

**Science and the RDAs : follow-up : report with evidence / House of Lords  
Science and Technology Committee.**

**Contributors**

Great Britain. Parliament. House of Lords. Science and Technology  
Committee.

Finlay, Ilora G.

**Publication/Creation**

London : Stationery Office, [2004], ©2004.

**Persistent URL**

<https://wellcomecollection.org/works/ue7t97yh>



Wellcome Collection  
183 Euston Road  
London NW1 2BE UK  
T +44 (0)20 7611 8722  
E [library@wellcomecollection.org](mailto:library@wellcomecollection.org)  
<https://wellcomecollection.org>

HOUSE OF LORDS

Science and Technology Committee

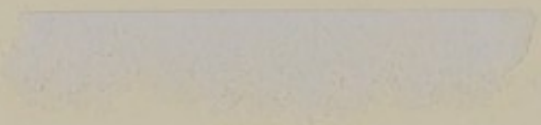
---

2nd Report of Session 2003-04

# **Science and the RDAs: follow-up**

Report with Evidence

HL Paper 103



WILLIAMSON LIBRARY
General Collections
P
6067



22501351131

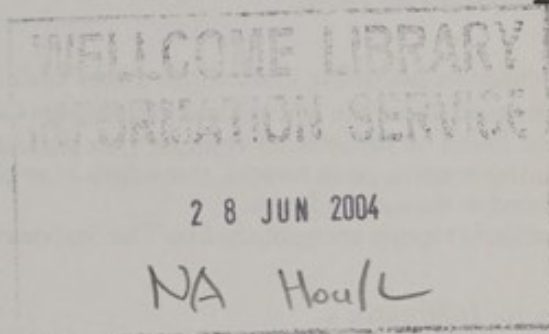
HOUSE OF LORDS

Science and Technology Committee

---

2nd Report of Session 2003-04

# Science and the RDAs: follow-up



## Report with Evidence

---

Ordered to be printed 27 May 2004 and published 14 June 2004

---

Published by the Authority of the House of Lords

London : The Stationery Office Limited  
£8.50

HL Paper 103

### *Science and Technology Committee*

The Science and Technology Committee is appointed by the House of Lords in each session "to consider science and technology". It normally appoints two Sub-Committees at any one time to conduct detailed inquiries.

### *Current Membership*

The Members of the Science and Technology Committee are:

Baroness Finlay of Llandaff  
Lord Lewis of Newnham  
Lord Lord Mitchell  
Lord Oxburgh (Chairman)  
Lord Paul  
Baroness Perry of Southwark  
Baroness Platt of Writtle  
Baroness Sharp of Guildford  
Lord Soulsby of Swaffham Prior  
Lord Sutherland of Houndwood  
Lord Turnberg  
Baroness Walmsley  
Lord Winston  
Lord Young of Graffham

For membership and declared interests of the Sub-Committee which conducted the original inquiry, see the Committee's 5th Report of 2002-03, *Science and the RDAs: SETting the regional agenda* (HL Paper 140-I).

### *Information about the Committee and Publications*

Information about the Science and Technology Committee, including details of current inquiries, can be found on the internet at <http://www.parliament.uk/hlscience/>. Committee publications, including reports, press notices, transcripts of evidence and government responses to reports, can be found at the same address.

Committee reports are published by The Stationery Office by Order of the House.

### *General Information*

General information about the House of Lords and its Committees, including guidance to witnesses, details of current inquiries and forthcoming meetings is on the internet at [http://www.parliament.uk/about\\_lords/about\\_lords.cfm](http://www.parliament.uk/about_lords/about_lords.cfm).

### *Contacts for the Science and Technology Committee*

All correspondence should be addressed to the Clerk of the Science and Technology Committee, Committee Office, House of Lords, London, SW1A 0PW.

The telephone number for general enquiries is 020 7219 5750.

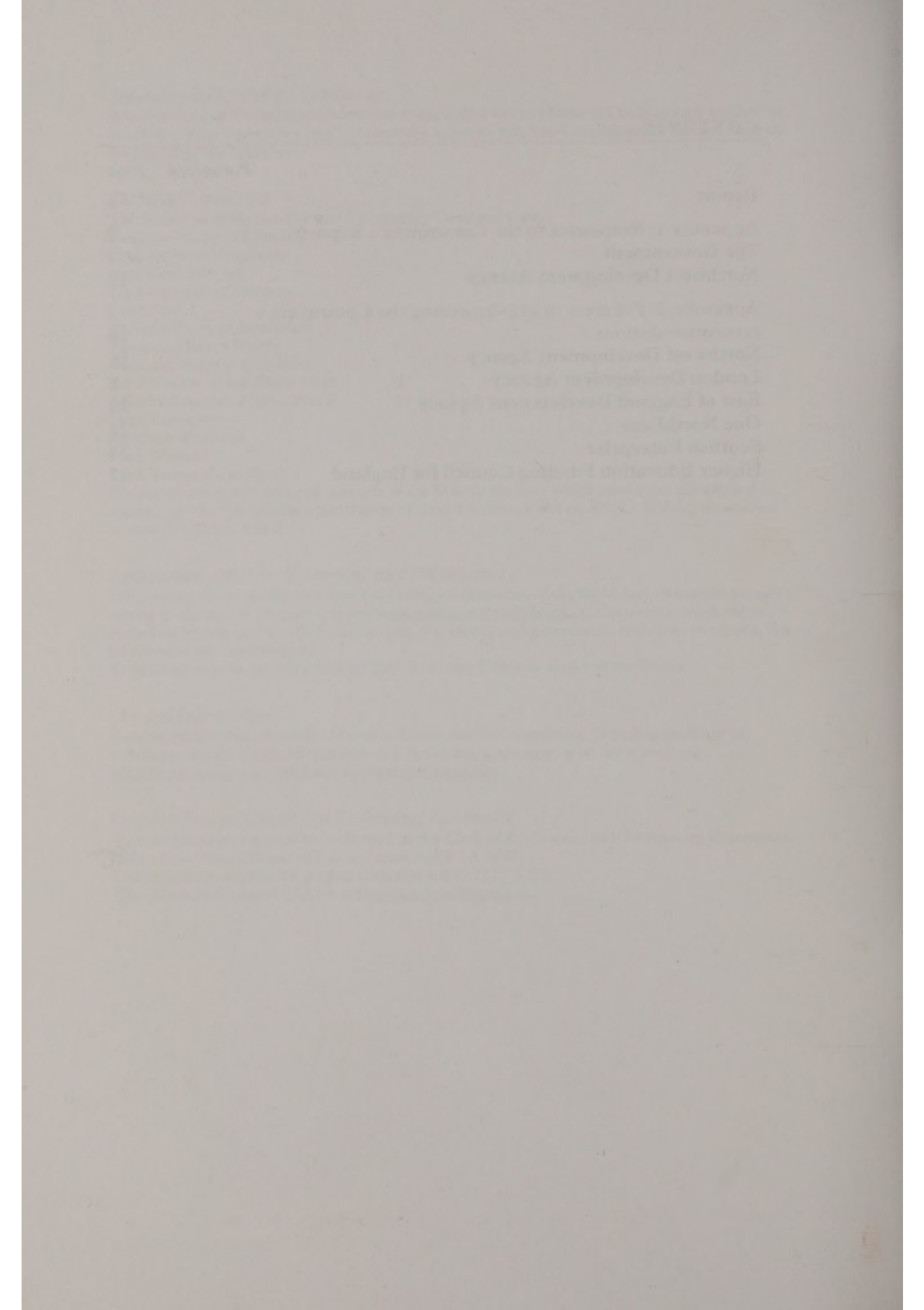
The Committee's email address is [hlscience@parliament.uk](mailto:hlscience@parliament.uk).



## CONTENTS

---

	<i>Paragraph</i>	<i>Page</i>
Report	1	5
Appendix 1: Responses to the Committee's Report		7
The Government		7
Northwest Development Agency		12
Appendix 2: Progress in implementing the Committee's recommendations		16
Northwest Development Agency		16
London Development Agency		18
East of England Development Agency		20
One NorthEast		22
Scottish Enterprise		24
Higher Education Funding Council for England		27



# Science and the RDAs: follow-up

## REPORT

---

1. In July 2003 we reported on *Science and the RDAs: SETting the regional agenda*.<sup>1</sup> Our Report considered the ways in which the Regional Development Agencies (RDAs) interact with the Science, Engineering and Technology (SET) base, with a view to encouraging innovation and promoting economic growth. The main message of our Report was the need for coherence, long term perspectives and reduced bureaucracy.
2. Since our Report was published our recommendations have been echoed in the work of others, including the National Audit Office's Report "Success in the Regions", published in November 2003, the Government's Innovation Report, "Competing in the Global Economy: the Innovation Challenge", and the report of the Lambert Review of "Business-University Collaboration" (both published in December 2003). We are pleased that the message seems to be securing general acceptance. However, we remain minded to revisit these issues in due course in order to explore the extent to which SET has been properly integrated into regional agendas.
3. The Government produced a response to the Report, as did the Northwest RDA, and both responses are printed in Appendix 1. We also wrote in February to the RDAs and other bodies asking for an update on the implementation of our recommendations, and received a number of responses, which are given in Appendix 2. We are grateful to all contributors for their help.
4. Our Report was debated on 29 April. The full text of the debate can be found in the Official Report (HL Deb., 29 April 2004, cols. 943-980).

---

<sup>1</sup> House of Lords Science and Technology Committee, 5th Report, Session 2002-03 (HL Paper 140-I; evidence, HL Paper 140-II).





## APPENDIX 1: RESPONSES TO THE COMMITTEE'S REPORT

**Government Response to the House of Lords Science and Technology Select Committee Report *Science and the RDAs: Setting the Regional Agenda***

## COHERENCE IN SET EXPLOITATION

(a) *We recommend that, as a priority, the Government should involve relevant national and regional players in devising and implementing—by the end of 2004—a national policy and strategy for SET exploitation that, with a carefully tailored set of common outcome measures, truly integrates national and regional perspectives. (Paragraph 6.38)*

The Government fully recognises the importance of a nationally and regionally integrated policy and strategy for the exploitation of SET. The Government's strategy for science, engineering and technology "Investing in Innovation" was published in July 2002. Investing in Innovation outlines the policy that the Government is following in terms of knowledge transfer and the exploitation of the science and engineering base at a national and a regional level. Current and future Government policy in knowledge transfer will also be informed by the recommendations of the Lambert Review, currently being considered by the Government, and the strategy set out in the DTI's Innovation Report. Both Reviews have examined national and regional issues and the consultation processes for both have received considerable input from national and regional stakeholders.

