House of Commons
Energy and Climate Change Committee

Innovate to accumulate: the Government's approach to low carbon innovation

Second Report of Session 2014–15

Report, together with formal minutes relating to the report

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The Energy and Climate Change Committee

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The current staff of the Committee are Farrah Bhatti (Clerk), Vinay Talwar (Second Clerk), Tom Leveridge (Committee Specialist), Marion Ferrat (Committee Specialist), Shane Pathmanathan (Senior Committee Assistant), Amy Vistuer (Committee Support Assistant), and Nick Davies (Media Officer).

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Summary

Innovative low carbon technologies such as bioenergy, offshore wind, and carbon capture and storage will be necessary to achieve the UK’s legally binding 2020 and 2050 carbon emissions targets and the Government is right to play an active role in facilitating their development. At the moment however, there is a mismatch between the resources allocated by the Government to support companies and its level of ambition in this complex policy area. The Government’s main tool for this policy is the public-private body, the Low Carbon Innovation Co-ordination Group (LCICG). Unfortunately the LCICG’s governance is muddled, with an unhelpful mix of core and associate members and inadequate transparency on decision-making and information sharing. We were surprised and disappointed to hear witnesses express continual frustration at the lack of consultation and publicity surrounding the LCICG’s new framework and its launch. A lack of staff for the LCICG Secretariat may contribute to the ineffective communication between LCICG and broader innovation partners. Investment decisions by the Government and LCICG may also be clouded by a lack of responsive, timely metrics. For example, such metrics would enable the performance of different innovations to be compared and evaluated.

DECC has admitted that this lack of staff resource also prevents it from engaging fully on European issues that are of direct relevance to UK innovators. These issues include the ability to shape multi-billion euro funding programmes, help UK innovators access EU funding, and help shape EU standards on low carbon products such as energy efficiency devices and heat pumps. DECC and the LCICG therefore need to deliver better support on EU issues for UK innovators. At a global level DECC and the LCICG could do more to help UK innovators benefit more from their intellectual property internationally, to help to build greater confidence for potential investors to support innovation in low carbon technologies.

Building investor confidence is an ongoing concern. Innovators and their business and academic partners value long-term certainty of structures such as supportive regulation (and where possible, longer-term certainty on funding). Without effective coordination of existing programmes by the LCICG, the risk increases for gaps or duplications in support for innovation, and a failure to communicate proactively with companies, entrepreneurs and developers. The current resource levels and structure between the Government and the LCICG on low carbon innovation have not enabled these risks to be managed effectively.

Greater ministerial engagement with the LCICG and a better resourced secretariat is therefore needed given the importance of achieving the UK’s climate change targets.
1 Introduction

Background

1. Low carbon innovation encompasses processes and products that help to achieve carbon emission reductions. The Government views these innovations as key tools towards the UK’s legally binding targets on energy and carbon emissions:

- The EU Renewable Energy Directive (2009): to increase the share of renewable energy in the UK’s energy mix from 1.3% in 2005 to 15% by 2020; and

- The Climate Change Act 2008: to reduce greenhouse gas emissions by at least 80% by 2050, relative to 1990 levels.

2. In June 2010, the National Audit Office (NAO) reported that at its creation in 2008, the Department of Energy and Climate Change (DECC) had inherited a poorly coordinated programme of direct public support for the development of renewable technologies.¹ This made it difficult for the NAO to determine whether the Government was achieving value for money from public funds.

3. In December 2011, DECC reported that it would introduce a more disciplined approach to plan and manage direct public support for low carbon innovation. DECC committed to:

- Relaunch the “Low Carbon Innovation Co-ordination Group” (LCICG) to enable it to coordinate the activities of all departments and bodies with key low carbon innovation interests and strengthen the Government’s vision and objective. See figure 1.

- Develop Technical Innovation Needs Assessments (TINAs) to provide a shared evidence base to ensure consistent prioritisation of public funding for low carbon innovation.

- Publish a new strategy for public support for low carbon innovation and provide greater transparency about the sources of public funding available.²

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¹ National Audit Office, Government Funding for developing renewable energy technologies, HC 35 Session 2010–11, 10 June 2010.
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Figure 1: Membership of the Low Carbon Innovation Continuation Group

Source: National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p17

4. Despite these Government commitments, the NAO subsequently reported in 2013 that the UK’s performance on low carbon innovation funding to date had been mixed.³ UK expenditure on energy research and development doubled between 2006 and 2011, yet DECC underspent its low carbon innovation budget each year between 2011 and 2013.⁴ Total spending by the LCICG members on innovation reduced by 33% between 2010-11 and 2011-12.⁵ There is limited financial commitment from the Government beyond 2015 to a low-carbon innovation budget; only the ETI (Energy Technologies Institute) has confirmed Government funding to 2017.⁶ Similarly, there is limited commitment from LCICG members as to the scale of their ongoing financial support for innovation beyond 2015.⁷ The NAO stated “the view of some companies responding to our consultation was that the funding bodies focus more on short-term results rather than long-term goals. As a result, companies lack confidence in future public funding to be able to plan their long-term investment strategy”.⁸

³ National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 7
⁴ National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 8
⁵ National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 7
⁶ National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 24
⁷ National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 24
⁸ National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 24
5. Given the central role that low carbon innovations could play in achieving the UK’s ambitious and legally binding energy and emissions targets, and the complexity of the public funding landscape, we decided to investigate what progress the Government had made since the NAO first reported on the issue in 2010. We announced our inquiry in October 2013 shortly after the publication of the NAO’s most recent report. Our terms of reference can be found online. We received 26 submissions of written evidence and held three oral evidence sessions between January and March 2014. We heard from academics and industry, including trade groups, and members of the LCICG. A full list of witnesses can be found at the back of this report.

What is low carbon innovation?

