Department for Business Innovation & Skills

THE ALLOCATION OF SCIENCE AND RESEARCH FUNDING 2015/16

INVESTING IN WORLD-CLASS SCIENCE AND RESEARCH

MAY 2014

Contents

Foreword:

Our world-class science and research base is vital to the UK's success. UK research is pushing back the frontiers of human knowledge, contributing to our cultural richness, and supporting the welfare of the nation. And of course, excellent research is a key driver economic growth.

At a time of tight control over public spending, the Government remains committed to supporting our world-class science and research base. We continue to protect the science ring fence in cash terms for 2015/16, and in addition have announced investment in science infrastructure of £1.1bn a year protected in real terms to 2021, together with funding for new programmes such as Quantum Technologies, the Newton Fund, and further investment in high level skills.

This means that overall BIS investment in science and research will reach £5.8bn in cash terms for Financial Year 2015/16, an increase in the overall allocation compared to recent years.

This continuing investment in our world-class research base will help us achieve our ambition to make the UK the best place in the world to do science and research.

But with this continued Government commitment to our excellent UK research base, comes a challenge to ensure we gain maximum benefit from this investment. This means continuing to build on efficiencies, increasing collaboration to develop creative solutions to shared goals, and doing more to leverage business and charity funding. These are themes which run throughout these allocations.

We can be proud to have a broad range of world-class research in the UK, from natural sciences and engineering, to social sciences, arts and humanities. It is right that we continue to invest in research excellence of all kinds.

We are continuing to invest in strategic priority areas, including those which support the Industrial Strategy and 8 Great Technologies, in addition to new and emerging priorities.

We are also providing funding for our outstanding researchers to pursue curiosity driven research. We continue to fund the UK's National Academies for this purpose. In addition, for the first time in 2015/16 we will be providing a funding allocation to the Academy of Medical Science, alongside its sister Academies.

Part 1. Investing in World-Class Science & Research

Introduction

Research excellence is a critical asset for the UK, providing a competitive advantage in the global race for prosperity. The UK's strong research base is vital in pushing back the frontiers of human knowledge, supporting the wealth and welfare of the nation, tackling current and future challenges and contributing to the cultural richness of the UK. World class research plays a key role in economic growth through creating new businesses, improving the performance of existing businesses, delivering highly skilled people to the labour market, and attracting investment from global businesses. It is also vital to the implementation of the Government's Industrial Strategy. The 8 Great Technologies, launched by the Government in January 2013, illustrate how UK strengths in key areas of research have the potential to drive growth and societal benefits and where the UK has a competitive advantage.[1]

The quality of UK research is high, and rising. While the UK represents just 0.9% of the global population and 4.1% of researchers it accounts for 11.6% of citations and 15.9% of the world's most highly-cited articles.[2] Equally striking is the breadth of UK capability demonstrating excellence across a wide range of research disciplines. The UK is also a focal point for global research collaboration and researcher mobility: key factors underpinning the success of our research base.

The UK is already the most productive country for research in the G8 - both in terms of publications and citations per unit spend – but in times of fiscal constraint we need to continue to improve the efficiency of our research base. Ongoing implementation of the Wakeham Review of Financial Sustainability and Efficiency, together with a review of university efficiency by Professor Sir Ian Diamond, will ensure that we continue to set an ambitious efficiency agenda.

The World Economic Forum evaluation ranks the UK consistently in the top 5 countries for university-industry collaboration in research and development[3], a major competitive

[1] Industrial strategy: https://www.gov.uk/government/policies/using-industrial-strategy-to-help-the-uk-economy-and-business-compete-and-grow;

8 Great Technologies: https://www.gov.uk/government/publications/eight-great-technologies-infographics

[2] *International Comparative Performance of the UK Research Base*, October 2013: http://info.scival.com/UserFiles/Elsevier_BIS_2013_web_Dec2013%202.pdf

[3] WEF (2013) 12.04 University-industry collaboration in R&D

advantage for the UK. UK research excellence is also a key attractor of private and charitable co-investment both domestically and from overseas[4].

The high level skills developed through research careers are an essential underpinning of economic growth especially in new and innovative areas. They underpin the sustainability of the UK research base, can take these skills into the wider private and public sectors and form the core of the vast array of broader benefits research brings to society.

The Government continues to recognise the importance of science and research to the economy by maintaining the ring fenced science and research budget at flat cash for Financial Year 15/16. This means that the Government can continue to support research and related training through the Dual Support framework and the funding allocations made to HEFCE and the Research Councils.

In addition, Government has made a long term commitment to investment in science infrastructure of £1.1bn a year protected in real terms to 2021 and announced additional funding for specific programmes including Quantum Technologies and the Newton Fund as well as further support for high level skills.

This brings the overall BIS investment in science and research to around £5.8Bn in cash terms for Financial Year 15/16 – an increase in overall allocation compared to recent years (see annex A).

This booklet sets out the allocations for the ring fenced science and research resource budget for Financial Year 15/16. Where appropriate it incorporates recent additions of funding for science as a result of Government spending decisions. Although science and research capital is not included within the ring fence the capital allocation for major funders is also set out here alongside other major science capital projects funded from the £1.1bn capital settlement. In addition the Research Councils, HEFCE and UKSA will be allocated a separate budget to cover their administrative costs. Those administration budgets are not covered in this publication.

[4] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/277090/bis-14-544-insights-from-international-benchmarking-of-the-UK-science-and-innovation-system-bis-analysis-paper-03.pdf

How the budget was allocated

The Haldane Principle means that decisions on individual research proposals are best taken by researchers themselves through peer review (see annex B). The Coalition Government supports this principle as vital for the protection of academic independence and excellence. The decisions leading to the allocation of science and research funding, as set out in this document, have been made in accordance with the Haldane Principle and the Government statement. It is legitimate for Government to have goals and to take a strategic view on large capital investments. The Government is currently consulting on the strategic priorities for investment in science capital over the long term. The balance between different tiers of investment is a key question in the consultation[5] and a number of specific projects in 15/16 are also highlighted in this document.

Strategic priorities for science and research funding

In order to protect national capability and international competitiveness and to maximise the economic and social benefits of research, the criteria in Annex C were developed for the prioritisation of science and research funding for CSR10. The spending review in 2013 set budgets for Financial Year 15/16 only, therefore these criteria remain unchanged. However, advice was sought on whether additional weight should be given to a subset of these criteria.

Advice was sought from the following bodies, all of whom have high-level overviews of science and research:

- The Council for Science and Technology[6]
- The Royal Society
- The Royal Academy of Engineering
- The British Academy The Academy of Medical Sciences[7]
- The Chief Scientific Advisers Committee[8]
- The Confederation for British Industry[9]

Each of these organisations provided written advice which they published on their websites. The request for advice from the Director General for Knowledge and Innovation

[5] https://www.gov.uk/government/consultations/science-and-research-proposals-for-long-term-capital-investment

[6] CST response https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/245012/13-894-cst-letter-john-oreilly-priorities-science-funding.pdf

[7] The Royal Society, the Academy of Medical Sciences, the British Academy and the Royal Academy of Engineering published a joint response letter http://royalsociety.org/policy/publications/2013/scientific-research-funding

[8] CSAC response http://www.bis.gov.uk/assets/goscience/docs/s/13-897-strategic-priorities-for-science-and-research-funding-csac-response.pdf

[9] CBI response http://www.cbi.org.uk/media-centre/press-releases/2013/06/cbis-full-response-to-spending-round

was also published on the BIS website and other responses were welcomed.[10] BIS received around 80 written responses from the research community, businesses, charities, individual HEIs and learned societies.

Stakeholder responses emphasised the importance of stability for long term planning and maximising the return on research investment. In particular, given the proximity of the REF which is already driving change through the research system, the aim should be to minimise additional disruption. Stakeholders endorsed the suggested subset of criteria with many also recommending an additional emphasis on the importance of sustaining the flow of high level skills.

Partner organisations were therefore asked to take these criteria, set out below, into account when preparing their delivery plans:

- Ensuring excellence with impact, sustaining our national capability and international competitiveness
- Maximising the contribution to UK economic growth
- Continuing to improve the efficiency of the research base
- Maximising the leverage from private, charitable and international funders
- Maintaining a substantial flow of new researchers and high level skills.

Ministers' decisions on the final allocations of science and research funding sought to take stakeholder views into account. A careful judgment has been made over the funding available, taking account of existing commitments, seeking to maintain stability and the extent to which organisations delivery plans meet the priority criteria set out above. A number of additional adjustments have been made to reflect policy decisions and financial pressures:

- An allocation of funding to the Academy of Medical Sciences alongside its sister National Academies.
- Partition of the funding for Antarctic Logistics and Infrastructure from the NERC core budget reflecting Ministerial announcements in 2012[11].
- Additional funding to meet increased running costs of large scientific facilities and additional costs of international subscriptions owing to exchange rate movements and rising energy prices since the previous allocation in 2010.
- Provision of additional funding for the Medical Research Council to help manage a reduction in commercial income.

In addition the figures presented here incorporate additional funding for science announced by the Chancellor since the spending review in 2013.[12] [13]

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[10] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/190725/13-773-20130418_-_science_and_research_invitation_to_comment_1_.pdf

[11] Written ministerial statement 2 November 2012: http://www.publications.parliament.uk/pa/cm201213/cmhansrd/cm121102/wmstext/121102m0001.htm

[12] Autumn Statement 2013: http://www.official-documents.gov.uk/document/cm87/8747/8747.pdf

Capital funding for science and research is not included within the science and research ring fence but this booklet also sets out the capital allocation to ring fenced organisations for Financial Year 15/16.

Efficiency and Reform

The Wakeham Review of Financial Sustainability and Efficiency in Full Economic Costing of Research in UK Higher Education Institutions was commissioned by the Research Councils and Universities UK to make practical proposals on the implementation of efficiency drivers within a more robust regime for monitoring HEI sustainability.

The Review, published in June 2010 recommended that the best way to constrain the indirect costs within the Full Economic Costing regime for Research Council funding was to place efficiency targets on HEIs, applying tighter constraints to those institutions with relatively high overhead rates. The principles of the Wakeham recommendations were applied across the spectrum of research funding to drive efficiency savings in SR10. This - together with pay restraint - is projected to deliver £324m of efficiency savings in 2014/15 (7% of the £4.6 billion resource funding).These savings are being reinvested in science and research within the ring-fence and are already driving greater asset and equipment sharing between universities. Extending this approach for one final year is projected to deliver a further £100m of efficiency savings in Financial Year 2015/16.

Efficiencies in universities are also being realised as a result of progress on implementation of the Diamond review into back office functions, and HEFCE research efficiency reforms made in SR10 are focusing funding on incentivising higher quality research.

We know that these measures are promoting UK research base productivity which is already the best in the G8, but we want to do more to ensure that our investment creates maximum return for the economy and wider society. This is why Professor Sir Ian Diamond, Vice-Chancellor of the University of Aberdeen, has been asked to lead a second phase of his work on efficiency and effectiveness in higher education, which is expected to report in February 2015.

Research Excellence Framework

The Research Excellence Framework (REF2014), undertaken by HEFCE and HE funding bodies in partnership with many academics from across the spectrum of disciplines, is now in the assessment phase. It combines assessment of the highest levels of research excellence with recognition for the impact that it has on the economy and society. UK universities submitted the work of over 52,000 researchers (including some 191,232 research outputs and over 7000 case studies of impact from excellent research). The REF2014 will conclude at the end of 2014 with the publication of the assessment outcomes. These will be used to inform the allocation of Quality Related research funding from 2015 onwards.