(b) *We recommend that the Government should establish a forum for the Office of Science and Technology (including the Research Councils), RDAs and other key players, that meets regularly to address the impact of and synergy between national and regional SET investments and, as far as possible, harmonise them. (Paragraph 5.26)*

The Government wants to maximise the impact of public investment in the science, engineering and technology base and fully recognises the importance of ensuring national and regional coordination.

The "Steering Group for the Research Councils and the Regional Development Agencies" was formed earlier this year and provides high-level strategic advice to develop the relationship and to provide a communication channel between the RDAs and Research Councils. The membership comprises RDAs, Devolved Administrations, Research Councils, DTI and OST and under its terms of reference the Group will:

- develop a strategy for engagement between RDAs and RCs;
- membership comprises RDAs, Devolved Administrations, Research Councils, DTI and OST and under its terms of reference the Group will:
- develop a strategy for engagement between RDAs and RCs;
- build on the outcomes of the annual meetings of RDA and RC Chief Executives and ensure that actions are carried out;
- provide a forum for debating responses to Government initiatives and reviews in the areas of policy development and major SET initiatives of regional and national significance;
- identify issues of mutual interest and exchange best practice, for example on:
  - facilitating entrepreneurship and innovation;
  - effective knowledge transfer between academic institutions and business;
  - ways of funding innovation and knowledge transfer;
  - regional excellence in research in key sectors;
  - research to inform regional development strategies;
  - research to inform sustainable development;
- discuss co-ordination of Science and Industry Council matters of inter-regional and national significance.

We believe that this Group will fulfil the role envisaged by the Committee in terms of achieving national and regional coordination and harmonisation.

(c) *We recommend that the Government should urgently publish the latest possible information about its R&D spend per region, and keep this up to date as a measure of its performance in supporting regional economies through nationally provided SET. (Paragraph 5.10)*



Regional government R&D spend figures are published by the Office for National Statistics in March each year covering spend over the course of the previous financial year. Latest figures cover the expenditure on R&D during the financial year to 2002.

Government spend on R&D is compiled by the Office for National Statistics (ONS). Individual Departments each report to ONS on their R&D spend when figures are finalised after the end of each financial year. The estimates of total departmental R&D spend are then approximated onto a regional basis by ONS. Given the time it takes departments to tabulate their R&D expenditure, and the time ONS also require to collate departmental returns and derive regional totals, it is difficult to envisage how publication timetable may be brought forward any further.

Total Government R&D expenditure accounts for (as at 1999) only 11 per cent of total R&D expenditure in the UK. Drawing a link to how regions (RDAs, local government etc) are attracting/encouraging R&D spend from business (69 per cent of total spend in UK) and academia (20 per cent of total spend) and publishing estimates promptly for all sources may be of greater relevance than focusing on direct government spend alone.

*(d) We recommend that, better to inform future policies on SET exploitation, the Department of Trade and Industry (DTI) should work with business, universities and RDAs to carry out an analysis of the complex issues in the demand for and supply of SET. (Paragraph 2.28)*

We agree with the Committee that it is essential to have a better understanding of the supply and demand issues for SET in order to inform future policy to promote greater exploitation of the science base. As a starting point the Government asked Richard Lambert to examine how the long term links between business and British Universities can be strengthened to the benefit of the UK's economy. Among other things the Lambert Review was specifically tasked with identifying the benefits to business of greater interaction with higher education, how this could be promoted and how any barriers holding back business demand for universities' knowledge and skills outputs could be addressed. The Review also assessed lessons to be learned from business-university interaction across a range of countries and from best practice in the UK. The Review consulted widely with business, Research Councils, universities and national and regional administrations. The Report was published in early December and the Government is now considering the conclusions and recommendations

## RDAs' OPERATIONAL FRAMEWORK

### *Metrics and Bureaucracy*

*(e) We recommend that the Government should work with the RDAs urgently to develop simplified performance measures that take better account of SET's importance in economic development, and accommodate both realistic timescales for results and the differing circumstances of individual regions. (Paragraph 3.28)*

*(f) We recommend that, in framing the revised performance measures, the Government and RDAs should consider success in attracting others' funding as a valuable indicator. (Paragraph 3.29)*

*(g) We recommend that the Government should ensure that the revised performance measures contain incentives for cooperative working between RDAs. (Paragraph 3.37)*

*(h) We recommend that the Government should reduce the bureaucratic load on RDAs and work with them to ensure that its guidance is reduced to the essential minimum and is, in any case, made consistent. (Paragraph 3.33)*

The Government notes these recommendations, which cover similar ground to recommendations made by the National Audit Office in its report *Success in the Regions*, published on 19 November. The Committee's recommendations will therefore be taken into account in the implementation of the NAO's recommendations and in the continuing evolution of the approach to tasking the RDAs and monitoring their performance.

Specifically in relation to SET, as announced in the DTI's Innovation Report, the DTI will lead a project involving the RDAs, Devolved Administrations and the Office for National Statistics (ONS) to agree a limited set of innovation indicators, based on a common methodology. The project will draw on the current ONS Quinquennial Review of the Business Enterprise Research and Development (BERD) survey. We will complete this work by the end of March 2004 so that it will contribute to development of the next Community Innovation Survey (CIS).



#### BUILDING CAPACITY AND CONFIDENCE

(i) *We recommend that all RDAs should review their capabilities to ensure that they have sufficient operational knowledge and expertise to take SET initiatives forward. (Paragraph 3.44)*

The Government notes this recommendation. It is for the Board and the Chief Executive of each RDA to ensure that an adequate structure is in place to enable the delivery of the targets and objectives set out in their Regional Economic Strategies. The Government believes that RDAs recognise the importance of SET-based industries on competitive knowledge-based economies, and this is clearly demonstrated by the inclusion of such industries in the priority sector category for each RDA. We note and welcome the measures taken by RDAs to develop the capacity to manage their increasing commitment in the SET area. Such measures have included the appointment of senior, core staff with research and/or development backgrounds to facilitate HE-industry interactions, the development of existing staff through post-graduate

#### STUDY AND THE USE OF CONTRACTED OR SECONDED STAFF TO WORK ON SPECIFIC PROJECTS

(j) *We recommend that all RDAs should have a regional Science Council or similar body and that RDAs should collaborate in assisting those Councils to network and make good connections with national SET and Innovation bodies and policies. (Paragraph 3.51)*

The Government endorses this recommendation. The Government has consistently commended the establishment of broad models of Science Council in every region, initially in "Investing in Innovation" and most recently in the Innovation Report. Most regions have now established or are in the process of establishing equivalent bodies, and are sharing their experiences on establishment to identify good practice. In his capacity as Chairman of the North West Science Council, Sir Tom McKillop has been asked to establish a network between the Councils to ensure that best practice is exchanged.

#### OTHER FRAMEWORK ISSUES

(k) *We recommend that, whatever the future hierarchy of regional responsibilities, the leadership of RDAs should remain with the business community. (Paragraph 3.39)*

The Government is committed to members of the business community being key members of Regional Development Agencies. The Government have given the assurance in the White Paper "Your Region, Your Choice: Revitalising the English Regions" for any region that introduces an elected regional assembly, that the assembly will appoint the Chair and Board members of the Regional Development Agency. This White Paper is also clear that the elected regional assembly would be required to ensure that the Chair and half the Board have current or recent experience of running a business—thus ensuring that business will be at the heart of the decision-making process for regional economic development.

(l) *We recommend that all RDAs should explicitly address the development of SET skills and SET literacy in their FRESAs. (Paragraph 3.15)*

The Government welcomes this recommendation. The Committee will wish to be aware that there is a commitment in the Higher Education White Paper for the enhanced role of RDAs to include matching the supply and demand for Higher Education, for further involvement in the ALMhigher campaign, and to be proactive in developing the work of the NTIs and encouraging the business community to make best use of opportunities offered by HE. We will need to build on these commitments and to focus on SET skills and SET literacy in RDAs FRESAs. The Committee will also wish to be aware of the Regional Skills Partnerships, which are being established in the wake of the National Skills Strategy, published in the summer of 2003. The RDAs have been charged to work with their partners (including where appropriate individual Sector Skills Councils) to come back with proposals for how they will structure the Partnerships by December 2003. The Partnerships will cover skills in general, including SET skills.

The Government would also welcome greater RDA involvement in STEM promotion in schools.

#### SUPPORTING BUSINESS

##### *The exploitation gap*

(m) *We recommend that RDAs should collectively establish a small working party of officials and private sector financial advisers to draw up and propose to HM Treasury and DTI innovative solutions to funding the exploitation gap for early-stage financing of high-tech enterprises. Given the urgency of the needs, we suggest completion of the task by the end of October 2003. (Paragraph 4.23)*



The RDAs have established a small working group to address this issue and representatives from the DTI's Small Business Service have attended as observers.

The Government is already working to stimulate private sector provision of risk capital through a number of measures. On the 10 December 2003 the Government published: *Bridging the Finance Gap: next steps in improving access to growth capital for small businesses*. These additional measures include:

- Changes to Venture Capital Trusts that will improve fundraising;
- Proposals to increase the Enterprise Investment Scheme threshold for income tax to £200,000;
- Launching a "pathfinder" round of Enterprise Capital Funds which will adapt the US Small Business Investment Company model for the UK by investing a mix of public and private sector capital in businesses with growth potential;
- A review of the Small Firms Loan Guarantee to ensure that it is working effectively in helping small businesses overcome the obstacles when raising debt finance; and
- The DTI's Small Business Service working closely with England's RDAs to ensure that these supply side measures are backed by effective demand for growth capital by building on the findings of the recent 'investment readiness' demonstration projects. The RDAs have also been asked by the Treasury to suggest policy measures for Budget 2004 on five key themes, including access to finance for SMEs and knowledge transfer between regions and between businesses and universities.