6. The Government and the LCICG define low carbon technologies to include technologies that can:

- Prevent or reduce the release of greenhouse gases into the atmosphere;
- Supply energy with substantially lower greenhouse gas emissions than current processes allow;
- Enable the deployment of innovations, such as energy distribution technologies;
- Reduce the amount of energy consumed;
- Help consumers to reduce their energy use, such as smart meters; and
- Reduce the release of greenhouse gases from other processes, for example industry or agriculture.

Technology innovation in this context includes improvements to systems and processes provided that they are closely linked with the deployment of a technology.

The Government’s approach to low carbon innovation

7. The Government’s plan is to achieve competition between low carbon technologies to deliver energy most cost-effectively and not to pick technology winners. Its alternative potential scenarios for meeting the statutory carbon reduction target depend on the outcome of innovation in renewable technologies, nuclear, Carbon capture and storage (CCS), and energy demand and efficiency. The NAO reported that the Government would:

- Work with industry to reduce costs;
• Support the development and demonstration of new low carbon generation technology such as CCS and less mature renewable technologies; and

• Support innovation to help reduce demand for energy.13

In February 2014, the Government launched its strategy document on low carbon innovation: “Coordinating Low Carbon Technology Innovation Support: The LCICG’s Strategic Framework”. This document sets out what the Government believes are the key innovation needs until 2020 for 11 low carbon technology sectors, through a Technical Innovation Needs Assessment (TINA) for each sector.14 The strategy document also assesses the scale of support required, but does not make choices between individual technologies nor their needs.

8. The Minister for Climate Change, Rt Hon Greg Barker MP, recognised the commercial importance of low carbon innovation to the UK economy:

    With the UK now sixth in the £3.4 trillion international low carbon goods and environmental services sector, the innovation that will continue to drive progress also presents a major opportunity for UK companies competing in the global race for green jobs and growth.15

9. However, the Government acknowledges that it cannot support all the innovation needs identified and it will have to make difficult choices on resource allocation in the future.16

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13 National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 11
2 The complexity of support for Low Carbon Innovation

10. Innovations can take decades to move from the research stage through to development and eventual deployment. This chapter outlines the complexity of issues involved in public support for low carbon innovations through this development journey.

The funding landscape

11. The NAO reported that while the public sector funding landscape is less complex than it was in 2010, there remain at least nine public bodies, including DECC, that contribute towards low carbon innovation funding in the UK, along with the different member agencies of the LCICG, each with different objectives. See figure 2.17

12. In October 2013, the NAO reported that UK public funding in low carbon technologies had fallen in recent years.18 DECC also underspent its £178m low carbon innovation budget between 2011 and 2013 because of delays in agreeing and launching its projects, and internal recruitment difficulties.19 However, total spending by LCICG members reduced from £522m in 2010–11 to £351m in 2011–12.20 Yet the LCICG Strategic Framework states that between 2011 and 2015, the core members of the LCICG “expect to invest more than £1bn in low carbon technology Research, Development and Deployment”.21 The failure of both DECC and the LCICG to commit all the resources available for low carbon innovation since 2010 may undermine the confidence of potential investors.

13. Furthermore, the NAO reported that the complexity of this funding landscape may make it difficult for innovators to navigate through funding.22 For example, Mr McDowall, UCL Institute for Sustainable Resources, stated that different parts of the LCICG are part-funded by other organisations who are also members, adding complexity to funding.23

17 National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 16
18 National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 7
19 National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 37
20 National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 24
22 National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 18
23 Q59 [Mr McDowall]
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### Figure 2: Main sources of public funding for low carbon innovation

