



**SCIENCE BUDGET ALLOCATIONS  
2005-06 to 2007-08**

May 2005



The DTI drives our ambition of 'prosperity for all' by working to create the best environment for business success in the UK. We help people and companies become more productive by promoting enterprise, innovation and creativity.

We champion UK business at home and abroad. We invest heavily in world-class science and technology. We protect the rights of working people and consumers. And we stand up for fair and open markets in the UK, Europe and the world.

# Foreword by the Secretary of State for Trade and Industry

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Since taking office this Government has demonstrated its continued commitment to invest in science. Successive spending reviews have seen the Science Budget more than double since 1997. I am delighted to present the Science Budget allocations for 2005-06 to 2007-08, which will provide a huge boost to research in the UK, and help us achieve our aim to make this country the best place in the world to do research.

Science and innovation are central to improving the success of the UK economy, the nation's health and the environment in which we all live. The UK has long had a world-class research base of which it can be proud. For example, British research produced 13% of the world's top – that is the most cited – papers in 2003, measured across a wide spectrum of disciplines. UK researchers are among the most prolific in the world, producing 16 research papers per \$1 million of research funding compared to 9.2 in the USA and 3.6 in Japan.

But a world-class research base is not enough: we must make that research more accessible to business and build up stronger interactions between the research community and firms of all sizes. To that end, we are making significant increases in the resources for knowledge transfer and business interactions available to Research Councils, universities and public sector laboratories. These resources will, for example, help the Research Councils to deliver their new knowledge transfer plans.

Government has needed to tackle two decades of stagnant investment in the research base. Although we continued to punch above our weight, our research infrastructure was being run down. Within these allocations we have made progress on the path to address previous underinvestment to make our infrastructure modern and sustainable.

As a result of the last Spending Review, Government spending on research will rise to over £3.4 billion a year by 2008 – testament to our commitment to make the UK the best place in the world to do both research and business.

Our record investment in research also sends a strong signal to scientists around the world that the UK is the place to come to carry out research in leading edge areas, including stem cells and nanotechnology.

But we cannot stand still. If we are to go on prospering, to go on succeeding, we need to do even better in future. In today's global economy, it is the countries that create a climate where innovation can flourish that will succeed.

For the SR04 allocations round we have introduced a new performance management system for the Research Councils and Academies, which is outlined in this booklet. The performance management system provides a more robust mechanism for translating the strategic priorities for the research base into specific aims and objectives for the Research Councils and Academies. It will also allow the balance of investment across the Science Budget to be adjusted in response to a more strategic view of new priorities.

The UK has world-class universities and a strong tradition of science and research. Our increased investment will ensure that they continue to flourish – investing at record levels in ideas, in the infrastructure necessary for their development, and in the transfer of knowledge between the research base and business. It demonstrates our determination to enable Britain to win in the challenging global economy. It is with great pleasure that I am able to reaffirm our commitment to UK science with the allocations outlined in this booklet.



A handwritten signature in dark ink that reads "Alan Johnson". The signature is written in a cursive style with a long horizontal stroke above the name.

Alan Johnson

Secretary of State for Trade and Industry

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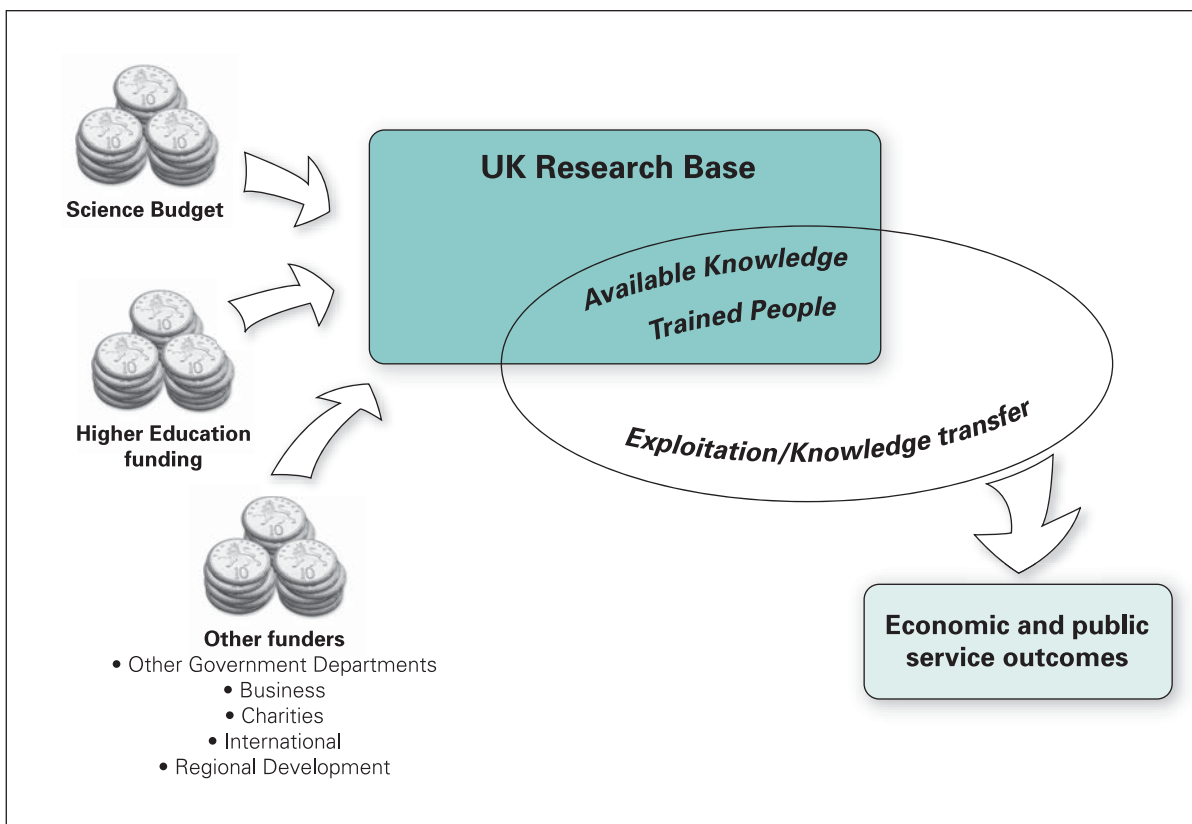
## 1 Science Budget Objectives

*This booklet outlines the allocations made for Spending Review 2004. For the first time the Arts and Humanities Research Council and the British Academy fall within the scope of the Science Budget. With this in mind, and for the purposes of this booklet, the "Research Base" extends from Particle Physics and Astronomy to the Arts and Humanities.*

# 1 Science Budget Objectives

The Government published its Science and Innovation Investment Framework<sup>1</sup> in July 2004, which sets out a comprehensive ten-year strategy for UK science. The Science Budget, administered by the DTI's Office of Science and Technology (OST), contributes the largest part – about 43 per cent of public sector investment in civil research or 30 per cent of all research – and has a key role to play, alongside others, in achieving the Government's aims as set out in the 10 Year Framework. The Science Budget's role within the Research Base is outlined in the diagram below.

**Diagram 1**



## 1 Science Budget Objectives

The Science Budget will rise to £3.45 billion by 2007-08.

£M	2004-05	2005-06	2006-07	2007-08
Science Budget	2734	3087	3235	3451
<i>Of which</i>				
Resource	2519	2883	3001	3197
Capital	215	204	234	254

As part of the SR 2004 settlement DTI has a new Public Service Agreement (PSA) Target:

*“Improve the relative international performance of the UK research base and improve the overall innovation performance of the UK economy including through effective knowledge transfer amongst universities, research institutions and business”*

OST has the responsibility for the health and standing of the UK research base as a whole, an obligation that goes beyond its responsibility to maximise the impact of the Science Budget. As a consequence, OST has a key role in aligning Science Budget priorities with those of other funders to deliver two broad outputs that derive directly from this PSA target. These are:

### Output 1: A healthy UK Research Base.

***Aim – to maximise the impact (of the Research Councils’ and Academies’ investment of the Science Budget) on maintaining and improving the UK’s Research Base.***

### Output 2: Better exploitation.

***Aim – to increase the contribution made to improving exploitation of the Research Base to meet national economic and public service objectives.***

This document sets out OST's allocation of the Science Budget for the period April 2005 – March 2008, the period for which funding was settled in the 2004 Spending Review. It explains how OST has deployed that funding so that it best contributes to achieving the PSA target. The allocations process took the two outputs defined above as the framework for determining the deliverables for the Science Budget, and incorporated these in the performance management system for the Research Councils (hereafter to be referred to as RCs) and the three other bodies we fund, the Royal Society, Royal Academy of Engineering and British Academy (hereafter to be referred to as the Academies).

# 2 The Allocations

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The UK is embarking upon the delivery of a 10 Year Science and Innovation Strategy. Backed by an initial 5.8% real annual growth in the Science Budget, which will rise to over £3.4 billion per year by 2008, it represents the Government's largest commitment yet to global excellence in research and innovation. The £10bn allocation of funding for 2005-2008, outlined in March, aims to lay the foundations by improving the health of key disciplines and sustainability and exploitation of the Research Base for economic growth and public good.