Additionally the Small Business Investment Taskforce, (a Non Departmental Public Body) drawing its membership from experts from the financial sector, will establish a focussed working group to examine the financing needs of early stage, high technology businesses. The group will work with the RDAs and will examine existing market provision, financing gaps and possible market solutions.

*(n) We recommend that DTI and RDAs should, in consultation with the providers and users of research, jointly ensure that means are available to identify and address gaps in the provision of applied and industrial research in relation to different SET-dependent sectors and clusters. (Paragraph 4.37)*

The Government accepts this recommendation. As a result of the Innovation Review, the Department has identified the need for a Technology Strategy to inform investment decisions in applied industrial research. This strategy will be governed by a business-led Technology Strategy Board which will take inputs from all stakeholders including the Devolved Administrations and RDAs and the research councils. To that end we are exploring mechanisms to ensure that RDA strategies for technology are factored into the national strategy and, where appropriate, the national strategy is delivered with a regional focus. This mirrors the approach the Department has taken on the UK Nanotechnology Initiative. The Department is fully supportive of the development of regional Science and Industry Councils which we expect to be key players in the development of the technology strategy.

#### MAKING CONNECTIONS

*(o) We recommend that RDAs work with the Small Business Service (SBS), Business Links, businesses, universities, Research Councils, charities and other relevant organisations to produce, publicise and keep up to date a web-supported intelligence service on SET support. (Paragraph 4.51)*

Some of the RDAs are already pulling this information together on local portals. For example, the London Development Agency's "Innovation Support for London business" contains details of government agencies and organisations which provide business support and advice to London business. Business Links are the key business facing support agency, and the Business Support directory included on [www.businesslink.gov.uk](http://www.businesslink.gov.uk) already includes innovation support programmes which will be updated on a regular basis. In addition, the Businesslink.gov portal, which will be launched next Spring, will offer businesses accessible, practical and authoritative information to help them succeed. One of its principal sections aims to help businesses use SET effectively. The portal is being created by a cross government partnership.

It is therefore important that any additional activity is complementary to existing arrangements.

*(p) We recommend that the DTI should re-examine the case for arrangements like the USA's small Company Set Aside Scheme to help small businesses to access and thus assist public sector procurement. (Paragraph 4.57)*

The Government is committed to supporting SMEs. It is also convinced that by increasing the involvement of SMEs in the Government market place this will promote competition and innovation in public procurement and bring wider benefits to the economy. The Small Business Service (SBS) and the Office of Government Commerce (OGC) are working together to remove barriers to the participation of SMEs in Government



contracts. For example, the joint OGC/SBS booklet "Smaller Supplier . . . Better value?" outlines to public purchasers the advantages of dealing with small firms in public procurement, as well exploring the barriers to their participation. OGC and SBS are also working closely together on two SME procurement pilots—one in Haringey and one in the West Midlands. All of these initiatives are aimed at reducing burdens on SMEs in tendering for Government contracts and encouraging their involvement throughout the supply chain.

In 2001 the Government established the Small Business Research Initiative in order to increase the success of smaller businesses in obtaining contracts from government bodies to conduct research and development. The Government Departments involved have agreed to a voluntary target of purchasing at least 2.5 per cent of their R&D from SMEs by 2004–05. The SBRI is complemented by other forms of support, such as the DTI's R&D Grant, for developing the research capability of SMEs.

It must be stressed that this is a voluntary target and is not therefore directly comparable to the US Set Aside programmes. During the development of current SME procurement policy, consideration has been given to applying such an approach in other areas, or making use of set-asides and quotas as a way to increase SME access to Government contracts. However, there are considerable problems with such solutions.

As the recent Better Regulation Task Force/Small Business Council report<sup>1</sup> makes clear, requiring a certain percentage of contracts to be awarded to SMEs runs counter to the Government's objective of basing all public procurement decisions on value for money for the taxpayer. This is because larger firms, which may be excluded under such arrangements, might sometimes provide better value for money than the smaller companies.

In addition to the value for money aspect, it is difficult to see how a set aside requirement would square with the EC and WTO Government Procurement Agreement (GPA) rules.

An EC treaty covers all public sector procurement contracts within the European Community, no matter what value. The Treaty sets down principles to prevent discrimination against firms from any member state to remove restrictions on moving goods and services freely. These principles are given in Council Directives, setting out the legal framework to which public authorities and utilities must adapt their contract award procedures. These Directives are currently being consolidated. The consolidation will not affect the open competition element of the directives.

The situation with the US set-aside scheme<sup>2</sup> is different in that the US negotiated an exception under the GPA, which allows them to make use of set-asides. In addition, below the GPA threshold, there is no equivalent in the US to the EC Treaty's non-discrimination requirements thereby allowing such "discriminatory" actions.

#### MOBILISING UNIVERSITIES' SET RESOURCES

*(q) We recommend that the Higher Education Funding Council for England (HEFCE) should work with the RDAs, the universities and other interested parties to develop strategic measures to assess the effectiveness of knowledge transfer and other interaction between universities and business, to complement the national quality measures for teaching and research. (Paragraph 5.43)*

The Government recognises the importance of measuring the impact of its SET exploitation strategy. Metrics for knowledge transfer interaction between universities and business is a new policy area, with very little historic data. Cultural change is a long-term goal and clear evidence of impact will be some way off. Analysis and evaluation work is underway. The Higher Education Funding Council for England (HEFCE) is currently working with stakeholders in the metrics agenda. The analysis and evaluation work will be informed in part by the outcomes of the recent Higher Education Innovation fund (HEIF) consultation in which the Regional Development Agencies (RDAs) are significant stakeholders and the publication of the third Higher Education

<sup>1</sup> Government: Supporter and Customer? Published May 2003 ISBN 0 7115 04423.

<sup>2</sup> *US Set Aside Programmes*: To foster an equitable federal procurement policy, government-wide small business goals, in terms of a percentage of annual expenditure, are established for federal agencies. SBA negotiates the goals annually with each federal agency on an individual basis. Currently, the overall small business goal is 23 per cent. This includes the specific goals of 5 per cent to Women-Owned Small Businesses (WOSB), 3 per cent to service disabled veterans, 5 per cent to small disadvantaged businesses, and the HUBZone goal, which is 2 per cent in FY-2001, 2.5 per cent FY-2002, and 3 per cent in FY-2003.

Under the Small business Act, federal agencies conduct a variety of procurements that are reserved exclusively for small business participation. These transactions are called "small business set-asides" and include the Small Business Competitiveness Demonstration Program, the Very Small Business Set-Aside Pilot Program, and the HUBZone Empowerment Contracting Program.

For all procurement actions expected to exceed the \$100,000 simplified acquisition threshold, prime contractors are required to make a "best effort" attempt to make use of small, disadvantaged, and women-owned small businesses as subcontractors if the opportunity exists under the contract. For procurement actions expected to exceed \$500,000 (\$1 million for construction), the winning contractor is required to provide the agency-contracting officer with a written plan that establishes a small business, subcontracting goal. The plan details how the winning contractor will make use of small business in each subcontract category and provide for timely payments.



Business Interaction (HEBI) survey early next year. This work will link into the DTI-led project to identify a limited set of innovation indicators (see response to recommendations (e)-(h)) so that we can understand how higher education impacts on the economy. In addition, following the recent consultation exercises by the UK funding bodies on research assessment, the funding bodies are considering the responses (which have included recommendations for the inclusion of criteria to assess applied research in the next Research Assessment Exercise (RAE) and will announce their decision early next year.

(r) *We recommend that each RDA should work with its regional university association to devise and put in place arrangements for closer strategic working that also minimise the bureaucracy of contracting arrangements.* (Paragraph 5.53)

The Government recognises that RDAs are increasingly building collaborative relationships with their regional partners, including their HEIs and regional university associations. For example, the North West Development Agency has established a sub-committee on SET issues to assist with its decision-making, and its membership is primarily from the HEI sector. These relationships have been assisted by the creation of Science and Industry Councils, which bring together the region's industrial and scientific communities, and by the collaborative bidding process into funding streams—for example, the Higher Education Innovation Fund.

(s) *We recommend that RDAs should collaborate with their regional university associations to map the strengths of the universities (in teaching, research and knowledge transfer) in relation to key clusters, aggregating the results into a national resource by making them available on the recommended web-enabled intelligence service.* (Paragraph 5.57)

In preparation for the establishment of Science and Industry Councils, many of the RDAs have already undertaken an assessment of the strength of their regional science base with particular reference to key industrial clusters. This analysis will be further enhanced by the Technology Strategy work which will assess the strength of the UK science base, including regional strengths. This also reflects the Government's Higher Education White Paper which proposes that higher education institutions consider where their strengths lie to determine their distinctive missions.

#### **Northwest Development Agency (NWDA) Response to the House of Lords Science and Technology Select Committee Report *Science and the RDAs: SETting the regional agenda***

The NWDA welcomes the House of Lords Select Committee report on Science and the RDAs and would like to respond as follows to the recommendations made.

The 19 recommendations of the House of Lords Inquiry, and the proposed responses are set out below following the same order as in the report.

#### **COHERENCE IN SET EXPLOITATION**

(a) *We recommend that, as a priority, the Government should involve relevant national and regional players in devising and implementing—by the end of 2004—a national policy and strategy for SET exploitation that, with a carefully tailored set of common outcome measures, truly integrates national and regional perspectives.* (Paragraph 6.38)

**Response to recommendation (a):** This is an issue on which the government should lead and the NWDA would support this approach provided that all RDAs will have a significant role to play in developing integrated national and regional perspectives.

The NWDA has begun this process within the region through a long-term science Foresight exercise to start in April 2004. The NW will be the first of the regions to undertake regional Foresight.

(b) *We recommend that the Government should establish a forum for the Office of Science and Technology (including the Research Councils), RDAs and other key players, that meets regularly to address the impact of and synergy between national and regional SET investments and, as far as possible, harmonise them.* (Paragraph 5.26)

**Response to recommendation (b):** This is welcomed. The forum should also include representation from the newly formed Science Councils. It should be noted that the Joint RDA-RCUK Steering Group is now established and RDA Science Groups at an operational level have begun to meet regularly.

