:* Save money; business continuity; low carbon opportunities for growth; resilience; supply chain.

51. *Sustainable Sheppey and Community Energy*

52. Another community project being run in Kent is through the Communities Living Sustainably Fund from the Big Lottery. The *Sustainable Sheppey* project again looks to identify community opportunities and risks from climate change. There are a number of work streams, one of which links to CC2150, but in addition there is a community energy project whereby communities will be given the funding for feasibility studies for renewable energy technologies of interest for their area.

53. This project is community led from the outset and we are asking residents on the Isle of Sheppey to identify technologies they would want to progress. We do not discuss climate science in this project unless more information is requested.[201]

54. *Focus used:* Income generation; locally-led projects; opportunities; energy security

[200] Further information on all these schemes are available at: http://www.lowcarbonkent.com/

[201] Further information on the project is available at www.kent.gov.uk/sustainablesheppey.

55. *How Kent County Council engages with other local authorities and Government bodies on climate change.*

56. Kent County Council works across a range of partner organisations and further developing and improving our partnership working is a key priority for the county. For example, Climate Local Kent incorporates all Districts and Boroughs in the county as well as the Environment Agency, Kent Fire and Rescue Service, NHS and Kent Police amongst others.

57. Governance across the county on climate change has been clearly defined with a Kent Environment Strategy Executive Officers Group and the Kent Climate Change Network. The former incorporates Environment Directors from County and District Councils as well as Natural England, the Environment Agency, Business Link, Kent Wildlife Trust and the AONB. The Network consist of lead officers from across Districts and Boroughs, NHS, Police, Fire and Rescue Service and the Environment Agency.

58. The Council is also represented on the Local Adaptation Advisory Panel (LAAP) and the Climate Local Steering Group and has provided input into areas such as the National Adaptation Programme and Climate Local.

59. Kent County Council utilises climate projections on a regular basis and has mapped these on to our own systems to inform our work programmes. We have increasingly found the need to provide an interface between the detailed science and our partners and residents. We use the science and national and local priorities to identify key priorities, issues and headlines for Kent as the resource is not always available in each individual partner organisation to be able to do this.

60. We also work with partners on a project specific basis. For example, work is currently underway with the Environment Agency and URS to develop a Water Resilience Framework for Kent. URS are working with climate science and projections, data from ourselves and the Environment Agency (amongst others) to identify how climate change, as well as population change, will influence the availability of water in the county as we are already a water scarce region.

61. In addition, a major partnership scheme, the £20 million Sandwich Town Tidal Defence Scheme, is now underway. This scheme increases flood protection from a one in 20 chance of tidal flooding each year to one in 200 for 488 homes and 94 commercial properties in Sandwich. The scheme has been jointly funded by Government, Kent County Council and Pfizer and is one of the first to use Defra's new partnership approach to funding flood defence schemes.

62. As an organisation we also regularly review available information and keep up to speed on developments in our role as coordinators of the Kent Environment Strategy. Information we use comes from the UK Climate Impacts Programme, Climate Ready, Climate Local and the New Scientist amongst many others.

August 2013

Written evidence submitted by Kirklees Council (CLC059)

EXECUTIVE SUMMARY

- Kirklees has over 10 years' experience in engaging with the public to deliver projects which reduce domestic carbon emissions and tackle climate change.
- In the last 10 years Kirklees has attracted c £38 million external funding which has provided subsidies for home energy efficiency improvements, as well as investing c £18 million of its own resources.
- A key project in that time was the Kirklees Warm Zone scheme which ran between 2007 and 2010. It was the first scheme of its kind in the UK to offer free loft and cavity wall insulation to all residents, without the requirement for means testing.
- Post Warm Zone, Kirklees has continued to manage a large number of projects to continue to improve home energy efficiency and reduce fuel costs for its residents.
- Climate change communications from the Council have changed over the last ten years. Initially, communication focussed on raising awareness of the science behind, and evidence for climate change. The focus of messages then shifted to reducing carbon emissions and, most recently, public engagement has centred on finance, fuel poverty, related health issues, and job creation.
- A key recommendation from Kirklees for the Committee to consider is, in future, that Government should develop policies which build on work undertaken by Local Authorities to tackle climate change in their local area, and to learn from the messages which are currently being used to engage the public.

1. INTRODUCTION TO KIRKLEES COUNCIL

1.1 In August 2013, Kirklees Council was invited to provide evidence to the House of Commons Science and Technology Select Committee relating to its experience of the public's understanding of climate change.

1.2 Kirklees Council is a metropolitan borough of West Yorkshire, England. It has a population of approximately 423,000, making Kirklees one of the larger local authority districts in England and Wales (ranking eleventh out of 348 districts). Kirklees has approximately 175,000 households, 116,000 (67%) of which are owner occupied. Around 39% of the energy used in Kirklees is for domestic purposes.

1.3 Kirklees Council has long been committed to tackling climate change, particularly by reducing domestic carbon emissions. Over the last 10 years the Council has attracted circa £38 million of external funding which has provided subsidies for energy improvements to homes. The Council has also contributed c £18 million capital match funding to deliver energy improvements.

1.4 Kirklees was the first Local Authority to develop and deliver the award winning *Warm Zone* scheme (2007–10), which was open to all residents and where over 51,000 households received free loft and cavity wall insulation.

1.5 Post Warm Zone projects have included:

1.5.1 *Kirklees BIG Energy Upgrade (2010–12)*
Kirklees worked with local authorities and registered social landlords (RSLs) across Yorkshire to tackle whole house, whole community energy efficiency upgrades on hard to treat homes. This project was supported financially by the European Union. It attracted £7 million investment from the European Regional Development Fund as part of Europe's support for the region's economic development through the Yorkshire and Humber ERDF Programme 2007–13. £1million was secured for Kirklees, and 250 properties had external solid wall insulation installed. Some properties also received several other measures to deliver a whole house, whole community approach to energy efficiency which improved the health and wellbeing of the local residents.

1.5.2 *RE-Charge (2008–11)*
The £2.7 million three year Council investment programme helped 281 private households across Kirklees, install 296 renewable energy generating technologies. It attracted £260K of external funding and prepared households to benefit from the Renewable Heat Incentive (RHI) and/or Feed-in Tariff (FIT), pre-empting the Green Deal.

1.5.3 *Hillhouse Greening the Gap (2010)*
Kirklees Council was successful in securing £500,000 from DECC's Low Carbon Communities Challenge Fund (LCCC). 53 private sector houses and four community centres in the Hillhouse area of Huddersfield had solar PV installed for free, plus other energy saving measures to improve the energy efficiency of the properties. Income generated from the Feed in Tariff is being invested in the community. To date this income amounts to £58k.

1.5.4 *Energy Efficiency in Kirklees Council homes (ongoing)*
Kirklees Council owns ~23,000 domestic properties which are managed by Kirklees Neighbourhood Housing. The council and KNH have made significant investment in energy efficiency measures through "Decent Homes" budgets and targeted energy budgets. Measures include gas boiler replacements, loft insulation top ups, external wall insulation, ground source heat pumps, solar thermal hot water, solar photo voltaic and a biomass boiler. This investment has dramatically improved the energy efficiency of our homes, increased the average SAP rating to 72.4, reduced our carbon emissions by 23% since 2005, helped tackle fuel poverty and created local jobs and a skilled supply chain.

1.6 Each project has required a separate communications plan and approach to marketing. The reference to climate change has varied across each project.

2. Our Views on the Level of Understanding about Climate Change and the Science amongst the Public, and whether it Matters

2.1 In the Council's experience, the level of understanding of climate change and the science behind it is generally good among our residents. In 2010 we conducted a Greener Living Survey which found that 95% of survey respondents believed that the world's climate is changing, and 74% said that their everyday actions contributed to climate change. 86% of respondents also agreed that climate change would have an impact on Kirklees in the next 50 years, and i) saving money, ii) convenience/services making it easy, and iii) health benefits were the survey respondents' top three motivations to live a greener lifestyle.

