

12. Innovation strategy

SUMMARY

Target innovation spend to align with the Government's technology strategy

A number of interviewees highlighted the importance of innovation in new technology over this period. Battery storage, systems for grid management, stimulating cost reduction in low-carbon technologies were all areas that received multiple mentions. All agreed the Government needs to align its innovation strategy with its technology strategy. There will be a series of 'no/low regrets' options and decisions that can be made now, with 'course correction' as new results emerge. However, concerns were also raised about the multiple departments and bodies involved in energy innovation and some argued there should be a more integrated joined-up approach in order to focus attention on key technologies.

12.1 Interview responses

A number of interviewees stressed the importance of targeted innovation funding for low-carbon technologies going forward. Interviewees said:

“Government needs a clearer framework for investing in research & development (R&D).”

“Innovation funding should be focused on genuinely new technologies.”

“We haven’t been smart about R&D in the energy sector... and we need to be more strategic.”

Several respondents argued for a clearer distinction between new technologies that require R&D funding to help them towards commercial viability and those to which Government provides subsidy. For example, some respondents argued wave and tidal technologies were ‘not market-ready’ and if Government deemed them to be strategically important then R&D funding should be made available as opposed to significant subsidy. Some respondents made similar comments regarding carbon capture and storage (CCS) technology, although others believed GB was not well-placed to drive forward innovation in CCS.

Another concern expressed by some interviewees was there were too many different organisations involved in innovation funding, and that as a result spending was disparate and not being strategically focused on priority areas. Respondents

were concerned the landscape was highly fragmented and lacking in focus.

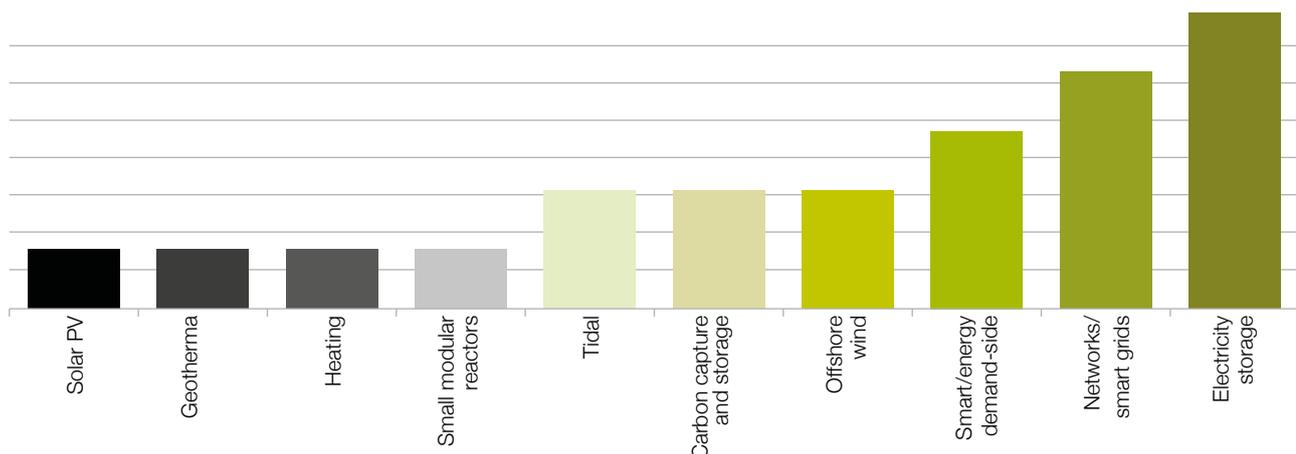
In terms of priority areas for innovation funding, Figure 54 shows the proportion of responses from interviewees when asked which technologies should be priorities for GB energy R&D / innovation..

Many respondents emphasised the potential of electricity storage technology to be a ‘game changer’ in the way we manage our energy needs. Some argued if there was one technology on which to focus funding it should be storage. Other interviewees drew a distinction between ‘grid-level’ and ‘household-level’ storage.