It should be noted that there is already extensive interaction between the RDAs and Research Councils, who are working in partnership on a range of regional initiatives, collaborations and facilities. The NWDA is working with EPSRC on funding NW studentships and on further support for the recently announced £24 million NWDA NW Science Fund.



It is hoped the forum will address the concerns expressed during the inquiry regarding the imbalance in SET investment and resources. Public sector investment remains well behind the national average and one of the consequences is that the NW is not able to take full advantage of national SET funding as its weight in the UK population or economy would suggest.

The NWDA recognises that in terms of the science agenda, activity supported must be viewed in a national and international context, not a regional one. Only by supporting NW world leading science, will the NW reap economic benefits from this science for the region. The NWDA also supports the view that severe reduction in funding for less research-intensive universities will reduce the ability for knowledge transfer from HEIs, particularly to SMEs.

*(c) We recommend that the Government should urgently publish the latest possible information about its R&D spend per region, and keep this up to date as a measure of its performance in supporting regional economies through nationally-provided SET. (Paragraph 5.10)*

**Response to recommendation (c):** We would strongly welcome this proposal. There is a critical need to establish objectively the strengths of all regions and their HEIs. The NWSC has looked to monitor long-term trends in certain areas and found regional data from national sources is frequently unavailable. We recommend that this be done where feasible on a sector basis and in key areas of emerging science using a common methodology.

*(d) We recommend that, better to inform future policies on SET exploitation, the Department of Trade and Industry (DTI) should work with business, universities and RDAs to carry out an analysis of the complex issues in the demand for and supply of SET. (Paragraph 2.28)*

**Response to recommendation (d):** This important issue would require a lead from DTI with substantial consultation and engagement with all key partners to develop a consensus view. Partners such as sector skills councils will also need to be engaged.

## RDAs' OPERATIONAL FRAMEWORK

### *Metrics and bureaucracy*

*(e) We recommend that the Government should work with the RDAs urgently to develop simplified performance measures that take better account of SET's importance in economic development, and accommodate both realistic timescales for results and the differing circumstances of individual regions. (Paragraph 3.28)*

*(f) We recommend that, in framing the revised performance measures, the Government and RDAs should consider success in attracting others' funding as a valuable indicator. (Paragraph 3.29)*

*(g) We recommend that the Government should ensure that the revised performance measures contain incentives for cooperative working between RDAs. (Paragraph 3.37)*

**Response to recommendations (e) to (g):** The issue of metrics has been often debated and while there can be no "one size fits all" solution, it is important to establish an approach to SMART and flexible metrics, both quantitative and qualitative, which all parties buy into. Dr Marilyn Wedgwood FRSA (Pro-Vice-Chancellor and Director of External Relations, Manchester Metropolitan University and Specialist Adviser to the Committee) has suggested approaches that could be used by the RDAs.

The NWDA has already set itself a series of clearly stated targets, based upon the regional economic strategy, many of which have been adopted to meet the longer-term needs of the science agenda. This is supplemented by the measures and targets the NWSC has set for itself. These measures are based on a recognition that success will result in a reputation for scientific and technological excellence, as a place to invest in science, as a region offering a flexible and fertile environment for exploitation, and as a destination of choice for talented SET individuals.

*(h) We recommend that the Government should reduce the bureaucratic load on RDAs and work with them to ensure that its guidance is reduced to the essential minimum and is, in any case, made consistent. (Paragraph 3.33)*

**Response to recommendation (h):** The issues of bureaucracy and metrics do overlap, and we recommend that an agreed approach to metrics, which may be an evolutionary one as for the RAE, is developed between all partners. This is a matter of some urgency.

A wider approach to reducing bureaucracy should initially be dealt with at RDA Chairs—Government Minister level.



### *Building capacity and confidence*

(i) *We recommend that all RDAs should review their capabilities to ensure that they have sufficient operational knowledge and expertise to take SET initiatives forward.* (Paragraph 3.44)

(j) *We recommend that all RDAs should have a regional Science Council or similar body and that RDAs should collaborate in assisting those Councils to network and make good connections with national SET and Innovation bodies and policies.* (Paragraph 3.51)

**Response to recommendations (i)–(j):** RDAs have increasingly recognised the importance of the SET base to support a healthy and dynamic economy, and their growing role in SET policy and initiatives such as HEIF 2 will require each RDA to consider its capacity. It is very important that RDAs can access much wider operational knowledge and expertise in SET both internally, and externally through Science Councils which have an international perspective on current and developing SET strengths.

The NWDA has already begun this endeavour. It led the creation of the Northwest Science Council, provides its secretariat and follow-through capability, and is the channel for translating the Science Strategy into measurable action. Additionally, the Agency has rightly set out to work with all the regional partners to ensure both the excellence of the science base and its effectiveness in supporting regional economic development. In doing so, regional boundaries are not seen as a constraint: the Northwest will work, in fact does work, with other RDAs and with partners elsewhere for mutual benefit.

### *Other framework issues*

(k) *We recommend that, whatever the future hierarchy of regional responsibilities, the leadership of RDAs should remain with the business community.* (Paragraph 3.39)

**Response to recommendation (k):** We support the recommendation as the importance of SET to the RDAs is reflected in many developments from SET-based industries in competitive knowledge-based economies. The NWDA, in common with other RDAs, has Board Members with a SET background. It is also RDA policy to encourage the appointment of Chairs with a private sector background, in some cases from a SET industry.

(l) *We recommend that all RDAs should explicitly address the development of SET skills and SET literacy in their FRESAs.* (Paragraph 3.17)

**Response to recommendation (l):** We accept the recommendation. Implementation of the NW Science Strategy will be linked closely to the FRESA, which is designed to ensure that the region's skills needs are identified and met. Less directly, the Strategy also supports the regeneration agenda through the creation of new business and employment opportunities, often in urban areas.

The development of SET skills should also be accompanied by the promotion of entrepreneurial and management skills for technologists, scientists and engineers. This is being tackled at undergraduate and postgraduate level through the University of Manchester and University of Liverpool Science and Enterprise Centres.

## **SUPPORTING BUSINESS**

### *The exploitation gap*

(m) *We recommend that RDAs should collectively establish a small working party of officials and private sector financial advisers to draw up and propose to HM Treasury and DTI innovative solutions to funding the exploitation gap for early-stage financing of high-tech enterprises. Given the urgency of the needs, we suggest completion of the task by the end of October 2003.* (Paragraph 4.23)

(n) *We recommend that DTI and RDAs should, in consultation with the providers and users of research, jointly ensure that means are available to identify and address gaps in the provision of applied and industrial research in relation to different SET-dependent sectors and clusters.* (Paragraph 4.37)

**Response to recommendations (m)–(n):** The funding gap is a critical limitation to innovation which has been increasingly causing concern and requires not just urgent and immediate attention, but also a coherent approach between regional venture capital funds and the proposed small business investment companies to develop an effective response. The critical gap is between £0.25 million and £3 million, and part of the problem is the cost of establishing technical due diligence and fund management. RDAs should be well placed to work with VC partners to develop more streamlined approaches to fund management.

It is unrealistic to expect an October 2003 solution, but we agree that a rapid response is needed.



*Making connections*

(o) *We recommend that RDAs work with the Small Business Service (SBS), Business Links, businesses, universities, Research Councils, charities and other relevant organisations to produce, publicise and keep up to date a web-supported intelligence service on SET support.* (Paragraph 4.51)

**Response to recommendation (o):** This could be a particularly useful where it is targeted to support clusters and networks, and RDAs are especially well placed to co-ordinate out such work. However, it is easy to fail in this area. For such a web-based service to be used it will need to be useful, ie visible, accessible, up-to-date, and relevant. To be useful it will need to provide simple, objective data on regional and HEI strengths in an efficient and effective way, and supported by key personnel based in RDAs, to provide local intelligence. To allow aggregation for national view, a common approach, with relevant intelligence input from national bodies would be essential.

(p) *We recommend that the DTI should re-examine the case for arrangements like the USA's Small Company Set Aside Scheme to help small businesses to access and thus assist public sector procurement.* (Paragraph 4.57)

**Response to recommendation (p):** The NWDA would encourage this approach.

*Mobilising Universities' SET resources*

(q) *We recommend that the Higher Education Funding Council for England (HEFCE) should work with the RDAs, the universities and other interested parties to develop strategic measures to assess the effectiveness of knowledge transfer and other interaction between universities and business, to complement the national quality measures for teaching and research.* (Paragraph 5.43)

**Response to recommendation (q):** As has already been stated, the NWDA has already set itself a series of clearly stated targets, based upon the regional economic strategy, many of which have been adopted to meet the longer term needs of the science agenda. This is supplemented by the measures and targets the NWSC has set for itself. These include measures on knowledge transfer and exploitation.

(r) *We recommend that each RDA should work with its regional university association to devise and put in place arrangements for closer strategic working that also minimise the bureaucracy of contracting arrangements.* (Paragraph 5.53)

**Response to recommendation (r):** RDAs strongly support the need to work with government on minimising bureaucracy, including contracting arrangements.

RDAs deal with HEIs at the collective and individual level. Where there is a strong case for HEIs to collaborate, eg in developing a common approach to intellectual property, or technology transfer, RDAs can work closely with regional university associations (RUAs). The NWDA has a strong working relationship with the NWUA.

However RDAs also develop different relationships with individual universities and are in a position to encourage the development of individual strengths, which support the regional economy, and also promote diversity and excellence across a region in a way that may be inappropriate for RUAs.

(s) *We recommend that RDAs should collaborate with their regional university associations to map the strengths of the universities (in teaching, research and knowledge transfer) in relation to key clusters, aggregating the results into a national resource by making them available on the recommended web-enabled intelligence service.* (Paragraph 5.57)

**Response to recommendation (s):** All RDAs need to map their strengths in a way that promotes the collective strength of UK plc, recognising that while some strengths are best promoted regionally, others (eg pharma) need to be recognised as national clusters, or in some cases (eg chemicals) as inter-RDA clusters. This work is already underway in the NW, led by NWUA.

