



department for
education and skills
creating opportunity, releasing potential, achieving excellence



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2 March 2004

To: Royal Society of Chemistry;
Institute of Biology;
Institute of Physics;
Save British Science;
Royal Society;
Royal Academy of Engineering;
Engineering Council;
Science Council

In February 2001 you published the *Charter for Science and Engineering*, a forward-looking document that described the policy challenges in science and engineering that would have to be faced by the Government in the current Parliament.

With international competition for scientific excellence rising rapidly, and with science and engineering skills increasingly important to securing high-value innovative business in the UK, we agree with you that the

Government must be prepared to make the tough long-term decisions upon which our future economic prosperity and quality of life depend.

In the 2002 Spending Review, the Government made a start: we delivered the largest sustained growth in science expenditure for over a decade, and the successful R&D tax credits have also been extended and improved. These measures have been complemented by a drive to recruit more science teachers to schools, to inspire more students to take up careers in science and engineering, and to improve the use of science by Government departments.

Building on these record levels of investment, the Lambert Review of Business-University Collaboration and the DTI Innovation Report, we are now in a position to consider where we want UK science to be in the next decade. The forthcoming Spending Review provides an excellent opportunity not only to take stock of current science policy and investment, but more importantly to look forwards.

That is why we have announced our intention to publish a ten-year investment framework for science and innovation alongside the 2004 Spending Review. The framework will articulate the Government's ambition for UK science and innovation over the next decade, especially its contribution to economic development and public services. The aim is not only to provide certainty for all those working in UK science and engineering, but also a clear lead to all parties who invest, and want to continue to invest, in our science capability, for example, businesses, Regional Development Agencies and charities.

In particular, we will set out our future intentions, matched against the aspirations that we want to achieve:

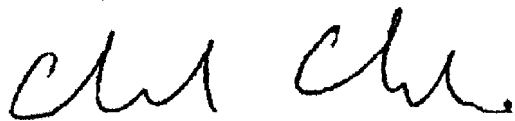
- continued world class excellence from our very best centres of science and technology, driven by competition for funding and talent;
- a dynamic research base that meets the needs of both public and private funders and is managed effectively to achieve financial sustainability;
- greater collaboration between universities and business to provide a sharper focus for research and an impetus to innovation and productivity growth;
- better translation of leading edge technologies into commercial applications;
- a responsive system which can supply the science and technology skills that our businesses and public services will need over the next decade, underpinned by excellent teaching in schools and including measures to increase the involvement of women and minority groups in science; and
- a society that is confident about the regulation and use of science and technology.

All this with one purpose: to make Britain an even more attractive location for science, for research and development, and for innovation.

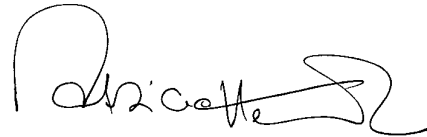
Your charter emphasised the commitment of the science and engineering community to provide assistance and advice to the Government in policy making. We welcome this commitment and attach

the Government's detailed response to the challenges you set out three years ago. We would now be interested to hear your views on what further steps you think are necessary.

Yours sincerely,



CHARLES CLARKE



PATRICIA HEWITT



GORDON BROWN

Government Response to the 2001 Charter for Science and Engineering

ARTICLE 1: People

We agree that improving the UK's science skills base will be a crucial factor in Britain's future success in a high-value high-skilled economy. A better skilled workforce, that promotes equal opportunities for all citizens to maximise their potential, is not only the route to a fairer society, but also a more productive one.

In 2001 we asked Sir Gareth Roberts to lead a review into the supply of people with science, engineering and technology skills. Since the publication of his report in April 2002, we have been working to implement its recommendations, particularly by making prospective career paths for scientists and engineers more attractive. We have allocated funds to increase the minimum Research Council PhD stipend to £12,000, and to increase Research Council postdoctoral salaries by an average of £4000. Many Roberts recommendations have now been implemented, with other, longer-term policies under development.

Furthermore, we asked Baroness Greenfield in 2002 to produce a report looking specifically at the under-representation of women in science, engineering and technology. As part of our resulting strategy, we are creating a resource centre to work with employers to tackle the barriers that face women in science and engineering employment. The centre will also work to encourage more women to take up and remain in science and engineering, for example, by running mentoring, networking and mobility initiatives, and by supporting those returning to careers.

And we have introduced a range of policies, set out in the National Skills Strategy, to provide more opportunities for those already in the workforce to acquire new skills. The New Deal for Skills provides support for learning towards basic skills in literacy, numeracy and information and communication technology, or a first level 2 National Vocational Qualification. It also offers increased support for higher-level skills in areas of sectoral or regional skill priority. In addition, the Government has introduced the Employer Training Pilots scheme to help low-skilled people in work gain basic skills or their first level 2 qualification, compensating employers that offer their staff paid time off to train.

