The institution of environmental sciences

Building our industrial strategy - Green Paper consultation

Submission of the Institution of Environmental Sciences (IES).

This submission is in response to the Government's consultation on its Green Paper, Building our industrial strategy. The Green Paper included thirty eight consultation questions, by which this submission is structured. The consultation closed on 17th April 2017.

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1. Does this document identity the right areas of focus: extending our strengths; closing the gaps; and making the UK one of the most competitive places to start or grow a business?

We do not dispute the merit and importance of the focus areas identified in this paper. However, these focus areas alone are not sufficient to deliver long-term sustainable growth, which must be a central aim of any modern industrial strategy. The strategy should also focus on making the UK one of the 'greenest' economies in the world, and address the opportunity which the UK green industries have in terms of increased international sales and income for the UK economy – we currently under-perform against international comparators in this area where there are great opportunities for economic growth and the environment. There are of course clear links with the government's other focus areas; transitioning to a greener economy will require the UK to draw on its strengths – its world-leading science and research base, and strong track record in delivering low carbon and resource efficient innovations – and will contribute to accelerating growth across the UK.

2. Are the ten pillars suggested the right ones to tackle low productivity and unbalanced growth? If not, which areas are missing?

We welcome the intention to focus on skills, science and innovation, and clean growth. As well as seeking to tackle low productivity and unbalanced growth, an essential aim of a modern industrial strategy should be to promote *sustainable* growth in the long term. Measures to promote unsustainable short-term growth may increase the likelihood and magnitude of catastrophic risks to the economy (such as runaway climate change, unsustainable pressure on resources, or radical ecosystem shifts). As such, we feel that sustainability should be embedded across this strategy in all ten pillars – it has relevance across our economy, not just to energy.

More generally, although the paper is broken down into ten pillars, we welcome the broadly 'horizontal' approach taken by the government. To tackle the interlinked challenges facing our economy, society and environment we need to seek cross-sector solutions, and encourage collaboration between businesses, academia, civil society and voluntary organisations, and government.

3. Are the right central government and local institutions in place to deliver an effective industrial strategy? If not, how should they be reformed? Are the types of measures to strengthen local institutions set out here and below the right ones?

The newly established body, UK Research and Innovation (UKRI) will be a crucial institution in delivering this Industrial Strategy. One of UKRI's six stated objectives is "*improved collaboration between the research base, business and the commercialization of discoveries*". It is extremely important that UKRI (which brings together the Research Councils and Innovate UK) can use this new structure to effectively link businesses with academia, where the UK has world-leading strengths.

4. Are there important lessons we can learn from the industrial policies of other countries which are not reflected in these ten pillars?

Yes; this strategy should reflect lessons from other countries regarding the importance of consistency of approach and policy, over a significant time period, for building investor confidence, particularly in new technologies. Policy stability allows industry to be sufficiently confident to make the necessary investments. For example, whilst in the UK there has been a lack of certainty over government policy on renewable energy in recent years, in Germany and some other European countries, where there is greater policy continuity in this area, industry has embraced these technologies. As a consequence, the UK has seen importation of some equipment in this sector, rather than the development and installation of 'home-grown' technologies (for instance, wind power towers, blades and turbines).

5. What should be the priority areas for science, research and innovation investment?

We welcome the increases in public funding for research an innovation announced by the Government in the Autumn budget in 2016, and reinforced in this strategy. This investment is vital to reinforce and capitalise on our world-leading research base, and we highlight several areas in which investment should be prioritised below. We argue that whilst research funding mechanisms should be challenge led and solution oriented, support for fundamental, 'blue-skies' research remains vital. As Sir Paul Nurse sets out in his review of the Research Councils, research policies should recognise "the differences and similarities between discovery [or fundamental], translational and applied research"[1].

The Campaign for Science and Engineering (CaSE) estimates that current UK Gross Domestic Expenditure on Research and Development (GERD) including the £2bn funding increase announced and potential increased private investment (assuming a ratio of public to private investment of 1:2, as public investment crowds in private investment), equates to roughly 2% of GDP[2]. This still leaves the UK behind

[1] Nurse, P. (2016) *Ensuring a successful UK research endeavour: A review of the UK Research Councils*. BIS/15/625. Recommendation 1(iii). www.gov.uk/government/publications/nurse-review-of-research-councils-recommendations

[2] http://www.sciencecampaign.org.uk/our-work/investment/r-d-investment-factsheet.html

both France (2.26% of GDP) and Germany (2.9% of GDP), and the OECD average (2.38% of GDP). CaSE estimates that for the UK to meet the EU2020 target, and international benchmark figure for total spend on research and development of 3% of GDP, the Government would need to invest approximately an additional £6.1 billion per year, on top of the recent investment announcements (based on current GDP). Public investment in research and innovation sparks greater private investment; to continue competing globally as a modern, innovative economy, it will be necessary for the UK to explore further opportunities to increase R&D spend in the near future.