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[13] Budget 2014 : https://www.gov.uk/government/publications/budget-2014-documents

Part 2. The Allocations

Resource[14]

	2015-16 £M
Research Councils	2665.5
AHRC	98.3
BBSRC	351.2
EPSRC	793.5
ESRC	153.2
MRC	580.3
NERC (core programme)	260.0
NERC (Antarctic logistics and infrastructure)[15]	29.0
STFC (core programme)	165.1
STFC (international subscriptions)[16]	127.5
STFC (cross- council facilities)[17]	107.4
HEFCE	1686.3
QR	1573.3
Research contribution to KE formula funding for HEIF[18]	113.0
UK Space Agency	170.2
National Academies	87.0
Royal Society	47.1
British Academy	27.0
Royal Academy of Engineering	12.4
Academy of Medical Sciences	0.47
Other Programmes	101.1
Science & Society	13.0
International	4.2
Newton Fund	75.0
Government Office for Science	2.8
Evidence & evaluation	2.1
Alan Turing Institute	4.0

[14] Figures are rounded to nearest £100,000

[15] Funding for Antarctic logistics and infrastructure has been partitioned from NERC core budget

[16] Managed by STFC on behalf of UK Researchers.

[17] Operated by STFC on behalf of all Research Councils

[18] HEIF may also include additional funding from HEFCE.

Total science and research resource	4710.1

Depreciation and impairment

	2015-16 £M
Research Councils	
AHRC	0
BBSRC	10.1
EPSRC	9.6
ESRC	0.2
MRC	43.7
NERC	41.0
STFC	83.2
Total	187.8

Capital[19]

	2015-16 £M
Research Councils	391.1
AHRC	0
BBSRC	71.0
EPSRC	95.0
ESRC	25.0
MRC	36.0
NERC (core programme)	27.4
NERC (Antarctic logistics and infrastructure)[20]	7.6
STFC (core programme)	53.3
STFC (international subscriptions)[21]	27.3
STFC (cross- council facilities)[22]	48.5
Research Capital England	117.3
HEI Research Capital (England)	86.2
HEI Research Capital (Scotland)[23]	16.1

[19] Figures are rounded to nearest £100,000

[20] Funding for Antarctic logistics and infrastructure has been partitioned from NERC core budget

[21] Managed by STFC on behalf of all Research Councils.

[22] Operated by STFC on behalf of all Research Councils

HEI Research Capital (Wales)	3.7
HEI Research Capital (N. Ireland)	1.7
RPIF (UK)	100.0
UK Space Agency	166.1
Total capital for ring fenced bodies	882.2
Science capital spending through bodies outside the resource ringfence	267.0
Investment in medical research facilities by Dept of Health and managed by MRC (MRC Clinical Research Infrastructure Initiative)[24]	150.0
MET Office High Performance Computer programme	50.0
MET Office EUMETSAT satellite programmes	20.0
NMO: maintenance capital, Advanced Metrology Laboratory, Quantum technologies[25]	18.5
Atomic Energy Authority	1.0
Support for commercialisation of research and technology at key institutions	12.5
Alan Turing Institute	15.0
Total science and research capital	1,149.2

[23] These funds are allocated on the basis that they will be supplemented by further funding from each of the devolved HE funding bodies.

[24] This investment was announced by the Chancellor in the 2013 spending review: https://www.gov.uk/government/publications/spending-round-2013-documents

[25] The investment in the Advanced Metrology Laboratory was announced by the Chancellor in the Autumn Statement 2012 and confirmed in 2013 spending review [Autumn Statement 2012: https://www.gov.uk/government/publications/autumn-statement-2012-documents ; https://www.gov.uk/government/publications/spending-round-2013-documents] and the funding for Quantum Technologies in the Autumn Statement 2013 https://www.gov.uk/government/publications/autumn-statement-2013-documents

Research Councils

The Research Councils support our world-class science and research base, thereby making major contributions to growth, prosperity, and the wellbeing of the UK. Collectively, the seven Research Councils provide public investment in science and research across the full spectrum of academic disciplines from the medical and biological sciences to astronomy, physics, chemistry and engineering, social sciences, economics, environmental sciences and the arts and humanities.

The Research Councils are non-departmental public bodies. They are independent legal bodies outside of government, accountable to Parliament and established by Royal Charter under the 1965 Science and Technology Act (or in the case of AHRC, the Higher Education Act, 2004).

Research Councils UK:

Research Councils UK (RCUK) is the strategic partnership of the UK's seven Research Councils. The RCUK mission is to optimise the ways in which the Research Councils work together to deliver their goals, and to enhance the overall performance and impact of UK research, training, public engagement, knowledge transfer and innovation activities. Leadership of RCUK is provided by the Research Councils' chief executives, working together through the forum of the RCUK Executive Group. In addition, the Chairs of Council collectively meet on a yearly basis to discuss cross cutting issues.

Excellent Research with Impact:

The Research Councils seek to provide a world-class science and research base. The investment that they provide supports excellent research; provides cutting edge research facilities and infrastructure; fosters international collaborations; supports postgraduate training; and enables public engagement with research. They support the research community in pursuing curiosity driven work, allowing them to define their own priorities as well as research which seeks a more direct application or to address key global challenges. Around two thirds of research funding is invested through responsive modes. This is an investment in the future.

Addressing societal challenges collectively:

The societal challenges facing us increasingly require research and innovation which integrates different approaches from across research disciplines. These often increase the impact and utility of the research for businesses and other users. The six grand challenge research themes are examples of the many areas in which the Research Councils will continue to work collectively[26]. Beyond these challenges Research Councils work closely together on areas of cross-cutting activity (e.g. in medicine or design), the industry sectors, TSB programmes and priority areas of government policy. For example, the Global Food Security programme, led by BBSRC, is helping to coordinate food-related research and associated activities across the UK's main public sector funders. In addition, supporting the government's Industrial Strategy, STFC is working with the University of Aberdeen to develop gravity sensors adapted from satellites to identify new oil and gas fields; the

[26] The cross council grand challenges are: Global Uncertainties; Digital Economy; Aging; Living with Environmental Change; Energy; Global Food Security.

sensors measure variations in gravity and density on the sea bed which can indicate the presence of natural gas or oil. This capability could identify untapped North Sea reserves (estimated to be worth a further £120 Billion to the UK economy) and increase the quantity of oil that could be extracted world-wide.

Efficiency:

RCUK have worked hard to identify and implement efficiency savings through the RCUK Efficiency Programme 2011-15.[27] Recognising the continued need for efficiencies, this programme is being extended into the 15/16 SR period, building on projected savings of over £400M. Based on draft projections, extending Wakeham savings into 2015/16 will generate additional efficiencies of over £100M over the subsequent years.

As RCUK, the Councils will work together to implement the recommendations of the Triennial Review and will continue to engage closely with BIS to harmonise processes, encourage efficiencies in their funded resources, and identify synergies for closer working and greater efficiency. One example of this is the RCUK "Gateway to Research" which makes information about grants across all seven Research Councils available for the first time in the same place.[28] In addition, particular progress has been made with respect to grant application, peer review and feedback to applicants. Work is also underway to bring together the Councils' two research outcomes systems, ROS and ResearchFish, into one harmonised system.

Further examples of the ways Research Councils are seeking further efficiencies, both within their own operations and more broadly within the sector, include:

- EPSRC has been facilitating equipment sharing by universities, including by providing recurrent resources to some universities with the explicit requirement that it be used to promote increased sharing and usage of the research equipment base. BBSRC has also supported its strategically-funded institutes in the development of equipment registers, to enable their participation in national equipment sharing initiatives.
- STFC is now seeing the benefits of a restructured senior management team that provides a more coherent, cost effective and accountable structure. This has resulted in reduced staffing and greater operational efficiency. STFC is currently conducting a fundamental review of the way in which it operates its support services such as Estate and Facility Management, Corporate ICT, HR and support services related to health and safety and environmental performance. This is a transformational exercise and implementation will take place over the course of the next two years.
- NERC plans to reduce the long-term running costs of large facilities – such as research ships, planes and monitoring networks – by investing in new sensors and robotic technology, and by sharing facilities with UK and international partners. It

[27] http://www.rcuk.ac.uk/Publications/policy/Pages/Efficiency2011.aspx

[28] Gateway to Research: http://gtr.rcuk.ac.uk/

will also streamline its' funding processes to improve agility, turn-around time, and quality of decision-making to promote leverage and cost-efficiency.

- Research Councils without the complexities of institutes (AHRC, EPSRC and ESRC), have created a joint Professional Support Unit for their retained functions for HR, Finance, IT, Reprographics and Office Facilities.
- BBSRC is building a centre of excellence in estate management and has taken on NERC's specialist estate team. In the realm of IT BBSRC is providing a range of services e.g. Share Point, peer review extranets for a number of Councils.
- MRC has sought substantial added value for the benefit of front-line science by striking stronger partnerships with Universities. The MRC's University Unit programme has transferred 14 MRC Units to University ownership with a total annual research expenditure of £65m. 970 high quality research staff have transferred to University employment.

Partnerships across the innovation ecosystem:

RCUK and individual Research Councils collaborate extensively with a range of partners such as HEFCE, TSB, business, charities and international partners to support all stages of research and innovation from discovery to business innovation. By working closely with other government departments, RCUK also delivers key evidence to support policy priorities, often with greater efficiency and lower administrative costs than government departments can achieve alone. This leverages additional support for the research base and helps maximise the impact of public investment.

This approach will continue and strengthen in 2015/16:

Research Councils are working closely with TSB to deliver new funding streams aimed at supporting the translation of research into application, for example, Industrial Biotechnology Catalyst, Agri-tech catalyst and Biomedical catalyst. MRC has worked closely with TSB to deliver the Biomedical Catalyst programme, an integrated scheme providing grant support to UK academics and SMEs developing innovative solutions to healthcare challenges both individually and in collaboration. As of January 2014, 186 projects, over 60% led by SMEs, have received grant funding totalling nearly £150m. This funding has been matched by nearly £80m of private finance and enabled companies to raise over £50m of further private investment.

Similarly, Research Councils (BBSRC, EPSRC, ESRC and MRC) and TSB are working together to deliver an integrated programme of investments in 'Synthetic Biology for Growth' which aims to boost the UK's synthetic biology research capacity and stimulate innovation in this area.

BBSRC, MRC, and NERC are partners in the European life science infrastructure for biological information (ELIXIR). ELIXIR was launched with £75m of UK Government funding in 2011, building on preparatory work funded by the European Commission. The initiative now has 17 European countries as partners.

In 2013 the Farr Institute was launched, this UK-wide institute has major research centres in London, Dundee, Manchester and Swansea, but also links research programmes underway across 19 UK universities. The Farr is supported by £17.5m raised by a 10-funder consortium (including the MRC EPSRC, and ESRC) plus an additional £20m capital

award from the MRC, and aims to deliver high-quality, cutting-edge research linking electronic health data with other forms of research and routinely collected data, as well as build capacity in health informatics research. In addition to health benefits for patients and UK citizens, the Institute will help to cement the UK's reputation as a world leader in research using large electronic health datasets.