Input from partners and the private sector in making these assessments is essential, given the difficulties, albeit understandable, universities face in making objective self-assessment of strengths. A sector approach could be adopted where feasible.

January 2004



## APPENDIX 2: PROGRESS IN IMPLEMENTING THE COMMITTEE'S RECOMMENDATIONS

### Memorandum by the Northwest Development Agency (NWDA)

I am writing in response to your letter to John Burrows of February 2004 enquiring of our progress in implementing the principal recommendations of your Committee's Report on Science and the RDAs.

I have broken down our actions as requested into the key areas:

#### METRICS AND BUREAUCRACY

##### (e)-(h) *Develop simplified performance measures on Innovation*

This was a key theme, picked up in the Innovation Review by DTI. Work has already begun to develop these measures through the Innovation Liaison Group (composed of RDA Innovation Managers) working with DTI. Our Innovation Manager attended the start-up workshop for this in Cambridge on 27 February and it is seen as a key priority both for the NWDA Innovation Team and by DTI.

##### (i)-(j) *Building capacity and confidence*

The NWDA has been reviewing its capacity to implement the SET agenda. For example, we have recently recruited a new Head of Innovation and Enterprise (which includes the SET area)—a PhD Chemist with 17 years' Sales and Marketing experience in the private sector. The strengthening of this team has been important to us for the last few years and we are in a fortunate position in having a relatively large team; the I and E team at NWDA has been built up in recent years to seven members, plus our significant impact on the SET agenda through the separate Cluster organisations including Chemicals, Biotech, Aerospace, Nuclear etc. In addition, we have a separate SET team running our Daresbury Science Campus Project.

We are fortunate in the North West to have been the first region to set up a Science Council and we are taking further steps now to strengthen the work of the Council and give it more direct impact on the regional SET agenda.

##### (k)-(l) *Framework issues*

The development of SET skills and SET literacy has been recognised in the NWDA as being critical to economic success. We are currently, with our Skills team, in discussion with a number of potential external partners to significantly improve this in the Region, eg by improvement of the quality of school science teaching and a range of reach-out projects aimed at both school children and the general public. An example of this was our part funding of an educational science gallery at the Museum of Science and Industry in Manchester which attracts 300,000 children each year.

##### (m)-(n) *The Exploitation Gap*

The NWDA has become increasingly involved in the provision of financing for early-stage high-tech enterprises and has launched four new VC funds in the last two years. NWDA/ERDF investment in these has totalled £34.5 million and this has leveraged in a further £107 million from DTI and private sources. We actively share our experiences in this area with the other RDAs and DTI.

##### (o) *Making Connections (set-up a web-supported intelligence service on SET support)*

We have commissioned an "Innovation Roadmap" which addresses this issue—this tool will be available initially to professional advisors to enable SMEs and individuals to receive up to date advice on sources of support for all forms of innovation, including SET-related. This project is due for completion by end H1 2004.

##### (q)-(s) *Mobilising Universities SET Resources*

##### (q) *Working with HEFCE*

NWDA has been very closely involved with the development of HEIF 2—our Innovation and Enterprise Manager sits both on the Regional Advisory Group (RAG) and the national panel which will assess the HEIF 2 bids. In addition, we will commit significant match-funding to HEIs who win HEIF 2 funding and have developed a prospectus and set of criteria which illustrate the type of project which will gain our support. We are in the process of drafting monitoring and evaluation plans to judge the impact and effectiveness of HEI HEIF spend and will share these with HEFCE.



*(r) Closer working with Regional University Association (NWUA)*

Our Chief Executive, Executive Director of Enterprise and Innovation, Skills Director and Head of Innovation and Enterprise meet regularly with HEI Vice-Chancellors and other Heads of Institutions. We jointly created a section of the Regional Economic Strategy (RES) and have worked throughout the HEIF process with NWUA.

*(s) Map SET strengths with Regional University Association*

This has been completed and is available through NWUA and will be accessible through the Innovation Roadmap mentioned previously.

Detail on specific achievements and projects is given below:

**RECENT ACHIEVEMENTS***The North West Science Fund*

This fund will shortly be operational. It is aimed at the development of science and technology projects in new fields subject to evidence of a clear fit with the Science Council Science Strategy and the Agency RES science objectives. It aims to leverage funding to the region and generate wealth from the commercialisation of high value science and technology.

*Metrics for North West Science Performance*

Metrics have been agreed around the following criteria: science excellence, people, finance and exploitation. Data has now been recorded for these metrics for the NW. They will be tracked and the NW Science Council will set stretching targets against UK and international comparators.

The NWDA has just entered into the second year of regionally allocated Industrial CASE studentship awards with the EPSRC. This builds upon the success of last year's awards and sees the allocation increase.

In light of this success the NWDA have been liaising with the other Research Councils to develop similar relationships and collaborations. One opportunity under investigation is the Small Business Research Initiative (SBRI), which offers the potential for the Research Councils and the NWDA to work together to achieve common goals.

**SUPPORT FOR ONGOING STRATEGIC SCIENCE PROJECTS**

These include 4GLS, the Microsystems Packaging Centre, GRID, NW Science Grid, Laser Deposition, AiMeS, The Environmental Alliance.

*The Creation of the new University in Central Manchester*

The new University of Manchester, supported by £35 million of NWDA funding, is in the international premier league of UK universities for research. However, the differentiator for the NW is that the university is sited in the centre of a concentrated hub of university activity, which spreads only a few miles. In this hub, the entire scope of HEI activity is covered. At one end of the spectrum, international excellence in academic research will be University of Manchester's focus. At the other end, there is the applied research and knowledge transfer agenda of Manchester Metropolitan University (MMU) and Salford Universities. We believe that geographical proximity still has advantages and that complete coverage on this scale in one location is unique to the NW.

The NWDA is also working with the regions Science Discovery Centres, in all sectors, to provide links and develop a co-ordinated offering across the region.

**PROJECTS UNDER DEVELOPMENT***Science Foresight*

Development of a 10–15 year strategic plan for regional Science Foresight. The NW will be unique in its project-based approach to Foresight. It is also the only English region to be looking at Foresight activity. Current projects are:

- A Waste into Products programme—conversion of waste especially from food and paper sectors into products.

- Business opportunities for Crime Reduction—engagement of business in adapting technology to reduce crime, eg improved facial recognition, city centre surveillance systems. There is a national scheme in this field but again the NW is the first region to take the opportunity forward to a project engaging with business.
- Leveraging of “technology hotspots”. This is defined as technology, which is still in a research phase though which has commercialisation potential and market demand in the medium term. We plan to fund these opportunities to lever them up for the NW.

#### *The Cockcroft Institute*

The NWDA continues to heavily support the development of the proposed Daresbury Science complex. In a recent development, the NWDA will commit up to £10 million to establish the National Institute for Accelerator Science and Technology. The Institute will be a further step in support of Daresbury Laboratory, especially to enhance the laboratory’s international reputation in accelerator design, construction and operation and research.

#### *The Microsystems Packaging Centre*

A pilot manufacturing facility for integration and packaging of nanocomponents that will be part of nanosystem based products. It is a facility for which there is business demand and it will be unique to the UK. The project will attract £30 million of NWDA support.

#### *The Laser Deposition Centre*

An industry focused facility to accelerate the development and take up of laser net shaping deposition technology. This is an emerging technology that will enable business to move rapidly from design to formation of high value components.

March 2004

### **Memorandum by the London Development Agency (LDA)**

I am writing to respond to your request for a response on LDA work to date on implementing the recommendations of the House of Lords Science and Technology Committee inquiry into Science and the RDAs.

As you will be aware, since the inquiry concluded, a number of other government consultations have reported, in which RDAs have been, or will be, closely involved. The DTI Innovation Report and the Lambert Review of Business University Collaboration both address some of the recommendations of your own inquiry.

LDA work to date:

#### **METRICS AND BUREAUCRACY (RECOMMENDATIONS E-H)**

1. The Innovation Report, and the Lambert Review both recommended development of an intelligent set of metrics to measure impact of innovative activity including effective mobilisation of the SET base. The DTI have started the process of defining innovation metrics to measure successful implementation of the Technology Strategy and to incorporate them into RDA tier 3 output measures. LDA is engaged in this process.
2. LDA has previously recommended to the committee that metrics to incentivise cooperative working between RDAs should be developed.
3. The LDA has already incorporated an indicator relating to Private Sector investment in its tier 3 outputs, defined as “Investment benefiting deprived areas: Leverage through RDA funding and activity of private sector investment (financial and in kind) benefiting residents”.
4. It also has a further tier 3 indicator referring Co-ordination initiatives, that measure “[the improvement] of the co-ordination of development within and between the public and private sectors such as joint strategy frameworks, improved allocation of expenditure”.



**BUILDING CAPACITY AND CONFIDENCE (RECOMMENDATIONS I-J)**

5. The Innovation Unit at the LDA leads on technology sectors and Innovation. It is implementing the London Innovation Strategy and Action plan whose aims are:

- Creating a Culture of Innovation in all London's Organisations—Encouraging and enabling London's businesses to innovate.
- Harnessing London's world class knowledge base for the benefit of London's businesses.
- The strategy also includes a Science and Knowledge policy for mobilising the SET base in London.

6. All project managers within the unit with responsibility for delivering various aspects of the action plan are recruited on the basis of having previous commercial experience, their knowledge and experience of science and technology sectors (with MSc, PhD or MBA qualifications where appropriate), and experience of commercialising technology. Several members of the unit have worked in high-tech start up environments, or have started their own spin-out companies.

7. The LDA established the London Science Industry Council in December 2003 (previously the London Innovation Steering group in operation since September 2002). It acts as a strategic advisory and special interest group that oversees implementation of the London Innovation Strategy, and ensures that the needs and views of business are reflected throughout. Its members are drawn from large corporates such as BT and HSBC, the SME sector, entrepreneurs, RTOs and universities. LDA is working with all the other RDAs to develop common terms of reference for Science and Industry councils.