### Priorities for investment

At the start of the allocations process the Office of Science and Technology looked at the relative strengths and weaknesses of the UK research landscape, as derived from the 10-year framework. This highlighted the need to target investment at:

- Continuing to improve the sustainability and infrastructure of the Research Base;
- Improving knowledge transfer and exploitation;
- Improving the health of key disciplines, particularly in areas where the UK is relatively weak;
- Continuing the implementation of Sir Gareth Roberts' review of the supply of scientists and engineers;
- Increasing efforts to improve public engagement with, and confidence in, science and emerging technologies;
- Contributing to the promotion of a diverse science workforce that is representative of society.

In addition to these high-level priorities, energy (which cuts across most of the RCs) and clinical research were recognised as critical areas of importance at an early stage in the process.

The 10 Year Framework recognises that a world-class Research Base is a prerequisite to successful exploitation. To ensure that the UK's Research Base is on a secure and sustainable footing, substantial funding has been made available for the move towards funding research on the basis of Full Economic Costs (now set at 80%), Roberts Review Fellowships and Capital Investment in Research Council Institutes. The processes for allocating these streams were agreed through a constructive early dialogue with RCUK.

Individual RCs were asked to propose rigorously prioritised programmes of research for SR2004 and beyond. Not all of the highest priority areas put forward could be given extra support, whilst others were met in full or in part. The allocations decisions taken by OST were driven by a desire to get the right balance of investment across a hugely successful Research Base.

The need to deliver efficiencies in line with the Gershon Review was reflected in the process; all RCs and RCUK's delivery plans contain the necessary measures to be taken to deliver these, with RCUK co-ordinating and driving forward the efficiency agenda.

£70M was allocated in this spending round for the DGRC Strategic Fund. This was designed to address key strategic priorities including energy (where additional funding was provided to strengthen underpinning research to develop UK capability across the full range of future energy options) and clinical research, health of disciplines, major restructuring and the promotion of knowledge transfer. To this end the DGRC Strategic Fund has been fully allocated to these key priorities.

The following table provides a full breakdown of the Science Budget allocations. Sections 3 to 6 explain in more detail the rationale and direction of the funding for the Sustainability, Knowledge Transfer and Exploitation, Science and Society and Large Facilities allocations. Section 7 summarises the Research Councils' and Academies' delivery plans, full versions of which are available on each organisation's web site. The new performance management system is described in section 8.

## 2 The Allocations

**Table 1. Science Budget Allocations for 2004/05 to 2007/08.**

(The amounts shown are the total allocations. The bracketed figures indicate capital element included in total allocation.)

£000's	04-05 allocation <sup>2</sup>	05-06 allocation	06-07 allocation	07-08 allocation	% age uplift in 2007/08 against 2004/05
<b>Research Councils<sup>3</sup></b>	<b>2,210,199</b> <b>(166,630)</b>	<b>2,432,634</b> <b>(164,085)</b>	<b>2,638,409</b> <b>(179,327)</b>	<b>2,791,943</b> <b>(155,067)</b>	<b>26%</b> <b>+ 581,744</b>
<i>of which</i>					
Arts and Humanities Research Council	67,746 (0)	80,536 (0)	91,379 (0)	97,092 (0)	43%
Biotechnology and Biological Sciences Research Council	287,571 (6,308)	336,186 (11,141)	371,644 (14,998)	381,829 (18,855)	33%
Council for the Central Laboratory of the Research Councils <sup>4</sup>	127,940 (19,262)	167,004 (19,853)	182,256 (30,105)	212,507 (40,356)	66%
Engineering and Physical Sciences Research Council	497,318 (6,457)	568,193 (13,229)	636,294 (13,248)	721,172 (13,268)	44%
Economic and Social Research Council	105,252 (1,780)	123,465 (3,250)	142,468 (3,250)	150,336 (3,250)	43%
Medical Research Council	455,279 (28,034)	478,787 (34,573)	503,461 (38,261)	546,514 (41,948)	20%
Natural Environment Research Council	314,256 (15,852)	334,047 (19,576)	359,367 (21,757)	367,248 (23,937)	18%
Particle Physics and Astronomy Research Council	274,037 (8,137)	293,916 (11,963)	306,540 (12,708)	315,245 (13,453)	15%
Diamond Synchrotron capital <sup>5</sup>	(80,800)	(50,500)	(45,000)	(0)	
<b>Knowledge Transfer</b>	<b>78,960</b>	<b>91,440</b>	<b>103,500</b>	<b>108,500</b>	<b>37%</b> <b>+ 29,540</b>
<i>of which</i>					
Higher Education Innovation Fund	60,305	69,425	83,000	85,000	

2 Includes figures, for comparative purposes, for AHRB/BA which did not become the responsibility of the Science Budget until 1 April 2005

3 Figures from 06-07 include allocations made to enable Research Councils and Academies to pay a greater proportion of the Full Economic Cost of projects they support.

4 Excludes capital funding for Diamond synchrotron, which is shown separately below.

5 The Diamond synchrotron, announced in 2000, will be completed in 2006-07

Table 1. (continued)

Public Sector Research Establishment and other Knowledge Transfer initiatives	18,655	22,015	13,000	16,000	
RC Knowledge Transfer Fund	0	0	7,500	7,500	
Regional Development Agency and RC Capacity Building <sup>6</sup>	0	0	2,000	3,000	
<b>Sustainability</b>	<b>296,570</b>	<b>419,560</b>	<b>300,000</b>	<b>300,000</b>	
<i>of which</i>					
Science Research Investment Fund	296,570	300,000	300,000	300,000	
Full Economic Cost <sup>7</sup>	0	119,560	-	-	
<b>Large Facilities</b>	<b>53,628</b> <b>(48,628)</b>	<b>45,406</b> <b>(40,406)</b>	<b>60,414</b> <b>(55,164)</b>	<b>104,681</b> <b>(99,423)</b>	<b>95%</b> <b>+ 51,053</b>
<b>Academies<sup>8</sup></b>	<b>50,245</b>	<b>52,420</b>	<b>62,329</b>	<b>72,209</b>	<b>44%</b> <b>+ 21,964</b>
<i>of which</i>					
Royal Society	31,045	32,520	36,359	41,072	32%
Royal Academy of Engineering	5,600	5,850	7,885	9,752	74%
British Academy	13,600	14,050	18,085	21,385	57%
<b>Science and Society<sup>9</sup></b>	<b>7,175<sup>10</sup></b>	<b>7,665<sup>11</sup></b>	<b>9,975</b>	<b>11,395</b>	<b>59%</b> <b>+ 4,220</b>
<b>International Collaboration</b>	<b>-</b>	<b>-</b>	<b>3,000</b>	<b>3,000</b>	
<b>Restructuring and contingency</b>	<b>37,700</b>	<b>38,011</b>	<b>56,957</b>	<b>60,014</b>	
<b>Total</b>	<b>2,734,477</b> <b>(215,258)</b>	<b>3,087,136</b> <b>(204,491)</b>	<b>3,234,584</b> <b>(234,741)</b>	<b>3,451,742</b> <b>(254,748)</b>	<b>26%</b> <b>+ 717,265</b>

6 Regional Development Agency and RC Capacity Building funds are included in EPSRC's allocation

7 Sustainability funding of 120/200M in 06-07 and 07-08 folded into individual Research Council and Academies figures. Distribution of £120M to HEI's in 05-06 will be handled centrally by ESRC

8 Includes figures, for comparative purposes, for AHRB/BA which did not become the responsibility of the Science Budget until 1 April 2005

9 Science and Society includes work on public engagement, diversity in the science workforce and promoting science in schools (SETNET)

10 Includes £2.925m DTI funding for SETNET

11 Includes £2.925m DTI funding for SETNET

*The new Science Budget allocations are designed to:*

- Enable forward planning by allocating funds for the SR period.*
- Ensure the balance of investment is brought into line with PSA needs informed by understanding of the current position.*
- Improve the overall quality, sustainability, scale, agility, and productivity of the Research Base.*
- Produce long term investments, that are in line with Science Budget priorities, and can be proactively supported – OST and the Research Council's share responsibility for these decisions.*
- Provide the Science Budget with the agility it needs to respond to emerging priorities via reprioritisation within the RCs and Academies.*

## 3 University Research Sustainability

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### MODERNISING THE SCIENCE BASE

The long-term sustainability of the UK university research base continues to form a key element in this year's allocations round. In 2002 the *Cross-Cutting Review of Science and Research*<sup>12</sup> found convincing evidence that the UK university research base was on an unsustainable trajectory. Overtrading in research, a reliance on internal cross subsidies and a resulting underinvestment in the physical research infrastructure were all issues that needed to be tackled in order to ensure the continued capacity and capability of universities to produce world-class research. *Investing in Innovation*<sup>13</sup> set out the Government's agenda for tackling this problem including two specific actions under the Science Budget: investment in university science research infrastructure; and an increase from 2005-06 in the amount that RCs and Academies contribute to the overall costs of university research.

### SCIENCE RESEARCH INVESTMENT FUND

The Science Research Investment Fund (SRIF) was established to address problems caused by historic under-investment in renewal and refurbishment of the physical infrastructure of universities. This under-investment placed future research output in jeopardy. A third round of SRIF (SRIF3) commences in April 2006 and runs to 2008.