The research, people and infrastructure funded through the Research Councils underpins policy across Government policy and Councils will continue to foster productive relationships with all Government Departments. Research Councils have strategic relationships with all central Government Departments and the Devolved Administrations. Research Council co-funding with Government Departments is around £500M annually, which is combined with contributions of a similar scale from Government Departments.

The Research Councils will continue to participate in a growing range of co-funded international research initiatives both in Europe and globally. Involvement in the European Joint Programming Initiatives, which are designed to tackle major societal challenges, will support alignment of national research strategies.

Arts and Humanities Research Council (AHRC)

£M	2015/16
Resource	98.3
Depreciation and impairments	0
Capital	0

Strategic Direction:

The AHRC funds research, training, and knowledge exchange in the Arts and Humanities. In addition to supporting excellent primary research, the AHRC priorities are to ensure:

- national capability is maintained in key areas;
- new generations of postgraduate (PG) and early-career researchers (ECR) are established;
- the UK's considerable international presence in A&H research is enhanced;
- path-breaking initiatives are supported (including cross-disciplinary);
- knowledge exchange and public engagement with arts and humanities research promotes economic growth and social well-being.

AHRC's key objectives for 2015-16 are set out in its strategy: *The Human World: AHRC Strategy 2013-18*.[29]

Impact:

During 2015-16, AHRC will support researcher-initiated work across 50 disciplines and through existing thematic programmes which focus on priority areas such as cultural and linguistic translation, heritage policy and practice, interdisciplinary engagements between science and culture, and the far-reaching impact of digital technologies.

Modern research is global and AHRC's international reputation is high. AHRC will continue to lead HERA (Humanities in the European Research Area), and in EU priority areas such as heritage. It will continue to develop relationships with the US, and significantly develop work in China in the creative economy, heritage, design and researcher exchange in partnership with Chinese and UK HEIs and cultural organisations.

[29] AHRC Strategy 2013-18 is available online at http://www.ahrc.ac.uk/News-and-Events/News/Documents/AHRC-Strategy-2013-18.pdf

AHRC supports economic growth in a number of ways, including training successful people who work across all parts of the economy, and the creative economy in particular. This is either directly, by supplying 'content' in the form of research-led books, broadcasting, films, games, music and the underpinning of exhibitions, or indirectly through brokerage, co-ordination, policy development and advancing knowledge of, for example, creative clusters and the relationship between digital technology and creativity.[30]The cultural sector contributes to UK exports ($2bn in music alone according to UKTI), and the attractiveness of the UK as a destination for tourism and inward investment. It is also a key element in facilitating international relations and enabling trade, including in Higher Education.

AHRC will continue to seek partner funding as a priority in developing the next generation of projects. They will establish a target of 5% co-funding on projects relating to knowledge exchange.

AHRC spends over a third of its budget on postgraduate support. In 2015-16, this will include new mainly consortia-based Doctoral Training Partnerships which, pooling expertise, enable shared training, economies of scale and extended networking for junior researchers. Other schemes, such as the Collaborative Doctoral Awards and the Knowledge Exchange Hubs for the Creative Economy open-up new approaches and establish links between HEIs and creative and cultural organisations.

[30]Recent examples include the BBCTV award-winning series *Garrow's Law*, based on a AHRC-funded Old Bailey archive; the commercially successful and widely-praised video game *Dear Esther* and the award-winning film *The Act of Killing* (developed with AHRC grants); as well as exhibitions at the British Library, British Museum and elsewhere. The 'Brighton Fuse' and 'Cultural Value' projects have increased understanding of the generation of value and growth in creative activity. http://www.ahrc.ac.uk/News-and-Events/News/pages/AHRC-Impact-Report-Published.aspx

Biotechnology and Biological Sciences Research Council (BBSRC)

£M	2015/16
Resource	351.2
Depreciation and impairments	10.1
Capital	71.0

Strategic Direction:

The BBSRC invests in research, skills and innovation across the life sciences to address some of the most significant issues facing society such as food security, infectious disease, sustainable energy and chemicals, and enabling longer, healthier lives. BBSRC's research spans the microbial, plant and animal kingdoms (including humans) from molecules to cells to whole organisms and populations.

BBSRC's priorities for 2105/16 are to:

- Maintain the excellence of the UK bioscience and technology research base to drive innovation for the widest possible economic and social benefit;
- Ensure the supply of talented people into the economy and public sector, meeting user needs;
- Support growth in key industrial sectors by funding research, skills and infrastructure supporting bio-industries;
- Further develop Research and Innovation Campuses to accelerate translation of excellent bioscience and help grow new and existing companies;
- Work in partnership and seek leverage to deliver BBSRC's strategy with greater impact, effectiveness and efficiency.

These priorities are set out in more detail in the BBSRC Strategic Plan refreshed in 2014.[31]

Impact:

[31] www.bbsrc.ac.uk/strategy

BBSRC will provide sustained support for world-class research and training. It will protect levels of funding for 'excellence' across a broad range of bioscience, and balance this with an appropriate degree of focus on priorities where research will have the most impact on major economic and societal challenges.

Excellent bioscience underpins key industrial sectors in the bioeconomy including agriculture, renewable energy, chemicals, food and drink, pharmaceuticals, healthcare and biotechnology. Together these contribute more than £75 billion (GVA) to the economy and employ directly 1.5 million people[32]. Industrial Biotechnology and Bioenergy (IBBE), for example, offers enormous potential for growth as well as helping the Government meet emissions and renewables targets. IBBE is forecast to add between £4bn and £12bn to the UK economy by 2025[33]. To support growth in major areas, BBSRC will continue to focus on global grand challenges such as food security, replacing fossil fuels and healthy ageing where the societal and economic impact is greatest. Recognising the importance of technologies to generate new knowledge, markets and revenue streams, BBSRC will also strengthen investment in emerging technologies including agri-tech, synthetic biology and data-rich bioscience (e-science).

BBSRC has a strong track record in leveraging funds, particularly through international partnerships and research with the private and the third sectors. Recent examples included £3m from BBSRC to a £16m research programme with India, Gates Foundation and Department for International Development on sustainable agriculture[34] and two BBSRC - National Science Foundation (NSF) collaborations on enhancing photosynthetic efficiency and reducing the use of nitrogen fertilisers in agriculture where over £5m from BBSRC was matched by US funds.[35]

BBSRC will continue to prioritise high-quality PhD training to ensure new researchers have a breadth of skills, including leadership and management, the ability to communicate results and ethical awareness. It will promote understanding of knowledge exchange through placements in industry or with other research users. In addition, BBSRC's industrial training strategy will, in partnership with the private sector, supply the skilled people industry needs and address key skills shortages.

The UK Research and Innovation campuses associated with BBSRC strategically-funded institutes support interaction between academia and business, driving innovation and impact from UK bioscience. BBSRC's ongoing programme of investments in campus infrastructure will bring researchers and business together, enable access for business to key research-led facilitates and provide low-risk environments to nurture new and existing businesses.

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[32] BIS, Industrial Strategy: UK Sector Analysis Economics Paper No. 18 (2012), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/34607/12-1140-industrial-strategy-uk-sector-analysis.pdf

[33] IB 2025: Maximising UK opportunities from Industrial Biotechnology in a Low Carbon Economy; a report to government by the Industrial Biotechnology Innovation and Growth Team, May 2009

[34] Sustainable Crop Production for International Development http://www.bbsrc.ac.uk/SCPRID

[35] Nitrogen: improving on nature www.bbsrc.ac.uk/funding/opportunities/2012/ideaslab-nitrogen-improving-on-nature.aspx and Achieving a step change in the efficiency of photosynthesis www.bbsrc.ac.uk/funding/opportunities/2010/photosynthesis-ideas-lab-of-2010.aspx

Engineering and Physical Science Research Council (EPSRC)

£M	2015/16
Resource	793.5
Depreciation and impairments	9.6
Capital	95.0

Strategic Direction:

The EPSRC's objectives are, within the engineering and physical sciences (EPS), to support excellent research, provide high quality post-graduate training to and ensure that this research and training has maximum economic and social benefit for the UK.[36]

In 2015/16 EPSRC will continue to shape capability, develop leaders, and deliver impact by:

- investing in research excellence, taking a comprehensive view of its portfolio and beyond to co-define with its community the landscape of research to support;
- investing in and developing current and future research leaders, supporting and promoting leadership role models who can inspire others;
- ensuring that the essential pipeline of ideas, and the highly skilled people who create them flow through to business, translating research into innovative products and services.

EPSRC will continue building and deepening strategic partnerships, in particular with the Technology Strategy Board (TSB) and the Catapult Centres, which cannot succeed without the pipeline of research and skills EPSRC delivers. EPSRC will work with the TSB and Catapults in strategic planning, co-funding, and detailed portfolio development. Of TSB's £200m anticipated 2014/15 expenditure on its fourteen priority areas, £180m is linked directly to EPS. Six of the seven Catapult Centres[37] will build directly on and continue to benefit from engagement with EPS research.

[36] http://www.epsrc.ac.uk/about/plans/strategicplan/Pages/ourstrategy.aspx

[37] High value manufacturing, cell therapy, offshore renewable energy, connected digital economy, future cities, and transport systems.

Impact:

EPSRC-funded research and training is key to the success of many UK business sectors including aerospace, automotive, construction, nuclear energy, offshore wind energy, information economy, and life sciences. Over £1.5bn of EPSRC's current portfolio being of direct relevance to these sectors.

EPSRC research is also well aligned to support emerging technologies such as Big Data, robotics, advanced materials and energy storage. The Autumn Statement 2013 announced £270m (over 5 years) for EPSRC to develop a network of Quantum Technology Centres which will support translation of the UK's world leading quantum research into application and new industries – from quantum computation to secure communication.

EPSRC will continue to invest in its challenge-led programmes of manufacturing the future, digital economy, healthcare technologies and energy. It will also look to identify and invest in areas of emerging capability where the UK is well placed to deliver economic and social benefit from an excellent research base. As an example EPSRC will specifically invest in Big Data, an area of strategic importance to the UK: the ability to derive information and value from data, through its collection, processing, transmission, analysis and understanding is transforming all significant sectors of the economy

EPSRC will protect the levels of funding it invests in training to ensure that those who have the most potential as researchers have access to the best training experience and can therefore develop in a way that meets the UK's demand for highly-skilled individuals. Skilled, numerate people, trained in the engineering and physical sciences, are essential to business growth. EPSRC is contributing to a workforce appropriate for the UK's needs: researchers who can transcend subject boundaries, who know how industry works, and who have the necessary leadership skills. EPSRC's investment in 113 Centres for Doctoral Training will build critical mass and provide a national strategic focus on skills in the vital sectors of the UK economy[38].

EPSRC will take a leadership role in helping universities work together and to leverage additional funding sources. Through its funding relationships and programme of capital investments EPSRC will further encourage equipment-sharing between universities. It will look to link leading investments and capabilities in universities more effectively with those in industry e.g. by promoting the flow of people between universities and the Catapult Centres.

EPSRC recognises that significant benefits could be achieved by leveraging funding from Europe both through Horizon 2020 and through EU Structural and Investment funding. By so doing it will be able to align sources of funding in a way that will deliver even greater research quality and help deliver innovation.

[38] This includes the additional funding for 22 CDTs most recently announced in the 2014 Budget.