Interdisciplinary research

The holistic approach to research and innovation funding which is being adopted by the Government, through the formation of UK Research and Innovation (UKRI) is welcome. Research which embraces interdisciplinarity is vital to increasing our understanding of complex and interconnected socio-environmental and economic systems, and tackling the major ('wicked') societal and environmental challenges we face now and in the future. A funding structure which supports interdisciplinary research across traditional Research Council boundaries will assist this. Nevertheless, it is extremely important that the UK's Industrial Strategy recognises the importance of and prioritises these types of projects.

Sustainable development

The RCUK Strategic Vision 2011-2015 stated that Research Councils (RCs) will enhance the impact of their funded research by "Focusing research to produce impact for a productive economy, healthy society and a sustainable world"[3]. We welcome this sentiment, but would support a more explicit integration of the sustainable development concept into the aims and vision of both the newly formed body UKRI and the individual RCs. Although RCs are non-departmental public bodies, in line with Government policy ("The government is committed to sustainable development"[4]), sustainable development should be a key principle underlying RC strategic planning and funding decisions and the broader strategy of UKRI.

Furthermore, enhancing our understanding of how humans interact with environmental systems, and how to make our society more sustainable should be a priority area for further research through interdisciplinary sustainability science.

Knowledge exchange

Knowledge exchange is vital to a strong science base and an innovative, progressive economy. However, this process cannot be relied upon to happened spontaneously, and done well, takes time and

[3] Research Councils UK Strategic vision (2011-2015) http://www.rcuk.ac.uk/Publications/policy/StratVision/

[4] https://www.gov.uk/government/policies/making-sustainable-development-a-part-of-all-government-policy-and-operations

resources. Investment to facilitate effective knowledge exchange is important if it is to be mobilised to the extent necessary to drive innovation – incentives, rewards, and facilitation schemes are necessary and an important part of the science budget.

6. Which challenge areas should the Industrial Challenge Strategy Fund focus on to drive maximum economic impact?

The circular economy and resource efficiency

The concept of the circular economy "envisions entire economies built around the principle of using resources to their maximum value, keeping them within the economy indefinitely, and aiming to 'design out' waste from the system as far as is possible"[5]. Increasing circularity involves developing longer lasting products, increasing repairability, and using remanufacturing techniques to increase product and resource re-use. It also involves designing products with recycling or remanufacturing in mind. This is an area where innovation is rapid, and has the potential to deliver significant economic impact with appropriate support.

The Ellen MacArthur Foundation, Stiftungsfonds für Umweltökonomie und Nachhaltigkeit (SUN; the environmental economics branch of the Deutsche Post Foundation), and McKinsey have identified that by adopting circular economy principles, Europe can take advantage of the impending technology revolution to create a net benefit of €1.8 trillion by 2030, or €0.9 trillion more than in the current linear development path[6]. As the European Union takes active steps towards increased circularity through the Juncker Commission's Circular Economy Programme, the UK should not miss out on the competitive advantages the programme could afford. Defra analysis in 2011 predicted that improving resource efficiency could save British businesses up to £23 billion per year[7]. Investing in research on the resource efficiency and the circular economy (be it new materials, remanufacturing, eco-design or other areas) has the potential to deliver innovations which will drive growth, make UK businesses more efficient, and aid the transition to a sustainable economy.

Low carbon technologies

[5] Roberts, C. and Hill, J. (2015) New materials for new ways of making things, *environmental SCINETIST,* 24.1: pp 7. https://www.the-ies.org/resources/new-materials-and-circular-economy

[6] Ellen MacArthur Foundation, SUN, McKinsey & Co. (2015) Growth Within: a circular economy vision for a competitive Europe (June 2015). www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_Growth-Within_July15.pdf

[7] https://www.gov.uk/government/news/research-shows-companies-can-save-money-by-helping-the-environment

The proposals to target investment through the Industrial Strategy Challenge Fund on clean energy and battery technology are very positive. These are areas where innovation is already fast-paced and industry is keen to develop. As such, funding for business-led collaborations, with support throughout the development process, could prove extremely beneficial.