2.2 Utilising these survey results, we are keen to lead the way as a Council by showing our residents that we are investing in measures to tackle climate change but that will also help individuals financially and in terms of health benefits.

3. What is Kirklees doing on Climate Change and Why

3.1 *Context/Rationale*

3.1.1 We know that the policies, strategies and services that we develop and deliver as a Council have an impact upon the environment and that we have an opportunity to shape a more sustainable future to improve people's lives. The climate is changing, so we must adapt and be prepared for the challenges ahead. The

Government's Stern Review in 2006 concluded that the benefits of strong, early action on climate change far outweigh the costs of not acting.

3.1.2 The UK has committed to challenging greenhouse gas reduction targets via the 2008 Climate Change Act.[202] As a Local Authority we have a part to play in helping the UK achieve these challenging targets in our role as community leader, service provider, estate manager and role model.

3.1.3 In June 2010 we made a commitment to protect the environment and reduce CO_2 as part of the Kirklees Partnership Charter and our Vision commits us to continue to reduce the carbon footprint of Kirklees.

3.1.4 In 2010, the Council approved its *Integrated Investment Strategy (IIS).* This strategy is a framework for investment which sets out the priorities for how the Council will allocate its resources and attract external investment to improve the lives of all Kirklees residents. One of the strategic aims is for a district better prepared to manage the effects of climate change—setting out a clear 40% carbon emissions reduction target by 2020 for both the Council and the District, from a 2005 baseline.

3.1.5 The 2011 Leeds City Region Mini-Stern Review, focussed on the economics of decarbonising the local economy. A separate appendix was prepared on the Kirklees economy, which identified that:

- Kirklees district has an overall energy bill of approximately £660 million per year and this will likely rise to £876 million by 2022—an increase of £216 million per year within 10 years.
- The study suggested that an investment of the equivalent of 1% of Gross Value Added—GVA—(£500 million over 10 years in the case of Kirklees) could be profitably spent every year to exploit commercially attractive energy efficiency and low carbon opportunities in the domestic, industrial, commercial and transport sectors.[203]
- Such an investment would yield up to *1265 jobs over the next 10 years and could increase the GVA of the local economy by £58 million per year (1–2%),* from both cost effective and cost neutral measures targeted towards energy efficiency and low carbon energy generation.
- The study also found that intervention and investment at the levels indicated above could reduce carbon emissions in Kirklees by 48% by 2022—at no net cost.

3.1.6 In response to this, *Kirklees Council became an early signatory to Climate Local***.** Climate Local is a new initiative led by the Local Government Association LGA) to drive, inspire and support council action on climate change. It succeeds the Nottingham Declaration on Climate Change (of which Kirklees Council was also a signatory) by offering a framework that enables councils to reflect local priorities and opportunities for action. Climate Local focuses on councils' efforts both to reduce carbon emissions and to improve their resilience to the anticipated changes in the climate.

3.1.7 In December 2012 the Council approved a set of "Climate Local Commitments" for Kirklees to stimulate a green economy and create jobs, help tackle climate change and provide affordable warmth for our residents, building on achievements to date. There are six key headline commitments as outlined below:

- *Local Economy- Jobs and Skills*
  Creating local jobs in the green sector and ensuring we have the appropriate skills for a low carbon economy
- *Homes*
  Continue to aim to provide affordable warmth and tackle fuel poverty. This will help improve the health and wellbeing of Kirklees residents
- *Council Operations*
  Leading by example through the efficient use of energy and water in our buildings, street lighting and fuel use by fleet vehicles
- *Transport*
  Increasing greener transport and transport connectivity in Kirklees, thus reducing transport related carbon emissions.
- *Waste*
  Developing future plans to reduce waste and maximise diversion from landfill.
- *Natural Environment*
  Delivering a setting for investment, maximising biodiversity and reducing costs.

[202] The UK Climate Change Act 2008 sets legally binding carbon emission reduction targets for 2020 (reduction of 34% in greenhouse gas emissions) and for 2050 (reduction of at least 80% in greenhouse gas emissions) from 1990 levels, and introduced five-yearly carbon budgets to help ensure those targets are met. In June 2011 the Government set in law its fourth Carbon Budget to reduce emissions 50% under 1990 levels by 2025.

[203] Further information can be found at www.lowcarbonfutures.org/low-carbon-cities

3.2 *2013–14 Climate Local Capital Projects*

3.2.1 *Working with businesses—the Kirklees Business Environment Voucher scheme (£250k)*

This scheme provides a 50% grant for Kirklees businesses for projects that will help reduce energy, waste and water costs. This project helps Kirklees businesses save money, stimulates the local economy by supporting local suppliers and installers to implement the measures, and reduces district carbon emissions.

3.2.2 *Working with the public—Completion of Kirklees Energy Saver Scheme and Kirklees Energy Saver 2 (£400k)*

The Council secured £576K from the Government (Department of Energy and Climate Change) as part of a Green Deal pilot initiative to deliver a scheme called Kirklees Energy Saver. The scheme was launched in January 2013 to home owners and offered free energy assessments and interest free loans or grants via utility—Energy Company Obligation (ECO)—funding. The loans and grants are to install energy saving measures such as boilers, wall insulation, glazing and loft insulation. The scheme focused on 10 target areas which were already "warmed up" due to the programme of work previously carried out on Council housing in the areas. The scheme will help over 300 home owners install energy saving measures in their homes via a grant or a loan.

The Kirklees Energy Saver 2 (KES2) project will build on the success of the Kirklees Energy Saver scheme (KES1) which has been over-subscribed. It will also offer specific support to the most vulnerable residents in Kirklees. There will be an offer of a home visit to provide advice and support and funding for heating repairs and other energy saving measures, with referrals to partner organisations.

3.2.3 *Work to reduce carbon emissions across the Council (£350k)*

This programme will deliver a range of energy/carbon reduction projects to reduce the Council's energy costs and carbon emissions, and help us meet our 40% carbon reduction target by 2020.

These include continued investment in LED traffic lights, upgrading car park lighting and energy efficiency measures within council buildings.

4. What the Focus is when it comes Talking to the Public and how it has Changed, together with your Experience of what is Effective or not when Communicating at a Local Level

4.1 In Kirklees, the last decade has seen a number of changes in the way the authority addresses climate change issues and communicates with the public. Initially, resources were focussed on *raising awareness of climate change* through the Council's "Green Ambition" environmental programme, and explaining the scientific argument to engage people in the broader consequence of rising temperatures and what they could do at an individual level. This was in line with national media and communicating the findings from key research such as the Stern Report.

4.2 As time progressed, and council priorities evolved, messages which were originally about "tackling climate change" became focussed on *reducing carbon emissions*. Generally speaking, the message that climate change is real and happening is to an extent understood and accepted, and the focus moved to reducing the key cause of climate change—carbon emissions. This mirrored local authority data collection requirements such as those set out in Local Area Agreements and National Indicators (185 and 186).

4.3 Most recently, during the economic downturn, communication with the public on matters concerning climate change has centred on *finance, fuel poverty, related health issues, and job creation*. For example, using less energy in the home has been promoted as a means of mitigating the impact of income reduction from other areas such as the Welfare Reform. With dramatic reductions in council resources to support this agenda (both in staffing levels and available investment funding), projects are progressed where inward investment is generated reducing pressure on council capital and ensuring best value for money is achieved.

4.4 The Council's current projects aimed at the public are the Kirklees Energy Saver Scheme and a recent collective energy switch. Both schemes are aimed at supporting the residents of Kirklees to *reduce their home energy bills* and meet the Council's key objectives of *reducing fuel poverty and providing affordable warmth*. They have both been communicated effectively via the following routes:

- On the Council's website and in key council publications.
- Social media—Facebook, Twitter etc.
- Regular press releases (picked up by the local press)
- Articles in Kirklees Together (the Council's free community magazine)
- Word of mouth/posters distributed via key frontline workers eg Area Neighbourhood Action Teams.
- Drop in sessions/dedicated phone lines where members of the public can speak with council staff, for example using libraries for help and internet access.
- Community champions and/or trusted members of a community or community groups delivering messages on behalf of the council.