**THE EXPLOITATION GAP (RECOMMENDATIONS M-N)**

8. The LDA is establishing its own London Seed Fund and is planning to launch a pre-commercial Proof of Concept fund for London HEIs, to ensure more financial robust high tech ideas come to market. It is also shortly to launch the Technology Gateway, a portal and package of services, support networks, finance and mentoring that will support start-up high-growth business emerging from the SET base in universities.

9. The Technology Strategy, as set out in the Innovation Report, will deal with the issue of identifying and addressing gaps in the provision of applied and industrial research in relation to different SET sectors and clusters. RDAs are one of the key stakeholders in this process.

**MAKING CONNECTIONS (RECOMMENDATION O)**

10. LDA has launched the London Innovation website, to create web-based communities, reduce confusion and streamline information ([www.london-innovation.org.uk](http://www.london-innovation.org.uk)). It contains links to all London HEIs, private research and technology organisations, science parks, information on finance and so on. It has recently added intelligent web-spidering functionality through the *knowledge2innovate* portal to help London firms exchange information with other businesses, universities and research establishments, and provide fresh incentives to innovate.

11. LDA has also launched London Assets For Business (LA4B)—a database of facilities from over 30 different institutions in London, including Higher and Further Education institutions, museums, NHS Trusts, and other public sector organisations such as the London Business Innovation Centre and the London Film Commission, primarily aimed at SMEs in the London area, to give them access to capital-intensive facilities at competitive prices, and to remove the need to invest in expensive facilities themselves.

**MOBILISING UNIVERSITIES' SET RESOURCES (RECOMMENDATIONS Q-S)**

12. Recent research commissioned by the LDA indicates this the lack of incubator provision is a barrier to the generation of HEI spinouts in London, and so for the mobilisation of the SET base. The research further indicates that the research hotbed in central London that are spinning out companies are particularly concentrated, as a consequence, incubation space in London, particularly that associated with HEIs, needs to grow by 25 per cent to meet current and future demands. A major programme of work to provide networked incubator and innovation centres, aligned with hot-bed university research environments has been put in place, and will be complemented by a continuum of support measures reflecting the evolving needs of innovative SMEs. This will include the Technology Gateway support programme referred to earlier.

13. Of course, London's economy is different from that of other regions in the UK, in that its high-value-added service sector is significant. In addition, it enjoys a cultural and creative strength and diversity that is unique, so focusing on attention on the science base alone is insufficient to recognise both the needs and opportunities that London represents. Accordingly, we have developed a Science and Knowledge policy, as



part of our Innovation Strategy, that strongly emphasises the need to consider both "knowledge" as well as "science" and how these can be mainstreamed across all business sectors.

14. Examples of Incubation/innovation centres supported to date include:

- Furniture Works (London Metropolitan University)
- Centre for Manufacturing Excellence (University of East London)
- Centre for Excellence in Construction (Kingston University)
- Product Development for Creative and Manufacturing Industries (University of Greenwich)
- Whitechapel Innovation Centre (Queen Mary University of London)
- London Bioscience Innovation Centre (Royal Veterinary College)
- London Innovation Centre (London Business School and University College)
- Rapid Prototyping Centre (Royal College of Art)
- Centre of Excellence for Creative Commercialisation (Central St Martins, London Institute)
- London Institute of Genetic Medicine (London Medical Schools)
- Intelligent Media Institute (Imperial College, University College and London Institute)
- London Nanotechnology Centre (University College and Imperial College)
- King's College Incubator
- Imperial College Bioincubator.

15. LDA works closely with, and supports financially, the London Higher Education Consortium—London Higher. The LDA's Higher Education Sector Development Project encompasses a programme of work that is designed to contribute to the representation, development and promotion of London's higher education sector. The work programme will include:

- Identifying and developing the role of HE in regional economic development Facilitating and supporting the representation of London's HE to national and regional government
- Promoting London HE internationally
- Catalysing HE engagement in joint work with the LDA
- Encouraging collaboration amongst London HEIs
- Mapping the strengths and economic impact of London HE, for London and the UK.

16. The annual Higher Education-Business Interaction survey undertaken by HEFCE includes questions on engagement of universities with RDAs and regional economic priorities. This may in time become part of a formal return to HEIs as a way to allocate permanent stream funding. The Lambert review has also suggested metric to assess effectiveness of RDAs' brokerage of university-business interaction. LDA is committed to engaging with all these processes to devise an appropriate set of light touch measures to assess capabilities and progress.

17. Thank you for giving us the opportunity to respond on what the LDA has been doing to address the important issues your enquiry has raised. We are pleased that government policies are now being developed to take these forward, as indicated by Gordon Brown with the recent announcement of a 10-year investment framework to support science and innovation. We also pleased that RDAs, as key stakeholders, have been given a significant role in implementing these policies.

18. However, we are concerned that an appropriate balance is maintained between regional and national priorities in the allocation of new spending. London and its surrounding regions are the drivers of the UK economy. The national asset base of HEIs (there are 40 in the London region alone), private research and technology organisations, science, engineering and technology capability, potential high-growth business sectors, research and development investment and finance, is concentrated in London and south-east. These assets are crucial to the successful implementation of government science and innovation policies and we believe should be supported as such in the interests of the national economy.

*March 2004*

#### **Memorandum by the East of England Development Agency (EEDA)**

The East of England has notable strengths in science, engineering and technology. For example, the region is a global leader for science and technology research, with the highest proportion of employees engaged in research and development in the UK. Further, the region houses more than 30 world-leading research centres.



EEDA is working in collaboration with the regional universities, research institutes and the private sector in encouraging a greater degree of commercialisation of R&D.

A key goal of our Regional Economic Strategy is to further enhance the region's role as a global leader for science and technology research and, to better exploit the region's knowledge base and successfully commercialise R&D. We believe that EEDA has made significant steps in achieving these aims, championing a collaborative approach between higher education, research institutes and private sector companies in engineering and technology in partnership with other public sector agencies.

EEDA is making progress in implementing the Science & Technology Committee's recommendations, although we are conscious that a great deal of work still lies before us.

#### METRICS AND BUREAUCRACY

EEDA has been working with the other eight RDAs across England, and the DTI to develop a set of metrics for Innovation.

In working on the HEIF 11 bids, EEDA has successfully persuaded the HEIs to actively contribute to the Regional Economic Strategy (RES) priorities, and to work with EEDA in supporting key projects such as the Proof of Concept fund for the region, which will attract both RDA and HEI resources.

EEDA successfully secured resources from the DTI Bioscience unit.

EEDA has worked with the NHS to successfully secure significant resources to support the Health hub for the East of England.

EEDA is in the early stages of discussion with the BBSRC regarding focus to support life sciences where there is common interest between the BBSRC and EEDA.

EEDA has successfully secured resources from EPSRC to support the development of the Centre of Integrated Photonics in Ipswich.

EEDA has secured resources from the Six Business Links to contribute to its Innovation Exchange.

EEDA has secured significant resources from Norfolk County Council to contribute to its Centre of Engineering Excellence in Hethel Norfolk, one of EEDA's network of Enterprise Hubs.

#### BUILDING ON CAPACITY AND CONFIDENCE

EEDA has recruited two new specialist sector advisors, both have a significant industrial background; one of them (for the Life science sector) has a science and industry background.

In addition, EEDA has just agreed with its Board to recruit two full time staff to its Innovation and sectors team, and three full time staff to its Skills team, all of who will contribute either directly, or indirectly to the SET agenda.

EEDA has drawn up terms of reference for its Science and Industry Council. It has agreed the setting up of such a council with its Board as a priority for 2004-05, and will make significant RDA funds available to the SIC. EEDA has consulted widely with industry and HEIs on this development through a recent study completed by Arthur D Little.

#### MAKING CONNECTIONS

EEDA, the SBS and the Business links are in early stages of agreeing common intelligence and customer relations management systems.

#### MOBILISING UNIVERSITIES

EEDA has carried out two mapping exercises of the strengths of its HEIs, both have now been published. One led by KMPG the other by Arthur D Little. An event to disseminate the outcomes of these, and agree a way forward, is being held on 5 May. It is anticipated that Lord Sainsbury will be the keynote speaker at this event.

EEDA has strengthened its relations with the HEIs through the HEIF 11 process. Extensive joint work has ensued, leading to a large number of collaborative proposals in which EEDA is a key partner. In addition, the CEO of the AUEE was present on the EEDA panel to select and recommend bids to the HEFC panel.

*14 March 2004*



### Memorandum by One NorthEast

One NorthEast warmly welcomes the Science and Technology Committee's Report, and believes that the acknowledgement of the importance of science, engineering and technology (SET) exploitation in a modern economy as a driver of economic growth, is in itself an endorsement of the central tenets of the Strategy for Success. One NorthEast is committing £200 million over five years to this programme of activity, which dramatically enhances the Region's ability to exploit the commercial potential of its SET base. In this response, we will outline the progress that has been made by the Strategy for Success with respect to the key recommendations of the Report.

The Strategy for Success is guided by our Region's Science and Industry Council, and has established Centres of Excellence in life sciences (CELS), nanotechnology (Cenamps), new and renewable energy (NaREC), digital media (Codeworks) and process innovation (CPI)—five areas of technology in which the North East has particular strengths. The other main delivery mechanism is NStar, a company providing venture capital-style funding to North East SMEs.

One of the key policies of the Strategy for Success is to concentrate on a limited number of SET areas, identified in an independent study (Arthur D Little, 2001) as being, or having the potential to be, world-class. We believe that in a region such as ours, which traditionally has not had a strong business R&D base, we must focus our resources in order to build critical mass in selected strategically important areas.

One of the most important difficulties with the development of the Strategy for Success programme has been that the EC State Aids laws and R&D frameworks have not kept pace with national and regional policy in science and innovation.

We welcome the structured approach of the DTI to the Micro and Nanotechnology (MNT) Network, which has been successful in addressing some of the concerns raised in our original submission about the fragmentation of public expenditure across a number of programmes and regions, each with different requirements. However, the concern still remains with many other technology areas. We would encourage a similar approach, hopefully encompassing an even broader range of activities, to these areas in future.

