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**REPORT BY THE
COMPTROLLER AND
AUDITOR GENERAL**

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Government funding for developing renewable energy technologies

Summary

Introduction

1 Expanding the supply of renewable energy is central to the Government's aims to tackle climate change and achieve security of energy supplies. Renewable sources of energy comprise wind, water, biomass, solar and geothermal and are distinct from non-renewable low carbon sources, such as nuclear power, and coal with carbon capture and storage. The Department of Energy and Climate Change (the Department) is responsible for the Government's renewable energy policy and targets.

2 The Government's target, originally set in 2000, was to obtain 10 per cent of UK electricity supplies from renewable sources by the end of 2010. The Government's medium-term requirement to meet the legally-binding obligation established under the EU Renewable Energy Directive 2009 is to increase the proportion of all the UK's energy needs, covering electricity, heat and transport, which are supplied from renewable sources to 15 per cent by 2020. This is linked to the national statutory targets to deliver an 18 per cent reduction in UK carbon dioxide emissions, compared to 2008, by 2020 and an 80 per cent reduction in carbon emissions by 2050 supported by further increases in renewable energy generation. There are no specific targets for renewable energy beyond 2020. The government estimated in July 2009 that investment totalling some £100 billion would be required to achieve the 2020 target.

3 The Government has established arrangements that provide financial support for renewable energy technologies, to encourage innovation and deployment:

- **Direct support using public funds to encourage research, development, demonstration and early deployment of renewable energy technology.**

This support has historically tended to take the form of grants, but it also includes loans and equity investments and other support. This support may also contribute to wider government goals for technology innovation, carbon reduction, and economic growth. The value of this type of support in 2008-09 was approximately £76 million.

- **Regulatory and fiscal measures funded by industry and consumers that reward renewable energy generation and penalise carbon-intensive energy.** The main measure is the ‘Renewables Obligation’, which requires all licensed electricity suppliers to source an annually increasing proportion of their electricity from renewable sources. It is designed to help achieve the level of deployment needed to meet the 2020 target by providing renewable electricity generators with additional income, and in 2008-09 provided financial support worth around £1 billion. Other measures include the EU Emissions Trading Scheme and the Climate Change Levy.

4 This report, which follows our earlier 2005 report on renewable energy¹, examines the delivery and performance of direct support using public funds for the development, demonstration and deployment of renewable energy technologies, focusing on electricity and heat generating technologies. This support has been provided by some 20 different schemes and funding streams (the “schemes”) established since 2000 (see Appendix 1). Some individual schemes were set up to reduce carbon emissions, deliver technology innovation, or achieve economic growth, rather than focusing specifically on renewable energy goals. In these cases, we examined spending and impacts relating to renewable energy, but not their performance against wider objectives which in some cases we have previously reported on.² We do not cover public funding for basic research, which aims to broaden scientific knowledge rather than deliver commercial applications that can support deployment targets.

Key findings

On strategic objectives for renewable energy

5 The Department is seeking to accelerate the deployment of renewable energy technologies. The latest available data from 2008 shows that only 2.3 per cent of UK energy was generated from renewable sources, so to meet the 2020 renewable energy target the Department will have to drive a seven-fold increase. The target provides a clear basis for assessing progress overall. The Department has established illustrative scenarios for how individual technologies, such as wind or marine energy, might deliver the target, but it considers the market is better placed than Government to determine the mix of technologies that offers the best value for money for energy consumers. The Department is also seeking to secure innovation that can improve existing renewable technologies, reduce their costs and deliver new technologies, to help meet the statutory longer-term carbon reduction commitment.

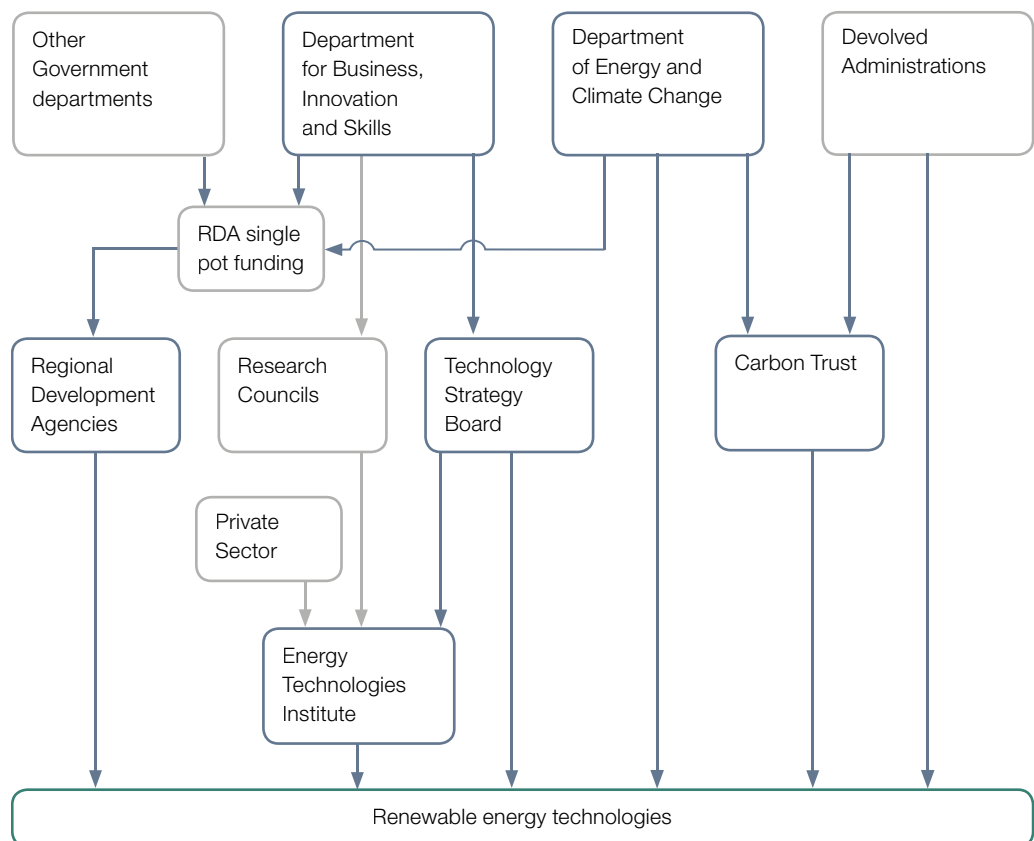
1 C&AG’s report, *Department of Trade and Industry: Renewable Energy*, HC 210, 2004-05.