4.5 Learning from projects has demonstrated that people have been motivated to participate in schemes for a variety of reasons. Financial benefits alone are in many cases unlikely to drive behaviour change; we have

seen that the impact of tackling areas street by street is incredibly powerful in stimulating uptake via word of mouth and seeing neighbours take up an offer. Additionally, taking a scheme door to door increases uptake due to the trust in the Council brand and reassurance that contractors have been through a robust selection process.

4.6 A recent development while delivering work via the Kirklees Energy Saver Scheme has been a sudden drop in ECO funding by the energy supplier for external wall insulation. This has led to difficult communication with affected Kirklees residents, and demonstrates the challenge Councils face in maintaining trust while being vulnerable to external market influences.

5. Whether Kirklees Engage, and how, with Other LA's and Government Bodies on This

5.1 Kirklees has evidenced its extensive track record of delivering home energy efficiency projects across the district. The success of each project has involved key partners—with functions ranging from the provision of funding, to installation of physical measures.

5.2 Going forward, the council is a committed partner in the Leeds City Region and associated "City Deal" and recognises that this is an effective way to engage and co-operate with our partner authorities and private sector for the benefit of residents.

5.3 Some key examples of current projects where other Local Authorities and/or Government bodies have been engaged are outlined below.

5.3.1 *Collective Energy Switch*
Between February and May 2013, Community Energy Direct (CED—a Community Benefit Industrial & Provident Society) conducted a collective energy tariff switch as a Department of Energy and Climate Change (DECC)-funded partnership project. Project partners were Kirklees, along with Bradford, Leeds, Wakefield and York local authorities, Rochdale Borough Housing, Fresh Horizons and Wakefield District Housing.

5.3.2 *Kirklees Energy Saver*
Via a joint bid with Leeds City Council, Kirklees successfully secured £718k from the Department of Energy and Climate Change (DECC) to deliver a green deal pilot programme across Kirklees. This will help secure a further circa £425K Energy Company funding (ECO) into Kirklees. The total funding for the pilot is £1.393 Million which includes Council capital of £150k. A managing agent and contractor have been procured to deliver this project, with close links to an energy supplier.

5.3.3 *Leeds City Region Green Deal*
Kirklees Council is part of the Leeds City Region collaborative approach to procure a Green Deal and Energy Company Obligation funding and delivery partner. Working alongside the ten other Local Authorities in the region, Kirklees is providing valuable input to the scheme which aims to be available for all residents in the city region from April 2014.

5.3.4 *Climate Local Network*
As a Climate Local signatory, Kirklees is represented at all Climate Local events organised by the Local Government Association and often shares best practice with other Local Authorities.

6. Conclusions and Recommendations

6.1 Kirklees is one local authority that has built up trust with its residents through their work on climate change, and gained a national reputation and acknowledgement of its good work. We should be supported to continue this communication with the public.

6.2 Local authorities have a lot of learning to share regarding how best to engage with the public on climate change and the local and practical problems and successes of delivery.

6.3 The financial and health impacts of climate change are among the key motivators for the public to change their behaviour and live a greener lifestyle.

6.4 Collaborative working and larger scale projects with other Local Authorities have attractive economies of scale, especially in the current climate of diminishing resources.

6.5 In contrast, local authority work on the climate change agenda is at risk in view of the current (and ongoing) budgetary constraints, and the unreliable and unstable utility ECO funding situation.

6.6 Behaviour change activities are extremely resource intensive—where possible, local authorities should be enabled to continue improving home energy efficiency with physical measures to reduce domestic carbon emissions.

August 2013

Written evidence submitted by the Environment Agency (CLC060)

SUMMARY

The Environment Agency is the principal environmental regulator in England. As part of our role we consider the impacts of climate risks in our work including manage flood risk and coastal erosion management, safeguarding water resources and protecting the water and wetland environment.

We have a new role to provide advice and support to help businesses, public sector and other organisations adapt to a changing climate (this is known as the Climate Ready Support Service). The role is for England but the products generated are available across the UK.

We also administrate the economic incentive schemes such as the EU Emissions Trading System, the CRC Energy Efficiency Scheme and Climate Change Agreements. We do not have any direct influence over the remaining emissions from homes and surface transport such as cars and trains.

Our engagement is generally with and through partners and trusted intermediaries. We work closely with Government bodies such as Natural England, Public Health England and the Met Office, through trade and professional bodies, and with local authorities and local resilience fora.

Audience needs vary considerably and we adjust our messages accordingly. Messages that focus on climate impacts such as flooding are better understood than those concerned with climate science. We have found that using more active language, such as "adapting to a changing climate" and being "Climate Ready" helps audiences to move on from the idea of climate change being remote and something they need to believe in, to needing to take action now.

Question 1: *What is the Environment Agency doing at a local level to communicate about climate change, particularly since it has taken on the role of delivering advice on climate adaptation. It would be helpful if you could include details of how you interact with other Government bodies on this. It would also useful if you could provide details of the Environment Agency's involvement with Climate Change 2150.*

Our Climate Ready Support Service

1. Our Climate Ready Support Service provides online advice, a help desk and tailored support to help organisations adapt to extremes of weather and the changing climate. We operate the service for England only, but our tools and resources are available online for use across the UK.

2. The service focuses on priority risks and sectors in the National Adaptation Programme, published by government in July 2013. It is therefore aimed at organisations rather than the general public. The priority sectors for the service are: local government, the built environment, the natural environment, infrastructure, health and wellbeing, agriculture and forestry, business and services.

3. The service aims to build climate resilience in these sectors and organisations. We are clear that that the purpose of our advice is to help organisations understand how a changing climate affects their interests and how they can take actions to avoid and reduce the consequences.

4. Our advice is delivered with and through other government delivery bodies, service providers and sector representatives. We use existing communication channels and networks where possible to ensure that customers can readily find advice from trusted and familiar sources in a language that they understand. Our approach is to build capacity in those other organisations rather than to create a dependency on the services of the Environment Agency. Our advice is tailored to customer needs to help them take appropriate action. For the majority of organisations, this means thinking first and foremost about their organisation rather than climate science.

5. We provide access on behalf of Defra to the UK Climate Projections, which provide the latest information on how the UK climate may change. We also work with researchers and Research Councils through the "Living With Environmental Change" (LWEC) programme to summarise evidence on future climate impacts. LWEC is producing a series of reports that summarise impacts for policy makers and businesses. These are designed to be accessible to lay audiences, though are not specifically aimed at the general public.

Interactions with Local Government

6. We work closely with local government through our Climate Ready Support Service and our wider roles. We have supported the Local Government Association's "Climate Local" initiative with staff secondments. The initiative supports councils' efforts to reduce carbon emissions and to improve their resilience to future climate through sharing information and developing action plans. Seventy-three councils have joined the initiative to date.

7. We provide adaptation training to councils, including a learning aid for councillors on the roles, opportunities and drivers for council led action on climate change. We will run training events in the autumn/winter 2013–14 for local authorities to promote available information and resources.

8. We support the Local Adaptation Advisory Panel, which brings together local authorities, government departments and delivery bodies to understand what support councils need to adapt to future climate. This is a

key mechanism for local government to feedback to central government on adaptation legislation, policy and delivery programmes.

9. We are helping to develop practical tools to promote local adaptation. This includes working with Climate UK to make Kent County Council's "Severe Weather Impacts Monitoring System" available to all local authorities, helping them to record the impacts of severe weather on their services and aid future service planning.

10. We also provide support to councils and their partnerships through our local advisory and statutory planning role. This includes Local Nature Partnerships and Local Enterprise Partnerships, who we work with on major developments and support in producing European Structural and Investment Fund Strategies.

Working through Climate Change Partnerships

11. Local delivery of our Climate Ready Support Service is provided by working in partnership with a network of Climate Change Partnerships, through their Climate UK umbrella organisation. The Partnerships work through stakeholder networks to share learning and build local climate resilience in businesses, local government, and communities. They have close relationships with business organisations such as Chambers of Commerce and the Federation of Small Businesses, as well as with utilities, banks, insurers, local authorities, community engagement groups, tourism bodies, universities, and industry associations.