### METRICS AND BUREAUCRACY

One NorthEast welcomes the Report's calls for the Government to reduce the bureaucratic load on RDAs and to simplify their performance measures. We are pleased with the recognition that performance measures must take account of the long timescales involved, and also the differing circumstances of different regions; we would encourage the approach that has been suggested of developing a basket of measures from which RDAs could select a number on which to be assessed. In relation to this point, we also welcome the Report's recommendation that the Government should urgently publish the latest information about its R&D spend per region, and keep this up to date as a measure of its performance in supporting regional economies through nationally-provided SET. The North East is of course the recipient of by far the lowest Government SET spend. The links between these recommendations and the Government's explicit commitment to reducing regional disparities in prosperity should be borne in mind.

We are engaged in discussion with DTI and the other RDAs over revising the innovation performance measures, having attended workshop sessions and made other contributions direct to DTI on the subject. ONE has worked in cross-RDA groups such as the UK Micro and Nanotechnology DA Group, of which the Director of Strategy for Success is Chairman, and is assisting other RDAs to establish their own Science and Industry Councils. We are also conducting an internal review of One NorthEast's policy towards the breadth of innovation, which of course incorporates a considerable proportion of SET projects and programmes.

### BUILDING CAPACITY AND CONFIDENCE

With regard to the Report's recommendation that RDAs review their capability to take SET initiatives forward, the staff of each of the Centres of Excellence are employed due to their experience in the technologies concerned, as well as in the exploitation of that technology. For example, the CEOs of the Centres are all highly successful businessmen, with impressive records in their respective industries.

We recognise that RDAs are now succeeding in addressing the prior deficit of adequate skills, expertise and capacity in SET, and are rapidly developing their capability in those areas. The Strategy for Success has assembled a highly able team with extensive understanding of, and experience in, SET and SET-related policy issues. We are willing to assist DTI in any training programme to address any outstanding relevant needs.

One NorthEast was the second region to introduce a Science and Industry Council. The North East's Council is composed of senior figures in the Region from industry, the public sector and higher education, and its initial remit (since its establishment in 2001) has been to oversee the development and implementation of the Strategy



for Success. Chaired by Sir Ian Gibson, the Council champions the role of science, technology and innovation in the Region, as well as promoting the North East as an exciting place to do business. The Council meets quarterly and has proved to be a very effective forum for setting policy and providing regional leadership. Now that the Strategy is up and running, the Council is developing a wider role in relevant policy areas—for example, the future role of universities in regional economic development, and spatial planning as it relates to science and innovation.

#### THE EXPLOITATION GAP

Strategy for Success via NStar, the early stage technology venture company, is addressing the two equity gaps identified by the Select Committee. NStar has already secured £33 million of funding (£27.5 million from ERDF) for a Proof of Concept (PoC) Fund (up to £60,000 for SMEs and up to £90,000 for universities) and a Co-Investment Fund (CoIF) (requiring matched funding from other sources) to plug the finance gap between research grants and the closer-to-market VC funding.

In the areas of SET that One NorthEast has identified as key to the Region's success, we have established the Centres of Excellence. They assist universities in instigating, and attracting funding for, industry-relevant research; work with businesses to develop their innovative capacity; and act as knowledge transfer centres, making connections between businesses and universities in order to instigate collaborative activity or direct licensing of new technology to industry.

#### MAKING CONNECTIONS

The Strategy for Success is creating a highly interactive web-based User Interface for the Strategy, and also for the University Innovation Centre (UIC) for Nanotechnology. The Strategy for Success User Interface will provide an interactive gateway to the services, latest news, developments, documents, templates, regulations and procedures of the programme.

The UIC aims to facilitate knowledge transfer between Higher Education Institutes (HEIs) and Industry, and to encourage small businesses to participate in the generation and exploitation of knowledge. The UIC User Interface will present a "shop window" for industrial customers, individual entrepreneurs and academics to access the UIC. The Interface will provide a gateway into the UIC and access to its component parts: access to facilities and services; a customer ordering point; access to finance networks; project management and tracking capability; and advice on business support and planning, company formation, IP strategies and marketing.

#### MOBILISING UNIVERSITIES' SET RESOURCES

The Report calls for closer strategic working between RDAs and their Regional University Association; this is already occurring between One NorthEast and Universities for the North East. One NorthEast has also anticipated the recommendation of the Report for RDAs to map the SET strengths of the universities in relation to key clusters: this exercise in the North East led to identification of the five Centre of Excellence areas of technology.

We conclude with a few more relevant remarks. There are clearly highly important links between the Science and Technology Committee's Report and the recent DTI Innovation Report, and with the Technology Strategy proposed by that Report. The Innovation Report, particularly in the chapter on Regional Innovation, echoes many of the Committee's concerns and recommendations, and is a welcome recognition by Government of the importance of the regions in the delivery of innovation and its benefits to the country. The Technology Strategy must carry this recognition forward into action. It is a great opportunity for greater interaction, at both policy and operational level, between regional and national bodies, and this opportunity must be seized upon.

One NorthEast believes that the regional dimension to innovation is key to national success. The purely financial benefits to the UK of bringing the poorer regions' GDP to the national average are clear; the social implications of reducing regional disparities in prosperity are just as dramatic. There is no conflict between pursuit of national excellence and pursuit of the regional agenda, if it is done in the right way—targeting and building on the excellence that undoubtedly exists in both the research base and industry of each region. We believe that the Strategy for Success is an excellent and progressive approach to this crucial task.



### Memorandum by Scottish Enterprise

#### Stimulating Employment, Employment Opportunities Regeneration, Wealth Creation and Improved Skill Levels

##### (1) INTERMEDIARY TECHNOLOGY INSTITUTES

The ITIs are one of the key components of SE's approach to strengthen innovation and R&D and fit closely with SE's strategy to support the growth of Scotland's industry sectors. The creation of three Intermediary Technology Institutes in Life Sciences, Energy and Techmedia will therefore play a vital part in creating a Smart Successful Scotland. Scottish Enterprise has committed a £450 million investment over the next 10 years to the ITIs.

The ITIs will contribute to:

- increasing and sustaining the birth rate of high value added technology based companies;
- an increase in the level of exchange between the research and corporate sectors in Scotland, helping in the transfer of skills and further establishing and connecting Scotland into key overseas markets, promoting Scotland as an important centre for specific technologies;
- creating a sustainable flow of market relevant technology companies;
- significantly increasing the retention of graduate and professional skills in Scotland.

ITI Scotland Limited, a company limited by guarantee, was incorporated in June 2003. The company has four divisions—ITI Energy; ITI Tech Media; ITI Life Science and ITI Operations—the latter providing shared services across the organisation. Gordon Campbell was appointed as Chairman of the ITI Scotland Board in August 2003. The first full Board meeting was held in November 2003. The recruitment of four Chief Executives to head up each of the divisions began in December 2002 and the first appointments were made in June 2003, with all CEOs on board by December 2003.

During August, the new Executive Team considered how best the ITI model should be operationalised, identifying the key tasks which would be required to build the organisation. The launch of ITI Scotland was made by the Deputy First Minister in September 2003 and this was followed by a series of well attended market seminars lead by each CEO to introduce the concept and themselves in their respective market place within Scotland. Key meetings with academics and companies were also facilitated to afford the CEOs and their senior teams an opportunity to explore key areas of interest and competencies within the research and company base.

ITI Scotland is operational from premises in Glasgow whilst TechMedia, Energy and Life Sciences are operating from leased premises in Glasgow; Aberdeen and Dundee respectively.

##### *ITI Staff Recruitment*

Each ITI has a relatively small staffing level, but many posts require a significant degree of specialist skills and a particular blend of expertise. The ITIs have attracted a high calibre of staff with nearly all director level appointments now in post. Good progress is now being made on second level appointments.

##### *Foresighting; Project Scoping and Commissioning*

This activity significantly informs the strategic direction for the ITIs first full year operating plan. An initial process to provide a view on a small number of potential technology platforms and potential research projects has been initiated by all three ITIs; outcomes are expected in March 2004 with first projects being formalised and research work commissioned between June and September 2004.

##### *Membership*

ITI opened up applications for membership in November 2003. General membership fees have been set at £400 and to date 42 applications have been received to date. Those who have expressed interest in ITI activities are provided with regular updates on developments by email and more recently an E-Zine, and active recruitment will begin in earnest from April onwards.

##### *Operating Plan 2004–05*

The Executive Team are currently leading the creation of an operational plan for the coming year, this is currently being finalised. Further information on the ITIs is now available through their website [www.iti.scotland.com](http://www.iti.scotland.com)



## (II) PROOF OF CONCEPT FUND

The Proof of Concept Fund is a £33 million fund to support the pre-commercialisation of leading-edge technologies emerging from Scotland's universities, research institutes and NHS Trusts.

583 applications have been received to the Fund over five funding rounds. The results of the latest (Fifth Round) selection process will be available in July 2004. 120 projects worth £19.1 million have been supported over four funding rounds across 10 technology sector areas, and 283 jobs have been created working on the projects supported to date.

38 projects have completed their Proof of Concept Funding period resulting in the following outcomes, as at 1 March 2004:

- Five spin-out companies.
- 11 considering spin-out formation.
- Six considering licensing deals with companies.
- Nine appraising commercialisation options.
- Two failed to prove the concept and were terminated early.
- Two have formed the basis of an EU Fifth framework programme.
- Two have stalled on the negotiation of the IP.
- One has failed to negotiate the IP.

Applications have been submitted (Feb 2004) to the European Regional Development Fund (ERDF) programmes to leverage a further £8 million in match funding. The additional funding would enable the Proof of Concept Fund to be further developed, so as to rigorously address some of the commercial opportunities that have been identified in the initial results.

Invest NI has launched their own Proof of Concept Fund in December 2003 which has been closely modelled on the SE version.

## (III) ROYAL SOCIETY OF EDINBURGH/SCOTTISH ENTERPRISE FELLOWSHIPS

The total number of Enterprise Fellowships awarded to date is 55. This number includes the latest seven awards for fellowships commencing 1 April 2004. The value of an enterprise fellowship is typically £45-55k, which includes salary, business expenses and training costs. Scottish Enterprise plans to support up to a further 49 Enterprise Fellowships, over the next three years, so the programme has reached the mid point. It is continuing to deliver robust businesses into global markets. During 2004, an interim review and evaluation will be carried out to assess value for money and economic impact of the program.