Several believed the key action for Government/regulators for grid-level (i.e. large-scale) storage was to ‘facilitate’ growth of the market by removing market/regulatory barriers. Some respondents believed decentralised household-level storage would benefit from innovation funding in the form of deployment grants, similar to that made available to electric vehicles and renewable heating systems. Grants could also be applied on an applications basis or on a per kW basis to avoid being technology specific. This could also potentially increase the role of demand-side aggregators.

Several respondents also emphasised the potential of smart energy, smart grids and other demand-side measures to deliver significant cost savings. Interviewee responses in relation to demand-side response are discussed in more detail in chapter 6. Other interviewees also pointed to more unique ‘game-changing’ technologies such as small modular (nuclear) reactors (SMRs), ammonia-based energy storage, and compressed air energy storage (CAES) among others.

Figure 54: What should be the priorities for GB energy R&D / innovation?



12.2 Analysis

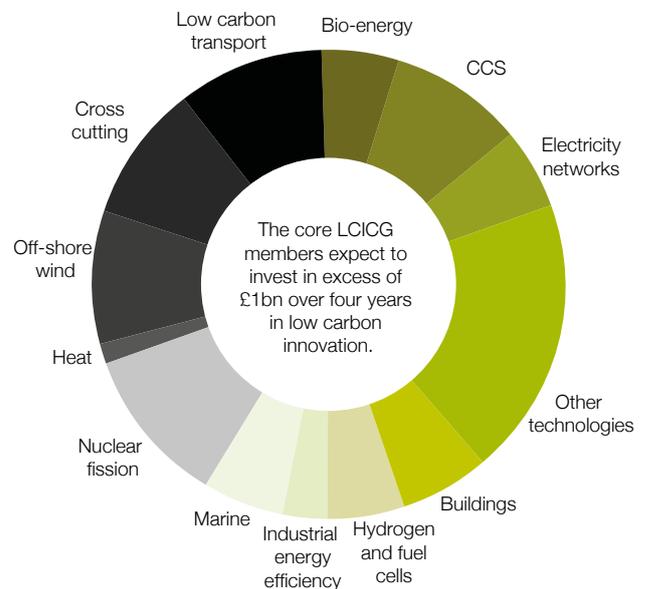
Several interviewees expressed concerns that GB innovation expenditure in energy was not being focused on strategically important technologies and there was a lack of clarity regarding the framework for allocating R&D funds. There should also be a distinction between ‘innovation’ and ‘R&D’, i.e. bringing forward new technology versus supporting existing technologies to reach commercialisation. The innovation and R&D support could be determined under the ‘whole systems approach’ as discussed in chapter 2. This approach could guide decisions in a transparent consultation to determine the most strategic and cost-efficient technologies the UK should invest in. This will also emphasise the interconnectedness between the different sectors such as heat and transport.

A significant number of different organisations are involved in allocating GB innovation funding to energy projects. The Low Carbon Innovation Co-ordination Group (LCICG) brings together the “major public sector backed organisations that support low carbon innovation in the UK”. In total, there are 17 different public sector backed organisations within the LCICG, as listed in Table 11.

The result of such a wide array of organisations involved in innovation funding is energy R&D is not focused but rather spread over many competing technologies. Figure 55 shows the estimated breakdown of LCICG member spending over 2011 to 2015; it suggests there is not a particular focus on specific technologies but rather a wide range of technologies receiving funding.

The LCICG’s historic spending and forecast for saving potential by technology is not aligned to the views expressed by interviewees. When asked which technologies should be prioritised for R&D, several interviewees mentioned technologies such as electricity storage, smart energy, smart grids and other demand-side measures, and some mentioned CCS, offshore wind and wave/tidal technology. Although LCICG members

Figure 55: Breakdown of LCICG member spending 2011-15 by technology



Source: Low Carbon Innovation Co-ordination Group (2014), Coordinating Low Carbon Technology Innovation Support: The LCICG’s Strategic Framework, February 2014