Economic and Social Research Council (ESRC)

£M	2015/16
Resource	153.2
Depreciation and impairments	0.2
Capital	25.0

Strategic Direction:

The ESRC is the primary UK funder of long-term, strategic social science research, identifying key societal challenges. ESRC co-ordinates the national social science research capacity and capability to address these challenges and delivers a continuous supply of skilled people and appropriate research infrastructure to address them in the future.

In 2015/16, ESRC will deliver more 'transformative' research, which pioneers theoretical or methodological innovation; revolutionise the UK's data infrastructure through greater use of transactional and administrative data; identify and support 'frontier science'; embed an international perspective in all activities; extend the use of evidence to inform policy-making and professional practice through our support for the 'what works' network; and promote bold new approaches to knowledge exchange and engagement with business. To achieve this, ESRC will:

- Invest in selected priority areas;
- Increase engagement with business and implement a new, more effective approach to knowledge exchange as part of our evolving strategy for partnership and co-investment ;
- Strengthen the contribution of social science within the Technology Strategy Board's (TSB) activities;
- Extend partnerships to a wider range of UK and international partners in priority areas;
- Work closely with other Research Councils across a wide range of areas of mutual interest, and to develop joined up provision for greater efficiency;

- Build capacity and capability to ensure widespread use of our growing UK data infrastructure.

Impact:

The UK has an outstanding social science research base, with almost all areas at the global leading edge. For example, an independent panel of experts recently concluded that the UK's Human Geography research ranks first in the world, based on a range of quantitative and qualitative indicators.[39]The research funded by ESRC has an impact across all sectors of the economy and all areas of public policy.

Delivering research to support growth is a thread running throughout ESRC's priorities. For example, investment in the Institute for Fiscal Studies (IFS), and two new centres funded in partnership with BIS will strengthen the evidence base to inform policies for growth – particularly in relation to SMEs in the Enterprise Research Centre and the 'What Works' Centre on Local Economic Growth (also partnered with the Department for Communities and Local Government). In 2015/16 ESRC will increase access to research and data resources for business, ensuring social science is contributing to economic growth in the UK. This will include use of its longitudinal studies, Big Data investments and research in innovation and behaviour. It will increase collaboration with the business sector, in particular across our current priority areas for private sector engagement - Retail, Financial Services and the Green Economy. It will focus on engagement in areas such as Big Data, Future Cities and Innovation.

ESRC has a proven track record of leveraging resources from partners in government, business and charities, both within the UK and internationally, to deliver mutual priorities. ESRC will raise the annual value of its private sector research partnerships by 50 per cent by the end of 2015/16.

The national network of 21 institutional and consortia level Doctoral Training Centres (DTCs), created in 2010 to support doctoral research in the full range of the social sciences as well as areas of interdisciplinary research, is currently being reviewed to ensure that it continues to support the UK's future social science research capability. In particular, there will be a strong focus on developing further capacity to make best use of investments funded under the Big Data Network and to ensure that social scientists have the skills to work with new forms of data and increasingly to work across disciplinary boundaries.

[39] *International Benchmarking Review of UK Human Geography*, February 2013, p.15, http://www.esrc.ac.uk/_images/Human-Geography-Benchmarking-Review-Report_tcm8-25257.pdf

Medical Research Council (MRC)

£M	2015/16
Resource	580.3
Depreciation and impairments	43.7
Capital	36.0
DH capital contribution to Clinical Infrastructure Initiative	150.0

Strategic Direction:

In 2015/16, the MRC will continue to support excellent discovery science and strengthen partnerships where there is the greatest potential to deliver improved health and economic impact. This vision is set out in the MRC's strategic plan for 2014-19.[40]

Key research priorities for 2015/16 are:

- Big data/Medical Bioinformatics; by 2015 MRC will be consolidating links between molecular and clinical and population level data; links with industry; and strengthening training and research programme opportunities built on medical bioinformatics infrastructure.
- Capacity, infrastructure and skills; MRC recently announced the *Clinical Research Infrastructure Initiative,* following a £150M provided by the Department of Health[41]. The initiative will enhance translational capability, partnerships with industry and existing strategic clinical research infrastructures. At least £50m of additional funding is sought from potential partners in the public, charity and private sectors to add value to all aspects of this work
- Dementia; MRC will maintain a portfolio of high quality research to deliver greater understanding of neurodegenerative diseases and design new interventions that may prevent the later devastating impact of dementia.
- Antimicrobial resistance; MRC will lead a cross-funder initiative to support new research in this important area. The work will involve the integration of novel chemistry with biology and extensive collaboration across research councils,

[40] http://www.mrc.ac.uk/About/Strategy/MRCStrategicPlan2014-2019/index.htm

[41] http://www.mrc.ac.uk/Newspublications/News/MRC009654

industry and other UK and international funders to address this important interdisciplinary research challenge.

- Experimental Medicine; MRC has built up experimental medicine research in the UK, to foster more ambitious human studies in academia, and to increase academic-industry partnerships, closely co-ordinated with other medical research funders.

- Stratified medicine; MRC will continue to encourage consortia bids from industry and academia to promote discovery and development of new molecular and cellular pathology approaches. In 2015 MRC will also begin close working with the new TSB funded Diagnostics for Precision Medicine Catapult.

- Regenerative medicine; MRC will continue to support UK stem cell research centres of excellence, an area where the UK currently has a competitive lead, despite other countries investing heavily[42].

Impact:

The publication output from MRC research is exceptional, achieving more than twice the world average citation impact overall.[43]

MRC research outputs are immediately relevant to several key emerging technologies. MRC strategic initiatives have helped build research capacity, drive excellence and cluster expertise and activity, specifically for big data, synthetic biology and regenerative medicine. These developments help underpin the overarching life sciences strategy.

Collaboration with the private sector is an important aspect of MRC's work. Almost a third of MRC funded groups establish productive interactions with private sector organisations which involve co-publication, co-funding, training, access to facilities, or exchange of materials and expertise. These productive collaborations have involved 530 separate companies worldwide, and contributed at least £700m of direct financial commitments (in the form of co-funding, royalties, free reagents, facilities and equipment etc.) to the UK science base since 2006.

MRC research provides a steady stream of innovative research assets with high health impact. Knowledge transfer from MRC funded research since 2006 has resulted in the establishment or growth of more than 100 companies. Of these 100 companies, 40 are actively developing new products having obtained finance to do so, and a further 30 are successfully selling products and growing. These companies represent at least 535 new skilled jobs in the UK[44].

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[42] Taking Stock of Regenerative Medicine (BIS, 2011) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32459/11-1056-taking-stock-of-regenerative-medicine.pdf

[43] http://www.mrc.ac.uk/Achievementsimpact/Researchfish2012/Publications/index.htm

[44] http://www.mrc.ac.uk/Achievementsimpact/Researchfish2012/Spinouts/index.htm

MRC provides support for both research scientists and clinically trained researchers necessary for the highest quality multidisciplinary research programmes. The MRC is the leading UK funder for clinician scientists at the intermediate and training fellowship level and works closely with the National Institute for Health Research (NIHR) and other health research funders. The aim of this co-ordination is to ensure that the UK has appropriate skills to underpin relevant emerging technologies, the life sciences strategy and to promote interdisciplinary research and training.

MRC is committed to the reduction, refinement and replacement of animal use in scientific research. To help deliver this commitment, the MRC will work with the BBSRC to continue support for the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs) at the current level.

Natural Environment Research Council (NERC)

£M	2015/16
Core Programme Resource	260.0
Antarctic Logistics and Infrastructure Resource	29.0
Depreciation and impairments	41.0
Core Programme Capital	27.4
Antarctic Logistics and Infrastructure Capital	7.6

Strategic Direction:

The NERC's strategic goal during 2015/16 is to fund excellent, peer-reviewed environmental science that helps to:

- Understand and predict how our planet works;
- Manage our environment responsibly as we pursue new ways of living, doing business, escaping poverty and growing economies.

To achieve these goals, NERC will focus more on industrial relevance and UK and international partnerships so that business, government, civil society and scientists can work together to co-design and co-deliver new environmental science; to find and apply existing knowledge. NERC's strategic priorities are set out in more detail in the Strategic Plan.[45]

During 2015/16 NERC will:

- Continue to invest in a rolling portfolio of priority programmes, namely the cross-council 'grand challenge' themes and new partnership research programmes. The latter will be co-designed and co-funded with partners to address critical societal and economic challenges (including valuing nature; food security; soil quality; tree health; air pollution in developing mega-cities);
- Invest in excellent discovery science (responsive mode) projects across the breadth of NERC science disciplines;

[45] http://www.nerc.ac.uk/latest/publications/strategycorporate/strategy/the-business-of-the-environment.pdf

- Sustain the flow of top talent and skills for the UK by delivering new doctoral training partnerships (DTPs) offering excellent, multidisciplinary training environments with HEIs and employers for at least 240 new students every year; and establishing new centres for doctoral training (CDTs) that deliver strategically important skills identified in collaboration with business and Government;

- Invest with partners to maintain a critical mass of UK national capability to address longer term strategic priorities in the form of large-scale, long-term infrastructure, community facilities, skills and environmental data located in research centres and universities;

- Work with research providers, translators and users to support knowledge exchange and speed up innovation across the whole UK economy;

- Reform NERC's organisational structure, skills and funding mechanisms to deliver the strategic goals of excellence, impact and efficiency.

Impact:

UK environmental science leads the world on excellence producing more top-ranked publications than most comparable nations.[46] Recent case studies demonstrate how NERC research and innovation have contributed to economic growth[47]:

- New technology for more accurate drilling worth £500m to the oil and gas industry over the past 15 years;

- Assessing the potential and safety of UK shale gas;

- Mapping the sea-bed and monitoring the environment for regulatory compliance.

In addition to the RCUK Global Food Security Programme, NERC supports the food and drink industry through research and innovation in water, soils, ecosystem services, insect pollinators and pollution. In 2015/16 NERC will partner with BBSRC through industry clubs to launch new programmes in sustainable agriculture and aquaculture – to address the challenges of maintaining or intensifying food production whilst reducing supply chain costs.

In 2015/16 NERC will invest in big data translation to provide environmental products and services in partnership with the TSB and others. NERC and TSB will help major companies use NERC-funded autonomous technology and sensors to monitor deep-sea carbon storage sites.

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46 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/263729/bis-13-1297-international-comparative-performance-of-the-UK-research-base-2013.pdf

NERC has achieved significant leverage through multidisciplinary and collaborative co-funding with industry and international partners. NERC support for oil & gas research leveraged £135m from industry to HEIs and BGS (2002 to 2012), while NERC investment of £1.5m in the International Space Innovation Centre at Harwell leveraged £15m, laying foundations for the new Satellite Applications Catapult Centre (2011-13). In 2015/16, NERC will take further action to boost leverage.

In 2015/16 NERC will invest in new programmes that provide essential policy support to the UK government, including tree health. NERC-supported research in managing trees and wider ecosystems exposed to pests and disease, such as the recent ash and oak die-back diseases, will inform policy and practice. This research will be co-designed and co-funded with Defra, Scottish Government, Forestry Commission and BBSRC.

Science and Technology Facilities Council (STFC)

£M	2015/16
Resource	
International Subscriptions	**127.5**
Facilities	**107.4**
STFC Core Programme	**165.1**
Depreciation and impairments	**83.2**
Capital	
International Subscriptions	**27.3**
Facilities	**48.5**
STFC Core Programme	**53.3**

Strategic Direction

The STFC's Corporate Strategy is built upon three long term strategic goals: delivering world class research, world class innovation and world class skills[48]. It has three distinct and interrelated functions:

- **Universities:** Supporting university-based research, innovation and skills development in astronomy, particle physics and nuclear physics;
- **Scientific Facilities:** Providing access to world-leading, large-scale facilities across a range of physical and life sciences, enabling research, innovation and skills training in these areas.