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<th>Interest in low carbon innovation</th>
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<td>Department of Energy and Climate Change (DECC)</td>
<td>Ensuring secure, clean affordable energy supplies and promoting action to mitigate climate change. In addition to its £178 million innovation portfolio for the period 2011-15, which includes Offshore Wind, Carbon Capture &amp; Storage, Bioenergy, Nuclear, Buildings, the Department is also investing £1 billion into enabling the development of the UK’s first commercial Carbon Capture and Storage demonstration plant.</td>
</tr>
<tr>
<td>Department for Business, Innovation and Skills (BIS)</td>
<td>Boosting economic growth and employment, BIS sponsors the Technology Strategy Board and the UK Research Councils, and through them, the Energy Technologies Institute (ETI).</td>
</tr>
<tr>
<td>Carbon Trust</td>
<td>The Carbon Trust is an independent company helping businesses and governments accelerate the move to a sustainable, low carbon economy through carbon footprinting and reduction expertise, and developing commercialising and deploying innovative low carbon technologies solutions, from energy efficiency to renewable power. The Department presently funds the Carbon Trust to deliver three schemes, including a large collaborative programme with the Offshore Wind industry.</td>
</tr>
<tr>
<td>Energy Technologies Institute (ETI)</td>
<td>The ETI is a private sector organisation operating as a public/private partnership, with six global companies. It brings together the collective knowledge, expertise and experience of its diverse members to address future energy needs and funds projects that accelerate the development of affordable, clean, secure technologies required to help the UK meet its legally binding 2050 targets. The ETI makes targeted commercial investments in nine programme areas including Offshore Wind, Carbon Capture and Storage, Bioenergy; Buildings and has to date announced £210 million in projects, half of which is met through public funding.</td>
</tr>
<tr>
<td>Technology Strategy Board (TSB)</td>
<td>The TSB is a non-departmental public body, funded by BIS to stimulate UK economic growth through innovation. The TSB expects to commit up to £15m per year to its energy programme until 2015. It has worked with the Department on a number of joint calls including Offshore Wind and Carbon Capture and Storage, with Scottish Enterprise to fund a marine energy competition, and with the Research Councils to co-fund many competitions. In addition, the TSB is funding the Offshore Renewable Energy Catapult Centre which will facilitate innovation in offshore renewables and provide a central point of access to the UK R&amp;D base, test facilities and other UK assets.</td>
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<tr>
<td>Engineering and Physical Sciences Research Council (EPSRC)</td>
<td>The Research Councils’ UK Energy Programme brings together the work of EPSRC, the Biotechnology and Biological Sciences Research Council, the Economic and Social Research Council, the Natural Environment Research Council, and the Science and Technology Facilities Council. The programme aims to position the UK to meet its energy and environmental targets and policy goals through world-class research and training. Its vision is to help solve some of the most serious challenges facing the UK today and in the future. It is investing over £540m over four years (2011-15) in research, skills and knowledge transfer.</td>
</tr>
<tr>
<td>Scottish Government</td>
<td>The transition to a low carbon economy is a strategic priority within the Scottish Government’s Economic Strategy. The Scottish Government works with a variety of organisations to establish new technology hubs and alliances to act as focal points for low carbon innovation in the energy sector. These include the Energy Technology Partnership, the Scottish Funding Council, Enterprise Agencies, the Scottish Green Energy Centre and European Structural Funds. These initiatives link to EU and UK funding programmes and attract overseas R&amp;D investment. The Scottish Government also supports low carbon innovation through direct funding to the Energy Technology Partnership and Scottish Enterprise.</td>
</tr>
<tr>
<td>Scottish Enterprise</td>
<td>Scottish Enterprise is Scotland’s main economic, enterprise, innovation and investment agency. Scottish Enterprise works with partners to stimulate economic growth, exploit low carbon opportunities, improve Scotland’s business infrastructure and support businesses. Innovation, Renewable Energy and transition to a low carbon economy are three of Scottish Enterprise’s top five priorities. In recent years, they have provided support for low carbon innovation through a range of bespoke support programmes.</td>
</tr>
<tr>
<td>European Union</td>
<td>The European Union’s energy technology development activity is coordinated through the Strategic Energy Technologies (SET) programme. The EU has a wide range of initiatives and funding streams that support energy and low carbon technologies with the aim of helping the EU to meet its energy and economic growth objectives. The largest of these funding streams is the Horizon 2020 framework programme for research and innovation which is expected to invest in excess of £5.2 billion in energy technology research and development between 2014 and 2020.</td>
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</table>
14. UK innovators are also able to access international funding. The largest of the EU funding streams that supports low carbon innovations is the Horizon 2020 programme for research and innovation which expects to invest €5.2bn in energy technology and research between 2014 and 2020. Professor Skea of Research Councils UK suggested that the UK might have benefitted more from Horizon 2020 funding if the UK delegation in Brussels had been better resourced, as the UK had missed opportunities to shape what the European Commission was developing. Dr Hollinshead, DECC Director of Science and Innovation, told us it was hard to say whether the UK was still losing out on opportunities to access EU funding because he did “not see all the opportunities given the level of resource” he had in Europe. He also acknowledged that DECC was struggling to increase staff resources on European issues.

15. Another reason additional staff resources on EU issues would be helpful is because UK low carbon innovators may be at risk of missing opportunities to export their products to EU markets because of the UK’s comparative lack of influence in shaping international regulation. Professor Skea argued that because the UK lacked the human resources for a dedicated Government team to negotiate on behalf of UK innovators’ interests, the UK was insufficiently shaping EU standards. Professor Fisk of the Chartered Institute for Building Services Engineers (CIBSE) concurred, identifying an EU energy efficiency product directive which has the power to favour or exclude particular innovative products produced by UK firms. Small UK firms without an in-depth knowledge and dedicated resource to engage and influence such directives would be at a disadvantage. Dr Hollinshead acknowledged that the UK Government did not currently have sufficient resource to influence standards. “The level of resource I have at the moment allows us to comment on their [EU] strategy and take part in the prioritisation activities. To be completely honest with you, for standards and things, I don’t have the resources to get involved.”

16. Professor Skea also told us that academia had benefitted more from EU funding than industry: “UK academics are very successful in the EU framework programmes. Industry less so”. The Technology Strategy Board (TSB), a member of the LCICG, agreed. However, we heard that the LCICG was trying to redress this industry shortfall, with a network of “catapult centres” that had been set up to help innovators collaborate and draw

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24 National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 16
25 Q25 [Professor Skea]
26 Q228 [Dr Hollinshead]
27 Q226, Q229 [Dr Hollinshead]
28 Q112 [Mr Corbett]
29 Qq25, 29 [Professor Skea]
30 Q26 [Professor Fisk]
31 Q227 [Dr Hollinshead]
32 Q18 [Professor Skea]
33 Q18 [Mr Saunders]
on funding from industry, research programmes such as Horizon 2020, and public funding.

17. **DECC has admitted that a lack of staff resource is preventing it from engaging fully on European issues that are of direct relevance to UK innovators. These include the ability to shape funding programmes, help UK innovators access EU funding, and help shape EU standards. DECC should carry out a detailed assessment of staffing needs on European innovation issues in order to determine how much additional staff resource is required. DECC should work with the Low Carbon Innovation Co-ordination Group (LCICG) to deliver better support on EU issues for UK innovators.**

**Long-term signals to support low carbon innovation**

18. Decisions on domestic and international funding have long-term implication. The Government acknowledges that low carbon technologies can take 20 years or longer to develop. Innovation investment therefore involves taking a long-term view. The NAO reported that the short-term nature of public funding challenges the development of low carbon innovation:

> The LCICG’s inability to guarantee funding beyond the end of the [2011–2015] Spending Review periods makes it harder for them to attract private sector investment. The view of some companies was that the funding bodies focus more of short term results rather than long-term goals. As a result, companies lack confidence in future public funding to be able to plan their long-term investment strategy.