12. The Partnerships promote and support practical adaptation action. Recent examples include:

- Working with local communities to map vulnerable and resilient road networks.
- Providing county councils and their local partners with an online system for logging the costs (in money and reputation) of extreme weather on an ongoing basis.
- Developing an accredited qualification in Business Resilience, and testing it with 150 small businesses.
- Running business resilience training days, including a Business Resilience Health Check, for businesses regulated by the Environment Agency.

Working with other government bodies

13. We have worked closely with lead government departments to develop the aims of the Climate Ready programme, particularly the Departments of Health; Business Innovation and Skills; Communities and Local Government; Environment, Food and Rural Affairs; and the Cabinet Office.

14. In delivering the programme we work closely with other agencies and delivery bodies, especially the Met Office, Natural England and the Forestry Commission. Examples of working with other Government bodies include:

- Establishing a delivery group for health sector resilience with the NHS Sustainable Development Unit, Public Health England and the Department of Health, which is supporting Health and Wellbeing Boards to develop local climate risk assessment and action plans.
- Working with the National Flood Forum and Cabinet Office to develop local resilience case studies. These document the actions of four community groups to help increase their resilience against flooding and other weather events. The group in Calderdale use social media and web content to engage the local community and increase resilience during extreme events.
- Running workshops for local transport authorities, such as local authority highways teams and ambulance services, to understand and manage risks to their services from extreme weather.

Communication through our wider flood and coastal management role

15. We work with our partners to help the public and communities understand their risk of flooding, which can involve consideration of climate change when thinking over the long term.

16. We aim to raise their awareness of flood risk and encourage people to take action to protect themselves and their property so they are better prepared for flooding. This may include them checking their flood risk on our flood map, signing up to our free warning service—Floodline Warnings Direct—or preparing a personal flood plan. We also look to improve flood response at a community level by holding community meetings and workshops, promoting community led flood action groups, and working with communities to establish community flood plans.

17. We issue flood warnings to the public, businesses and the emergency services to help them prepare and respond to floods. In March 2013, 62% of properties in the highest flood risk areas received our direct flood warnings, up from 60% at the end of 2011–12. Research carried out in 2013 found that our communications are effective in helping people to understand that preparing for flooding is worthwhile. Almost nine out of ten customers who are signed up to our free flood warning service and who had previously received a flood warning said that flood warnings are easy to understand, two-thirds agreed that flood warnings are accurate and half take action when a flood warning is issued.

18. From October to November 2012 we ran a flood action campaign which aimed to change behaviours and encourage people to accept risk and take action:

- Our website had 650,000 unique users during the campaign—a 150% increase compared to the same period in 2011–12.
- Over 4,000 people signed up for flood warnings as a result of the campaign.
- Almost 2,000 people downloaded flood plans in direct response to the campaign adverts.

19. Climate change projections indicate rising sea levels and increasingly severe and frequent rainstorms, resulting in a greater risk of flooding.

Coastal Communities 2150

20. The Coastal Communities 2150 project helps communities to develop visions for managing their long term risks from coastal and climate change to 2150 and beyond. The project is a partnership between the Environment Agency, Kent and Hampshire County Councils and partners in Belgium and Holland. It is funded by the European INTERREG body.

21. The Environment Agency is working in Newhaven, Seaford and Lewes in East Sussex, and has developed successful local engagement groups that are supported by town and parish councils. Kent County Council is working in Margate, the Isle Sheppey and the Romney Marshes. Hampshire County Council is engaging at 6 sites around the Solent.

22. Public interest has been higher than expected and is driven by the desire to shape long term community plans. The UK partners have found it easier to form local public engagement groups than the Dutch or Belgians, who have encountered a public attitude that "the government have always dealt with this—so why should I get involved?"

23. Recent extreme weather events such as the droughts and floods in 2012 and Hurricane Sandy in New York seem to have contributed to general public acceptance that weather events have become more extreme and communities should prepare for more to come. The 150 year time frame has not been a problem for the public or businesses, who seem generally concerned with leaving a sustainable legacy for future generations.

Question 2: *We have been told by various witnesses that, whereas talking about climate change does not necessarily result in changes in behaviour, when other topics that affect people more directly (such as energy security or flooding) are focused on then there is much greater willingness to change behaviour. Any experience you have of whether this applies to the areas you work in would be useful.*

24. We audiences are usually interested in climate change only to the extent that it affects their interests. They find it easier and more worthwhile to engage when risks are framed in familiar terms. We find it is more productive to focus on relevant impacts such as flooding and drought.

25. We find it helpful to take a people-first or organisation-first perspective. This involves thinking about how they are affected by current weather, and then how such vulnerabilities could increase in the future. This allows them to consider their adaptation needs without having to engage with complex science.

26. More expert audiences such as utilities are comfortable talking about climate change and appreciate to the need to adapt. However, they are also primarily interested in the impacts of climate change rather than the climate itself. A lack of relevant information is often cited as a barrier to action, with organisations finding it difficult to translate climate projections into the more relevant impact assessments that they need to inform adaptation decisions.

27. We have undertaken market surveys to understand how potential customers for our Climate Ready Support Service, including organisations in the, business, local government, infrastructure, built environment, health, natural environment, agriculture and forestry sectors, engage with climate adaptation, and what language resonates with them. In summary, this shows that:

- Organisations are more familiar with climate change mitigation than adaptation and are more likely to be acting to mitigate climate change. The reasons for this include: greater understanding of how to act; actions are associated with cost savings; they can apply tangible, measurable, specific targets; and existing regulation. By contrast adaptation tends to have a lower profile and is associated with more barriers to action.
- When thinking specifically about environmental risks there is relatively high awareness of climate change among the target audience and organisations perceive it to be the top environmental risk (as important as environmental regulation/compliance). Organisations also identify the impacts of climate change as key risks (eg flooding, droughts, heat-waves, and extreme weather). 29% of organisations believe they have already been affected by climate change a great deal and a further 39% believe that they have been affected a little. The target audience are most likely to think they will be affected by disruptions to staff (63%), all impact on logistics (60%), and all impact on premises or infrastructure (58%).

— The majority of organisations have a strategic approach to risk management as part of their normal business planning, and so can manage climate risks within that process rather than separately.

— Organisations commonly cite barriers to adaptation that include: mitigation taking priority over adaptation; short-term focus is prioritised (adaptation is perceived to be long-term); a lack of understanding of the business case (the financial argument); economic pressures; lack of knowledge, capacity, finances and time; lack of confidence in the science and difficulty dealing with probabilities.

28. It can also be effective to focus on adaptation actions (solutions) rather than climate (uncertain problems). In many cases, no- or low-regret actions can be taken that make sense regardless of future climate. For example, businesses can benefit from simple water efficiency measures or registering for our flood warning service irrespective of how the climate changes.

August 2013

Written evidence submitted by the BBC (CLC064)

The most important principle is that our interest in reporting any subject is journalistic, rather than one of raising awareness. As an Independent news organisation it would not be appropriate for us to give advice on how organisations or individuals might seek to raise awareness, particularly in areas of contested scientific and indeed political debate. Our role is to explain these issues to our audiences so that they understand what the debate is about, and the context in which it is taking place.

Of course Climate change is an umbrella phrase covering a very broad waterfront. As the Committee is clearly well aware, even within the science of climate change, some issues are basic physics, some are widely accepted as falling within a narrow range of possibilities, and there are others where fundamental issues are being debated. The last of these would be, in terms of the way we report on a subject under the BBC's Editorial Guidelines, treated as "controversial subjects".

In addition, there are numerous political and economic questions relating to how governments, firms and individuals should respond to climate change. Defenders and opponents of all policy-related questions deploy facts and opinions to buttress their arguments as they see fit. Broadly speaking, a policy debate is a "controversial subject", and the BBC will cover the appropriate range of argument as it applies to the policy itself.