Building on Government investment totalling £2.2 billion provided in previous spending reviews (in addition to the Wellcome Trust's contribution of over £500m), the Government is providing capital funding worth £500 million per year in SRIF3 to address the effects of under-investment in research infrastructure. Of this, £600 million will be provided by the Science Budget on a UK-wide basis and £400 million will be provided by DfES on an England-only basis. Additional funding may be made available for HEIs in their respective areas by the devolved administrations in Scotland, Wales and Northern Ireland. SRIF funds are delivered by HEFCE in England, SHEFC in Scotland, HEFCW in Wales and DELNI in Northern Ireland.

<sup>12</sup> *Cross-Cutting Review of Science and Research: Final report*, HMT, DfES, DTI, March 2002. [www.hm-treasury.gov.uk/spending\\_review](http://www.hm-treasury.gov.uk/spending_review)

<sup>13</sup> *Investing in Innovation: A strategy for science, engineering and technology*, DTI, HM Treasury, DfES, July 2002. [www.ost.gov.uk/invest-innov.htm](http://www.ost.gov.uk/invest-innov.htm)

SRIF is already making a major impact on universities across the country. For example:

#### Cardiff University

Cardiff University is using £3 million of its allocation from SRIF towards the construction of a new research building for the Department of Optometry and Vision Science. The new accommodation will provide the additional space and facilities to enable Cardiff University to capitalise on its position as one of the UK's leading departments for research in vision sciences.

#### The University of Bristol

The average annual worldwide bill for repair and reconstruction following major disasters is £40 billion. This includes commercial aircraft losses, petrochemical industry failures and earthquakes. To help reduce these losses, Bristol University has, with the help of SRIF funding, established a centre to test the dynamics of buildings, aircraft and other major structures before they are constructed and put into use.

#### Napier University

Napier University is leading the way with new research exploring how everyday pollutants affect health. The University is also working in collaboration with the British Olympic Association to understand how the performance of top athletes is affected by breathing at altitude. Using new equipment purchased with the help of SRIF funds, the Biomedicine Group at Napier is researching how small particles in the air produced by diesel engines in cities and towns can harm the delicate lining of the lung.

#### FULL ECONOMIC COSTING

As outlined above dedicated capital funding under SRIF has enabled Government to begin to address years of previous under-investment in the physical infrastructure. However, sustainability over the long term will only be achieved when institutions are able to recover the full costs of the research they undertake without running down investment in other parts of their activities. Spending Review 2002 allocated £120 million to increase the proportion of costs paid by Research Councils for the projects they fund. From April 2006, RCs will use this additional money to add to grants without building volume. As a further step on the trajectory to sustainability an additional £80 million has been allocated in Spending Review 2004 to enable RCs to pay 80% of the full economic costs of the projects they fund. Along with the up-lift in quality-related research funding and the continuation of SRIF this reform of the dual support system will bring significant additional funding into institutions for publicly funded research. The Government's aim is that by the beginning of the next decade RCs should meet the full economic costs of the research they fund. Further information on Full Economic Costing is available at <http://www.ost.gov.uk/research/dualsupport.htm>.

## 4. Knowledge Transfer and Exploitation

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The Government underlined its belief in the importance of Knowledge Transfer in the Ten Year Framework, which explained that there would be a portfolio of different measures to promote the uptake of knowledge in business and other outside bodies. The Science Budget has an important role in funding 'supply side' actions by the Universities and other publicly funded research institutions. In addition, and funded separately, the Government also stimulates demand from the business community, for example through the Technology Strategy, Knowledge Transfer Partnerships and Regional Development Agencies (RDAs).

### HIGHER EDUCATION INNOVATION FUND (HEIF)

The Higher Education Innovation Fund (HEIF) has funded a wide range of knowledge transfer activities across the spectrum of the (English) Higher Education sector and is beginning to deliver results in terms of noticeable culture shifts within Universities and major growth in business/university interaction. In light of recommendations in the Lambert review<sup>14</sup>, HEIF is being increased to £110m per year by 2007-8, and the fund is moving towards a new system of more predictable allocation to provide greater continuity, allowing longer-term planning. In future every HEI receiving funds from the Higher Education Funding Council for England (HEFCE) will be entitled to an allocation from HEIF, calculated according to a formula. Whilst the majority of the funding will be allocated in this way, a smaller amount of money will be set aside to be allocated competitively in order to encourage innovative ideas and reward excellence.

Although the majority of HEIF funding comes from Science Budget, some comes from the Department for Education and Skills. The detailed design of the new programme will be worked up in conjunction with stakeholders. OST and HEFCE (which administers the fund) intend to issue a formal consultation document later this year.

### PUBLIC SECTOR RESEARCH ESTABLISHMENT FUND (PSRE FUND)

To support knowledge transfer from Public Sector Research Establishments, later this year OST will launch a third round of the Public Sector Research Exploitation Fund (up to £25m over three years). In preparation for this third round we are providing mentoring to help those Government research

<sup>14</sup> Lambert Review of Business-University Collaboration, December 2003. [www.lambertreview.org.uk](http://www.lambertreview.org.uk)

## **4 Knowledge Transfer and Exploitation**

organizations that have strong research programmes but lack the capacity to develop their knowledge transfer activities.

### **KNOWLEDGE TRANSFER (KT) IN RESEARCH COUNCILS**

In light of the Innovation Report and the 10-year Framework, all eight Research Councils agreed Knowledge Transfer plans with the Director General of Research Councils at the end of 2004. These plans are now being incorporated into their overall Delivery Plans.

In order to provide a boost to Knowledge Transfer OST has earmarked £15m to be put towards delivering the Knowledge Transfer plans – to be supplemented by other funds from RCs.

In addition, £5 million has been set aside for knowledge transfer capacity building in the RCs and Regional Development Agencies (RDAs).

The Government will support both RDAs and RCs in developing increased capacity to deliver their KT roles effectively, and encourage them to make best use of national science and technology strategies to shape their regional goals.

## 5. Science and Society – Science Workforce and Research Careers

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### SCIENCE WORKFORCE

Widening the pool of talent from which the UK draws its skilled scientists, engineers and technologists (SET) is vital if we are to meet the needs of the UK economy over the next 10 years. Following the Publication of the Greenfield Report<sup>15</sup> in 2003, the Government produced a Strategy to increase the numbers of women in the SET workforce (including academia) and in the governance of SET. The Strategy included a commitment to set up a new Resource Centre for Women in SET. A contract for this centre was signed in May 2004. The Consortium running the Centre comprises Bradford College, Sheffield Hallam University, the Open University and the WiSETi Project of Cambridge University. The Government has now committed a total of £6.9 million over the period 2004 – 2008 for the operation of the Centre, £1.5 million of this funding being ring-fenced for activities specifically to help women who wish to return to SET careers. The Centre works with SET employers to help them adopt best practice in the recruitment, retention and return of women into SET. Full details can be found at <http://www.setwomenresource.org.uk>

The Government is also committed to increasing the representation of Black and Minority Ethnic people in the SET workforce and is developing a strategy to target those groups that are least well represented. This is being done in consultation with organisations that are already active in the field of SET education at primary and secondary school level. A total of £1.65 million has been allocated for specific projects such as the Diversity in Science Communication (DISC) programme and for delivering the agreed strategy up to the end of this spending review period.

### RESEARCH CAREERS AND THE ROBERTS REVIEW

In its strategy for science, '*Investing in Innovation*', the Government made a commitment to implement measures that were based on those recommendations of Sir Gareth Roberts' Review<sup>16</sup> that focused specifically on making research careers more attractive and research career paths more

<sup>15</sup> SET FAIR – A Report on Women in Science, Engineering, and Technology from The Baroness Greenfield CBE to the Secretary of State for Trade and Industry, November 2002. [www.dti.gov.uk](http://www.dti.gov.uk)

<sup>16</sup> SET for Success: The supply of people with science, technology, engineering and mathematics skills, April 2002. [www.hm-treasury.gov.uk/documents/enterprise\\_and\\_productivity/research\\_and\\_enterprise/ent\\_res\\_roberts.cfm](http://www.hm-treasury.gov.uk/documents/enterprise_and_productivity/research_and_enterprise/ent_res_roberts.cfm)

stable. In addition to the allocation made in the 2002 Spending Review, the government has allocated a further £85 million to the RCs in SR04 to continue the implementation of these measures over the period 2004-2008. This will result in the average funded term of the Research Council PhD award increasing from three to three-and-a-half years so as to allow additional training to be provided where necessary, and increasing the Research Council PhD stipend in line with inflation over the period.

## 6. Large Facilities and Capital

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### CAPITAL INVESTMENT

UK scientists need access to world-class facilities and laboratories if they are to continue to carry out world-class research. Such facilities are provided through three primary routes:

- **within UK universities.** The Science Research Infrastructure Fund (SRIF), discussed in Section 3 above, will help universities continue to invest sustainably in their capital infrastructure;
- **through subscriptions to international organisations.** These bodies provide access for UK scientists to very large facilities, typically beyond that which can be afforded by a single country. They include CERN, the European Space Agency, the European Southern Observatory and the European Synchrotron Radiation Facility; and
- **within Research Council institutes, centres and surveys.** These carry out research and other activities, which have characteristics (such as scale or duration) that make them impractical for universities to carry out.