19. Ms Baker of EEF, the Manufacturers’ Organisation, argued for long-term stability: “We would like to see a commitment [from the Government] to keep the institutional [innovation] structure stable, to continue to fund those and give a longer-term window on what the funding intentions are likely to be.” Dr Edge of RenewableUK criticised the lack of clear policy signals beyond 2020 from DECC’s forecasts: “Offshore wind, we could be doing nothing in the 2020s or we could be doing 30GW, if you look at the scenarios they put out. How is anyone meant to prioritise the funding for innovation if we do not know we are going to be doing any of it or a lot of it?” Signals about market certainty were also identified by the TSB, a member of the LCICG, as an influence in driving investment towards research and development. The Government acknowledged that “Policy uncertainty and imperfect market signals can be particularly significant barriers in the energy sector. Market incentives such as Feed In Tariffs and CfD can help provide confidence.”

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35 National Audit Office, *Public funding for innovation in low carbon technologies in the UK*, October 2013 p 24
36 Q95 [Ms Baker]
37 Q81 [Dr Edge]
38 Q34 [Mr Saunders]
Prioritising resource

20. The Government recognises in the LCICG Strategic Framework the challenges of achieving low carbon goals with limited financial resources:

   A key challenge for [the LCICG] is focusing our resources on those innovations where the need is most pressing and where our investments can have the most impact. Our analysis to date suggests that for the UK Government alone to support all of the innovation needs identified would require substantially more funding than is likely to be available.40

The Government therefore needs to prioritise particular areas for support. The LCICG Strategic Framework states that the Government:

   Estimate that delivering all of the innovation support activities identified would require the UK Government to invest somewhere between £3bn and £4bn over the next 5–7 years. By comparison, we estimate that the equivalent spend over the five years to 2016 is around £1–£1.5bn.41

Technical Innovation Needs Assessments

21. With limited public funds available for low carbon innovation, there is a need to prioritise resources between different low carbon technologies and between different stages in the innovation process. The LCICG has devised an evidence base to guide its investment decisions between and within innovation sectors. These appraisals, Technical Innovation Needs Assessments (TINAs), cover 11 low carbon sectors: Bioenergy, Carbon capture and storage, Domestic Buildings, Non-Domestic Buildings, Energy Networks & Storage, Heat, Industrial Sector, Marine, Nuclear Fission, Offshore Wind, and Hydrogen. The NAO reported that the Government Office for Science commended the TINAs in 2011 as an example of good practice in prioritising DECC’s scientific and technical requirements.42 The TINA approach was also supported by many witnesses.43 However, we heard from Dr Maclean of SSE and Dr Leese of the Mineral Products Association, that there was insufficient consultation with industry when identifying the 11 low carbon sectors.44

22. The NAO reported that challenges remained in comparing the performance of the different sectors against each other:

   The TINAs have enabled the [LCICG] to agree priorities within a technology area. However, it remains difficult to compare the return from investment across the technology areas because of the wide range of scenarios considered

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42 National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 7
43 Q46 [Dr Edge, Mr McDowall, Ms Baker, Dr MacLean], Q117 [Mr Hayer, Mr Corbett]
44 Q47 [Dr Maclean] Q117 [Dr Leese]
and the assessments do not address wider barriers and opportunities such as the planning system or supply chain. Therefore it has been difficult to prioritise investments between the 11 sectors. A ‘high’ priority investment within one sector may in reality be lower than a ‘medium’ priority in another.

23. We heard that the LCICG recognised the challenges of comparing sectors and as a consequence is now testing new common metrics across the 11 sectors starting with the offshore wind sector. The LCICG are piloting seven new common metrics, such as the number of new patents and reductions in unit energy costs. However, the NAO reported that DECC believed that it could take two to three years to incorporate the metrics into the LCICG decision making process. Dr Clarke and Mr Saunders of the LCICG also acknowledged the ongoing challenges of comparing different types of low carbon technologies.

24. We are concerned that the lack of responsive, timely metrics may cloud investment decisions by the Government and LCICG and we recommend that the LCICG reports back with a plan to improve the rate at which information on metrics is shared.

25. We welcome efforts to develop common metrics to compare technologies across different sectors. The Government should provide in its response to this report an update on the pilot and how long it will be before the metrics are applied to all sectors.

Minimising risks

26. We heard evidence from the ETI, a member of the LCICG, that minimising the risks that potential investors take is the key to commercialisation:

If you assume the innovation piece is £1 then the commercialisation piece will be £10 or £100, and in general, that is what the finance groups and the private sector are picking up… unless the technology is reasonably low risk, they will not make that investment and pull it through into commercialisation. I think the critical role for the public sector and for groups like the Technology Strategy Board and the ETI is helping this derisking process at the front end, such that it is seen as an attractive proposition for the big commercial investors subsequently.

27. Investment risk is lower where there is greater confidence in a technology area. For example, Professor Skea stated:

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45 National Audit Office. Public funding for innovation in low carbon technologies in the UK, October 2013 p 7
46 Q37 [Mr Clarke] Q38 [Mr Saunders]
47 National Audit Office. Public funding for innovation in low carbon technologies in the UK, October 2013 p 31
48 National Audit Office. Public funding for innovation in low carbon technologies in the UK, October 2013 p 31
49 Qq40-42 [Dr Clarke, Mr Saunders]
50 QS [Mr Clarke]
Confidence is much more robust in energy efficiency, infrastructure, including gas infrastructure, than it is in renewable, which is largely driven by a climate change agenda about which people feel less certain at the moment. Energy infrastructures, smart grid, people feel very confident that that is going to go ahead, renewable deployment, a bit less even.\textsuperscript{51}

28. Professor Fisk agreed, emphasising the clear message that building engineers are encouraged to place upon energy efficiency.\textsuperscript{52} Dr Edge of RenewableUK and Mr Clarke of ETI emphasised the need to seize the opportunity to develop these technologies now. They explained that the combination of time pressures towards reaching the 2050 targets, the time-lag involved with sourcing funding to develop new technologies, and the costs of ‘retrofits’ rising over time, added urgency.\textsuperscript{53}

29. The focus on energy efficiency is reflected in ministerial efforts. The Minister stated:

   When I came into the Department, there was no separate office for the deployment of energy efficiency. We had nuclear, renewables, oil and gas, coal but there was no dedicated strategic office for energy efficiency. We changed that. We created a dedicated resource in the Department for energy efficiency policy, and last year, the Prime Minister launched the first ever national energy efficiency strategy”.