[48] STFC corporate strategy 2010-2020: http://www.stfc.ac.uk/resources/pdf/STFCCS2010.pdf

National Campuses: Building national Science and Innovation Campuses around our national laboratories to promote academic and industrial collaboration and translation of our research and technology to market through direct interaction with business.

In order to carry out these functions, STFC not only funds research directly but also provides access to large scale infrastructures and analytical facilities that are beyond the means of any single university or research group. This includes access to large scientific facilities in the UK including the ISIS pulsed neutron and muon source, the Diamond Light Source synchrotron facility, and the Central Laser Facility. It also provides access, where appropriate, to facilities outside the UK through international subscriptions. These include the European Organisation for Nuclear Research (CERN), European Southern Observatory (ESO), European Synchrotron Radiation Facility (ESRF), and Institut Laue-Langevin (ILL) neutron source.

STFC is responsible for delivering the two National Science and Innovation Campuses (Harwell Oxford and Sci-Tech Daresbury). These were set up to create an environment where innovation can flourish in close connection to research and the benefits of innovation to the economy can be maximised. The two Campuses are built around STFC laboratories in Cheshire and Oxfordshire and their clusters of technical expertise. Both are designated as Enterprise Zones.

Impact

STFC funded research continues to be among the best in the world. In 2011, the UK ranked first in the world in particle physics and second in nuclear physics and third in astronomy when measured by citation impact.[49] The recent discovery of the Higgs boson at CERN is a high profile example of the excellence of STFC supported research. CERN researchers publish over 1,000 high quality papers each year. Participation in such international collaborations also brings economic benefits and the UK has doubled its return from CERN commercial contracts over the past three years. This return is set to increase further with the establishment of a CERN business incubator at the Sci-Tech Daresbury Campus which will allow technology developed at CERN to be commercialised within the UK.

Research successes such as the discovery of the Higgs boson help inspire a new generation of STEM students, as shown by applications for physics and astronomy degree courses increasing by a further 7% in 2012, this following an increase of 25% over the previous two years. STFC trains a rolling cohort of some 830 PhDs. Around 50% of STFC-funded PhD students continue in research and the rest choose to go into industry, commerce or government. This is a massive contribution to addressing the shortage of high level scientific, analytic and technical skills required by the UK.

[49] "Performance of the UK in Physics Research: National and International Perspectives", Science-Metrix Inc, 2013, carried out on behalf of STFC, EPSRC and IoP

STFC also supports UK businesses with innovation and product development through, for example, the Harwell Imaging Partnership. The Partnership provides access for non-expert industrial users to the imaging facilities at Diamond, ISIS and the CLF and is currently working with companies including Jaguar LandRover, Tata Steel, Luxfer Group, and Evotec. It has identified another twenty companies for the next phase of this programme.

More generally, the success of the Science and Innovation Campus model continues and Harwell Oxford and Sci-Tech Daresbury are now host to over 230 enterprises and more than 5,000 jobs. Surveys indicate particularly low business failure rates, strong growth, high value job creation and high levels of academic collaboration and commercial innovation among tenant firms. Public sector engagement acts as a catalyst to leverage private sector investment and a good example is the decision in 2012 by Element Six (world leaders in synthetic diamond supermaterials) to invest £20m to create a new R&D facility at Harwell Oxford.

The Harwell Oxford Campus is also the gateway and hub for the UK's £9 billion space industry. Harwell Oxford, and the expertise of the STFC laboratories, is at the heart of the UK "Space Gateway" and is home to the TSB's newly established Satellite Applications Catapult Centre (see page 48). This is in addition to the presence at Harwell of many of Europe's top space companies including Astrium, Logica, SSTL, and Telespazio VEGA.

Sci-Tech Daresbury is the home to the Hartree Centre, one of the world's foremost Centres in high performance computing and software development. The computing capabilities at the Hartree are coupled with a specialist 3D visualisation suite, which allows product developers and other research bodies like the Met Office to explore the data in more depth than has been possible before. Partnership with the Hartree Centre gives companies like Unilever and Jaguar LandRover a competitive edge by harnessing the power of supercomputers to accelerate the product design and discovery process. The Hartree Centre will continue its important work and further develop its plans to use data analytics and "Big Data" to help businesses become smarter, more productive and secure competitive advantage.

Higher Education Funding Council for England (HEFCE)

£M	2015/16
Quality-Related (QR) Research	1573.3
Research contribution to KE formula funding	113.0
Research Capital England	117.3
HEI Research Capital England	86.2
Research Partnership Investment Fund	100.0

HEFCE is responsible for distributing Quality Related (QR) research funding to English Higher Education Institutions (HEIs). QR is allocated as a block grant to individual institutions distributed by formula, primarily on the basis of the outcomes of 2008 Research Assessment Exercise (RAE), until the outcomes of the Research Excellence Framework 2014 are available. Following reforms introduce in 2011-13, QR research funding is now focused on internationally excellent research (3* & 4* - research of internationally excellent and world-leading quality respectively), and it also incentivises institutions to work with businesses and charities, leveraging additional investment, and to supervise postgraduate researchers.

QR funding supports institutional research capability and infrastructure. It enables institutions to invest strategically in their research capacity, to plan ahead to develop and support excellent researchers between project funding, and to explore novel fields and respond to emerging priorities. HEFCE research funding is particularly significant in sustaining capability in the arts and humanities and in the social sciences.

QR also enables HEIs to lever funding and commissioned research from other sources, and provides the capacity to pursue projects where funders, notably charities, do not meet full economic costs.

HEFCE will continue to take forward funding both for research and for support for the next generation of researchers, by selectively funding on the basis of only internationally excellent research, while continuing to support institutions leveraging funding from external sources such as the charitable and business sectors.

HEFCE will continue to work with the Research Councils to sustain the international competitiveness of the UK research base, to ensure that the overall impact agenda is delivered coherently, and to work with Research Councils and the National Academies to address collectively issues such as health of disciplines and research careers.

Impact

The Government is committed to encouraging universities and business to work more closely together, through the provision of incentives which enhance the economic and social impact of research.

The Research Excellence Framework (REF2014), undertaken by HEFCE in partnership with many academics from across the spectrum of disciplines, will conclude at the end of 2014 with the publication of the outcomes of the exercise. For the first time this will combine assessment of the highest levels of research excellence with recognition for the impact that it has on the economy and society. HEFCE will use these outcomes to inform research allocations from 2015 onwards.

Sir Andrew Witty's review of Universities and Growth recognised the importance of funding to support knowledge exchange and university-SME engagement. HE Business and Community Interaction (HEBCI) survey confirms that university engagement with businesses and others has grown significantly over the last decade, now generating nearly £3.6bn pa external income for UK universities. HEFCE is committed to continue knowledge exchange (KE) formula funding (through HEIF) including £113m from science and research funding. The Government is committed to a long-term and fully rounded approach to funding all forms of knowledge exchange with all forms of partner through KE formula funding (with external income to HEIs a proxy for impact). HEFCE will continue to reward KE performance, including appropriate de minimis cut-off to allocations. HEFCE will consider how dynamic change in improvement in performance can be rewarded, while providing stability for Institutional planning.

HEI Capital Funding

HEFCE will continue to focus research capital funding on maintaining excellent departments with the critical capacity to compete globally and the expertise to work closely with business, charities and public services.

Historically HEFCE has received two streams of research capital funding, one from the UK-wide Science and Research Budget and one from the Higher Education budget in England. For clarity, therefore, page 13 shows the BIS science and research funding contribution to HEI research capital for each of the four countries of the UK as well as the funding to HEFCE for HEIs in England.

Scottish, Welsh and Northern Irish HE funding bodies propose to allocate the BIS contribution by reference to the research income HEIs receive from Research Councils. This BIS capital is allocated on the basis that the funding bodies will supplement the BIS capital with further funding for HEIs in their administrations, which will be allocated by reference to research income from sources other than Research Councils.

HEFCE propose to allocate its capital allocations partly by reference to income from Research Councils and partly by reference to research income from other sources.

UK Research Partnership Investment Fund (UKRPIF)

The UK Research Partnership Investment Fund (RPIF) is designed to support investment in higher education research facilities. The fund was launched in 2012 and provides research capital funding to leverage private investment into university research partnerships with business and charities. This has so far secured over £1bn investment, including £300m from the Fund, in R&D collaborations between universities, businesses and charities.

UKRPIF, managed by HEFCE, is open to universities across the UK for bids between £10m and £35m for large long-term capital projects/partnerships, which have at least double that in private co-investment and build on a strong record of research excellence.

An additional £100m pa has been allocated to the Fund for financial years 2015-16 and 2016-17. This will lever at least £400m private co-investment, taking total investment secured through the Fund in research partnerships between universities, business and charities to over £1.6bn.

HEFCE will continue to administer the Fund to support major research infrastructure projects in universities and colleges undertaking world-leading research which secure at least double private co-investment, and which stimulate strategic research partnerships between universities, businesses and charities.

National Academies

The four UK independent National Academies are the Royal Society, the British Academy, the Royal Academy of Engineering (RAEng) and the Academy of Medical Sciences (AMS). They receive government funding for specific projects and programmes, principally to allow a cadre of the most capable academics to work full-time on research. This investment:

- helps maintain UK research skills and excellence;
- supports development of research links and collaborations with the best researchers overseas, particularly in regions of strategic importance to the UK;
- helps the Academies to act as an important source of authoritative, impartial advice for public policy making;
- supports work to promote STEM careers, diversity in the STEM workforce, and public engagement with science, engineering and research.

The Academies are increasingly working in collaboration to provide cross-disciplinary policy advice on behalf of their communities. Examples include: joint advice from all four Academies on science and research priorities to inform Spending Review decisions; the joint publication of a policy report on Human Enhancement; AMS and Royal Society holding a joint meeting on antimicrobial resistance in May 2014; Royal Society and RAEng independent review of shale gas; Royal Society and RAEng STEM Diversity Programme; all four Academies in ongoing work around sustainability of the science base.

Implementation of the Wakeham efficiency savings has enabled the National Academies to increase their support for excellent researchers. They are committed to keeping the costs of back-office related contracts and support functions as low as possible and to obtaining greater value by developing shared approaches to procurement and to outsource services where appropriate.

Royal Society

£M	2015/16
Resource	47.1

Strategic Direction

The Royal Society is the UK's national academy of science. Its key strategic aims are:

- Promoting science and its benefits;
- Recognizing excellence in science;

- Supporting outstanding science;
- Providing scientific advice for policy;
- Fostering international and global cooperation;
- Education and public engagement.

In 2015/16, the Royal Society will focus on three core areas of activity:

- Supporting scientific excellence and innovation through the Society's fellowship programmes;
- Science Communication and Education activities to inspire the next generation of scientific talent e.g. public events and grants to link school teachers to leading scientists;
- Promoting international competitiveness through increased opportunities for collaboration

Impact

The Society will continue to foster scientific excellence and innovation through its highly competitive and prestigious university research fellowships. In addition to the impact on excellent science, a third of the fellows reported some commercial activity resulting from their fellowships including collaborations, consultancy, new products, and spin-outs.