We have a highly experienced team reporting on these issues, notably our Science Editor and our Environment Analyst—and the BBC's News Editorial Board receives quarterly updates from the Science Editor on BBC climate change coverage.

BBC coverage has been criticised by some for both giving too much airtime to climate change sceptics and, conversely, for not providing enough coverage of the claims that climate change is happening more quickly, or requires an even more radical or urgent response.

In 2011 the BBC Trust published a report it had commissioned from Professor Steve Jones on the impartiality and accuracy of the BBC's coverage of science. It covered a range of topics including climate change, his assessment was that the BBC had continued to give undue prominence to climate change sceptics and had not kept pace with the debate: "*The real discussion has moved on to what should be done to mitigate climate change. Its coverage has been impeded by the constant emphasis on an exhausted subject whose main attraction is that it can be presented as a confrontation".*

The BBC's management response noted "*… that the treatment of a scientific story will depend upon its nature and context. Sometimes it is appropriate to present it as a debate within the scientific community whereas at others a range of views, including from non-experts, is justified given the social, political and cultural context*."

The BBC remains committed to the principles, set out in its Charter and Agreement, of due accuracy and impartiality, and to applying them to coverage of all the issues around climate change.

As outlined above, for the BBC this is a matter of reporting and journalistic inquiry, and one where our strong reputation for independence is paramount. On that basis, I hope you can understand why we would be highly reluctant for our editorial approach on any issue to be subject to formal examination by a Committee of Parliament, as this would seem to conflict with our guaranteed independence from Government and Parliament as enshrined in the Charter.

October 2013

APPENDIX

CORRESPONDENCE FROM THE DIRECTOR, EDITORIAL POLICY & STANDARDS, BBC TO THE COMMITTEE, SEPTEMBER 2013

Many thanks for your letter dated 5 August. Thank you also for the opportunity to give evidence to your Committee on behalf of the BBC, as part of your inquiry into "Climate: Public Understanding and Policy Implications".

I will respond to the points raised in your letter one by one:

Audience Knowledge of Climate Change

The BBC does not measure or monitor our audience's level of *knowledge* about climate change. This would not fall within the BBC's remit and would, in any case, be extremely difficult to quantify. Shuckburgh *et al*, notes that less than half of their respondents classed themselves as knowing "a fair amount or a lot about climate change", and that this represents a significant decrease since earlier surveys. However, it seems unlikely that this kind of self-assessment indicates the absolute level of knowledge among respondents.

We do however measure our audience's *interest* in certain subject areas, including science. For example, we know that 69% of UK adults are interested in science news, and 68% of UK adults think it is important that they personally understand science news. Health and medical developments are the greatest area of interest for UK adults, followed by news about energy and fuel sources, then followed by interest in the environment and climate change.[204]

BBC's Corporate Position on Climate Change

As I explained in my evidence to the committee, there is an important distinction between the BBC's corporate and editorial positions on any subject matter, including climate change. The BBC has a stated desire to reduce its environmental impacts. Our approach to this ranges from innovation in our core business of making programmes through to targets aimed at reducing the environmental impact of our operations. This corporate position has no bearing on our editorial position.

There is information about our sustainability strategy and our environment targets here: www.bbc.co.uk/sustainability.

BBC Editorial Guidelines

The Editorial Guidelines (www.bbc.co.uk/editorialguidelines) set out numerous considerations for content producers. To ensure our audience is clear about the background and expertise of interviewees on news programmes, content providers must abide by the following guidelines:

> *We should normally identify on-air and online sources of information and significant contributors, and provide their credentials, so that our audiences can judge their status. (3.4.12)*
>
> *We should not automatically assume that contributors from other organisations (such as academics, journalists, researchers and representatives of charities) are unbiased and we may need to make it clear to the audience when contributors are associated with a particular viewpoint, if it is not apparent from their contribution or from the context in which their contribution is made. (4.4.14)*

Fact Checking

Editors of individual programmes (whether news or otherwise) are responsible for fact checking their content before it is aired. They do this by following the standards set out in the BBC Editorial Guidelines (Section 3: Accuracy).

Role of the BBC Science Editor

The BBC's Science Editor, David Shukman, was appointed following the Professor Steve Jones review of the impartiality and accuracy of the BBC's science coverage. David's role is described in some detail in the BBC Executive's follow up report (December 2012): http://downloads.bbc.co.uk/bbctrust/assets/files/pdf/our_work/science_impartiality/science_impartiality_followup.pdf.

David regularly engages with colleagues across BBC Science and discusses matters of scientific debate and controversy with them. However, his role does not extend to fact-checking all science output from BBC News (let alone from the BBC as a whole); this remains the responsibility of the editor in question.

College of Journalism Science Training

As part of the BBC's response to Professor Jones' report, the BBC's College of Journalism set up and runs a course called "Reporting Science", which is open to all staff. During the course, delegates discuss issues raised by the Jones report, and work on ways to ensure that future BBC science coverage complies with our

[204] BBC/GfK Pulse, January–May 2013, 1,000–2,000 respondents

accuracy and impartiality requirements. BBC News has made the course compulsory for assistant editors and above (ie all those with editorial responsibility for programmes and web pages), and highly recommended for other grades.

As I explained in my evidence to the committee, scientists do not participate in the College of Journalism training, as the debates about science are approached from a journalistic point of view. However, extensive discussion with scientists and the scientific community took place during the preparation of the course material. Most notably, we spent an afternoon with the President of the Royal Society and Nobel Laureate, Sir Paul Nurse, and interviewed him about science reporting, how science works, pitfalls and opportunities and so on. We also interviewed Professor Colin Blakemore and Dr Karol Sikora, two of the UK's most eminent scientists.

Clips of these interviews are included in the course, and can be viewed on the College of Journalism website http://www.bbc.co.uk/academy/journalism/subject-guides/science.

Application of the BBC Editorial Guideline to Specific Programming (in this Case, Sunday Politics)

Regardless of the topic, an impartial interviewer must put forward a range of arguments, perhaps even act as a kind of devil's advocate, when questioning a minister about government policies. It may be the case that some arguments heard in the public sphere are misinformed, but that does not mean that they should not be put to politicians. It is part of the BBC's function of holding government to account.

The BBC Editorial Guidelines set out our due impartiality and due accuracy requirements. In essence, interviews should be conducted on the basis of reasoned argument. However, so long as ministers have to face arguments based on misunderstandings, even ignorance, they will be given the opportunity to rebut them on the BBC. This is recognised in the Editorial Guidelines, which say "Accuracy is not simply a matter of getting facts right. If an issue is controversial, relevant opinions as well as facts may need to be considered. When necessary, all the relevant facts and information should also be weighed to get at the Truth" (Section 3: Accuracy).

Reasoned argument requires knowledge of an issue, and knowledge of the range of arguments deployed. Production staff on programmes such as Sunday Politics are well used to getting to grips with pretty much all topics of public debate which come up in government. They have access to the BBC's in-house specialists and will conduct their own research, which, were appropriate, will include consulting with outside experts and academics.

I do not accept that a scientific line presented by a BBC presenter in order to challenge a Government Minister provides that aspect of science with a level of authority beyond that which it has already acquired within the scientific community.

The BBC Editorial Guidelines apply equally to BBC online content as much as they do to our on air content.

Meetings with Individuals to Discuss Climate Change

My meetings with Lord Lawson and Peter Lilley MP provided an opportunity for me to explain the BBC's approach to impartiality in relation to climate change and how the BBC's Editorial Guidelines apply to climate science coverage. Both had accused the BBC of bias on these subjects. As part of my role as Director of Editorial Policy and Standards, I meet a wide range of people in order to explain the BBC's approach to editorial matters though I am not aware of having met anyone else specifically to discuss accusations of bias in relation to climate change.

BBC Written Evidence

The BBC does not intend to provide the Committee with further written evidence. I would hope that this letter, together with my oral evidence, satisfactorily informs the Committee's inquiry.

Written evidence submitted by the Chief Scientific Adviser to HM Government (CLC0066)

You wrote to David Willetts with a number of questions about the role of Government scientists in communicating climate science to the general public. It is appropriate that I reply as these are matters that are under my aegis. I attach a note which GO-Science officials have prepared in consultation with Government Departments.