Building on recent policy progress, our ten-year investment framework for science and innovation will consider what further action is needed to improve the responsiveness of the supply of skills to meet the changing needs of the UK economy, and to ensure that research in the UK continues to attract world-class talent.

ARTICLE 2: Economy and wealth creation

We agree that science and engineering make an extremely important contribution to the economy of the UK. In an increasingly knowledge-driven global economy, these areas will remain critical to the UK's ability to innovate and to our long-term competitiveness.

Since 1997 we have set about creating the climate for innovation to flourish in the UK, combining macroeconomic stability and sustained growth with a supportive business tax system, a strong competition regime, and dynamic and flexible financial markets.

Our programme of economic reform has been accompanied by measures to foster the transfer of knowledge and technology from the science base to businesses. The Higher Education Innovation Fund and the Public Sector Research Exploitation Fund, together worth over £200 million between 2004 and 2006, encourage the translation of university and public sector research into business innovation, and the Lambert Review of Business-University Collaboration has recently proposed ways to strengthen this process.

Building on the recent DTI Innovation Report, the Department of Trade and Industry are refocusing their investments in support of collaborative business R&D and knowledge transfer in a new £150 million National Technology Strategy. And we have also increased access to risk capital, both through tax incentives and a number of funds, particularly for smaller, higher-risk companies that play such an important role in the innovation process.

We will move forward on this through the implementation of the DTI Innovation Report and our ten-year investment framework for science and innovation, which will include a full response to the Lambert Review. We will continue to pursue, building on investments to date and in partnership with the research and business communities, research funding and R&D support policies to ensure that business can work collaboratively and more effectively with the UK's research base in generating wealth from innovation, and that the UK remains an excellent location for R&D.

ARTICLE 3: Investment

We agree that investment in science and engineering are vital to our future national prosperity and quality of life. You asked that the improvements in the public funding of science made in the Government's first term be sustained and strengthened over the lifetime of the current parliament – and that is exactly what we have done.

The 2002 Spending Review delivered the largest sustained increase in science expenditure for a decade: £1.25 billion extra a year by 2005-06 compared with 2002-03, accompanied by the reforms necessary to renew our science base. This includes extra resources to boost the volume of research and a dedicated capital stream of £500 million a year for science research infrastructure, along with measures to move research onto a sustainable financial

footing by ensuring that universities recover the full economic costs of the research they conduct.

We are also helping industry to invest more in science and engineering with the most generous R&D tax credit scheme in Europe – providing around £600 million a year of support to innovative businesses – and we are consulting with businesses to improve further the range and operation of the credits. On top of this, businesses can get 100% First Year Capital Allowances for investment in capital equipment used in R&D.

Our ten-year investment framework for science and innovation will, in taking stock of policy progress to date and consolidating recent consultations and reviews, set out the next steps in our long-term investment in the UK's science base to enable businesses, universities, other research funders and individuals to plan their own investments in UK science and innovation over the coming decade.

ARTICLE 4: Culture

We agree that science and engineering are integral to our national culture, and that a constructive and well-informed dialogue about the public's concerns must be an essential component of debates on scientific issues.

The Department of Culture, Media and Sport sponsors a range of bodies – such as the National Museum of Science and Industry, the Natural History Museum, the Museum of Science and Industry in Manchester, and the National Maritime Museum – that not only play a significant role in preserving our national science heritage, but are also active in informing the public about science and engineering. These bodies make an invaluable contribution to the Government's drive to improve further the quality of science teaching in schools, the scientific understanding of young people entering the workforce and the image of science in society.

If we are to take full advantage of the enormous opportunities our investment in science is creating, we must continue to encourage public engagement with science through debates that lead to improved mutual understanding and trust between scientists, policy makers and the public. The Government welcomes the science and engineering community's recognition that they must understand the public's concerns and engage them in constructive dialogue.

Looking forward, we recognise that securing the engagement and trust of the public in scientific developments will be important to capturing the full social and economic benefits that science and engineering research can offer, and we call upon the science and engineering community to work with us in continuing this dialogue.

ARTICLE 5: Education

We agree that the future of science and engineering depends on the supply of highly trained people. You asked that the Government in this Parliament urgently tackle concerns regarding the supply and training of science teachers in schools.

Following the implementation of recommendations of the Roberts Review, the number of science teachers recruited to initial teacher-training courses has increased by 24% since 1999/2000. From October this year the network of Science Learning Centres, created in partnership with the Wellcome Trust, will be providing continuing professional development to teachers and technicians. And we have launched the *AimHigher* strand of the Students Associates Scheme, with places for 500 Higher Education science, ICT, maths and technology students to work in schools supporting teachers.