### **Influence of Advances in SET and National SET Policies on SET Strategy**

#### (I) ISLI/ALBA CENTRE

The Institute for System Level Integration has increased its research activity with the number of Engineering Doctorate projects now standing at 30. In addition, the ISLI Design Group has strengthened with the addition of MEMS design capability.

In the Test area, a new EU funded project has started—called PATENT—concerned with microsystems design and test, and an MPhil in Test Engineering has been launched. A group of former MSc students from ISLI have beaten contestants from 13 Scottish Universities to win the Scottish Institute for Enterprise National Business Plan competition.

The ISLI is currently hosting two participants in the SE/RSE Enterprise Fellowships scheme, both focused on electronics design-related research and commercialisation.

### **Policy Implementation and Links into Local, Regional, National and EU Mechanisms**

#### (I) INNOVATION RELAY CENTRE NETWORK

The Innovation Relay Centre (IRC) helps advise companies in training technology, and how to secure EU funding for R&D projects. There are about 68 organisations involved, across some 30 countries, funded by EC and match funded in Scotland by the Enterprise Networks. SE's involvement in the Innovation Relay Centre is to help them deliver their existing programme.



There is a slight enhancement to the way the IRC is operating—IRC advisors are getting closer to the Local Enterprise companies and are more closely aligning with the Scottish Development International Sector Trade teams eg Life Sciences, New Technologies, Energy.

There are two distinct services that IRC provide which SE is working to position and make available as “SE Network Consistent Products”, namely:

- Trading Technology Across Europe.
- Advice/Assistance to companies in securing major R&D funding.

SE is commissioning an evaluation of IRC to look at actual and relative performance in Scotland, what are the business benefits and economic impacts of what IRC does, and what alternative options are there for the delivery of the same impacts and benefits.

### **Providing Financial Support for Science, Engineering and Technology**

#### **(1) EDINBURGH/STANFORD LINK**

The Edinburgh-Stanford Link was established as a programme of research and training linking the Human Communication Research Centre (HCRC) at the University of Edinburgh with the Center for the Study of Language and Information (CSLI) at Stanford. The focus is on speech and language technology, an area in which the participating centres both have internationally recognised reputations for excellence.

The Link is fully funded by Scottish Enterprise, with £5.3 million for commercially focussed, early stage research over five years and a further £0.7 million for commercialisation activities relating to the research. The first round of research activities commenced in the spring of 2002.

There have been two rounds of research proposals, in which outlines are considered and full proposals requested. Nine projects were approved in the first round. These mostly commenced around the start of 2003 and involve over a dozen staff at both Stanford and Edinburgh as “principal investigators”, with about 10 employed researchers. The second round is currently in the phase where full proposals are being developed.

The Link is now established and already impacting on Scottish businesses. A number of important lessons have been learned through relationships with Stanford and their approach to commercialisation. One of the key lessons is that the researchers must establish close relationships with businesses at the earliest opportunity and in advance of commencing research. This knowledge of the customer is key in defining research that will be capable of commercial application.

### **Investment Readiness Programme**

The Investment Readiness Programme was launched in April 2003 with a budget of £4.5 million over three years. Its objective is to assist businesses access investment funding by helping them become “investment ready”.

There is evidence that many businesses fail to secure funds for viable projects because there are shortcomings in the way the project is presented to potential investors. The programme funds up to 50 per cent of the cost of expert advice to businesses which enables them to address such issues.

As examples the programme would contribute to the cost of establishing intellectual property ownership of a new product and helping prove the market. This type of assistance is particularly valuable in technology new starts and spin outs from academia.

The programme which is funded by the Scottish Executive is managed by Local Enterprise Companies who are able to integrate it with other services available to business. The maximum contribution to each project is £10,000. In its first six months in operation the programme completed 117 projects which raised £13.5 million with a potential further £48 million in the pipeline.

### **Business Growth Fund**

The Business Growth Fund makes commercial investment in SMEs in Scotland with the potential and ambition to grow.

The Business Growth Fund budget for 2003–04 was £5 million. By end of this financial year SE will have completed about 70 direct investments of which 70 per cent will be equity and around 25 per cent of which have some university connection.

**Scottish Co-Investment Fund**

Since June 2003 SE has made 22 investments using £2.5 million of Scottish Co-Investment Fund funding and leveraging £8 million of private sector funding in a variety of sectors, about one third of which are university connected.

*March 2004*

**Memorandum by the Higher Education Funding Council for England (HEFCE)**

May I respond to your letter of 11 February on the above subject, related to the Recommendations in the Committee's Report in July 2003. The majority of these Recommendations refer to actions which may be undertaken by the DTI, the OST and Research Councils; to the RDAs' operational frameworks and other specific matters within the RDAs' own purview. However the section 1.11 (q), (r) and (s), headed Mobilising Universities' SET resources, is particularly relevant to HEFCE, as follows.

HEFCE has been developing a set of performance indicators and metrics over the last three years, through annual surveys of "Higher education-business interaction", whose results have been published as HEFCE 2001/68, 2003/11 and 2004/07. The scope and shaping of these surveys, designed to both benchmark and measure progress in the effectiveness of knowledge transfer, have been managed through HEFCE with a group of stakeholders; including UK higher education funding bodies, the CBI, the OST and Research Councils UK and HM Treasury. In addition we have convened round table meetings drawing in groups involved in parallel work on such strategic measures, including detailed work related to Intellectual Property exploitation, research intensive and less intensive forms of interaction as well as the social and civic impact. Every England higher education institution (HEI) which has received funding through HEFCE to develop their capability in responding to the needs of business ("third stream" funding) has reported annually on their activities and delivery against previously agreed targets and measures.

The Regional Development Agencies (RDAs) have been involved in the monitoring of major and collaborative work funded in this way, working with HEFCE regional staff. The RDAs have been working closely with regional university associations and individual HEIs since their inception. In particular the RDAs have been engaged with HEIs in the development of their proposals, submitted to HEFCE by 25 February 2004, for funding under the HE Innovation Fund's (HEIF's) second round. Also the RDAs are contributing to the assessment of these proposals, through HEFCE's Regional Advisory Groups and the HEIF national Advisory Board which will meet in May 2004.

The above development work and partnerships in evolving both aims and measures are supported by a degree of co-location between RDAs and the regional university association and by instances of complementary funding, taking account of regional economic priorities. Together these actions are providing a more coherent approach to: the connection between HEIs' knowledge base and resources with both regional and national social and economic needs, a more robust set of measures and objective qualitative effectiveness indicators and a route to less bureaucratic processes in mobilising HEIs' resources.

*March 2004*





## RECENT REPORTS OF THE HOUSE OF LORDS SELECT COMMITTEE ON SCIENCE AND TECHNOLOGY

Information about the Science and Technology Committee is available on [www.parliament.uk/hlscience/](http://www.parliament.uk/hlscience/), which also provides access to the texts of Reports.

General Parliamentary information is available on [www.parliament.uk](http://www.parliament.uk).

### Session 1999–2000

- 1st Report Non-Food Crops
- 2nd Report Meeting with Health and Science Ministers
- 3rd Report Science and Society
- 4th Report Non-Food Crops: Government Response
- 5th Report Air Travel and Health
- 6th Report Complementary and Alternative Medicine

### Session 2000–01

- 1st Report Science in Schools (*follow-up to 3rd Report 1999–2000*)
- 2nd Report Therapeutic Uses of Cannabis (*follow-up to 9th Report 1997–98*)
- 3rd Report Resistance to Antibiotics (*follow-up to 7th Report 1997–98*)
- 4th Report Human Genetic Databases

### Session 2001–02

- 1st Report Managing Radioactive Waste: the Government's consultation (*follow-up to 3rd Report 1998–99*)
- 2nd Report Science in Schools: Government Responses
- 3rd Report What on Earth? The threat to the science underpinning conservation (*follow-up to 1st Report 1991–92*)

### Session 2002–03

- 1st Report Managing Radioactive Waste: Government Response
- 2nd Report Chips for Everything: Britain's opportunities in a key global market
- 3rd Report What on Earth? The threat to the science underpinning conservation: The Government's response and the Committee's commentary
- 4th Report Fighting Infection
- 5th Report Science and the RDAs: SETting the Regional Agenda

### Session 2003–04

- 1st Report Chips for Everything: follow-up
- 2nd Report Science and the RDAs: follow-up





THE UNIVERSITY OF CHICAGO

DEPARTMENT OF THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE





ISBN 0-10-400463-0



9 780104 004630

✓



**Distributed by TSO (The Stationery Office)**

and available from:

**TSO**

(Mail, telephone and fax orders only)

PO Box 29, Norwich NR3 1GN

General enquiries 0870 600 5522

Order through the Parliamentary Hotline Lo-call 0845 7 023474

Fax orders 0870 600 5533

Email [book.orders@tso.co.uk](mailto:book.orders@tso.co.uk)

Internet <http://www.tso.co.uk/bookshop>

**TSO Shops**

123 Kingsway, London WC2B 6PQ

020 7242 6393 Fax 020 7242 6394

68-69 Bull Street, Birmingham B4 6AD

0121 236 9696 Fax 0121 236 9699

9-21 Princess Street, Manchester M60 8AS

0161 834 7201 Fax 0161 833 0634

16 Arthur Street, Belfast BT1 4GD

028 9023 8451 Fax 028 9023 5401

18-19 High Street, Cardiff CF10 1PT

029 2039 5548 Fax 029 2038 4347

71 Lothian Road, Edinburgh EH3 9AZ

0870 606 5566 Fax 0870 606 5588

**The Parliamentary Bookshop**

12 Bridge Street, Parliament Square

London SW1A 2JX

Telephone orders 020 7219 3890

General enquiries 020 7219 3890

Fax orders 020 7219 3866

**Accredited Agents**

(see Yellow Pages)

and through good booksellers

© Parliamentary Copyright House of Lords 2004

Applications for reproduction should be made in writing to The Licensing Division,

HMSO, St Clements House, 2-16 Colegate, Norwich NR3 1BQ

— Fax 01603 723000

ISBN 0 10 400463 0