Although a clear majority of the public still think the climate is changing, there has been a downward trend in public acceptance of the reality of, and concern about, climate issues. The publication of the Inter-Governmental Panel on Climate Change Fifth Assessment Report represents an opportunity to reengage the public on the risks of climate change, and on the options for responding to these. Over the coming months I will be attaching considerable priority to engaging with the public on these issues.

I will look forward to your committee's report with interest.

ROLE OF GOVERNMENT SCIENTISTS IN COMMUNICATING CLIMATE SCIENCE TO THE GENERAL PUBLIC—RESPONSE TO THE QUESTIONS RAISED IN THE COMMITTEE'S LETTER TO DAVID WILLETTS MP, 30 JULY 2013

Communication of the science which informs policy matters. Openness and transparency in the policy process should be the default.

Scientists are involved in the business of government in a range of ways. These include:

- the Government Chief Scientific Adviser and departmental Chief Scientific Advisers. a special group of civil servants with a more explicit role in public engagement on scientific issues;
- officials who commission scientific (and engineering) evidence to inform policy and may often themselves have a scientific background;
- scientists who work in research establishments within government; and
- external, independent academic or industry scientists who serve on advisory bodies or otherwise offer advice to government.

For the purpose of this document, we focus on the third of these categories; people doing primary scientific research across government. These scientists are generally employed in relevant non-departmental public bodies (NDPBs) rather than in central ministerial departments.

A second important distinction is between communication of the science informing policy and communication of the resulting policy itself.

Turning to the points in the letter:

The number of scientists working for Government Departments and non-departmental bodies

Latest figures suggest that at 1 April 2013 there were around 14,000 FTE specialist science and engineering posts across government (in ministerial and non-ministerial departments and within their NDPBs). These are posts where relevant science or engineering expertise is an essential requirement.

The number of these scientist that are involved in primary research and how many of these work on areas related to climate science

There are no scientists involved in primary research in government departments, other than those departmental Chief Scientific Advisers who maintain a part-time role with a University or other external organisation. In these cases, a "Chinese wall" is maintained between the two roles.

In NDPBs:

- In the Met Office, in 2013–14 118.7 FTE scientists were involved in primary climate research. This includes the DECC and Defra funded Met Office Hadley Centre Climate Programme (supporting the Met Office's role in delivering the UK's National Climate Capability and evidence to inform specific departmental policies), the DFID funded Climate Science Research Partnership, and EU projects that provide primary research in support of the main Climate Programme.
- In the Centre for Environment, Fisheries and Aquaculture Science (Cefas), seven staff are currently fully occupied by research on the impacts of environmental change on seas and on fish populations. A further 15 staff work on projects related environmental change for at least part of their time.
- In the Environment Agency, around 20 of the research team are active researchers, publishing in peer-reviewed journals. Six of these work in areas related to climate science, principally on understanding the impacts of environmental change and how to adapt. The whole climate change research team consists of 11 people.
- In Forest Research, 12 FTEs currently work on primary climate *change* research (adaptation and mitigation), none directly on climate research.

Any rules or guidance for the publication of research in peer review journals by Government employed research scientists

There is a presumption that all research commissioned by departments should be published. As there are no active researchers in central government departments, there is no central guidance on publishing in peer reviewed publications. Some departments have general guidance for publication of research, the purpose of which is to ensure that quality can be assured and that ministers can be kept informed of any upcoming publication.

Departments' policies related to climate change are underpinned by a huge scientific evidence base, which is independently assessed both through the peer-review process and by authoritative assessments from, for example, the IPCC, and other international and national bodies. Research is sourced through sponsorship of relevant NDPBs, provision of support to Research Council led initiatives such as the Ocean Acidification and

Arctic Research Programmes led by NERC, and by the letting of commercial contracts to academic groups and consortia such as the recently completed AVOID Programme.

DECC requires research undertaken under contract to be submitted for peer-review publication and also to be made available as appropriate in project and programme reports. DECC requires Met Office staff and other funded scientists to operate independently of DECC and that their research and scientific conclusions are not constrained or influenced by the Department. Similarly, these scientists are encouraged to communicate their research to the media and to public audiences.

In other NDPBs, there is also a presumption that research is published, and there will be internal guidance on procedures for publication. NDPBs generally ensure their sponsor departments see papers to be submitted for publication, to make sure departments are aware of emerging research from their funded programmes. Sponsor departments are not otherwise involved in the publications process. It is usual in NDPBs for there to be senior manager sign off for any publication, for quality assurance purposes. Any publication with a potentially high level of media interest will be drawn to the attention of relevant departmental officials and press offices to ensure there are "no surprises".

Any rules or guidance for scientists discussing or promoting their research and findings through the media and other means; and how these apply to scientists working on climate science

Government departments and NDPBs have guidance on procedures for interactions with the media. Media and press offices have an important role to support and facilitate such interactions. The purpose of such guidance and co-ordination is to:

- Ensure those speaking to the media are aware of other relevant media activities on the same or related topics.
- Ensure Ministers can be kept aware of issues in the public domain so they are in the best position to handle questions.
- Ensure others in the department are aware of activity that impacts their own work.
- Identify opportunities for using existing planned media events to further communication on related issues.
- Ensure staff are adequately supported in their interactions with the media.

Public servants discussing their science via the media must limit their comments to the science. Nevertheless, questions can sometimes stray into the policy implications of the science and the policy decisions made by Ministers. As set out in the Civil Service Code, it is not appropriate for public servants to discuss policy decisions. This can be a difficult tension to manage and may deter some scientists from engaging in public communication through the media. For this reason, media training for government scientists, and support for them in engaging with the media via press offices and external bodies such as the Science Media Centre, is important, encouraged and increasing.

An important feature of the role of Chief Scientific Advisers is that they maintain their professional scientific independence whilst working as civil servants. This is to ensure the impartiality of the scientific advice given to government. The corollary of this independence is that CSAs can have an independent profile in the media with respect to the scientific advice when they deem it necessary. CSAs will use their judgement in deciding whether public engagement or internal discussion alone will have greater impact.

Any rules or restrictions for scientists publicly discussing Government policy relevant to their area of research

While policy is under discussion, civil servants, including Chief Scientific Advisers, and government scientists in NDPBs should not advocate a particular policy position over alternatives. CSAs will often publicly discuss the science behind the policy, while recognising that science is just one of a range of evidence and factors in the policy-making process.

October 2013

Supplementary written evidence submitted by the Met Office (CLC068)

In our written evidence and in the oral evidence session in September we informed the Committee we had seen an increase in the level of interest shown by the public in climate related science. The Committee asked us to provide further evidence in support of that statement.

The Met Office has a number of routes through which the public can access information and engage directly when they have specific questions and the following tables provide details on the numbers of enquiries received through each.

1. **Traditional communication routes** remain popular and, as shown in the following tables, we have seen a steady increase in the number of enquiries received by letter, email, fax and telephone about climate and

climate science over the last few years. In addition we have seen a rise in the number of requests presented under the FOI and EIR Acts.

TELEPHONE/LETTER/EMAIL/FAX ENQUIRIES

	April 2011 to March 2012	*April 2012 to March 2013*	*April 2013 to August 2013*
Total number received	255	279	206
Average per month	21	23	41

FOI/EIR REQUESTS

	2011	*2012*	*2013 (to August)*
Climate related requests	4	11	15

2. **Social media** provides increasingly important channels through which the Met Office can connect directly with the public. We provide a range of information, videos and blogs across a number of social media platforms, including Twitter, Facebook and YouTube.

Website

We are continually collecting feedback from the public on ease of navigation of our website, how useful they find the content and what they would like to see. In addition to accessing our website directly, the public are also able to access content through an email subscription service designed specifically for the Public Sector and managed by Gov Delivery.