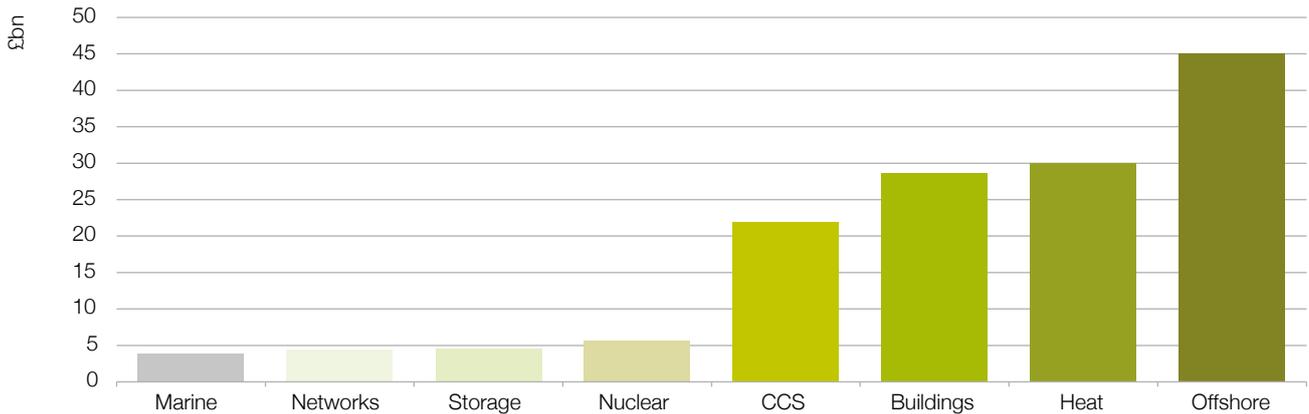
Table 11: List of LCICG members

Core members	Associate members
Carbon Trust	The Crown Estate
BIS	Department for Communities and Local Government
DECC	Defra
ETI	Department for Transport
EPSRC	MoD
Scottish Enterprise	Department of Enterprise, Trade and Investment
Scottish Government	Ofgem
Innovate UK (including Catapults)	Welsh Government
	UKTI

Source: LCICG website, http://www.lowcarboninnovation.co.uk/about_the_lcicg/

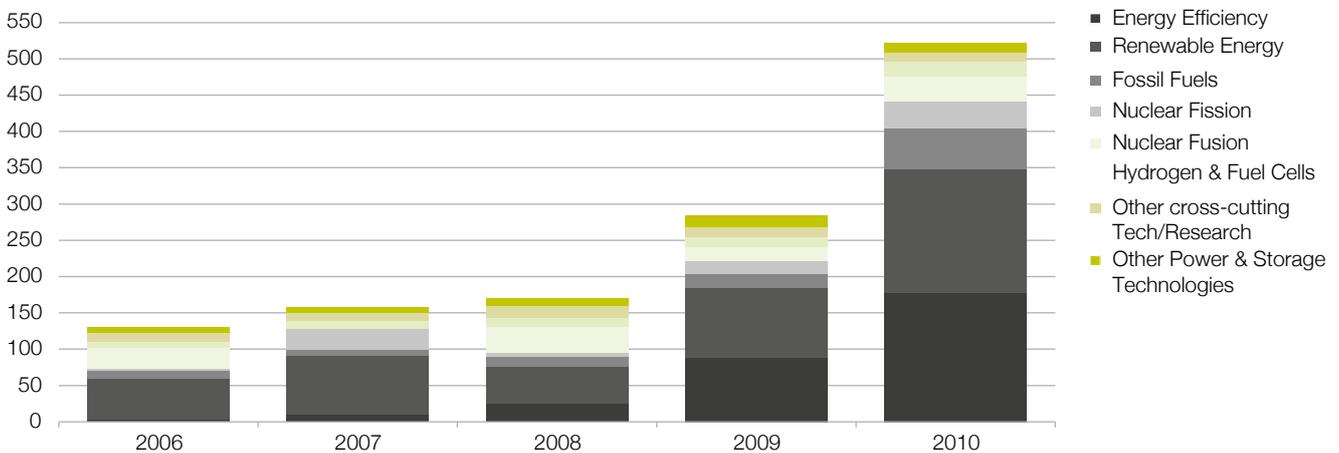
3. Energy efficiency (continued)