The low carbon technologies sector is also already a major and fast growing contributor to the UK economy. In 2013 the Gross Value Added by the low carbon sector (and associated supply chain) to the UK economy was estimated at £44.9 bn, and it is showing significant year-on-year growth: 8.7% over the period 2010-2013[8]. The widespread adaptation of these technologies will lead to public cost savings associated with improvements in public health, and offsetting the impacts of climate change reducing economic risk. Support for innovation in this area is therefore extremely important, and evidence suggests that investment here could deliver greater economic impact than in other areas. As a 2014 Policy Brief from the Grantham Research Institute and the Global Green Growth Institute notes, "*there is evidence that low-carbon innovations induce larger economic benefits than the 'dirty' technologies they replace because they generate more knowledge in the economy, which can be used by other innovators to further develop new technologies across various sectors of the economy*"[9].

Making the most of data

As well as promoting research and innovation in new technologies and ideas, it is important to ensure that maximum impact is delivered from research already being conducted. Encouraging openness in data sharing is one area where there is potential to deliver major impact.

In the environmental sciences, for example, as we highlighted in our submission to Sir Paul Nurse's review of the Research Councils, understanding how the natural environment is changing and assessing human impacts on the environment requires monitoring and measurements. To be of greatest benefit these measurements should develop into long-term datasets to enable better analyses of the changing environment. Currently measurements are made in the UK by central and local government, groups such as the Environment Agency, Universities, consultancies and special interest environmental groups. These measurements encapsulate different measurement methodologies and instrument standards and protocols and will vary in their sampling periods. There will however be a certain amount of overlap. There is a need for a more coordinated environmental measurement strategy for the UK. Although currently this would not fall within the remit of the Research Council bodies themselves, there is an

[8] Department for Business, Innovation and Skills (2015) *The size and performance of the UK low carbon economy: Report for 2010 to 2013*. March 2015. www.gov.uk/government/uploads/system/uploads/attachment_data/file/416240/bis-15-206-size-and-performance-of-uk-low-carbon-economy.pdf

[9] Dechezleprêtre, A. and Sato, M. (2014) *The impacts of environmental regulations on competitiveness*. Policy brief, November 2014. Grantham Research Institute on Climate Change and the Environment and Global Green Growth Institute, p4.

opportunity to enhance support for an organisation such as the UK Environmental Observation Framework[10]. A coordinated monitoring strategy would save a significant amount of money at various levels of government and facilitate much more detailed long-term environmental analysis.

Beyond the environmental sector, there may be other opportunities for the Industrial Strategy Challenge Fund to target funding towards initiatives focused on the collation of open, accessible and standardised data, which would facilitate better research and scientific analysis. As well as delivering greater efficiency, enhanced data collation may facilitate innovation in a range of sectors.

Sustainable Development Goals

The UK has committed to delivering the UN Sustainable Development Goals (SDGs) by 2030. Science, technology and innovation have a core, underpinning role in implementing the vision of the SDGs, and it we would welcome a clear link between the Industrial Strategy Challenge Fund and these Goals, which would make this fund more responsive to societal challenges as well as technological change. This should form part of a clear UK domestic implementation strategy.

7. What else can the UK do to create an environment that supports the commercialisation of ideas?

Incentivisation

Catalysing the commercialisation process through incentivisation is important. We identify two key mechanisms to incentivise the commercialisation of new technologies and ideas: (1) the use of public procurement to favour and de-risk the adoption of innovation, and (2) fiscal incentives to both innovators and adopters of innovative technologies.

One sector where incentivisation could yield particular benefits is the low-carbon or environmental industries. This sector employs thousands of people in the UK, and is a growing contributor to the UK economy, delivering and facilitating sustainable growth. This sector is also a significant foreign revenue earner for the UK, but could be even more successful if it were to perform to the level of our peers in, for example, the USA and Germany. We therefore need to recognise, support and incentivise this industry, to support innovation and increase its rate of growth.

Regulation

We would caution against the development of an Industrial Strategy which promotes the misconception that all regulation is bad for business and innovation. Not just at the commercialisation stage, but indeed throughout the innovation pipeline, private sector investment in research and development and

[10] www.ukeof.org.uk/

breakthrough technologies is secured and sustained by a stable and transparent regulatory and policy environment in which investors have confidence.