\textit{Supporting different stages of development: the ‘valley of death’}

30. Focussing support at the right stages of the innovation process is also important. RCUK and EDF argued that it was easier to attract investment for early stages of innovation (Research & Development) and late-stage innovation (system launch/concept close to market launch) but that support dried up during the middle phases of innovation (demonstration, testing, scaling-up) in which innovators claim that a funding gap, or “Valley of Death” exists during the commercialisation of a new product.\textsuperscript{54} The Science & Technology Select Committee also scrutinised the “Valley of Death” issue and its impact on innovation.\textsuperscript{55} EDF argued for more support for SME’s in innovation and that “more funding should be made available for large-scale demonstration, testing and commercialisation of innovative technologies”.\textsuperscript{56} We heard that the UK had limited industrial capacity to develop innovations beyond the research stage but that the ETI saw its role as the facilitator to bridge that gap by linking big industry with the public sector in order to support research activity through to development.\textsuperscript{57} We note that catapult centres (see paragraph 16) also have a role to play in bringing those groups together.

\textsuperscript{51} Q34 [Professor Skea]
\textsuperscript{52} Q34 [Professor Fisk]
\textsuperscript{53} Q82 [Dr Edge], Q16 [Mr Clarke]
\textsuperscript{54} LCI0018, LCI0013
\textsuperscript{55} Science and Technology Committee. Bridging the valley of death: improving the commercialisation of research (4 March 2013)
\textsuperscript{56} LCI0013
\textsuperscript{57} Q45 [Mr Clarke]
31. The ‘Valley of Death’ issue may also be linked to the balance between supply and demand for innovation. The University of Exeter Policy Group explained that the development of innovation may be adversely affected through too much focus on the supply side of innovation and not enough focus on stimulating demand for low carbon innovation products or processes. They attributed this in part to the LCICG’s structure with core members “made up of research and technical bodies, while the institutions which have a direct impact on the viability and deployment of new technologies such as Ofgem are only associate members”.58 David Clarke of ETI said that in the past, discussions with regulators such as Ofgem had been ad hoc and occurred halfway through the development of an innovation. Mr Clarke stated that the LCICG now saw an opportunity to be more structured and engage with regulators earlier on in the project development stages.59 We discuss the membership of LCICG in greater detail in Chapter 3. Professor Fisk of CIBSE agreed that there was a lack of market demand for low carbon innovations, advocating greater “procurement pull” to stimulate demand.60 As we discussed previously (see paragraph 17) an ability to influence EU product standards may stimulate demand that helps UK innovators pull their innovations through to market.

**Intellectual property**

32. To ensure maximum benefit for the UK from innovations developed in this country, it is important to protect intellectual property both within the UK and internationally. Mr McDowall of the UCL Institute for Sustainable Resources suggested that public funding may be supporting the research and development of UK low carbon innovations but since the Government did not own the intellectual property, foreign manufacturers could then profit from reproducing the innovation internationally.61

33. However, Dr Edge said that too much regulation on intellectual property could stifle essential collaborations from developing within the supply chain, so a balance had to be struck between protection and flexibility.62 Dr Hollinshead agreed:

> I think the only answer is that you have to try to manage IP to mitigate the risks of international collaboration as best you can, but also to remember that that international collaboration presents you with opportunities to drive UK exports and growth. It is making sure you are taking sensible steps for the legal cover you need and doing the best to protect it. As the end of the day, if you just hide the IP and do not do anything with it, it is not very valuable either.63

34. The Minister confirmed that he was exploring new ways of protecting intellectual property for investors, along the lines of an export finance guarantee:

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58 LCI0020
59 LCI0020
60 Q4 [Professor Fisk]
61 Qq72-76 [Mr McDowall, Ms Baker, Dr Edge]
62 Q76 [Dr Edge]
63 Q203 [Dr Hollinshead]
In the same way that if you are exporting to developing countries the UK Government will underpin your financial risk for not being paid through export guarantees, there ought to be some commensurate or similar tool that offers protection to entrepreneurs and innovators exporting their IP abroad in order to give entrepreneurs greater confidence that if they do go into foreign markets with cutting-edge IP, they are not going to have their legs cut away from them. That was a very nascent idea but I think it is a very interesting one, and one I am sharing with Downing Street and we are developing.64

35. **Ensuring that UK innovators benefit more from their intellectual property will help to build greater confidence for potential investors to support low carbon innovation. We support the idea of developing a tool similar to the export finance guarantee that offers protection to UK innovators and entrepreneurs. We recommend that the Government further develops this idea and report back to us on the viability of such a tool.**
3 Strengthening Engagement

36. The complexity and breadth of domestic and international parties involved with low carbon innovation suggest a need for an effective co-ordination mechanism to strengthen engagement. The LCICG has been tasked with fulfilling that function.

37. The LCICG aims to set clear goals to 2020. During 2014 and 2015, it will plan for a prioritised innovation portfolio for 2015–2020. It will use the following criteria to develop its future programme:

- impact on energy policy objectives; impact on economic growth objectives; impact on knowledge, skills and capabilities;
- the additionality of government funding; the timing and availability of suitable projects;
- the delivery risk, leverage and materiality; and
- the likelihood of subsequent successful commercialisation.

Full details can be found in the LCICG Strategic Framework.

38. To achieve its goals, while operating on finite public resources, it will need to engage effectively with the innovation community. There is scope for greater synergy between and beyond LCICG members according to the Minister, who told us that the LCICG is: ‘more active in its component parts than as a body as a whole’.

39. The NAO first reported in 2010 that the LCICG needed to improve its engagement with the innovation community, and in 2013 the NAO reported that DECC and the NAO had found it difficult to obtain information from stakeholders which confirmed the effectiveness of the LCICG’s engagement.