Alongside moving towards full economic costs and proper capital sustainability for universities, the Government wishes also to ensure that the RCs invest sustainably in their institutes, centres and surveys. Investigations in 2001-02 and again in 2003 showed an annual investment gap between actual investment and the level of investment needed to sustain the capital assets of the RCs. This issue was partly addressed under Spending Review 2002, and additional capital is being allocated under Spending Review 2004 such that by 2007-08, Research Councils will be investing sustainably in their capital assets with an annual investment of £155m.

OST also maintains a Large Facilities Capital Fund (LFCF). This enables RCs to seek additional capital for large investment in infrastructure to ensure UK scientists have access to the facilities they need. The fund covers both large national facilities and participation in international facilities located both in the UK and abroad. A Large Facilities Road Map is maintained and updated every two years, and periodic prioritisation exercises are carried out to earmark money from the fund. A new Road Map will be published in summer 2005, and

## 6 Large Facilities and Capital

the next prioritisation exercise will be completed by the end of 2005. Each individual project passes through the Office of Government Commerce's Gateway process. Further details of the Road Map and the LFCF can be found at: <http://www.ost.gov.uk/research/funding/lfroadmap/index.htm>

Projects currently being partly funded by the Large Facilities Capital Fund include the Diamond synchrotron, a second target station for the ISIS neutron source, and the new marine vessel (the RRS James Cook). All three of these projects will be completed during the SR2004 period. The Large Facilities Capital Fund is approximately £100m p.a

Capital Investment (£K):	2005-06	2006-07	2007-08
Research Council capital investment			
AHRC	0	0	0
BBSRC	11141	14998	18855
CCLRC	19853	30105	40356
EPSRC	13229	13248	13268
ESRC	3250	3250	3250
MRC	34573	38261	41948
NERC	19576	21757	23937
PPARC	11963	12708	13453
CCLRC for Diamond*	50500	45000	0
<b>TOTAL</b>	<b>164085</b>	<b>179327</b>	<b>155067</b>
Large Facilities Capital Fund*	40406	55164	99423
<b>TOTAL</b>	<b>204491</b>	<b>234491</b>	<b>254490</b>

\* Phase 1 of the Diamond synchrotron will be completed in 2006-07. From 2007-08 onwards the 'CCLRC for Diamond' line will be merged with the Large Facilities Capital Fund. Remaining capital funding for Diamond Phase 2 will come from Research Councils and from the LFCF.

## 7. Allocations to Research Councils and Academies

### 7.1 Arts and Humanities Research Council (AHRC)

£k	Resource	<i>Of which capital grant</i>	<i>Of which non-cash</i>	Capital
2005-06	80,536	–	–	–
2006-07	91,379	–	–	–
2007-08	97,092	–	–	–

#### Strategic Direction

The Council's four key strategic priorities are to: sustain and promote high-quality and innovative research across the full range of disciplines in the arts and humanities; further develop sustainable research capacity and capability; to extend and enhance interdisciplinary work, both within the arts and humanities, and in collaboration with other disciplines; and to enhance interactions across the research community and the creative, cultural, and heritage sectors.

#### Priorities for investment over the next 3 years

AHRC's Delivery Plan sets out six priorities for 2005 to 2008. These are highlighted in bold in the key deliverables below.

#### Key Deliverables

Key deliverables in relation to the four strategic priorities are set out below.

*Sustaining and promoting high-quality and innovative research across the range of disciplines in the arts and humanities:*

- Continue to provide the majority of funding in responsive mode, while developing a programme of strategic initiatives.

- **Sustain the momentum for collaborative and team-based research by increasing the proportion of the responsive-mode budget devoted to team-based research to 75% by 2007-08. The balance to be spent on low-cost, high-value-added support for individual researchers, including career development for younger researchers.**
- Continuing support for the development of a healthy and sustainable research base in the creative and performing arts.

### *Development of sustainable research capacity and capability:*

- **Establish by 2007, in partnership with the ESRC and the Funding Councils, four new centres of excellence to be a national focus for language-based studies of China, Japan, the Arab-speaking world and Eastern Europe and the Former Soviet Union.**
- Ensure that by 2006 at least 90% of the postgraduate budget is devoted to supporting students preparing for and undertaking doctoral research, and that all of them receive high-quality training.
- From 2006, expand provision for collaborative doctoral awards.
- **Develop the existing ICT programme and establish in 2007 a programme to develop the use of e-science in arts and humanities research.**
- Revise the Resource Enhancement scheme in 2006 so that it provides a more strategic approach to the development of the intellectual infrastructure for research.
- Create more opportunities for the exploitation of research and create a network of KT professionals working in the arts and humanities to support entrepreneurship amongst researchers.

### *Enhancing interdisciplinary work, both within the arts and humanities, and in collaboration with other disciplines:*

- **Establish in 2005-06 a networking programme on identities and cultures, collaborating closely with the ESRC.**
- Developing and implementing interdisciplinary research programmes across the arts and humanities in areas of intellectual urgency and strategic importance.

- Establishing similar programmes, which span the arts and humanities and the sciences, in collaboration with the Research Councils and other agencies.

*Developing interactions across the research community and with the creative, cultural and heritage sectors:*

- **Establish an integrated strategy for the direct support of research in museums and galleries. The strategy will develop effective partnerships between museums and the HE sector, enhance the research capacity and capability of both, and produce high-quality research outputs.**
- **Support for the creative industries**, including:
  - the establishment in 2006 of a collaborative research programme with co-funding from the creative industries.
  - the development of a research programme to explore the nature of creativity.
  - Sponsorship of the DTI's KTP programme for the first time in 2005 and the development of a precursor KTP scheme in 2007 to encourage SMEs to engage with the HE sector.
- Develop a targeted series of bilateral collaborations with agencies in European countries and elsewhere to support research in areas of mutual interest and importance.

AHRC's Delivery Plan is available at <http://www.ahrc.ac.uk/>

## 7.2 Biotechnology and Biological Sciences Research Council (BBSRC)

£k	Resource	<i>Of which capital grant</i>	<i>Of which non-cash</i>	Capital
2005-06	325,045	28,176	12,256	11,141
2006-07	356,646	28,176	12,256	14,998
2007-08	362,974	28,176	8,256	18,855

### Strategic Direction

BBSRC is the UK’s principal funding agency for basic and strategic research across the biosciences – in the microbial, plant and animal kingdoms (including humans). This encompasses strategic areas such as animal health and welfare, agricultural sustainability, pharmaceuticals and healthcare, and food safety and quality. BBSRC funds world-class research and provides training and career development in the biosciences, as well as promoting innovation and knowledge transfer for policy and business development, and fostering public engagement.

### Priorities for investment over the next 3 years

To sustain the vibrant UK bioscience base, BBSRC will increase responsive mode funding by at least 4% pa and establish a portfolio of large multidisciplinary programmes.

### Key Deliverables

- promote multidisciplinary research by investing £25M in Integrative and Systems Biology. This builds on £30M already provided by the Council, with additional input from EPSRC, for new Systems Biology Centres in leading Universities. The new investment will be used in part to boost bioinformatics and computational methods in bioscience. A further £15M will be invested in research into innovative new tools and resources to both advance basic research and to support rapid translation of outputs.
- build on cross-Council initiatives supported through SR 2002, focusing on research priorities critical to its Vision and Strategic Plan. These include:

£8M to transfer basic plant science into crop research; £6M for research that exploits outputs from genomics to advance animal health and welfare; and prioritisation of brain science and stem cells research within in responsive mode funding.

- increase core strategic grants to its sponsored institutes by an average of 3% pa. Institutes contribute significantly to the UK science base and to knowledge transfer and innovation. BBSRC will provide £23M towards redevelopment of the Pirbright laboratory of the Institute for Animal Health, within a project totalling £121M (£31M from the Large Facilities Fund and the rest from Defra)
- fund more PhD awards over four years; around 80% of new awards starting in 06/07 will be 4-year flexible awards. BBSRC will continue to work with the other RCs, through EPSRC, to fund Academic Fellowships that provide a more secure career path for contract researchers into permanent academic positions, and renew the skills base in HEIs
- Through BBSRC's technology strategy the Council will increase its investment in underpinning-research to meet the needs of industry in the coming decade, and encourage more collaborative R&D, for example through a four-fold increase in Industrial Partnership Awards.
- increase its support for Knowledge Transfer. This will include enhanced support for Follow-On Fund and for the Small Business Research Initiative, as well as new Enterprise Fellowships and promotion of academic/industrial staff interchange.
- double investment in public engagement, focusing on activities to ensure that the Council's objectives and activities are widely communicated, and that planning and policymaking is informed by wide stakeholder engagement and dialogue.

BBSRC's Delivery Plan is available at <http://www.bbsrc.ac.uk/>

### 7.3 Council for the Central Laboratory of the Research Councils (CCLRC)

£k	Resource	<i>Of which capital grant</i>	<i>Of which non-cash</i>	Capital
2005-06	147,151		66,636	70,353
2006-07	152,151		66,636	75,105
2007-08	172,151		66,636	40,356

#### Strategic Direction

The provision of internationally competitive research facilities and capabilities, underpinned with well-equipped and purpose designed estates infrastructure, is key to CCLRC support for the future health of science and engineering disciplines in the UK and the closer engagement of industry with the CCLRC programme. The highest priority for the CCLRC *SR2004 Delivery Plan* is to invest in a platform of experimental capabilities and a multidisciplinary research environment in support of the academic and industrial research communities.