There are occasions where regulation plays an important role in promoting innovation in specific sectors, practices and technologies, for mutual economic and environmental benefit. This has particularly been the case in the environmental sector ("*there is ample evidence that environmental regulations induce innovation in clean technologies*"[11]). For instance, in the waste management sector, research shows that the landfill tax (introduced in 1996) has encouraged diversification and promoted the development of innovative waste treatment solutions, as well as social and environmental benefits[12]. In this case, the landfill tax acted as a primary driver for investment across the sector's supply chain. As Databuild's Report for HM Revenue and Customs highlights, the landfill tax promoted investment in research on the recycling of traditionally 'hard-to-treat' materials, exemplifying the potential for profit in immature technologies, and driving them closer to market. In this way, regulation has driven, and continues to drive, innovation in, and the commercialisation of, technologies that are valuable to the UK.

8. How can we best support the next generation of research leaders and entrepreneurs?

Education and training

The Higher Education sector needs to be encouraged to embed research, innovation and entrepreneurship, as well as sustainability awareness, throughout its curricula. Multi- and inter-disciplinary awareness and methodologies should also be taught. There is a role for professional bodies and learned societies in mainstreaming these skills through degree accreditation. The IES' accreditation scheme for environmental science programmes seeks to prepare graduates for the future by equipping them with transferable skills such as team and project working, as well as subject specific knowledge and understanding. We are keen to work with government and industry bodies to develop and improve the accreditation of degree programmes and other training.

Innovation prizes

To support innovators in business and research, the government should seek to learn from the successes of innovation 'prizes' such as the X-prize and Scotland's Saltire Prize. These examples are goal-oriented initiatives designed to support and accelerate innovation to tackle major societal and

[11] Dechezleprêtre, A. and Sato, M. (2014) *The impacts of environmental regulations on competitiveness*. Policy brief, November 2014. Grantham Research Institute on Climate Change and the Environment and Global Green Growth Institute, p3.
[12] Talbot, A. et al. (2014) Qualitative research into drivers of diversion from landfill and innovation in the waste management industry. *HM Revenue & Customs research report 316*, April 2014, DATABUILD. HM Revenue & Customs.

environmental challenges, or to accelerate the commercial development of promising new technologies, and have proven histories of success.

Equality of opportunity

The government must ensure equal opportunities for progression, and seek to tackle any discrimination or lack of representation on the basis of gender, marital status, race, ethnic origin, colour, nationality, national origin, disability, sexuality, religion, belief, or age. As well as the need to address this issue as a moral imperative, innovation often arises from diversity. We must ensure that the full cross-section of our society is empowered and supported to engage in business, research and innovation. There is evidence that diverse workforces are more innovative and productive[13], demonstrating the 'power of difference' and benefits of diversity.

9. How can we best support research and innovation strengths in local areas?

Local Enterprise Partnerships (LEPs) need to be able to support research and innovation on a much more significant scale, and so need to be required and funded to do that.

Mapping existing research strengths in local areas, and making this information publicly available, may help to build better local and regional links and strategic partnerships. Making links between geographically proximate institutions and businesses can encourage clusters to develop which can accelerate innovation, attract investment and contribute to the local and national economy.

13. What skills shortages do we have or expect to have, in particular sectors or local areas, and how can we link the skills needs of industry to skills provision by educational institutions in local areas?

Sector-specific skills: environmental sciences

In 2012 the Natural Resources Research Council (NERC) conducted an analysis of the postgraduate and professional skills needs of the environmental sciences sector[14]. This 'Most Wanted' report highlighted 15 critical skills gaps for the sector and ranked them in priority order. These were then broken down into lists of cross-disciplinary skills gaps, and discipline specific skills gaps.

The top three critical skills listed are (1) modelling, (2) multi-disciplinarity, and (3) data management. In modelling and data management, fields in which the rate of technological change is fast, there is great potential for innovation, but in order to capitalise on this potential we must also foster the appropriate

[13] http://www.mckinsey.com/business-functions/organization/our-insights/is-there-a-payoff-from-top-team-diversity

[14] NERC (2012) *Most Wanted II: Postgraduate and professional skills needs in the environment sector*. LWEC Report 2012. http://www.nerc.ac.uk/skills/postgrad/policy/skillsreview/2012/

technical skills. We encourage the government to refer to the full NERC report and skills framework for the full list and a more detailed breakdown and explanation. The emphasis on the need for multidisciplinary skills recognises that some of our most ground breaking and world leading research is currently taking place at interdisciplinary boundaries. This gap is relevant beyond the environmental sciences: the UK should be developing interdisciplinary skills across all sectors and subject areas.