Since 2010 the Society has sought to promote greater engagement between academia and industry including the launch of the Industry Fellows' College in 2013 to improve networking opportunities.

The last 12 months have also seen an increase in the number of international collaborations and leverage of funds from private, public and third sector partners – every £1m invested through research fellows has leveraged a further £6.3m.

The Society has a number of well established programmes such as the summer science exhibition and the Partnership Grants scheme which promotes science to the next generation. The Society is extending its existing public engagement programme. The key theme of this will be "meet the scientists", a programme of activities which will provide greater opportunities for members of the public, young people and school children to meet with scientists at the cutting edge of research. By encouraging scientists to discuss the work they do with the public, the Society aims to show the importance of science in society and the opportunities science offers to the next generation. The Society will also work with partners in science and the arts across the UK to bring these activities to a wider community.

British Academy

£M	2015/16
Resource	27.0

Strategic Direction

The British Academy promotes and champions the humanities and social sciences. Its aim is to inspire, recognise and support high achievement throughout the UK and internationally. The British Academy's portfolio of funding schemes, high-level policy advice and public engagement fills a distinctive niche in the UK's research landscape. The Academy develops outstanding scholars, innovative research and international partnerships, helping to maintain the UK's world leading position in humanities and social science research. Its policy and public engagement activities strengthen policymaking and enhance understanding of major issues.

In 15/16 The Academy will focus on:

- Developing research leaders of the present and future through fellowship schemes and other forms of support, with particular interest in bringing on the next generation of scholars;
- Supporting excellent, innovative research, enhancing the quality of UK research;
- Building on momentum in Language and Quantitative Skills, sustaining national capability in skills of strategic significance for international competitiveness;
- Enhancing its programme of public engagement and policy advice;
- Developing strategic initiatives, heightening international competitiveness and collaboration.

Impact

Humanities and Social Science research contributes to quality of life, to the UK's reputation and international links, and to innovation and growth, providing expertise and insights for a range of strategic sectors, especially the service sector (currently 75% of the economy) and the creative and cultural industries (which account for around £1 in every £10 of the UK's exports).

The Academy's grants and fellowship schemes play an important role in fostering excellent research and innovation. These schemes open up new research areas and leverage external funding - for small grants, for example, for every £1 invested, an average of over £20 is generated from other sources.

The Academy will continue to contribute to public debate and to policy development. It will continue to bring the expertise of its Fellows and others to bear on the challenges facing society today and in the future, such as unemployment and growth, the environment, ageing, and well-being. Through the Language and Quantitative Skills Programme, the Academy is providing leadership to raise the importance of these skills and achieve long-term change. This will continue to be a priority for 15/16.

Royal Academy of Engineering

£M	2015/16
Resource	12.4

Strategic Direction

The Royal Academy of Engineering aims to create and support sustainable and balanced economic growth based on world class engineering and more technology business and industry in the UK. The RAEng achieves its goals through its work in the following areas:

- Supporting world class research and researchers through fellowships and exchanges;
- Creating better industrial engagement through industrial secondments, the Enterprise Hub and enterprise fellowships;
- Enhancing the skills base at all levels through work on education skills policy and practice;
- Providing advice on a range of national policy issues including; the electricity capacity margin, public procurement and mitigation of extreme space weather events;
- Engaging with the wider public to promote the importance and value of engineering through the Engineering for Growth campaign.

Impact

Engineering is a major driver of economic growth. The RAEng's research programmes will continue to deliver value to companies, building on the 300 industrial collaborations undertaken by its Research Chairs, Senior Research Fellows and Research Fellows in 2013.

The RAEng's investments will serve to leverage external funding. To date, investments have leveraged £31m of additional value. The Enterprise Hub, created in 2013, has already attracted over £1 million additional investment from Fellows and the private sector.

The Engineering Enterprise Fellowships will continue to enable entrepreneurial young researchers to benefit from a 'year out' during which they establish a business and receive business training: the first 6 fellows have created 4 start-up companies and leveraged £1.5 million in external investment in their first year.

The RAEng has produced valuable original research on STEM skills and education which underpins the Academy's wide-ranging policy advice to Government and has a significant

impact on education skills policy and practice in the UK. Its *Engineering for Growth* campaign[50], which currently has 25 partners from industry, academia, research and Government, will amplify awareness of the value of engineering to the economy and society. The Academy's *Ingenious* grant scheme promotes creative public engagement with engineering.[51]

Academy of Medical Sciences

£M	2015/16
Resource	0.47

Strategic Direction

The mission of the Academy of Medical Sciences (AMS) is to promote medical science and its translation into benefits for society. Underpinning this mission are six objectives:

- Promoting excellence;
- Influencing policy to improve health and wealth;
- Nurturing the next generation of medical researchers;
- Linking academia, industry and the NHS;
- Seizing international opportunities;
- Encouraging dialogue about medical sciences

The AMS will focus on three core areas in 15/16:

- Undertaking policy work on issues of significant health burden and/or relevance to economic growth; ensuring that the UK has a sustainable research base and the right workforce to respond to future medical science challenges and opportunities;
- Forging new relationships between academia, industry and the NHS that can accelerate translation, improve the regulatory and governance framework, and engage patients, practitioners and the NHS in the development and adoption of new treatments;

[50] http://engineeringforgrowth.org.uk

[51] http://www.raeng.org.uk/societygov/publicengagement/ingenious/default.htm

- Increasing international engagement to respond to global health challenges; acting as a voice for UK medical science in Europe and beyond.

This is the first time that the Academy of Medical Sciences has received some funding from BIS.

Impact

The AMS brings together partners across the medical research 'ecosystem' to leverage expertise and resources, and works closely with the other National Academies to reflect the inter-relationship of medical research with science, engineering, social science and the humanities.

The AMS has had a direct impact in translating knowledge from bench to bedside, for example the formation of the Health Research Agency was a direct response to the Academy's 2011 report on regulation and governance of medical research.[52] The AMS will continue its influential policy work in 15/16.

The Academy's FORUM brings together industry, academia and the NHS to debate scientific opportunities and translational challenges. The 2013 FORUM report on stratified medicines provided a blueprint for UK leadership in this vital area, and a variety of agencies, including the Technology Strategy Board, are taking up the recommendations. In 2015/16, the FORUM will continue to catalyse connections across the sectors to share perspectives and promote partnership.

The AMS has a vital role as the voice of UK medical science in Europe and beyond. The AMS has contributed to, and often led, pan-European statements on research regulation and EU Research and Innovation strategy, most recently the Clinical Trials and Data Protection Regulations, both of which have profound implications for UK science. In 2015/16 the AMS will continue to engage with European policy-making, including through the Federation of European Academies of Medicine, and to take forward burgeoning relationships with the US Institute of Medicine and Chinese Academy of Medical Sciences amongst others.

To date the Academy has leveraged funds from the public, private and charitable sector to maximise value from its own investments and to broker partnerships with other funders; Wellcome Trust, GSK, Medical Research Council, Department of Health, ABPI, Roche, Amgen, GE Healthcare, MHRA, TSB and Cancer Research UK have all provided external support for policy work in the last 2 years. The Academy will continue to build on this in 15/16.

[52] http://issuu.com/acmedsci/docs/newpathw

UK Space Agency

£M	2015/16
Resource	170.2
Capital	166.1

Strategic Direction

The UK Space Agency is an executive agency of BIS which is responsible for leading UK civil space activities. This includes establishing UK civil space policy and regulation; building a strong national space capability; encouraging investment by industry and academia; inspiring and training a skilled UK workforce of space technologists and scientists; delivering a range of national and international space projects in cooperation with industry and academia including through strong involvement in the European Space Agency (ESA).

The UK Space Agency will deliver an excellent space programme with maximum economic, scientific and policy benefit for the UK. The Agency's overarching goals are to lead and foster the growth of the UK space sector and to create a dynamic environment in which the UK space sector can deliver a world-class space programme with maximum benefit to science, commerce, government and society.[53]

The Agency, in collaboration with Research Councils and the TSB, will be supporting universities, the research community and innovative businesses in promoting continued economic growth.[54] The Agency also works systematically across government with DEFRA, MoD, DfID, FCO, DCMS and DfE to delivers its ambitions for example through the 'Space for Smarter Government' programme.

The Agency maintains a focus on efficient working both in its own activities and those of key partners including ESA. ESA is targeting a reduction of its overheads in response to pressure from the UK. As an example of substantive action, the Agency recently re-tendered its Earth observation technology programme yielding a £740k/year reduction in programme delivery costs.

Impact

The recent Space Innovation and Growth Strategy (IGS) 2014-2030 set out how the UK's thriving space sector now contributes £9.1 billion a year to the UK economy and directly employs 28 900 with an average growth rate of almost 7.5%[55]. Recent export successes

[53] UK Space Agency Civil Space Strategy 2012-2016, available at http://www.bis.gov.uk/assets/ukspaceagency/docs/uk-space-agency-civil-space-strategy.pdf

[54] Space Innovation and Growth Strategy 2014-2030: Space Growth Action Plan, available at http://www.bis.gov.uk/assets/ukspaceagency/docs-2013/igs-action-plan.pdf

[55] As above

include sales of UK satellites and space technology to the US, Canada, Brazil, Russia and Algeria. During 2015/ 16 the Agency will continue to invest in technology and ground-based facilities to exploit new space infrastructure in existing commercial markets such as telecommunications and for expansion into new markets.

In support of MetOffice needs, the Agency will continue to invest in the next generation of European polar-orbiting satellites to improve weather forecast accuracy and timeliness. The Agency will also maintain UK involvement in the International Charter: Space and Natural Disasters, which provides vital data to UK and global authorities for managing disasters such as floods, typhoons and earthquakes.

Applications of space systems are under pinned by scientific excellence and innovation. Through the Agency's strong involvement in ESA, the UK is leading and participating in ambitious space science and exploration missions. UK companies and academics are being competitively selected to build innovative space hardware and data processing capabilities which in turn builds a strong competitive industrial and science base able to compete on a global scale. Examples include the 300m€ contract to Airbus to build the Solar Orbiter probe for launch in FY 2017/18.

Scientific impact is evidenced by the crucial role of NERC scientists in the IPCC recent report exploiting the results of Agency investment in Earth observing satellites; and the global top 3 ranking of STFC-funded astronomers arising from Agency funding of missions such as Hubble, Swift, Herschel and Planck. In 2015/16, key launches will include Aeolus, LISA Pathfinder and Sunjammer, while work will continue on fresh projects including EarthCARE, Biomass, ExoMars, JWST, InSight, BepiColombo and EUCLID.

A new five-year £80m fund[56] announced in the 2013 Autumn Statement will increase the UK's ability to collaborate on the international stage by exploiting space technology to deliver international development goals.

The Agency oversees the UK Space Gateway project at Harwell. With the launch of the TSB's Satellite Applications Catapult and the announcement of the establishment at Harwell of ECSAT (ESA's European Centre for Space Applications and Telecommunications), the Harwell-Oxford Science and Innovation Campus is a key tool for delivering the Agency's space strategy. This will be balanced by regional space policy actions working in partnership with the LEPs and devolved administrations.

All non-scientific projects leverage at least 50: 50 industry funding (for example, £60m of public funding has been agreed to contribute to a planned £300m commercial programme to design and demonstrate the production of the SABRE engine[57]).