#### Priorities for investment over the next 3 years

##### *Sustainability funding (£30M additional funding)*

The planned programme will enable the CCLRC to baseline its large facility experimental operations (and hence scientific output) at new levels of sustainability – supported by an upgrade of laboratory buildings and site development – and to complete the preparations in hand to accommodate the increasing demands from an expanding user base, especially for the new ISIS and Diamond facilities. The sustainability programme will involve:

- investing in ‘laboratories of the future’ that are well-founded;
- replacing key components of large research facility infrastructure to improve reliability, to take advantage of ‘technology refresh’ options for more efficient and effective operations, and to anticipate the increasing complexity of the experimental regimes.

### *New Science Capabilities (£5M pa)*

The CCLRC will continue its innovative programme to deliver new science capabilities at the principal research facilities over the next three years, for which partnership with HEIs and industry is a cornerstone. Opportunities for joint funding, including through national and international partnership, will be sought to extend this programme and to ensure it is aligned with the strategic needs of the other Research Councils.

### *Underpinning Technologies (£7.5M pa)*

For the longer timescale, the CCLRC will continue to invest in its Instrumentation, e-Science and Accelerator Science and Technology advanced technology centres to deliver underpinning technologies for the next generation of large research facilities.

### *Synchrotron Radiation (£30M additional funding)*

A particular challenge for CCLRC over the next three years will be to manage the migration of science programmes from the Synchrotron Radiation Source to the new Diamond Light Source. This will involve making provision for dual operation of the two facilities to meet the highest priority scientific requirements of the UK research community.

## **Key Deliverables**

With its new Research Council role and the clear statement of Government intent set out in the '*10 year framework for Science and Innovation*' the CCLRC will, over the next three years, seek to deliver:

- sustainable operational regimes for the large research facilities managed through the CCLRC and benchmarks;
- reduced administration costs and enhanced resource for front line science and engineering programmes;
- effective ongoing partnerships with the other Research Councils on programmes of joint interest, including support for accelerator science, e-Science and the life sciences (stem cells, brain research and proteomics);
- science and technology strategies for the entire CCLRC multidisciplinary programme and an associated capital investment plan and estates strategy;

## 7 Allocations to Research Councils and Academies

- effective policies for positioning CCLRC support for 'Education and Training', 'Knowledge Transfer' and 'Science and Society' and the implementation of associated support programmes;
- innovative strategic partnerships with key stakeholders at local, regional, national and international levels – including support for the partnership enterprises envisaged for both the Chilton and Daresbury sites;
- critical strategic appraisals of requirements for new large research facilities, within its fields of competence, for input to the Office of Science and Technology Large Facility Road Map;

completion of the ongoing major capital investments in the Diamond Light Source, the ISIS second target station and the Energy Recovery Linac Project.

CCLRC's Delivery Plan is available at <http://www.cclrc.ac.uk/>

## 7.4 Engineering and Physical Sciences Research Council (EPSRC)

£k	Resource	<i>Of which capital grant</i>	<i>Of which non-cash</i>	Capital
2005-06	554,964	28,558	-840	13,229
2006-07	623,046	30,558	-840	13,248
2007-08	707,904	32,558	-840	13,268

### Strategic Direction

EPSRC invests in high-quality research and related postgraduate training to maintain and develop a strong research base in engineering and physical sciences and to promote economic development and improved quality of life in the UK. The Council works to: improve the international quality of engineering and physical sciences research in the UK; provide a strong supply of skilled scientists, engineers and technologists; increase innovation and exploitation in the UK; and actively promote public engagement in science and engineering. Where appropriate the EPSRC programmes are delivered in conjunction with other bodies.

### Priorities for investment over the next 3 years

Priorities for investment over the SR04 period include: strengthening the health of the engineering and physical sciences disciplines, delivering an integrated programme of energy research in collaboration with sister Councils and others, ensuring a strong supply of scientists, engineers and technologists particularly in areas of strategic importance, and optimising knowledge transfer opportunities.

### Key Deliverables

#### *Health of Disciplines*

EPSRC will continue to sustain the breadth of the UK engineering and physical sciences research base, building capacity in strategically important areas that are currently at risk and promoting agility of support for talented researchers.

## 7 Allocations to Research Councils and Academies

- EPSRC will increase responsive mode funding by 6% over SR2004.
- Building on its pilot programme of **Science and Innovation Awards**, EPSRC will provide £50M over SR04 period, for the establishment of at least 15 new strong research groups in strategically important areas such as statistics, chemistry/process engineering interface, physical organic chemistry, structural materials and electronics design. Postgraduate studentships will be included supporting capacity building.
- Advanced Research Fellowships will be increased by 20% to 240 by 2007/08. The number of Senior Fellowships awarded annually will double, with 24 Fellows in post by 2007/08.
- EPSRC will continue to manage the allocation of Academic Fellowships on behalf of the OST.

### *Energy*

EPSRC will take a clear strategic lead in driving forward a vibrant and diverse UK energy research programme, jointly with other RCs and funders. Dedicated programme management will ensure a fully integrated activity, addressing all aspects of the energy agenda including sustainable energy technologies, new sources of energy, improvements to existing technologies and safeguarding capability in nuclear engineering and associated areas.

- Working with ESRC, NERC and BBSRC, EPSRC will increase combined Council funding for energy research to £70M pa by 2007-8.
- EPSRC will increase funding for the national fusion research programme from £17M in 2005-6 to £22M in 2007-8.

### *Cross-Council programmes*

EPSRC will continue to participate in existing cross-Council programmes, e.g. Basic Technology and Stem Cells. In particular, EPSRC will continue management of the core e-Science programme.

### *A strong supply of scientists, engineers and technologists*

EPSRC will continue to provide most of its support for postgraduate training through the flexible routes of Doctoral and Collaborative Training Awards. In addition training resources will target key areas:

- EPSRC will establish Engineering Doctorate training in the strategically

important areas of Nuclear Engineering, Systems Engineering and Large Scale Complex IT Systems.

- Multidisciplinary training will be provided through the Doctoral Training Centres at the Life Sciences Interface and new centres will be established alongside the Integrated Systems Biology Centres, supported in conjunction with BBSRC.

*Supporting the knowledge economy – optimising opportunities for knowledge transfer*

- EPSRC will build on its existing programme of engagement with business, for example, by establishing formalised interactions with at least 30 high performing R&D-intensive companies
- Opportunities for knowledge transfer will be developed and explored, e.g. piloting the concept of Integrated Knowledge Centres.
- The level of industrial involvement in the EPSRC portfolio will be further increased; in part through involvement with the DTI Technology Programme for which £5M pa will support academic participation.

EPSRC's Delivery Plan is available at <http://www.epsrc.ac.uk/>

## 7.5 Economic and Social Research Council (ESRC)

£k	Resource	Of which		Capital
		capital grant	non-cash	
2005-06	120,215	3,200	914	3,250
2006-07	139,218	3,200	914	3,250
2007-08	147,086	3,200	914	3,250

### Strategic Direction

The ESRC's mission is to promote and support high quality basic, strategic and applied research and related postgraduate training in the social sciences. To advance knowledge and provide trained social scientists who meet the needs of users and beneficiaries, thereby contributing to the economic competitiveness of the United Kingdom, the effectiveness of public services and policy, and the quality of life. To provide advice on, and disseminate knowledge and promote public understanding of the social sciences. ESRC is organising and presenting its work around four broad categories: research, capacity, engagement and performance.

### Priorities for investment over the next 3 years

ESRC's Delivery Plan sets out a series of key priorities for 2005 to 2008. These can be summarised into the following seven strategic objectives: seizing opportunities in research through responsive mode funding; creating opportunities in research through directive mode funding; improving human capacity in the social sciences; providing capacity in data and ensuring methods development; engagement with stakeholders and the public; international benchmarking of performance; and maximising international presence and opportunities.

### Key deliverables

- Increasing the proportion of research in response mode and starting to raise success rates: this will include a new scheme above the current £750k threshold and aimed, for example, at researchers in groups or networks or large scale surveys; new international collaborative grants schemes; open competitions for new research centres; and, a first grants scheme for new researchers.

- Funding research that addresses the Council's key research challenges:
  - a) succeeding in the global economy – for example, developing collaborations with the Department for International Development (DFID) and extending the work of the Advanced Institute of Management (AIM);
  - b) with MRC, promoting social neuroscience research in individual behaviour;
  - c) research on education and life chances;
  - d) additional research on climate change, the environment and sustainability, and on energy jointly with other Councils;
  - e) with AHRC, promoting research on religion, ethnicity and society; and
  - f) population research on child bearing and the changing dynamics of the family.
- 'Health of disciplines' support, including additional studentships and skills development, in vulnerable subject areas such as: economics, management and business studies, quantitative skills, socio-legal studies and area studies and, with the AHRC, to build capacity in Chinese, Japanese, Arabic and East European studies.
- Further support for the maintenance and development of the Census datasets and the development of new international data resources. A new initiative on survey design and measurement.
- Further development of work to implement the Council's knowledge transfer strategy including funding a new 'research brokers' scheme and working on new initiatives with the other Councils. Developing a new science and society strategy and a public engagement programme that is evidence based and which heightens the understanding of social science. Further development of the ESRC Society Today web site which gives access to a wide range of information on the Council's work [www.esrcsocietytoday.ac.uk](http://www.esrcsocietytoday.ac.uk) and on social science research more generally. The new brokers will also work on communications activities.
- Funding new work on developing appropriate bibliometrics for the social sciences and international benchmarking reviews of social science disciplines.