The critical skills gaps identified in the 2012 NERC review were the same as those identified in an earlier 'Most Wanted' analysis undertaken between 2008 and 2010[15]. This shows that policy interventions during that period failed to address these skills gaps, and new approaches are required.

Facilitative skills

For development and infrastructure projects to succeed, a range of skills are required beyond the obvious engineering and construction sector, including environmental. These can be broadly considered as 'facilitative skills'. In the environmental sector this includes for instance the skills required to carry out impact assessments, and plan and implement mitigation activities. It is important that individuals employed in these areas are equipped not only with technical environmental skills, but with the communications, project management and business awareness skills which will enable them to interact and collaborate successfully with other professionals. When assessing the skills requirements of major infrastructure projects, facilitative skills should not be forgotten. Furthermore, when looking at the skills of STEM graduates, these complementary business awareness skills should be an important factor for consideration.

14. How can we enable and encourage people to retrain and upskill throughout their working lives, particularly in places where industries are changing or declining? Are there particular sectors where this could be appropriate?

As sectors change to reflect changing realities and new technologies, lifelong learning is vital. In the environmental sector for instance, new modelling, data management and earth observation technologies are regularly emerging, and upskilling is important. As our understanding of environmental systems and processes evolve, it is also important that professionals continue to develop their own understanding. The Institution of Environmental Sciences supports its members to undertake learning and development activities throughout their careers. Professional bodies play an important role in encouraging and facilitating lifelong learning and career progression, through Continual Professional Development (CPD). Professional bodies and professional registers should therefore play an important

[15] NERC (2010) *Most Wanted: Postgraduate skills needs in the environment sector*. ERFF Report 07. http://www.nerc.ac.uk/skills/postgrad/policy/skillsreview/2010/

role in the government's skills development plans, and we would be pleased to engage further with the government on this topic.

15. Are there further actions we could take to support private investment in infrastructure?

If the UK is to meet its national obligations under the Climate Change Act, and its international commitments under the Paris Agreement, it is clear that renewables must form an important part of our energy mix in the future. There is significant interest from the private sector in investing in renewable energy projects and infrastructure, but an unstable regulatory environment in recent years has acted as a barrier in some cases to greater investment. To encourage greater private sector investment in these nationally vital infrastructure projects, a stable regulatory environment which inspires investor confidence, is very important.

23. Are there further steps that the Government can take to support innovation through public procurement?

The Government has a major opportunity to support innovative new low carbon and resource efficient technologies, as well work towards delivering on its ambition to be the first government to leave the environment in a better state than they found it, through public procurement policy. By leveraging the large sums currently spent on public sector procurement, the Government can offer a market for innovative and sustainable products, technologies and services, incentivising innovation in these areas, de-risking investment in innovation, and act as an example, or demonstrator to encourage change in purchasing practices in other sectors of the economy.

These actions would also be consistent with existing government commitments, such as the Greening Government Commitments[16]. Supporting the UK circular economy by purchasing re-used and re-manufactured equipment, would assist government departments and their agencies in sending less waste to landfill, and reducing their greenhouse gas emissions. Investing in low carbon technologies and energy efficiency across the government estate would also deliver both financial benefits (through energy savings) and contribute to meeting sustainability targets and ambitions, for instance as set out in the Common Minimum Standards for procurement of the built environments in the public sector[17].

24. What further steps can be taken to use public procurement to drive the industrial strategy in areas where government is the main client, such as healthcare and defence? Do we have the right institutions and policies in place in these sectors to exploit government's purchasing power to drive economic growth?

[16] https://www.gov.uk/government/publications/greening-government-commitments-2016-to-2020
[17] https://www.gov.uk/government/publications/common-minimum-standards

There is a major opportunity for public sector procurement to support the UK circular economy, as well as saving money, by purchasing re-used and remanufactured equipment, investing in repair capability, and supporting business models based on leasing and take-back of equipment. The Industrial Strategy should support the development of standards and certification, and possibly bespoke financial products such as insurance and loans, that would provide the necessary certainty of quality for such procurement.