Space acts as a beacon to attract new generations of engineers and scientists. The Agency operates its 'Space for All' outreach programme to support activities such as the Space Academy which trains teachers to use space in the classroom. The six-month mission of the UK astronaut Tim Peake aboard the International Space Station starting in December 2015 will bring particular opportunities to inspire the next generation.

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[56] UK Autumn Statement 2013: http://www.official-documents.gov.uk/document/cm87/8747/8747.pdf

[57] This investment was announced in the 2013 Spending Review: https://www.gov.uk/government/publications/spending-round-2013-documents

Science and Society Programme

£M	2015/16
Resource	13.0

Strategic Direction

The latest survey of UK public attitudes to science (2014)[58] shows that people are overwhelmingly positive about the contribution science makes to the UK economy, in terms of growth, international competitiveness and future prosperity. Three-quarters (76%) think scientific research makes a direct contribution to economic growth in the UK, and nine in ten (91%) agree that young people's interest in science is essential for our future prosperity.

The BIS Science and Society programme aims to tackle the barriers which prevent UK society from reaping the full and equitable benefits of science and technology. It works in partnership with other stakeholders to support the UK in developing the STEM skills required at all levels within the population, increase broad scientific literacy, and improve public support for science and research.

A review of the programme in 2013 highlighted five priorities:

- simplify the landscape of interventions for young people;
- target new audiences;
- engage with people where they naturally congregate, rather than expecting them to come to you;
- be ready to react after crises to capitalise on media and public attention to science and research; and
- communicate consistent core messages.

The review recommended that BIS should take a leading role in Science and Society. In March 2014, BIS published a UK Charter for Science and Society[59], supported by case studies from partner organisations that demonstrate principles of behaviour in Strategic Commitment, Implementation and Practice, and Evaluation and Impact in order to achieve the shared vision of:

[58] https://www.gov.uk/government/publications/public-attitudes-to-science-2014

[59] https://scienceandsociety.blog.gov.uk/2014/03/11/hello-world/

"…a UK in which we all share in the development and contribution of science[60] to our culture, quality of life, sustainable economic development and growth and feel a sense of ownership about its direction."

BIS commitment to the Charter is demonstrated through the activities funded through the Science and Society Programme. BIS is taking a leading role in developing and communicating this shared vision and aims, and focusing support on activities that will have significant impact on target groups, achieve value for money and are robustly evaluated.

Impact

Two activities funded through the Science and Society programme to support the aims of the Charter are the STEM Diversity Programme and STEMNET. The STEM Diversity Programme aims to increase the diversity of people working in science, technology and engineering professions, the Science and Society programme is funding the STEM Diversity Programme. This programme focuses on diversity in a wider sense to include all minority or disadvantaged groups, not just gender diversity. The Royal Society has published a major data study on the diversity of the science workforce – while the Royal Academy of Engineering has developed a diversity concordat which 70% of engineering institutions, representing over 90% of registered engineers, have now signed.

The Science, Technology, Engineering and Mathematics Network (STEMNET) is a UK-wide organisation aiming to inspire school age young people to take an interest in science, technology, engineering and mathematics. STEMNET runs 2 programmes funded through the Science and Society Programme: i) STEM volunteer ambassadors who raise awareness amongst children of the range of careers that science and technical qualifications offer and provide stimulating scientific activities to increase their interest in STEM subjects; and ii) STEM advisory network for schools giving impartial advice to schools on how they can help get students into further STEM education, training and employment.

The STEM Diversity Programme is having impact by providing leadership and brigading action across the STEM community, including in industry. STEMNET is being independently evaluated and an interim report was published last year[61]. It showed that 89% of UK Secondary schools had accessed STEM Ambassadors and there were 24,722 Ambassador activities in the previous year. 84% of teachers thought that STEM Ambassador activity improved the students' awareness of STEM careers and 55% of pupils said that they enjoy science but that increased to 71% of those who had contact with a STEM Ambassador

The Science and Society programme is continuing to improve its efficiency in other ways. In accordance with the BIS commitments to the Charter, all funded programmes are focusing on reaching audiences not normally targeted by other activities and providing robust evaluation. All continuing programmes will have revised KPIs reflecting the outcomes of the Review.

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[60] The definition of 'science' we use is deliberately wide, encompassing physical, biological, engineering, medical, natural and social disciplines, including research in the arts and humanities.

[61] Nfer Interim Report for STEMNET, Evaluation of STEMNETs operations and impacts 2011-2015, Feburary 2013

The Sciencewise Programme[62] will continue to support public bodies to consider and use public dialogue as part of an open policy making process to gather public views which inform their decision making on policies involving science and technology. The Programme supported over 20 public dialogue projects between 2011 and 2014 which have had an influence on diverse range of policies from landscape management to open data.

[62] www.sciencewise-erc.org.uk

International Programme

£000	2015/16
Resource	4.2
Newton Fund Resource	75.0

Strategic Direction

BIS ensures opportunities are maximised for international collaboration on science, innovation and higher education to achieve the UK's economic and social goals and to play a leading part in addressing global challenges. The International Knowledge and Innovation Unit (Global) in BIS aims to:

- Maintain the excellence of the UK research base by ensuring UK researchers have the opportunity to work with the best in the world and access large scale facilities;
- Ensure the UK has early access to new knowledge, technologies and markets;
- Enhance the UK's reputation for scientific excellence to promote inward investment and trade;
- Maintain the UK's right and ability to influence how global challenges are identified and tackled;
- Promote good use of science by other countries when making policy decisions in which the UK has an interest;
- Build positive relationships that give the UK a platform to promote other foreign policy goals including open trade, democracy and respect for human rights.

The Unit is responsible for:

Implementing the cross-government international science strategy including developing policy to support increased scientific/innovation engagement with the Emerging Powers and implementing the Newton Fund to promote the economic development and welfare of emerging powers through science and innovation collaboration. By working together on bi-lateral and multi-lateral programmes with a research and innovation focus, the UK will build strong, sustainable, systemic relationships with partner countries (China, India, Brazil, Turkey, South Africa & Wider Africa, Mexico, Chile, Malaysia, Thailand, Colombia, Philippines, Indonesia, Vietnam, Kazakhstan, Egypt). This will support the continued excellence of the UK research base and innovation ecosystem and act as a golden key to unlock opportunities for wider collaboration and trade.

Organising the UK's participation in multilateral science events such as G8 Science Events and Carnegie (G8+5) and supporting the GCSA and Minister for Science in their international activity

Managing the 90-strong Science & Innovation Network based in Embassies, Consulates and High Commissions around the world and the £1.6million Global Partnerships Fund[63]. The objectives of the Science & Innovation Network are to influence science and innovation policies of governments, industry and academia to benefit the UK; to improve UK policy based on international experience and emerging opportunities and challenges; to stimulate strategic science collaborations to benefit the UK and deliver wider policy goals; and to harness international technology partnerships and investment to grow UK innovation capability.

Impact

The Science Ministerial held alongside the UK G8 Presidency has positioned the UK as a leading nation in international science leading to us being asked to host the Carnegie (G8+5) this year. It also positioned science as a proper topic for G8 meetings.

The Science and Innovation Network enabled £15m worth of technology contracts to be agreed between UK businesses and the Czech Republic; the UK – East Asia Smart Grids collaborations with Japan are estimated to bring in up to £20m investment to the UK; in 2012-13, the SIN team in the USA informed UK policy on shale gas and unconventional hydrocarbons by facilitating a number of connections between senior officials from across the UK government and US stakeholders from government, academia, business, and community organisations to improve the UK's understanding of the challenges and opportunities; and advisory services provided by the SIN team in China led to a £1.8m contract for the UK's National Physical Laboratory from the National Institute of Metrology in China for the supply of a microwave antenna extrapolation range.

The introduction of the Newton Fund in Autumn Statement 2013 is being very well received by our 15 partner countries and has already leveraged £20 million of matched funding from China. Discussions are progressing well in relation to matched funding from the 14 other partner countries. We are in discussions with the Wellcome Trust and may be able to leverage funding from them for programmes in China and South East Asia.

[63] The level of funding in FY 15/16 is still to be specified but the GPF budget in 14/15 was £1.6M. Further information about GPF projects can be found at https://www.gov.uk/government/world/organisations/uk-science-and-innovation-network

Government Office for Science

£M	2015/16
Resource	2.8

Strategic Direction

The Government Office for Science (GO-Science) ensures that government policies and decisions are informed by the best scientific evidence and strategic long-term thinking. This is achieved by providing scientific advice to the PM and Cabinet, and improving the quality and use of scientific evidence and advice in government. GO-Science is led by the Government Chief Scientific Adviser (GCSA) who reports to the Prime Minister. Sir Mark Walport has been the GCSA since April 2013.

In addition to these objectives, GO-Science is responsible for delivering five cross-government functions**:**

- *Scientific Advisory Group for Emergencies (SAGE)*. SAGE provides COBR with advice on the scientific evidence needed to inform the government's response in emergency situations.
- *Foresight strategic futures*. Foresight produces detailed reports that draw together world-class scientific expertise and evidence on cross-cutting, long-term policy issues.
- *Horizon Scanning Programme*. Run in partnership with the Cabinet Office, the programme ensures that the Cabinet Secretary led Advisory Group successfully embeds long-term strategic thinking in government policy.
- *Government Science and Engineering professional network*. The GSE network brings together the scientific capability (people, resources and infrastructure) that the government needs to develop and implement evidence-led policy.
- *Council for Science and Technology (CST).* Meeting quarterly, the CST provides high quality independent advice directly to the Prime Minister on a range of topics.

The role of GO-Science is typically that of commissioner and expert customer for high-quality evidence. It procures and convenes experts to provide leading-edge research, analysis and evidence on questions with significant impact on government business. GO-Science takes this high-quality evidence and research, synthesizes it, and communicates it through a series of products that are relevant and impactful to Ministers and their Departments.

To focus GO-Science resources on meeting the organisation's broad objectives, the GCSA has prioritised six core policy themes based on their scientific importance and cross-cutting nature:

- Lifecourse and Cities
- Energy and Climate Change
- Trade and Finance
- Innovation and Infrastructure
- Data and Analytics
- Risk and Resilience

GO-Science will deliver a range of different projects against each of these areas, and engage with departments to ensure that the evidence they produce informs government policy.
In some cases these projects will be led directly by GO-Science, in others the organisation will play an enabling role alongside other parts of Government.

GO-Science specifically leads on producing two particular types of project; Foresight reports and Blackett Reviews**.** Foresight reports draw together world-class scientific expertise and evidence on complex cross-cutting topics such as climate change, flooding, obesity and the future of cities. The programme produces rigorous, peer-reviewed strategic futures analysis, helping policy makers across Government to plan for future uncertainties. Blackett reviews bring together evidence to examine the future impact of specific emerging technologies through the lenses of domestic policy and national security. They are smaller in scope than Foresight reports but are similarly focused on helping to shape departmental thinking. These two types of research project account for the bulk of GO-Science's resource spend. Further information about GO-Science's work and previously published reports are available on the GO-Science website[64].

Impact

The Foresight programme has been hailed as achieving significant impacts from many of the major reports it has produced. It is recognised across Government at the highest level as adding real value to strategic decision making and encouraging sustainable economic growth over the long-term.