ESRC's Delivery Plan is available at <http://www.esrc.ac.uk/>

## 7.6 Medical Research Council (MRC)

£k	Resource	Of which		Capital
		capital grant	non-cash	
2005-06	444,214	10,650	16,096	34,573
2006-07	465,200	11,650	16,096	38,261
2007-08	504,566	12,650	22,096	41,948

### Strategic Direction

The MRC mission is to fund research, training and knowledge transfer to improve human health and quality of life, and contribute to national wealth. Past MRC research has led to major impacts on the nation's health and breakthrough technologies in industry and healthcare, as well as providing fundamental biological insights.

### Priorities for investment over the next 3 years

In the SR2004 period MRC's budget is £1.53bn. This will meet the costs of MRC's own research establishments, research grants mainly to universities, research training and career development, and international subscriptions. The MRC's main priority over the period will be to foster clinical research, but it will also secure the health of disciplines and fund research to ensure progress in all areas of medical research. This will depend on maintaining sufficient broad-based investment so that novel ideas from the research community can be nurtured and new scientists trained. *The MRC will therefore maintain a balance between sustaining the broad strengths of the UK medical research base, while promoting research in priority areas.*

### Key deliverables

- MRC and Health Departments will build on their existing partnerships to further accelerate the translation of research results into improved human health. In this, *the MRC will work closely with the Joint MRC/Health Departments Health Delivery Group and the UK Clinical Research Collaboration.* As well as £25M extra money earmarked for pushing forward this agenda during the SR2004 period, the MRC will deploy £37M of existing funds: *by 2007/08, expenditure on clinical and public health research will have risen to at least £162M p.a.*

- The MRC will also give priority to other areas, including infections and vaccine development, global health, and biomarkers. The MRC will build on existing SR2002 Programmes: the stem cell programme will shift towards more translational questions in regenerative medicine and tissue engineering; the genomics and post-genomics programme will focus more on systems and integrative biology; the brain sciences programme will follow through the successful first round of trials platform and pathfinder awards. *The MRC will invest an additional £1M in the National Centre for the Replacement, Refinement and Reduction of Animals in Research.*
- *The MRC's research training and career development programmes will continue to respond to critical capacity shortages* such as integrative physiology and pharmacology, where a partnership is being forged with industry. The MRC will use the additional £7.9M provided for implementing the recommendations of the Roberts' Review on recruitment and retention of young scientists.
- During the SR2004 period, MRC Technology will build on the MRC's already strong position in exploiting the Council's IPR. *MRC Technology will establish a new Drug Discovery Group* to better position MRC intellectual property for translation into commercial exploitation. The MRC will play its part in taking forward goals in knowledge transfer, through calling on OST's knowledge transfer and capacity building funds.
- *The MRC will work closely with OST and other RCs on the delivery of science and society work.* An effective dialogue with the public is particularly important to MRC because of the sensitive nature of some developments at the forefront of medical research, and the ethical issues raised by research involving people and animals.
- The MRC has received an allocation of £42.3M to meet its share of the full economic costs of the research grants and fellowships it awards to universities.
- The MRC is developing radical plans for restructuring its administration in the light of the Gershon report. This will enable *delivery of the broader efficiency targets*, so ensuring that a greater proportion of the Council's budget is spent on front-line science.

MRC's Delivery Plan is available at <http://www.mrc.ac.uk/>

## 7.7 Natural Environment Research Council (NERC)

£k	Resource			Capital
		<i>Of which capital grant</i>	<i>Of which non-cash</i>	
2005-06	314,471	14,678	21,808	19,576
2006-07	337,610	14,678	21,808	21,757
2007-08	343,311	14,678	21,808	23,937

### Strategic Direction

NERC is the UK's principal funder for delivering independent basic and strategic research and survey in environmental sciences, needed to predict the changing environment and sustainability of natural resources. This encompasses strategic areas such as climate change, the Earth's life-support systems, sustainable economies and hazards. NERC funds world-class research, maintains long-term capability, and provides training and career development in the environmental sciences, as well as promoting effective knowledge transfer for policy and business use, and engaging society.

### Priorities for investment over the next 3 years

- To significantly improve predictions of climate change, globally and regionally, NERC will invest in research in atmospheric aerosols and ocean circulation, where some of the greatest uncertainties lie. Investments will be closely tied to national and international partnerships in research and policy areas and will build on NERC's substantial investment in climate-change.
- NERC will establish, and build on existing, cross-Council initiatives. In Environment and Human Health, partnerships with sister Councils will stimulate a multidisciplinary community to increasingly enable the management of the environment and hazard-risk in a way that improves people's health. In water management, investments will enable more reliable risk-assessment of flooding on timescales of minutes to decades, and short-term flood forecasts that feed early-warning systems;
- NERC will strengthen the UK environmental science base through enhanced investment in large multidisciplinary programmes, both 'blue-skies' and in strategic areas such as exploiting the opportunities of International Polar Year (2007-08).

## Key Deliverables

- NERC will renew and reinvigorate the strategic programmes in most of its Research and Collaborative Centres, with increasing emphasis on direct delivery of NERC strategic aims and infrastructural sustainability. The new 'Global Science in an Antarctic Context' programme will be a major effort in addressing Antarctic processes that play key, but uncertain, roles in the Earth's climate system. Three-dimensional survey, characterisation and modelling of the UK's landmass and submarine systems will provide baseline geoenvironmental information critical to socio-economic development of the environment.
- Knowledge transfer will be a key component of NERC's activities, investing in areas such as setting up a partnership to commercialise activity from its research centres; encouraging collaborative R&D; supporting co-operative training and education; and developing science-into-policy activities.
- NERC will provide extra funding to support NERC PhD students for an average of three and a half years. The best individuals will be supported in early career development through NERC fellowships and, with other Research Councils, Academic Fellowships as a pathway to academic positions.
- NERC will deliver the construction of the Antarctic base Halley VI and the research vessel James Cook, and work with international and national partners to develop remote sensing technologies and ensure UK access to key high-performance computing.

NERC will further its activities in stakeholder and public engagement to ensure involvement in setting priorities and understanding how research outcomes are used.

NERC's Delivery Plan is available at <http://www.nerc.ac.uk/>

## 7.8 Particle Physics and Astronomy Research Council (PPARC)

£k	Resource	Of which		Capital
		capital grant	non-cash	
2005-06	281,953	43,893	10,802	11,963
2006-07	293,832	43,893	10,802	12,708
2007-08	301,792	43,893	8,802	13,453

### Strategic Direction

PPARC's objectives, aligned with the Government's PSA target and 10-year framework, will be to enable the UK's astronomy and particle physics research community to improve its competitive performance internationally; increase the engagement of industry in the delivering of the science; increase the rate of knowledge transfer through both skilled people and innovative technologies; contribute with other agencies to improving the engagement of the public in science policy and education; and deliver administrative efficiencies.

### Priorities for investment over the next 3 years

Increasing the pool of highly trained people will underpin the UK's capacity to construct and exploit these facilities and contribute to the pool of skilled expertise available to the wider economy, in which PPARC students are highly marketable. PPARC will increase the number of quota studentships by 50 % by 2007/08; support the deployment of additional students on grants in high science priority areas and in R&D for major new facilities; and implement the introduction of variable length PhD training to improve the quality of the training required in specific areas.

To foster the greater engagement of industry particularly in R&D for major new facilities PPARC will introduce new funding arrangements to enable industry to collaborate more easily with university groups or engage independently in such programmes. It will increase its engagement with the other RCs and other national and international agencies to increase the level of co-funded programmes. It will invest more in brokerage activities to enable greater knowledge transfer of innovative technologies developed for astronomy and particle physics into other targeted sectors, for example, health care.

Crucial to improving the competitive performance of the science community will be providing it with access to the best world-class facilities, and participation in the design and construction of the next generation of facilities.

### Key deliverables

- deliver its contribution to the construction of the general purpose detectors for the Large Hadron Collider, which will be operational at CERN in 2007.
- increase its investment in accelerator R&D to position the UK to participate in the design and construction of a Linear Collider and MICE, a technology demonstrator for a future Neutrino Factory.
- decide the level of investment in the second generation of instruments for the VLT and Gemini telescopes, complete construction of the VISTA telescope, prepare for the start of operation of ALMA, and initiate R&D programmes for the next generation of ground-based astronomy facilities, in particular the Extremely Large Telescope and the Square Kilometre Array projects.
- exploit UK membership of ESA by participating in specific planned missions in the mandatory space science programme, and position the UK to play a leading role in the optional Aurora programme.
- deliver the grid computing infrastructure needed to exploit the data from the LHC and astronomy facilities, and the high performance computing requirements of the theory community.