27. What are the most important steps the Government should take to limit energy costs over the long-term?

It is important to consider limiting energy costs in the context of the other two strands of the energy trilemma: security of supply, and environmental impact. These three challenges are highly interlinked and should not be addressed in isolation.

Although the cost of 'green' taxes have often dominated political discourse on energy costs, demand is also an important factor. In tandem with efforts to increase generation, we should also be seeking to address wasted energy, through energy efficiency measures. In the UK Government's 2012 Energy Efficiency Strategy, it was estimated that through socially cost-effective investment in energy efficiency the UK could be saving 196 TWh of energy in 2020, which is equivalent to the output of 22 power stations[18]. If this full potential were to be realised, final energy consumption in 2020 could be 11% lower than the business as usual baseline. Following this strategy, research commissioned by DECC on energy efficiency in SMEs calculated that the value of the missed opportunity from energy efficiency for the companies studied was between £5,800 and £12,200 per annum, or between 18% and 25% of their annual energy costs[19]. The report also notes that were this level of missed opportunity to be representative of SMEs throughout the UK annual cost savings of between £1.26 bn and £2.63 bn could be available to the SME community. The research shows that 37% of these savings would require zero capital investment.

Improving energy efficiency is an opportunity to deliver benefits across several pillars of the Industrial Strategy. As was noted in DECC's 2012 Energy Efficiency Strategy, improving energy efficiency can improve productivity, increasing growth and reducing inflation. DECC also recognised in this document that "a more energy efficient UK will have lower exposure to international energy market price rises and volatility"[18].

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[18] Department of Energy and Climate Change (2012) *The Energy Efficiency Strategy: The Energy Efficiency Opportunity in the UK*. November 2012. www.gov.uk/government/publications/energy-efficiency-opportunities-in-the-uk

[19] ENWORKS (2014) *Research to Assess the Barriers and Drivers to Energy Efficiency in Small and Medium Sized Enterprises*. DECC, November 2014. www.gov.uk/government/publications/research-to-assess-the-barriers-and-drivers-to-energy-efficiency-in-small-and-medium-sized-enterprises

28. How can we move towards a position in which energy is supplied by competitive markets without the requirement for on-going subsidy?

Renewable energy technologies must be integral to a sustainable future energy mix. Subsidies can be an important tool in fostering and encouraging uptake of novel technologies, but should be reduced as generation costs fall. These decisions should be taken through a fair and transparent process, and led by evidence and expert analysis.

A progressive, dynamic economy requires creative destruction, or industrial mutation; supporting the creation of new industries, but letting older unsustainable industries be replaced. In the energy sector it is fairly obvious that the future lies in low-carbon electricity production (fossil fuels are a finite, unsustainable and dwindling resource). In this context there seems to be little justification for the hidden subsidy of tax relief for the oil and gas sector.

30. How can the Government support businesses in realising cost savings through greater resource and energy efficiency?

On energy efficiency, we echo our earlier call in relation to renewables for regulatory and policy stability. Confusing and frequently changing government schemes (for instance the de-funding of the Green Deal programme) can discourage businesses from engaging in activities to improve their energy efficiency. Clarity and confidence are important if more businesses are to take advantage of schemes to improve energy efficiency.

One scheme which was established to improve energy efficiency measures in medium and large businesses was the Energy Savings Opportunity Scheme (ESOS). Under the scheme businesses were required to conduct an audit of their energy consumption and performance (to be undertaken by a suitable experienced, accredited professional), which would highlight areas where efficiency could be improved, or demand reduced, ultimately saving businesses money. However, information on the scheme was not universally well communicated, and deadlines were not well enforced, leading to poor compliance. Funding for an agency to properly enforce this scheme would be welcome, and could lead to significant savings for UK businesses, whilst reducing our energy demand and therefore vulnerability to market perturbations and supply challenges. In general, greater recognition of the direct and long term cost savings from the implementation of environmental measures will be important if schemes to increase resource and energy efficiency are to be successful. There are great opportunities in this area for business and government – communication should reflect the scale of these opportunities and challenge the misconception that ‘green’ schemes represent a cost burden.

Support for resource efficiency savings could be boosted by applying elements of the EU's circular economy package, which could help provide incentives for re-use, remanufacturing and repair, and develop stronger markets for recycled materials. Developing measures of resource productivity would

also be useful, to enable a better understanding of how well UK industries are taking advantage of the resources available to them.