MET OFFICE WEBSITE—CLIMATE PAGES[205]

	2011	*2012*	*2013 (to end August)*
Page views	548,696	728,722	536,501
AR5 page (launched 20 Sept)	-	-	662 to 14 October

Blog

The Met Office blog was launched in July 2010 and has proven invaluable as a route to publish rapidly updatable information and to provide commentary on news and stories about the Met Office and our science.

MET OFFICE BLOG (http://metofficenews.wordpress.com/)

	2011	*2012*	*2013 (to end August)*
Visits to climate posts	518	90361	46460
Comments on climate posts	0	433	298

Twitter

The Met Office started its Twitter feed in 2010 and is used primarily as a customer service tool. In addition to providing alerts of National Severe Weather Warnings, we are able to directly respond to specific questions from the public in as near real-time as possible and have found our following grow year on year.

TWITTER (@metoffice)

	2011	*2012*	*2013 (to end August)*
Re-tweets and favourites of climate content	0	0	75
Followers (approx at August)	92,000	116,000	144,000

Facebook

The Met Office's Facebook page complements the blog and allows users to "Like" posts and share them across the other social media channels.

FACEBOOK (http://facebook.com/metoffice)

[205] http://www.metoffice.gov.uk/climate-guide

	2011	*2012*	*2013 (to end August)*
Interaction with climate content	11	32	65

YouTube

The Met office has several pieces of video content on YouTube around the subject of climate and climate change. The two highest profile pieces are *What is climate?* and *What is climate change?* The following table provides viewing figures for climate related content broken down by video.

Videos	*2011*	*2012*	*2013 (to end August)*
AVOID symposium[206]	n/a	n/a	1,700
Importance of satellite imagery in predicting climate in the polar regions	n/a	n/a	512
The work of the Met office Hadley Centre (video1)	693	330	205
The work of the Met office Hadley Centre (video2)	n/a	348	405
What is climate	7,767	14,510	7,636
What is climate change	3,262	8,665	9,772
How does the climate system work	n/a	5,799	9,318
How do climate models work	n/a	1,225	417
Total	**11,722**	**30,877**	**29,965**

Recognition of Social Media Engagement

The Met Office's continued and successful engagement with social media has been recognised by a number of awards:

- In February 2011, the Met Office received an "Excellence in Communication" award from Gov Delivery.
- In November 2011, and as the result of a public vote, the Met Office won the IBM sponsored "Best Use of Social Media in the Public Sector Award" in the Computer Weekly Social Media Awards in recognition of our work in using social media to reach the public with the latest weather and climate information when it matters.
- In November 2012 the Met Office won the Social Buzz Award for Best Public Sector Social Media Strategy in recognition of our strategy to utilise social media to place ourselves at the centre of online conversations about weather and climate.

Written evidence submitted by The Daily Telegraph (CLC070)

How should climate scientists communicate their findings?

- *Does the media make effective use of scientists when covering the debate about climate science?*
- *Are there any scientific voices missing in the debate?*

The media relies on scientists putting themselves forward and the research they publish. More could always be done to bring their views to the public's attention, but scientists in turn need to find ways to make their work and what they say about it accessible to a lay audience.

Scientists usually come top of professions that are most trusted by the general public in surveys. Why is that different in the climate debate?

- *What are your trusted information sources on climate?*
- *Is there a tendency on both sides of debate to demonise the opposition?*

I don't know as I have not seen any data to substantiate the premise of the question. I am wary about the value judgment implied in the term "trusted information source". We report information, and rely on our commentators to interpret it.

What is your opinion of mass media coverage of climate?

- *Is it possible for our major broadcasters to function as trusted voices on issues such as climate?*

[206] The AVOID final symposium took place on 12 February 2013 to showcase programme research results to high-level Government policymakers, senior researchers, and key representatives from research bodies and the business world. AVOID is a UK research programme funded by DECC/Defra and led by the Met Office in a consortium with the Walker Institute, Tyndall Centre and Grantham Institute.

— *How should we decide on what weight sceptical voices should be given in the mass media?*

The climate debate is covered exhaustively in the Telegraph and elsewhere. Again, I'm not sure about the word trust. Media have a duty to report all facets of a debate, even if it means pointing out that the balance of facts favours one side.

JAMES PAINTER'S RESEARCH HAS FOUND THAT PRESS COVERAGE IN THE UK HAS BECOME INCREASINGLY POLARISED—WHY IS THIS?

— *Do you consider the public are sensitive to the differences between reportage, informed commentary and polemic?*

— *Controversy and dissent sells—isn't this the reason the proportion of sceptical commentary in the press is much greater than the weight of science output might warrant?*

I am not familiar with Mr Painter's research. I can only speak for the Telegraph's coverage. We try to bring a range of voices and views to the debate, in addition to covering developments in the news story. Our readers are informed and have a clear understanding of the difference between news and opolemic.

WHAT IS YOUR PUBLICATION'S WORKING DEFINITION OF CLIMATE CHANGE?

— *Do you think that it is understandable to most of your readers?*

— *Does it agree with the current science facts?*

We don't have a working definition of climate change. We report on it rather than define it. In terms of our editorial policy, it is broadly that we believe that the climate is changing, that the reason for that change includes human activity, but that human ingenuity and adaptability should not be ignored in favour of economically damaging prescriptions.

DO YOU AGREE THAT THERE ARE CORE FACTS THAT EVERYONE MIGHT AGREE UPON? WHERE SHOULD THESE FACTS BE PROMULGATED?

— *Can you all agree, for example, on whether there needs to be more information available on climate science in formats that the public can engage with?*

— *Do you think there are any bodies that all sides of the debate could accept as authoritative voices on climate science?*

Your question suggests that we are participants in the debate. We are not. Our sole responsibility is to our readers, and that involves presenting them with a compelling daily package of news and features that they are happy to pay for. As part of that, we try to provide them with reliable information that they can engage with: Too often we are faced with impenetrable gobbledygook from scientists who appear to have no inkling that their case is incomprehensible to most members of the public.

AS A PUBLISHER OF NEWS, YOU COMMUNICATE WITH THE PUBLIC ON CLIMATE ISSUES. DO YOU THINK YOU ATTRACT A BROAD SPECTRUM OF OPINION OR ARE YOU ONLY SPEAKING TO LIKE-MINDED PEOPLE?

— *What is your purpose in writing about climate? Are you seeking to change minds, to educate and inform or simply to entertain?*

— *Do you find people better understand climate issues when they are linked to more immediate concerns such as energy efficiency, energy security and local environmental benefits like improving air pollution?*

You will see if you study the Telegraph over the past, say, five years that we cover a broad spectrum of views and, better than most, allow conflicting voices space to make their case.

DISCUSSIONS AND DISSENT ON CLIMATE CHANGE POLICY OFTEN FOCUS ON UNCERTAINTIES IN THE SCIENCE. SHOULD POLICY NOT BE DRIVEN BY MITIGATING THE RISKS OF CLIMATE CHANGE RATHER THAN HESITATE DUE TO UNCERTAINTIES IN ASPECTS OF THE SCIENCE?

— *Are the possible risks from climate change something that is covered effectively in the media?*

Of course, efforts should be focused on mitigating the effects of climate change. We regularly urge government in our leaders to consider how it does so. We are concerned that the identified risks of climate change are well covered, but do not take sufficient account of human adaptability and ingenuity How best to mitigate those risks is a debate worth having. The US, for example, has seen its carbon emissions plummet by switching from coal to shale.

December 2013

Written evidence submitted by The Daily Mail (CLC071)

1. How should climate scientists communicate their findings?

— *Does the media make effective use of scientists when covering the debate about climate science?*

— *Are there any scientific voices missing in the debate?*

The Daily Mail's science and environment correspondents read the major academic journals every day and report on papers which we believe are important and will interest our readers, Correspondents usually interview the author of the scientific paper, and other experts in that field, on the phone to ask them questions about their research and its wider significance. They also make use of the independent Science Media Centre which organises panels of scientists a once or twice a week to give their opinions on a topic or report and take questions from journalists, and provides reaction from scientists to articles authored by their colleagues. Climate change is no exception to this and our reporters regularly interview climate scientists and other researchers whose work has an impact on the climate, and report on their work. Like most scientists, climate scientists generally send out press releases about their published research in advance, and offer to speak to journalists about it, which is always appreciated. There are very few scientists in this field who publicly challenge the consensus about climate change. One example is Professor Judith Curry from the Department of Earth and Atmospheric Sciences at Georgia Institute of Technology who speaks to the media about her concerns that 1998 was the hottest year on record and there has been little warming since so she is often quoted.