In parallel PPARC has put plans in place to rundown its involvement in a range of current experiments, and review its longer-term commitment in relation to the continued operation of its ground-based astronomy facilities on Hawaii and La Palma.

PPARC is fully committed to the RCUK's administration strategy. It will continue to lead on the implementation of Joint Electronic Submission and its extension to harmonise a wider range of services by 2007.

PPARC's Delivery Plan is available at <http://www.pparc.ac.uk/>

### 7.9 Research Councils UK (RCUK)

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#### Strategic direction

Research Councils UK (RCUK) is a strategic partnership between the eight UK Research Councils. Through RCUK the Research Councils work together to enhance the overall impact and effectiveness of their research, training and knowledge transfer activities.

#### Priorities for cross-Council working over the next 3 years

The RCUK delivery plan sets out the Councils' priorities for joint working for 2005-06 to 2007-08, including support for multidisciplinary research, training and large infrastructure; raising public awareness of, and interest in, science and innovation; increasing the collective visibility and policy influence of Research Councils; providing more efficient services for stakeholders; and delivering year on year efficiency gains in operational performance.

#### Key deliverables

**Support for multidisciplinary research:** RCUK will continue to stimulate multi-disciplinary activities by enabling the exchange of information on research priorities, facilitating an open and collective approach to the development of multidisciplinary proposals and promoting best practice on the management and evaluation of multidisciplinary research.

Research priorities for the SR2004 period are set out in Councils' delivery plans and include £30m for the sustainable energy programme, and continued support through standard funding routes for e-Science, Basic Technology, Genomics and Proteomics, Rural Economy and Brain Science. New multidisciplinary priorities supported through cross-Council collaboration will include Systems Biology, Environment and Health and 21st Century Design.

RCUK will also continue with the programme of benchmarking each Council's peer review process and will review the effectiveness of processes for handling multi-disciplinary proposals in 2006.

**Support for Research Careers:** the long term health of the UK research base is dependent on the flow of people into research careers. The new RCUK Research Careers and Diversity Unit will manage and develop cross-Council initiatives such as the UKGRAD skills programme and the Dorothy Hodgkin awards scheme; report on the impact of investments made to boost training

following the Roberts' Report on SET skills; report on progress made on the Government's commitments in response to the Greenfield Report on Women in SET (SET Fair); work in partnership with the Resource centre for Women in SET and develop with other funders a range of materials aimed at enthusing young people to pursue a career in research, and informing students and researchers about career choices and opportunities.

**Large infrastructures:** the Large Facilities Roadmap enables RCUK and OST to maintain a comprehensive picture of potential large facilities and equipment projects in which the UK might be engaged over the medium to long term. It enables RCUK and OST to take strategic decisions as to the best way to maintain access for researchers to world class facilities and also to manage and fund UK investments in priority projects. Following consultation RCUK will publish a revised Large Facilities Roadmap in mid-2005. Working with OST, RCUK will also undertake an exercise to prioritise which projects on the roadmap might move into a capital construction phase, and hence potentially draw upon the Large Facilities Capital Fund and/or require significant investment from Research Council funds during the SR2004 period. The results of this exercise will be published in early 2006. RCUK will also continue to review the science and business cases for these large facilities projects.

**Public engagement:** the new RCUK Science in Society Unit will promote a more joined up approach to science in society activities across the Research Councils, Government and a range of other organisations. Focusing on raising public awareness of, and engagement in, science and research, the Unit will publish an RCUK science in society strategy in 2005 and deliver a programme of cross-Council initiatives including the Researchers in Residence scheme, grants for public engagement activities and support for events e.g. during Science Week.

***Increasing the collective visibility and policy influence of the Research Councils:***

RCUK will continue to work with OST and wide range of opinion formers and decision makers to influence policy in a number of key areas including the sustainability of the UK research base and health of disciplines; Framework Programme 7 and the establishment of a European Research Council; and the 2008 RAE. RCUK will continue to fund an external relations programme enabling Councils to brief key stakeholders, sponsor and attend conferences and promote the Councils collectively through the media.

**Stakeholder services:** Research Councils are forging ahead with the provision of more effective administrative services for the academic community. The full economic costing funding regime will be implemented for grants received

from September 2005 onwards, and RCUK will be closely monitoring the impact that this has on the overall balance and distribution of funding. By 2007-08 the Research Councils aim to have implemented a common research administration system enabling the electronic processing of grants, fellowships and studentships from submission to completion.

**Efficiency gains:** the Research Councils will collectively and individually re-engineer their delivery of services to maintain spend on administration within 3.5% from 2006-07, equivalent to an efficiency gain of around 6.5% on current performance. Councils will also achieve a collective efficiency gain of 10% by March 2008, through a programme of activities to reduce the proportion of expenditure attributable to administration costs; demonstrating effective reprioritisation of programme spend; increasing the efficiency of Research Council institutes and growing the level of co-funding of research and postgraduate training with business, charities and other sponsors. This equates to a total efficiency gain of £170m across the Councils by 2007-08. Other projects are focusing on harmonising Research Councils operations in the areas of ICT and human resources.

RCUK's Delivery Plan is available at <http://www.rcuk.ac.uk/deliveryplan.asp>

## 7.10 The Royal Society

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£ million, resource	2005/06	2006/07	2007/08
Total resource	32.520	36.359	41.072

### Strategic Direction

The Society's mission is to pursue excellence in science by encouraging and supporting the best individual scientists and engineers to carry out the highest quality of research and communicate results and issues surrounding their research. The Society does this to push back the frontiers of knowledge and to improve the quality of life in the UK and globally.

### Priorities for investment over the next 3 years and key deliverables

The Society will maintain the level and momentum of our grant-in-aid funded work across the whole range of science, engineering and technology. In particular, the Society aims to:

- Strengthen UK science by providing support to excellent individuals
- Fund excellent research to push back the frontiers of knowledge
- Attract and retain the best scientists
- Ensure that the UK has access to and engages with the best science around the world
- Support science communication and encourage dialogue with the public
- Support science education at all levels
- Provide the best independent scientific advice nationally and internationally
- Promote scholarship and encourage research into the history of science.

## 7 Allocations to Research Councils and Academies

The Society will also pursue an expansion of :

- public engagement
- innovation awards to help researchers take proven concept to the creation of a near-market product for commercial exploitation
- international collaboration and exchange

Some key deliverables (volumes) are:

<i>Activity</i>	<i>2005-06</i>	<i>2006-07</i>	<i>2007-08</i>
Research Appointments	420	420	420
Research Grants	160	160	160
International Collaboration	1500	1525	1550

The Royal Society also believes that UK science would benefit from a more diverse and inclusive culture.

Full details of the Society's grant schemes are available from <http://www.royalsoc.ac.uk>

## 7.11 The Royal Academy of Engineering

£ million, resource	2005/06	2006/07	2007/08
Total resource	5.850	7.885	9.752

### Strategic Direction

The Academy brings together the country's most eminent engineers from all disciplines to promote excellence in the science, art and practice of engineering. Our three key strategic priorities are: to enhance the UK's engineering capabilities; to celebrate excellence and inspire the next generation; and to lead debate by guiding informed thinking and influencing public policy.

### Priorities for investment over the next 3 years and key deliverables

The Academy's strategic priorities will guide the development of its programmes, as follows:

#### *Enhancing national capabilities:*

- Supporting industry/academia links:
  - Research Chairs and Senior Research Fellowships (33 to 46)
  - Visiting Professorships in key areas of engineering design (maintain at 155)
  - Industrial Secondments (increase from 24 to 25 a year)
- Promoting world class research:
  - Research Chairs in Emerging Technologies (first chair in 07/08)
  - Postdoctoral Research Fellowships (increase from 33 to 60)
- Promoting international contacts and exchanges:
  - Global Research Awards (increase from 15 to 16)
  - International Travel Awards (increase from 600 to 720)

## 7 Allocations to Research Councils and Academies

- Research exchanges with China/India (launch 15 in 2007/08)
- Distinguished Visiting Fellowships (launch 25 in 2007/08)
- Supporting small and medium sized enterprises:
  - Engineering Professional Development Awards (increase participants from 1,100 to 1,200)

### *Recognising excellence and inspiring the next generation:*

- Leading the Best Programme – a suite of Educational Enrichment Programmes for Science, Engineering and Technology – and developing it as a market leader
- Establishing an inspirational Programme for Science Teachers (launch in 2006/07 for 2,000 teachers)
- Recognising and celebrating excellence (Raise profile of medals and prizes)

### *Leading debate:*

- Enabling effective public engagement on engineering matters:
  - Public Engagement Fellowships for Researchers (launch in 2006/07 with 20 fellowships)
  - Develop and increase reach of *Ingenia*, the Academy's flagship magazine, other publications and web site
  - Conduct, with partners, an effective public engagement programme, including engaging with a wider audience at Academy events and raising the profile and reach of its activities
- Promoting policy formulation (at least four major studies a year)
- Providing an international voice for British engineering (including relationships with international Academies)

The Academy is also committed to the creation of an inclusive culture where diversity is fully valued.

