The institution of environmental sciences

Regulation and Innovation: developing Defra's Innovation Plan

Submission from the Institution of Environmental Sciences

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Background

The Institution of Environmental Sciences (IES) is a membership organisation that represents over 3,000 professionals from fields as diverse as air quality, land contamination and education - wherever you find environmental work underpinned by science. A visionary organisation leading debate, dissemination and promotion of environmental science and sustainability, the IES promotes an evidence-based approach to decision and policy making.

Regulatory enablers of and barriers to innovation

Not all regulation is bad for business and we strongly caution against the production of an Innovation Plan which promotes this misconception. If further investment in R&D and new breakthrough technologies is to be secured and sustained, a stable regulatory and policy environment in which investors have confidence is important.

There are also occasions where regulation can play 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. As a 2014 Policy Brief from the Grantham Research Institute and the Global Green Growth Institute demonstrates, "*there is ample evidence that environmental regulations induce innovation in clean technologies*"[1]. The report goes on to explain the benefits of this innovation for economies: "*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*"[2]. Smart regulation can disrupt markets as effectively as new technologies.

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[3]. 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

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[1] Dechezleprêtre, A. and Sato, M. (2014) *The impacts of environmental regulations on competitiveness*. Policy brief, November 2014. Grantham IResearch Institute on Climate Change and the Environment and Global Green Growth Institute, p3.

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

[3] 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.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/319324/report316.pdf.

'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 technologies that are valuable to the UK. The UK's Knowledge Transfer Network reports the same impacts from environmental regulation. This is the type of regulation which Defra's Innovation Plan should encourage.

Other examples demonstrate that when firms face higher expenditures due to, for instance, tax-inclusive fuel prices, they will invest more in research and development on low-carbon technologies[4]. Similar trends can be noted where regulation requires increased expenditure on pollution control measures or energy prices, encouraging firms to invest more in 'green' products and services.

As well as the obvious environmental benefits of investing in low carbon technology, this innovation should be encouraged as this is 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[5]. This is without considering the cost savings associated with improvements in public health, and offsetting the impacts of climate change which some of these technologies, if widely adopted, could bring about.

Beyond this, empirical research that has sought to estimate the rate of return on R&D at firm and industry levels has generally found social rates of return to be substantially higher than private rates of return[6]. With clear economic, environmental and social returns to be gained, we encourage Defra to use regulation to stimulate increased R&D and innovation.

Defra's service to innovative business

The Department's drive for Open Data should be applauded, but it is important that shared data must be made available in a format which enables innovation. Where potential uses and requirements cannot be forseen, Defra must be open to approaches from those whose ideas require data in various formats, and should facilitate this where possible. As the innovations of the future are likely to present challenges to the status quo, it is important for government to adopt this open, facilitative approach. This point is part of a wider requirement to recognise that where specific innovation is required to address industrial and business challenges, it is usually the case that no (affordable) solution currently exists, and therefore it is very difficult to predict what this new technology will look like.

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[4] E.g. Aghion et al. (2012) 'Carbon taxes, path dependency and directed technical change: evidence from the auto industry' *CCCEP Working Paper No. 120; Grantham Research Institute on Climate Change and the Environment Working Paper No. 102* http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2012/12/WP102-carbon-taxes-path-dependency-auto-industry.pdf
Recently published in the *Journal of Political Ecology*, Vol 24(1): pp1-51.
http://www.journals.uchicago.edu/toc/jpe/current.

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

[6] Griffith (200) 'How important is business R&D for economic growth and should the government subsidise it?', The Institute for Fiscal Studies, p3, http://www.ifs.org.uk/bns/bn12.pdf.

Digital innovation is a major growth area, and we must embrace the potential of data science where it may present business opportunities, which may also lead to the development of tools and services which may be of use to government.

How Defra uses new technologies to minimise burden on business?

Defra's recent investment in Earth Observation technology is encouraging. Earth Observation data can be used to underpin work by Defra and its agencies in many of its significant areas; obvious examples include habitat mapping, monitoring land use change, and flood mapping. Investing in this area of research will promote further innovation which will be of benefit to both government and private sector users. Integration of satellite-collected data with data collected by specialists *in situ* also presents opportunities to improve our understanding of environmental systems, as well as enhancing the efficiency of the data collection process. It is likely that over time such advances in data collection and processing will not just support businesses who must demonstrate compliance with environmental regulations, but will enhance and facilitate wider initiatives that improve the quality of life of UK and global citizens.