The Science Media Centre gave evidence to the Leveson Inquiry and I am aware that they highly value the Daily Mail as a supporter.

2. Scientists usually come top of professions that are most trusted by the general public in surveys. Why is that different in the climate debate?

— *What are your trusted information sources on climate?*

— *Is there a tendency on both sides of debate to demonise the opposition?*

Reporters covering all science issues including climate change should give an impression of how much agreement there is and how important a piece of research is in the wider context of that field. In climate science there is almost universal agreement that the climate is changing, and humans are having some impact on it, but not on its pace and scale and possible future effects. Just because the public trust scientists does not mean every piece of research by every scientist should be reported as fact—science is all about probabilities and it is our job to explain the debate and how it is changing. For example the scientist James Lovelock whose influential books suggested that there would be imminent disaster from global warning in the coming years has since moderated his stance as reported here- http://www.dailymail.co.uk/news/article-2134092/Gaia-scientist-James-Lovelock-I-alarmist-climate-change.html. Most science published in newspapers is based on material published in a peer-reviewed journal, further explained in an interview or conference presentation.

3. What is your opinion of mass media coverage of climate?

— *Is it possible for our major broadcasters to function as trusted voices on issues such as climate?*

— *How should we decide on what weight sceptical voices should be given in the mass media?*

Climate science has changed dramatically in recent years—there are now departments at universities around the world devoted to what was previously a niche issue. The UN's Intergovernmental Panel on Climate Change has around 800 scientists. But it is also a political issue. It is linked to rising energy bills for homes and businesses, to aid to the developing world, and feeds in to the debate about renewable energy (for example whether in cutting carbon emissions it damages the environment in other ways). For example in 2009 the "Climategate" controversy scientists at the University of East Anglia were exonerated of wrongdoing by a number of inquiries, but it is clear from their emails to and from government departments and the Met Office that they were discussing how their scientific findings fitted alongside political developments and international negotiations. It is important to explain uncertainties and changes to the science and expose where there may be a political agenda.

On sceptical voices, there are very few serious scientists who deny the climate is changing. But what is causing it, how fast is happening and what we do about it is controversial. When quoting those with well-known sceptical views such as Lord Lawson, we usually refer to him a climate change sceptic.

We note that according to last month's Spectator he complained that a meeting of scientists at the Lords was held without reporters being present to record the differing views of scientists.

4. James Painters research has found that press coverage in the UK has become increasingly polarised—why is this?

— *Do you consider the public are sensitive to the differences between reportage, informed commentary and polemic?*

— *Controversy and dissent sells—isn't this the reason the proportion of sceptical commentary in the press is much greater than the weight of science output might warrant?*

Climate science is used by government and others to justify higher energy bills; construction of wind farms, green taxes on businesses which can affect jobs; and closures of coal-fired power stations. When a subject becomes more prominent in public debate, and has considerable political and economic implications, then controversies will come to the fore. As far as the Painter report is concerned we would take issue with information provided in 2009 in regard to this paper and the reporting of Copenhagen.

To my knowledge the only Daily Mail editorial on the subject is the one attached to this email. It says "this paper keeps an open mind on climate change". Some columnists have doubted it in opinion pieces under their own name such as this article by Christopher Booker http://www.dailymail.co.uk/debate/article-2335982/CHRISTOPHER-BOOKER-A-dangerously-deluded-energy-policy-greens-want-hide-truth-soaring-bills.html. Others say it is real and serious and talk about how Britain should combat it—such as this by the New Scientist's Fred Pearce about nuclear power http://www.dailymail.co.uk/news/article-2066726/Nuclear-power-Yes—A-opponent-calls-Chris-Huhne-embrace-energy-source-thats-cheap-AND-good-environment.html. The public can read the news report and the comment and make up their own mind. Readers of the Daily Mail will be very familiar with distinct ways in which the paper reports news and comment. I am not aware of any climate science stories that have had an effect on newspaper sales.

5. What is your publications working definition of climate change?

— *Do you think that is understandable to most of your readers?*

— *Does it agree with the current science facts?*

It would be impossible to define every term used in the Daily Mail; we generally follow current widely accepted usage. Scientists now refer to "climate change" rather than global warming, as they no longer believe the effects of greenhouse gas emissions are simply warmer weather, but as climate patterns changes, the weather may become more extreme, with more floods and droughts; some areas of the world could become colder and others warmer. There are also other factors affecting the climate such as EI Nino and La Nina currents, volcanoes and cloud patterns. James Painters' research (referred to in question 4) makes the point that scientists think it is misguided to attribute single weather events to climate change as there is too much uncertainty there. But we do mention these trends in the Mail's weather reporting—see the article attached "Monsoon Britain" from January 2013 about how scientists believe downpours will become more common.

6. Do you agree that there are core facts that everyone might agree upon? Where should these facts be promulgated?

— *Can you all agree, for example, on whether there needs to be more information available on climate science in formats that the public can engage with?*

— *Do you think there any bodies that all sides of the debate could accept as authoritative voices on climate science?*

The climate is always changing and the vast majority of climate scientists believe there is a significant human impact on it although they disagree about the pace and effects. Climate scientists are unlikely to write papers saying climate change is not happening. The implications of climate change are also looked at by physicists, biologists, chemists, geologists—there is no one authority on it.

7. As a publisher of news, you communicate with the public on climate issues. Do you think you attract a broad spectrum of opinion or are you only speaking to like-minded people?

— *What is your purpose in writing about climate? Are you seeking to change minds, to educate and inform or simply to entertain?*

— *Do you find people better understand climate issues when they are linked to more immediate concerns such as energy efficiency, energy security or and local environmental benefits like improving air pollution?*

I am not aware that we have polled the views of our readers on climate change, although national surveys show a larger proportion of the public are sceptical about it than scientists are. (This may be because our readers will remember just 20 years or so ago scientists used to think the world would enter another Ice Age.) We try and relate our reporting to our reader's lives in terms of possible extreme weather and flooding, the effect on wildlife and nature, energy bills and energy security and health phenomena, such as hay fever or deaths from cold weather. Climate change can be an abstract concept so yes it can be better to link it to immediate concerns but we also cover major reports on the subject, for example these latest predictions from the UN's climate change panel in September 2013: http://www.dailymail.co.uk/sciencetech/article-2436113/IPCC-climate-change-report-Humans-causing-global-warming.html. Our reporting is intended to inform and entertain—something eye-catching the readers may not have heard of before—for example this story on animals shrinking as temperatures warm http://www.dailymail.co.uk/news/article-2049961/Animals-shrinking-heat-Sheep-deer-bird-reptile-numbers-falling-global-warming.html may get coverage even though it does not directly relate to our readers' lives.

8. DISCUSSIONS AND DISSENT ON CLIMATE CHANGE POLICY OFTEN FOCUS ON UNCERTAINTIES IN THE SCIENCE.

— *Should policy not be driven by mitigating the risks of climate change rather than hesitate due to uncertainties in aspects of the science?*

— *Are the possible risks from climate change something that is covered effectively in the media?*

It is not the role of newspapers to dictate policy.

Policy is concerned with mitigating the risks of climate change—while trying to make sure other countries do their bit and that it does not overburden households and businesses. It is driven by the science, which involves uncertainty and the probability of different scenarios. The modelling of past and future climate has become far more sophisticated in recent years but it is still prone to uncertainty—the latest IPCC report put the predicted rise in temperature at between 2C and 4.8C by the end of the century, and revised down how much warming there has been since the 1950s from 0.12C per decade to just 0.05C since 1998. Our readers will want to know how sure scientists are about different outcomes—especially if it involves tough choices now. I trust your committee will find this helpful.

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