Composition of LCICG membership

40. The LCICG includes members from the major public sector organisations that support low carbon innovation. The LCICG’s core members include DECC, the Department for Business Innovation and Skills, the Energy Technologies Institute (ETI), the Research Councils (RCUK), the Technology Strategy Board (TSB) and the Scottish Government. The LCICG also has a number of associate members such as the Department for Environment, Food and Rural Affairs (DEFRA) and the Office of Gas and Electricity Markets (Ofgem) (see figure 1, page 6).
41. The composition of the LCICG and its ability to coordinate within, and engage beyond, its membership remains an ongoing concern. We received written evidence from SSE, an energy supplier that is not one of the ETI’s industry members, about knowledge sharing: “ETI is an unusual public-private organisation. We have concerns about the governance of the ETI because the sharing of knowledge is controlled to a large extent by the private (rather than public sector) ETI members”.69 In response to this concern ETI that knowledge sharing was kept in-house, Mr Clarke said that information was made available to the public, albeit not immediately.70

42. Mr McDowall of the UCL Institute for Sustainable Resources, also questioned the choice of core and associate LCICG members. For example, Ofgem plays an influential role in low carbon innovation by setting the research & development (R&D) spending of the regulated parts of the UK energy industry, yet it is only an associate rather than core member of the LCICG.71 Dr Hollinshead acknowledged that DECC would consider Ofgem becoming a full member of the LCICG if there were no conflict of interest with Ofgem’s role as a regulator.72 There is also further scope for flexible LCICG membership as ETI said that it invites industrial groups on an ad hoc basis to engage in LCICG discussions.73

43. We conclude that the governance of the LCICG is muddled, with an unhelpful mix of core and associate members and inadequate transparency on decision-making and information sharing. Ofgem should be a core member of the Low Carbon Innovation Coordination Group. If the Government considers that there may be a conflict of interest with Ofgem’s role as a regulator, it should explain in its response to us why this is the case. We further recommend that the LCICG reassess its membership structure regularly to reflect developments in the low carbon innovation sector, including encouraging greater participation from ad-hoc members and developing sub-groups when appropriate.

**LCICG member objectives**

44. The NAO reported that some LCICG core members have different objectives.74 For example, the TSB focuses on improving UK economic growth by supporting business-led innovation, while the ETI aims to demonstrate how the most carbon could be saved at the lowest cost.75 These different objectives could result in differing views from LCICG members on the merits of supporting different UK innovators. For example, the TSB could decide to support an innovative company with greater export potential, while the ETI could prefer to back an innovative company with a greater carbon reduction potential. It is also possible to imagine a situation whereby the TSB and ETI are competing with one

69 LCI0008
70 Q11 [Mr Clarke]
71 Q46 [Mr McDowall], Q195 [Sir Robert Smith]
72 Q195 [Dr Hollinshead]
73 Q12 [Mr Clarke]
74 National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 18
75 National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 18
another to fund an innovative company that has both great export potential and great carbon reduction potential.

45. Similarly, there may be conflicting objectives within members of the ETI, for example two of its members, EDF and E.ON are competitors within the energy market. We were concerned that competition between members of an organisation like the ETI may be limiting cooperation on low carbon innovation. Dr Hollinshead recognised the tension between Government wanting to share information publicly and private companies wanting to capitalise on it, while protecting their own commercial know-how.76

46. We highlighted in Chapter 2 the complexity of issues involved in developing low carbon innovations; the differing objectives between and within LCICG members adds further complexity. We welcome the different perspectives that different LCICG members bring, but we are concerned that this creates a blurring of policy objectives which could lead to both gaps and duplications of public support towards important policy delivery, thereby hindering effective outcomes on low carbon innovation. Greater accountability and transparency on decision-making could help redress this.

47. The LCICG is tasked with coordinating complex and important Government policy objectives. DECC provides one part-time member of staff to act as the LCICG’s secretariat for strategic and policy oversight.77 The level of direct engagement between ministers and the LCICG is light, according to the Minister, “[the LCICG] does not meet with ministers very often. We only have a very strategic oversight role”.78 Given the complexity of the LCICG’s internal membership structure and the overall policy objectives, we are concerned that this minimal level of direct engagement by Ministers and part-time support by the secretariat may be insufficient to steer the LCICG to deliver its policy outcomes. The lack of resource for the LCICG may be a contributing factor to the poor communication between the LCICG and its stakeholders (see paragraph 49).

48. *The LCICG is the key tool for delivering the Government’s low carbon objectives, but there is a mismatch between the resources allocated by the Government and its level of ambition. We recommend greater ministerial engagement with the LCICG along with a better resourced secretariat.*

Communication

49. One of the most worrying things we heard in this inquiry was the consistent evidence that the LCICG’s external engagement with the wider innovation community was erratic and poorly targeted and that this was impeding the development of low carbon innovation.79 For example, Professor Fisk of CIBSE was concerned that insufficient feedback to the engineering community on LCICG funded projects had hindered the

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76 Q196 [Mr Hollinshead]
77 LCI0023
78 Q187 [Mr Barker]
79 Qq46, 49, 50 [Dr Edge, Ms Baker, Mr McDowall, Dr Maclean]
adoption of new innovative techniques.\textsuperscript{80} There was also criticism about the lack of external engagement, particularly consultation beyond the LCICG members on its new strategic framework and the 11 TINAs\textsuperscript{81} ETI acknowledged that although the LCICG had published three years’ worth of projects within the previous 12 months, the LCICG needed to improve how it targeted communications at the right institutions and organisations.\textsuperscript{82} Ms Baker of EEF was clear about the inadequacy of LCICG communication:

The [LCICG] strategic framework has been published this month, and it was only by looking on their website in preparation for [this evidence session] that I discovered it. I had not seen a press release. We had not been notified that it had been published... There needs to be a change in communication. There needs to be a communication culture, press releases, more engagement with the press, newsletters.\textsuperscript{83}