Full details on the Academy's plans and schemes can be found on the web site at <http://www.raeng.org.uk/>

## 7.12 The British Academy

£ million, resource	2005/06	2006/07	2007/08
Total resource	14.050	18.085	21.385

### Strategic Direction

The Academy's key objectives across the humanities and social sciences are to:

- support research of the highest quality and develop research capacity in the UK
- give recognition to academic excellence and help outstanding researchers to reach their full potential
- communicate and disseminate new knowledge and ideas
- promote UK research overseas, including international links and collaborations, to broaden knowledge and understanding across cultures
- contribute a humanities and social science perspective to public debate on science and society, and enhance appreciation of the contributions of the humanities and social sciences to the nation's intellectual, cultural, social and economic health and prosperity.

### Priorities for investment over the next 3 years and key deliverables

The Academy will maintain, and where possible enhance, the range and volume of its activities within programmes for (a) research (posts, projects and grants), (b) institutional and international support, and (c) communications and public engagement. Key developments will include:

- encouraging new areas of research, particularly interdisciplinary collaboration, developing networks of scholars and promoting special project initiatives to attract the ablest researchers capable of taking forward their subjects along new lines;
- establishing Area Panels, initially for Africa and for Latin America and the Caribbean, to encourage the development of relations, and establish links,

## 7 Allocations to Research Councils and Academies

structures and programmes which will promote UK research in these areas, and foster collaborative research;

- developing the work and potential of grant-aided British Institutes and Societies overseas, to enable UK scholars to undertake original research and fieldwork in areas of major scholarly interest;
- expanding the programme of events, debates, lectures and publications, to communicate to a wide public the results of new research and address particular issues of topical concern;
- improving accessibility to research funding schemes by encouraging an inclusive culture and the widest possible diversity in applications.

Numbers will be maintained in the following areas:

- Research Grants                      1500
- Research Posts                         150
- International Awards                 200

Full details of the Academy's plans and grant schemes are available from <http://www.britac.ac.uk>.

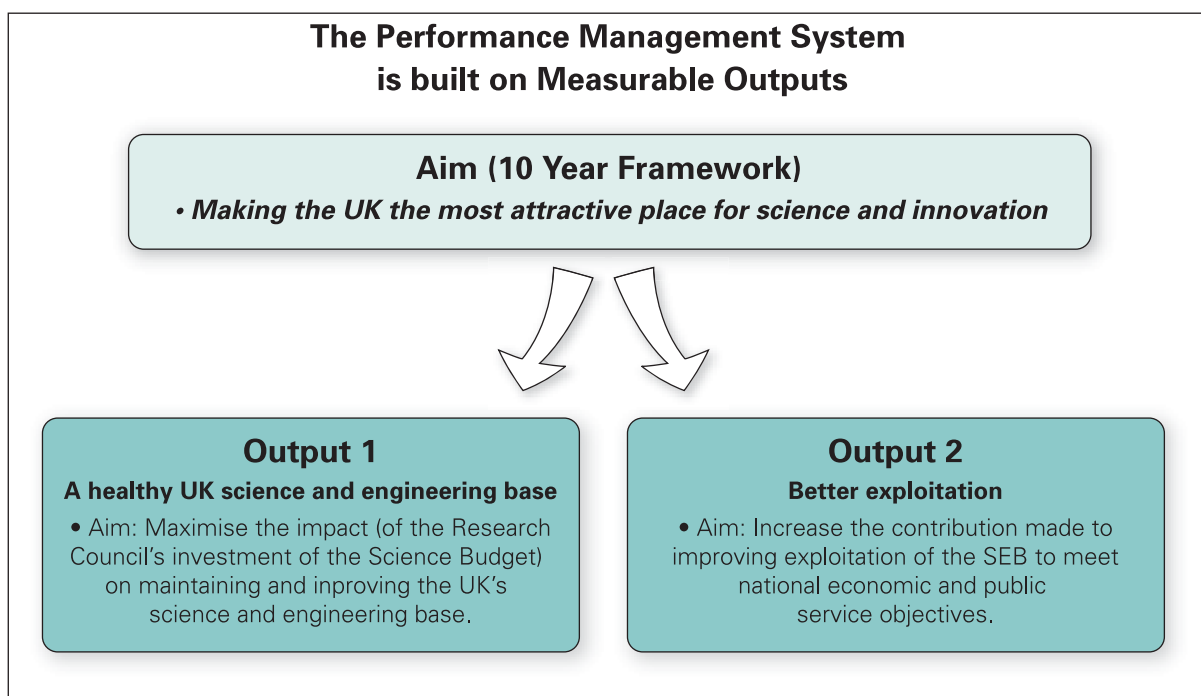
## 8. Managing By Performance – The Performance Management System

As outlined in previous sections this Allocations round has been conducted with a renewed focus on outputs. In order to measure the outputs from the Science Budget, OST has developed a new Performance Management System.

More effective performance management will enable us to measure better the contribution of the Science Budget to meeting the PSA target and to the UK Research Base as a whole.

The performance management system is built on measurable outputs derived from the 10-year framework.

**Diagram 2.**



### Output 1

A healthy Research Base should produce a number of principal outputs, as follows

- the UK contribution to the global knowledge pool, through the dissemination of research results and the generation of tacit knowledge;
- the UK supply of newly trained people each year, available for employment in the Research Base, the wider economy and society;
- the UK pool of trained people (largely, but not exclusively those with PhDs) including those whom the RCs themselves employ in their Institutes and laboratories;
- research facilities and infrastructure (including other collective assets such as databases and collections) in the UK and overseas available for collective use by UK researchers;
- healthy relationships amongst the various parties needed to make the Research Base efficient and effective;

For each of these a number of characteristics are of interest (though the balance between them will vary from case to case):

- scale
- quality
- agility – the ability to change quickly enough to respond to changing needs
- productivity – the ability to maximise output for each unit of input
- sustainability – the ability to maintain a flow of relevant outputs
- user focus – the ability to focus on the needs of key users as well as the interests of the scientific community in ensuring the relevance and availability of outputs.

These dimensions and their characteristics may be presented as a matrix, each cell of which may in principle be measured, for example UK share of world citations and citations/GDP, Publications/total revenue, Rate of PhD employment.

This is shown diagrammatically as follows:

OUTPUT 1					
Health of the Research Base	UK contribution to global knowledge pool	UK newly trained people	UK trained people pool	Facilities and infrastructure	Positioning and relationships
Scale			PhDs		
Quality		Citations			
Agility					
Productivity	Publications				
Sustainability					
User focus				Utilisation rate	

## Output 2

The components of output 2 are as follows

- interaction with business and public services
- collaborative research
- commercialisation of research
- co-operative training
- people exchanges between the Research Base and users.

For each of these, *scale* and *quality* essentially define performance.




The measurement framework for output 2 therefore appears thus:

OUTPUT 2					
Better exploitation	Interaction with business and public services	Collaborative research	Commercialisation of research	Cooperative training	People exchanges between Research Base and users
Scale			Patents	Studentships	
Quality			Licensing		

The indicators contained in the measurement framework are principally quantitative. They represent an addition to existing evidence supporting policy and management decisions, not a substitute for it. In many cases therefore qualitative information would supplement the quantitative data for monitoring purposes, particularly if significant decisions were in prospect.

In a few instances, certain measures do not reflect the particular behaviour of some scientific domains or disciplines. In these cases, alternative measures have been identified or are under development to be used as substitute or supplementary indicators. For example citation analysis works well for many areas of scientific research, but may not be the optimal approach for arts and humanities, some areas of social science, and engineering. A similar challenge applies in knowledge transfer and business interaction where metrics such as business earnings, patents or spin out companies each record valuable activity but do not combine easily to describe overall performance and omit equally valuable but less tangible activities.

There are three levels of outputs cascading from the PSA target, to the Science Budget and then to individual RCs and Academies as set out opposite.

Output 1 – A healthy UK Research Base		Output 2 – Better exploitation
<p><b>PSA level</b></p> <p>OST is responsible for ensuring the overall health of the Research Base</p>		<p>OST is responsible for the effective exploitation of the Research Base to meet UK national needs</p>
<p><b>Science budget level</b></p> <p>OST responsible for optimal investment. RCUK responsible for cross-Council coherence</p>		<p>OST responsible for maximising the effectiveness of the contribution of science budget. RCUK responsible for cross-Council coherence.</p>
<p><b>Research Council level</b></p> <p>RCs responsible for optimal investment of allocation and healthy UK Research Base in their disciplines.</p>		<p>RC's responsible for maximising contribution of allocation.</p>
<p><b>Council board level, HEI/Institute level, project level</b></p>		

The RCs may choose to cascade responsibilities further within their own organisations or amongst those they support.

Reporting and monitoring requirements for the Performance Management System vary for RCs and Academies.

All funded bodies are required to produce an annual Delivery Report that will cover the state of progress against all milestones and targets due for completion in the current financial year. The Annual Delivery Plans will include the latest set of data on the metrics in each RCs' or Academies' output framework.

## **8 Managing By Performance – The Performance Management System**

In addition to this Research Councils will be required to submit a report to OST every quarter outlining progress on any milestones and targets that fall within that quarter. Information will also be provided on any items in subsequent quarters where progress is believed to be such that there is a risk that future targets and milestones may not be met. Light touch monitoring discussions will take place at the end of quarters one and three with a more in depth discussion at the end of quarter two.

The Performance Management framework can, and will, now be used by OST and RCs, as well as the Academies, to measure the impact of the Government's investment in science and innovation.