We also recognise the importance of inspiring more students to study science and engineering. Following the Roberts Review, a new applied science GCSE has been launched, and we are piloting another new GCSE – *Science in the 21st Century*. We have introduced the science strand of the Key Stage 3 National Strategy for 11-14 year olds, and in 2006 we will be introducing a new Programme of Study for Key Stage 4 science.

<p>Our ten-year investment framework for science and innovation will look at the extent of the implementation of the Roberts Review and, building on this progress, at what next steps are necessary to ensure that the UK's schools, colleges and universities can supply young people with the grounding in science, maths and engineering upon which our economy depends.</p>
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ARTICLE 6: Health and the Quality of Life

We agree that the contribution of science and engineering to human health and quality of life is absolutely vital. We pay tribute to the tremendous advances in health and biological sciences made by UK scientists and engineers, from the development of Magnetic Resonance Imaging to the mapping of the Human Genome.

The NHS is now investing more than £500 million a year in research and development, and is currently reviewing its approach to secure greater patient benefits from clinical research. The Government is also sponsoring health and medical research through the Medical Research Council and the Biotechnology and Biological Sciences Research Council. And in the work of the UK Foresight Committee we are looking to the future in other areas of science too, investing in projects on flood and coastal defences and the use of new technologies in crime prevention.

Our ten-year investment framework for science and innovation will review how Government Departments, Research Councils, medical charities and business can work more effectively together to deliver research and innovations that bring real benefits to human and animal health, and quality of life.

ARTICLE 7: Energy and Environment

We agree that energy and environmental issues will present major challenges in the 21st Century, and that science and engineering are an essential part of the solution. That is why we are investing in environmental research and innovation including through the Research Councils and the Carbon Trust.

We are at the forefront of international efforts to tackle climate change, making clear our commitment to put the UK on a path to reduce carbon dioxide emissions by some 60% below 1990 levels by about 2050. To achieve this, a radical shift will be needed from our current reliance on fossil fuels to a low carbon economy. We will need to see doubling of the rate of improvement in energy efficiency compared to that of recent decades and far greater use of renewable technologies such as wind, wave, biomass and hydrogen. Investment in research, development and the demonstration of new technologies will therefore be key if we are to achieve our energy goals.

We see the outputs of the UK science base as essential to fulfilling our environmental priorities, so we will continue to invest in environmental research and to work with the science and engineering community in developing priorities for scientific and technological advancement in this area.

ARTICLE 8: Globalisation

We agree that science and engineering can play a huge role in solving international problems such as world poverty, and that mobility of researchers and international research collaboration will be essential for this.

Scientific advances in the management of natural resources, the water supply, communicable disease, and reproductive health are all essential to achieve the Government's Millennium Development Goals. This is why the Department for International Development invests £150 million a year in such research as part of a collective international effort focussed on the elimination of poverty.

The Government also makes an important contribution to researcher mobility and international collaboration. The Dorothy Hodgkin Postgraduate Scholarship Programme has been launched to attract top students from countries such as China, India, Russia and the developing world to study for science PhDs in highly rated UK research environments on a

fully funded basis provided jointly by Government and the private sector. And we are working with our EU partners, including through the implementation of the EU R&D Action Plan, to increase researcher mobility and collaboration, and to improve Europe's research and innovation performance.

The Government will continue to pursue its development goals and will work with the science and engineering community to improve the UK's status as a magnet for researchers from across the globe, providing opportunities for study and work in the UK to those with the skills we need, and collaborating with international partners to meet shared goals for research and innovation.

ARTICLE 9: Parliament

We agree that it is important to devote sufficient time to examining and debating science and engineering issues in Parliament.

As a measure of the importance of this area, the House of Commons Science and Technology committee has recently introduced a quarterly science question session with the Minister for Science and Innovation, Lord Sainsbury.

We will remain committed to facilitating the highest level of scrutiny and debate of science and engineering issues in Parliament, and we encourage the science and engineering community to continue their important contribution in highlighting key issues as we develop our ten-year investment framework for science and innovation.

ARTICLE 10: Government

We agree that high quality science and expert and independent scientific advice is essential for effective and credible political governance, and we thank the science and engineering community for its significant contribution to policymaking and service delivery.

Government departments spend significant sums of money on research and development, with an estimated £1.8 billion spent by civil departments in 2002-03. In addition, the Government obtains scientific advice on a wide range of functions, both from Chief Scientific Advisers and heads of profession, and from independent scientists. We have taken measures in recent years to strengthen the use of science and research in government, for example by requiring departments to publish strategies setting out the role that research programmes and other scientific activities play in the delivery of their objectives.

We will remain committed to maintaining and improving the quality and use of science and research in Government.