50. The NAO reported that the LCICG has developed its own website to improve its engagement with innovators.\textsuperscript{84} The “Low Carbon Funding Landscape Navigator” web tool holds details on funding opportunities from the LCICG members and other international organisations such as the EU.\textsuperscript{85} However, we heard evidence that, while the website was useful, wider industry knowledge about its existence was very weak. Mr Corbett, Mainstream Renewable Energy, said he had not known about the existence of the LCICG nor its website until two weeks prior to our evidence session.\textsuperscript{86} Similar views on weak engagement by the LCICG were expressed by Dr Edge of RenewableUK and Dr Leese of the Mineral Products Association.\textsuperscript{87}

51. The Minister recognised that improving communication was a priority and that work was now underway to communicate with different audiences such as SMEs and different sectors.\textsuperscript{88} In particular, Dr Hollinshead, stated that his team had held six meetings with small businesses to improve engagement with SMEs. He said that the launch of the LCICG strategic framework in February 2014 was also part of the Government’s external engagement strategy on low carbon.\textsuperscript{89}

52. The LCICG Strategic Framework should be the Government’s main way of engaging innovators for this complex policy area. Yet given that the NAO first reported in 2010 and again in 2013 that LCICG communications needed to improve, we were surprised and disappointed to hear witnesses express continual frustration at the lack of consultation and publicity surrounding the framework and its launch. We consider that a lack of staff

\textsuperscript{80} Q11 [Professor Fisk]
\textsuperscript{81} Q97 [Mr McDowall]
\textsuperscript{82} Q15 [Mr Clarke]
\textsuperscript{83} Q49 [Ms Baker]
\textsuperscript{84} National Audit Office. Public funding for innovation in low carbon technologies in the UK. October 2013 p 29
\textsuperscript{85} www.lowcarbonfunding.org.uk
\textsuperscript{86} Q103 [Mr Corbett]
\textsuperscript{87} Q49 [Dr Edge], Q104 [Dr Leese]
\textsuperscript{88} Qq187-192 [Gregory Barker, Dr Hollinshead]
\textsuperscript{89} Qq188-189 [Dr Hollinshead]
for the LCICG Secretariat may contribute to the ineffective communication between LCICG and relevant stakeholders. The Department for Energy and Climate Change, along with other LCICG members, must develop a communication strategy which will strengthen their engagement with non-LCICG members in the wider UK innovation sector. The LCICG should proactively identify relevant parties and communicate with them regularly.

International engagement

53. Efforts to improve external engagement should not be confined to the UK. We established earlier [see paragraph 30 ‘valley of death’] that UK innovators needed international collaborators to scale up their innovations, to learn from other countries about what works well, and to help secure new markets. We were pleased to hear that the TSB is establishing a network of catapult centres to help companies collaborate internationally, particularly by providing support to navigate European bureaucratic processes.\(^90\) The Minister told us that DECC was focussing its efforts on international collaboration on the EU’s Horizon 2020 Programme which has €5.2bn allocated for energy technologies between 2014 and 2020\(^91\). Professor Skea highlighted that UK innovators should not miss opportunities to engage with international partners beyond the EU such as South Korea, India and the USA.\(^92\)

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90 Q28 [Mr Saunders]
91 Q198 [Gregory Barker]
92 Q18 [Professor Skea]
4 Conclusion

54. We recognise that low carbon innovation is a complex policy area. Innovators and their business and academic partners value long-term certainty of structures (and where possible, longer-term certainty on funding). It is imperative that DECC ensures effective coordination of existing programmes, regular interaction between funders to minimise the risk of gaps or duplications in support for innovation, and proactive communication with the UK innovation community. The current resource levels and structure between the Government and the LCICG on low carbon innovation have not enabled this. The Government must reconsider how the LCICG or a reconstituted group can help to deliver low carbon innovation objectives.

55. To date communication has been ineffective. It is unsatisfactory that four years on from the NAO’s initial criticisms this remains a major concern. DECC must put more resource into managing the LCICG (both in terms of providing secretariat support and ministerial oversight) otherwise the potential for low carbon innovation to help meet important policy objectives such as reducing greenhouse gas emissions by 2050, as bound by the Climate Change Act 2008, will not be realised.
Conclusions and recommendations

Staff resources

1. DECC has admitted that a lack of staff resource is preventing it from engaging fully on European issues that are of direct relevance to UK innovators. These include the ability to shape funding programmes, help UK innovators access EU funding, and help shape EU standards. DECC should carry out a detailed assessment of staffing needs on European innovation issues in order to determine how much additional staff resource is required. DECC should work with the Low Carbon Innovation Coordination Group (LCICG) to deliver better support on EU issues for UK innovators. (Paragraph 17)

Metrics

2. We are concerned that the lack of responsive, timely metrics may cloud investment decisions by the Government and LCICG and we recommend that the LCICG reports back with a plan to improve the rate at which information on metrics is shared. (Paragraph 24)

3. We welcome efforts to develop common metrics to compare technologies across different sectors. The Government should provide in its response to this report an update on the pilot and how long it will be before the metrics are applied to all sectors. (Paragraph 25)

Intellectual property

4. Ensuring that UK innovators benefit more from their intellectual property will help to build greater confidence for potential investors to support low carbon innovation. We support the idea of developing a tool similar to the export finance guarantee that offers protection to UK innovators and entrepreneurs. We recommend that the Government further develops this idea and report back to us on the viability of such a tool. (Paragraph 35)

Composition of LCICG membership

5. We conclude that the governance of the LCICG is muddled, with an unhelpful mix of core and associate members and inadequate transparency on decision-making and information sharing. Ofgem should be a core member of the Low Carbon Innovation Co-ordination Group. If the Government considers that there may be a conflict of interest with Ofgem’s role as a regulator, it should explain in its response to us why this is the case. We further recommend that the LCICG reassess its membership structure regularly to reflect developments in the low carbon innovation sector, including encouraging greater participation from ad-hoc members and developing sub-groups when appropriate. (Paragraph 43)
LCICG member objectives