In one recent example, "The Future of Computer Trading in Financial Markets" (2012) report was vital in informing the European Commission about the impact that computer-based trading had on financial markets. Foresight is credited with the implementation of desirable amendments to the development of European regulation relating to: market making obligations; the anticipated exclusion of minimum resting times; and the introduction of common and synchronised time stamps. This report will have enduring impact by helping to put in place the robust evidence needed to inform a regulatory outcome that supports UK economic growth.

Other planned work includes research to support greater resilience to natural hazards including extreme weather events; and the development of energy system scenarios

[64] http://www.bis.gov.uk/go-science

drawing on a wide range of disciplines and departmental interests. The impact of this work and research into topics yet to be defined will be to help policy makers across Government to make decisions today which are robust to future uncertainties. This is essential in ensuring the Government can successfully extract excellent value for money as a result of constructing policies that account for the uncertainties of the long-term.

The impact of Blackett reviews will be similar, allowing GO-Science to produce more rapid and responsive advice to policy makers on emerging technologies. Previous Blackett reviews have provided evidence in response to specific questions on security and defence. By broadening their scope to examine the implications of emerging technologies on government policy and identify resulting actions, they will be an important contribution to the Cabinet Secretary's Advisory Group on horizon scanning. In turn, this will contribute to further embedding evidence-based long-term thinking across government.

Funding for Major New Science and Research Infrastructure

It is clear that for some infrastructure needs, strategic decision making at the national level is required in order to coordinate investments in the strategic national interest. This includes both where projects are of sufficient size to require the pooling of resources, (eg. the Large Hadron Collider), or where investment is required in the coordination of resources to maximise impact, (eg. the *Life* study). This decision also requires looking internationally at what our competitors are investing in, and identifying where it is in the UK national interest to collaborate in international infrastructure projects – either making significant contributions to projects around the world or indeed hosting them in the UK.

The Government's commitment to increase capital investment in real terms to £1.1 billion in 2015-16, growing in line with inflation each year to 2020-21 is an ideal opportunity to build a strategic vision of a world-leading science and research infrastructure. The Government is currently consulting on UK priorities to achieve this.[65]

A number of strategic capital investments have already been made with commitments in financial year 15/16. Those delivered through ring fenced bodies are referred to throughout this document, notably the £150M investment from the Department of Health for medical research facilities (see p28).

In addition several investments in science infrastructure will be made with non-ring fenced bodies. These include:

Met Office High Performance Computing programme, which will enable:

Higher resolution, ensemble models to give improved risk based local predictions of weather and the impacts on safety of UK citizens

Improved capabilities in Seasonal to Climate timescales, enabling improved planning decisions that maximise the resilience of the public and national infrastructures

Greater collaboration in operational environmental modelling services across UK Govt and the wider UK economy

Met Office EUMETSAT satellites:

Met Office EUMETSAT satellite programmes provide imagery and data from the European Third Generation satellite and the European second generation polar satellite for input to Met Office weather and climate models. The geostationary satellite is a legal requirement through the Eumetsat international convention, the polar satellite spend will become a legal requirement in 2014 when the programme is agreed at EUMETSAT. As a member of EUMETSAT through international convention the UK is required to contribute to mandatory programmes.

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65 https://www.gov.uk/government/consultations/science-and-research-proposals-for-long-term-capital-investment

NPL Advanced Metrology Laboratory: A facility to enhance the capability of the National Physical Laboratory, particularly in relation to quantum metrology, to help it maintain its position as a world-leading National Measurement Institute.

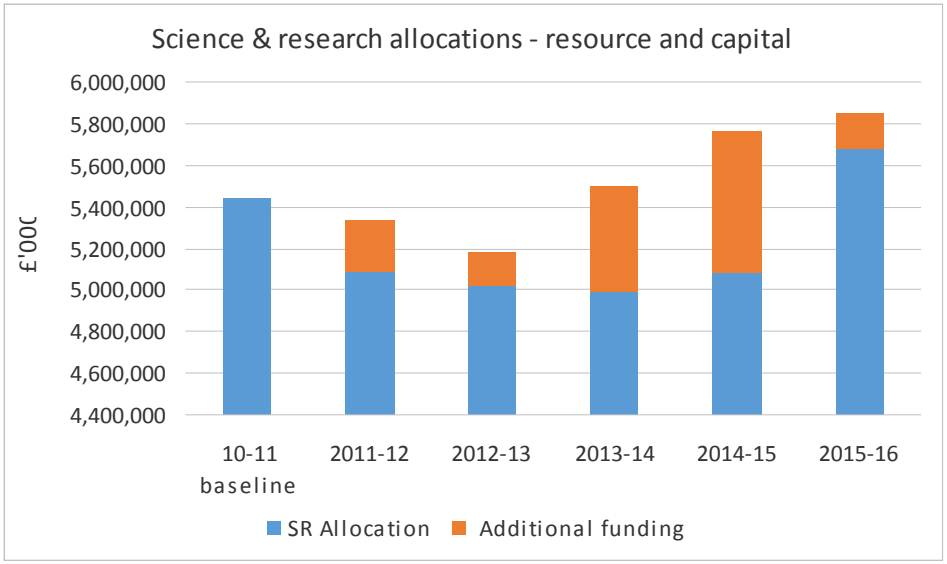
Atomic Energy Authority: an investment in new planned technology facilities at the Culham site, including the construction of a Materials Research Facility.

Support for commercialisation of research and technology at key institutions.

Alan Turing Institute: Creation of a world-class research institute specialising in data science and dedicated to British WW2 code-breaker Alan Turing.

Annex A: Science and research funding allocations – summary 2010/11-2015/16

	£M	10-11 baseline	2011-12	2012-13	2013-14	2014-15	2015-16	total
Capital	SR Allocation	873	514	449	416	517	1,110	3,879
	Additional funding	-	246	163	514	551	39	1,513
	Total	873	760	612	930	1,068	1,149	5392
Resource	SR Allocation	4,576	4,576	4,576	4,576	4,576	4,576	27,456
	Additional funding	-	-	-	-	127	134	261
	Total	4,576	4,576	4,576	4,576	4,703	4,710	27,717
Total	SR Allocation	5,449	5,091	5,025	4,991	5,093	5,686	31,335
	Additional funding	-	245	163	514	678	171	1,773
	Total	5,449	5,336	5,188	5,506	5,771	5,857	33,109



This table includes all new science funding announced since SR10 including the most recent announcements from budget 2014

Annex B: the Haldane Principle

The Government clarified the Haldane Principle during the last spending review for 2011/12 to 2014/15 after consulting senior figures in the science and research community. The clarified text is reproduced below.

This statement on the Haldane Principle applies to science and research which the Government funds through the Research Councils and National Academies. HEFCE has statutory independence.[66] The Haldane Principle does not apply to the research budgets of government departments, which are used to fund research to support their departmental policies and objectives. That said, departments work closely with the Research Councils to ensure that the research they fund is aligned with that funded by the science and research base and delivers maximum value to the taxpayer. More generally, Research Councils need to ensure that the views of those with an interest in the potential outcomes of the research are sought when setting their overall priorities.

The Government does, however, need to take a view on the overall level of funding to science and research and has decided to protect and to ring-fence the science and research budget for financial year 15/16. This decision is evidence that the Government recognises the strategic importance of science and research to our future growth, prosperity, culture and heritage.

There are areas where Ministers should have no input: Ministers should not decide which individual projects should be funded nor which researchers should receive the money. This has been crucial to the international success of British science.

At the other end of the spectrum there are decisions that ultimately must be for Ministers, albeit informed by external advice; these include the overall size of the funding for science and research and its distribution between the Research Councils, the National Academies and Higher Education research funding.

In addition, every Government will have some key national strategic priorities such as addressing the challenges of an ageing population, energy supply or climate change. The research base has an important role to play in addressing such priorities and the Research Councils, with the support of independent advice, have proposed research programmes to tackle them. It is also appropriate for Ministers to ask Research Councils to consider how best they can contribute to these priorities, without crowding out other areas of their missions. But it is for the Research Councils to decide on the specific projects and people to fund within these priorities, free from Ministerial interference.

Similarly, Ministers have a legitimate role in decisions that involve long term and large scale commitments of national significance. These include the construction of large

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[66] The Further and Higher Education Act 1992 states that the Secretary of State may not attach terms and conditions on grants to HEFCE which are framed by reference to: particular courses of study, programmes of research, the criteria for the selection and appointment of academic staff or the admission of students.

research facilities, where Ministers have to approve business cases, and involvement in international research treaties. Public funding from the Research Councils for both these categories of research spending must be dedicated to supporting excellent research, irrespective of its geographical location. In many cases the location will be an obvious decision, given clusters of relevant research capability. Ministerial views on such business cases should be formed with the aid of advice from the Research Councils.

It is important that Ministers, where they are involved in making strategic decisions on the funding of research, take account of advice from a wide variety of expert sources including academia and industry, both nationally and internationally.

The Government recognises the contribution to our national life and to the UK economy made by research and teaching in the full range of disciplines including physical sciences, social sciences, life sciences, environmental sciences, engineering and the arts and humanities.

The Government values the multiplicity and variety of sources of funding from the public, private and charitable sectors. These contribute to the provision of a rich and diverse environment supporting the research community across all disciplines.

Overall, excellence is and must remain the driver of funding decisions, and it is only by funding excellent research that the maximum benefits will be secured for the nation.

Annex C: Criteria used for the allocation of science and research funding

BIS strategic priorities for science and research funding in 2011/12 – 2014/15:

To allocate science and research funding in the spending review of 2011/12 to 2014/15, the Government developed the following 9 criteria for the prioritisation of science and research funding. The Government wanted to protect national capability and international competitiveness and to maximise the economic and social benefits of research. This funding covered the project-based Research Council funding, the block-grant HEFCE funding, and individual researcher support provided by the Research Councils and National Academies.

The 9 criteria used were:

- Further concentrating funding on research centres of proven excellence and with appropriate critical mass and multi-disciplinary capacity to address national challenges and compete internationally;
- Providing relative protection to funding in areas attracting leveraged funding from collaboration with charities, business and other private sector funders of research;
- Maintaining a substantial flow of new researchers;
- Maintaining national capability to support other Government departments that deal with crises such as foot and mouth disease and extreme weather events;
- Providing researchers with access to key large scale research infrastructure, both here and abroad;
- Supporting cross-Council research into strategic national challenges identified by Government, such as Energy and Climate Change;
- Pursuing a research cluster strategy to support economic growth in strong and emerging industrial sectors, and encouraging close working between Research Councils and TSB;
- Maintaining stability of funding over the medium-to-long term to achieve best Value for Money, provide institutional stability and enable recruitment and retention of research staff (through continuation of a ring-fenced budget);

- Promoting financial sustainability in the UK research base through maintenance of the full economic cost policy of research funded by Research Councils.

Strategic direction BIS strategic priorities for science and research funding in 2015/16:

In the spending review of 2015/16, the Government sought the advice and opinions of stakeholders (see Part 1, 'How the budget was allocated') and as a result, adapted the criteria from 2011/12 to 2014/15 to reflect the fact that this allocation is for just one year.

The following five criteria were used as high priority objectives for 2015/16:

- Ensuring excellence with impact, sustaining our national capability and international competitiveness;
- Maximising the contribution to UK economic growth (and industrial strategy, 8 great technologies);
- Continuing to improve the efficiency of the research base;
- Maximising the leverage from private, charitable and international funders;
- Maintaining a substantial flow of new researchers and high level skill

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