Figure 56: LCICG estimated cost reduction potential estimates by 2050 (cumulative)



Source: Low Carbon Innovation Co-ordination Group (2014), Coordinating Low Carbon Technology Innovation Support: The LCICG's Strategic Framework, February 2014, KPMG analysis

Figure 57: UK Energy Innovation Spend, £m real 2011



Source: DECC innovation spending return to IEA, from DECC website, accessed October 2015, <https://www.gov.uk/guidance/innovation-funding-for-low-carbon-technologies-opportunities-for-bidders>

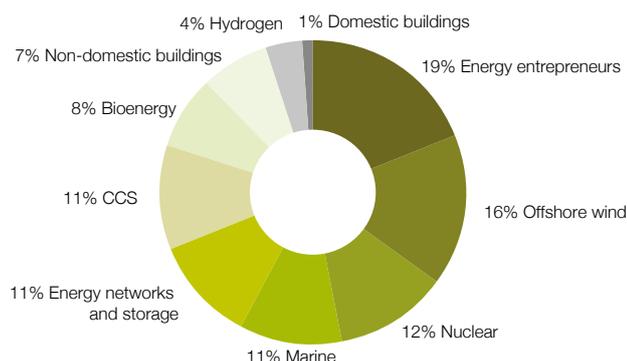
have allocated funds towards CCS, offshore wind and wave/tidal ('marine'), there does not appear to have been significant focus on electricity storage, smart grids or demand-side measures. LCICG forecasts only marginal cost reduction potential from networks and storage technologies to 2050, which is not in line with interviewee responses (see Figure 56).

Of the LCICG membership, DECC has the most influence over the allocation of innovation spending. Figure 58 shows National Audit Office (NAO) estimates of DECC's allocation of innovation funding by technology.

According to NAO estimates, DECC allocated just 11% of innovation funding to energy networks and storage. Smart energy and demand-side measures do not feature directly in the breakdown.

More recent data suggests even lower levels of spending on innovation in storage technology. The Committee on Climate Change estimates only £31m or 9% of energy sector R&D funding was spent on 'other power and storage technologies' in 2013/14 (see Table 12).

Figure 58: DECC allocation of funding across technologies



Source: National Audit Office (2013), Public funding for innovation in low carbon technologies in the UK, <http://www.parliament.uk/documents/commons-committees/energy-and-climate-change/04-NAO-Briefing-for-ECC-Public-funding-for-innovation-in-low-carbon-technology-FINAL.pdf>

Government has recently provided some additional clarity on its innovation strategy, although the mechanisms for driving it forward remain unclear. In a recent policy speech, the Secretary of State mentions the importance of Government support for technologies such as energy storage, low-carbon fuels, efficient lighting, CCS and nuclear (small modular reactors). However, in the Autumn Statement, where it was announced that energy innovation spending would double over the period to 2020, with a major increase in support for R&D on small modular reactors (£250 million). While Energy UK welcomes an increased focus on energy innovation, the majority of respondents in the interviews favoured storage and systems management as the key areas of innovation where attention and resources should be focused.

Table 12: Public sector expenditure on research and development

Sector	Expenditure (£m 2013/14)
Power	
Carbon Capture and Storage	42
Renewable energy	71
Nuclear (both fission and fusion)	51
Other power and storage technologies	31
Total	195
Buildings	
Buildings energy efficiency	20
Industry	
Industry energy efficiency	6
Transport	
Transport energy efficiency	69
Hydrogen and fuel cells	14
Total	83
Agriculture	
Defra R&D projects	4
Waste and other non-CO2	
WRAP	0.4
Defra R&D projects	0.6
Total	1
Cross-cutting	
Other energy efficiency	14
Other cross-cutting technologies	38
Total	52
Grand total	360

Source: Committee on Climate Change (June 2015), Meeting Carbon Budgets: Progress in reducing the UK's emissions, Report to Parliament and Technical Annex