6. The LCICG is the key tool for delivering the Government’s low carbon objectives, but there is a mismatch between the resources allocated by the Government and its level of ambition. We recommend greater ministerial engagement with the LCICG along with a better resourced secretariat. (Paragraph 48)

Communication

7. The LCICG Strategic Framework should be the Government’s main way of engaging innovators for this complex policy area. Yet given that the NAO first reported in 2010 and again in 2013 that LCICG communications needed to improve, we were surprised and disappointed to hear witnesses express continual frustration at the lack of consultation and publicity surrounding the framework and its launch. We consider that a lack of staff for the LCICG Secretariat may contribute to the ineffective communication between LCICG and relevant stakeholders. The Department for Energy and Climate Change, along with other LCICG members, must develop a communication strategy which will strengthen their engagement with non-LCICG members in the wider UK innovation sector. The LCICG should proactively identify relevant parties and communicate with them regularly. (Paragraph 52)

Conclusion

8. We recognise that low carbon innovation is a complex policy area. Innovators and their business and academic partners value long-term certainty of structures (and where possible, longer-term certainty on funding). It is imperative that DECC ensures effective coordination of existing programmes, regular interaction between funders to minimise the risk of gaps or duplications in support for innovation, and proactive communication with the UK innovation community. The current resource levels and structure between the Government and the LCICG on low carbon innovation have not enabled this. The Government must reconsider how the LCICG or a reconstituted group can help to deliver low carbon innovation objectives. (Paragraph 54)

9. To date communication has been ineffective. It is unsatisfactory that four years on from the NAO’s initial criticisms this remains a major concern. DECC must put more resource into managing the LCICG (both in terms of providing secretariat support and ministerial oversight) otherwise the potential for low carbon innovation to help meet important policy objectives such as reducing greenhouse gas emissions by 2050, as bound by the Climate Change Act 2008, will not be realised. (Paragraph 55)
Formal Minutes

Tuesday 22 July 2014

Members present:

Mr Tim Yeo, in the Chair

Christopher Pincher
John Robertson
Sir Robert Smith

Graham Stringer
Dr Alan Whitehead

The following declarations of interest relating to the inquiry were made:

14 January 2014, 26 February 2014 and 18 March 2014

Mr Tim Yeo declared interests, as listed in the Register of Members’ Interests.

Sir Robert Smith declared interests, as listed in the Register of Members’ Interests, in the oil and gas industry, in particular a shareholding in Shell Transport and Trading (oil integrated)

Draft Report (Innovate to accumulate: the Government’s approach to low carbon innovation), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 55 read and agreed to.

Summary agreed to.

Resolved, That the Report be the Second Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

[Adjourned till Tuesday 2 September at 9.15 am]
Witnesses


Tuesday 14 January 2014

Rob Saunders. Head of Energy, Technology Strategy Board, David Clarke, CEO, Energy Technologies Institute, Professor Jim Skea, Research Councils UK, and Professor David Fisk, Chartered Institutions for Building Services Engineers

Wednesday 26 February 2014

Dr Gordon Edge, RenewableUK, Dr Keith Maclean, Policy and Research Director, SSE, Susanne Baker, Senior Climate & Environment Policy Adviser, EEF, and Will McDowall, UCL Institute for Sustainable Resources

Dr Richard Leese, Director, Energy and Climate Change, Mineral Products Association, Joe Corbett, Head of Technology, Mainstream Renewable Power, Friends of the Supergrid, Filomena La Porta, Head of R&D Smart Energy Supply, EDF, and Dennis Hayter, Chair, UK Hydrogen & Fuel Cell Association

Tuesday 18 March 2014

Dr Helen Meese, Head of Engineering in Society, Engineering the Future, Professor Jim Watson, Research Director, UK Energy Research Centre, and Professor Paul Stewart, Centre for Low Carbon Futures

Rt Hon Gregory Barker MP, Minister of State for Climate Change, and Dr Paul Hollinshead, Director of Science and Innovation, Department of Energy and Climate Change
Published written evidence

The following written evidence was received and can be viewed on the Committee’s inquiry web page at http://www.parliament.uk/business/committees/committees-a-z/commons-select/energy-and-climate-change-committee/inquiries/parliament-2010/low-carbon-innovation/?type=Written#pnlPublicationFilter. INQ numbers are generated by the evidence processing system and so may not be complete.

1. Carbon Capture and Storage Association (LCI0021)
2. Centre for Low Carbon Futures (LCI0024)
3. Charlie Wilson (LCI0005)
4. Chartered Institution of Building Services Engineers (LCI0019)
5. David Bowen (LCI0001)
6. DECC (LCI0023)
7. Dr E.A.S. Linley (LCI0003)
8. EDF Energy (LCI0013)
9. EEF (LCI0025)
10. EEF; The Manufacturers Organisation (LCI0004)
11. Energy Technologies Institute (LCI0015)
12. Engineering The Future (LCI0009)
13. Friends of the Supergrid (LCI0012)
14. Grantham Research Institute on Climate Change and The Environment (LCI0017)
15. Lafarge Tarmac (LCI0016)
16. Mineral Products Association (LCI0011)
17. RCUK Energy Strategy Fellowship (LCI0018)
18. RenewableUK (LCI0014)
19. SSE (LCI0008)
20. Storelectric Ltd (LCI0002)
21. Technology Strategy Board (LCI0007)
22. UK Energy Research Centre (LCI0022)
23. UK Hydrogen and Fuel Cell Association (LCI0010)
24. UK Hydrogen And Fuel Cell Association (LCI0026)
26. Will McDowall (LCI0006)
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The reference number of the Government's response to each Report is printed in brackets after the HC printing number.

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