2 See, for example, C&AG’s report, *The Carbon Trust: accelerating the move to a low carbon economy*, HC 7, 2007-2008.

On identifying funding needs and setting priorities

6 The Department has specific accountability for achieving the Government’s UK renewable energy targets. The Department for Business, Innovation and Skills and other delivery bodies also provide funding for renewable energy technologies (Figure 1). These other organisations provide funding for renewable energy technology in support of their wider policy objectives to reduce carbon emissions (through supporting renewable energy and energy efficiency and other carbon reduction technologies such as carbon capture and storage); support technology innovation; or deliver economic benefits. Each organisation independently carries out its own assessment of renewable energy funding needs, opportunities and priorities in line with its individual objectives and funding allocation. The Department does not have direct control over all public funding provided for renewable energy.

Figure 1
The delivery of direct support for renewable energy technologies



NOTES

- 1 Arrows indicate main funding flows and accountabilities.
- 2 The Energy Technologies Institute is a public-private sector partnership that receives matched funding from the private sector. The Departments, Technology Strategy Board and Carbon Trust part-fund projects that also draw on private-sector funding.
- 3 Research Councils and Devolved Administrations are outside the scope of this report.

7 There is a significant amount of contact between the Department and other organisations that fund renewable energy technologies, including through a cross-Whitehall Climate Change Board that oversees the delivery of PSA 27 to lead the global effort to avoid dangerous climate change. The Department has since February 2010 also been a member of the Low Carbon Innovation Group established by the Carbon Trust, Energy Technologies Institute and Technology Strategy Board in 2008, and whose membership has recently been widened to include the Research Councils. These arrangements have led to improvement in the degree of coordination. For example, the Department's decision to fund a new support scheme for marine technologies, to meet a gap for marine technologies that had existed for several years, was informed by discussions with other organisations including the Carbon Trust.

8 Since its creation in October 2008, the Department has been working to establish a more strategic approach to developing renewable energy and supporting the achievement of the UK target for 2020. It published a renewable energy strategy in July 2009 alongside the low carbon innovation strategy and low carbon transport strategy, and it is developing a supporting renewable energy 2020 delivery plan.

9 The Department is also working with other government departments, delivery bodies and industry to pilot the development of longer-term innovation action plans for key technologies showing potential requirements and priorities. This focus on individual technologies follows the Government's endorsement of a recommendation in the Carbon Trust's report *Focus for success* to tailor support for prioritised technologies.³ The Department published a summary of its first pilot action plan, on marine energy, in March 2010, which recommended targeted public funding to address market failures, although it does not indicate the level of support required. It also recommended building on existing dialogue between delivery bodies by setting up a strategic coordination group to provide a strategic overview of Government funding for marine energy. The Department intends to evaluate the pilot before deciding whether to prepare innovation action plans for other renewable energy technologies.

On the funding allocated to renewable energy technologies

10 Data on the overall level and distribution of public funds to support renewable energy technologies is not routinely collected and published. Information collected by the Department on funding for renewable energy excludes funding provided by Devolved Administrations and Regional Development Agencies, which the Department is not directly responsible for but which are key sources of public funding for renewable energy technologies.

³ Carbon Trust (2009) *Focus for success: A new approach to commercialising low carbon technologies*.

11 Since 2000, the 20 schemes and funding streams we examined provided support totalling some £265 million up to March 2009 for renewable energy technologies, which has reduced to £192 million following repayments of grants to the Department by some recipients. As at March 2009, gross spending through the Department's schemes together with legal commitments to future spend totalled £241 million. This was around two-thirds of the budget the Department and its predecessors had been allocated for renewable energy technologies during the period, and reflected demand for certain schemes being lower than forecast and some funding being reallocated to other objectives.

12 Although new technology mainly contributes to the delivery of medium and long-term goals, direct support for renewable energy development, demonstration and deployment has mostly been short term. Most recently, funding of up to £178 million that has been made available to renewable energy projects from the £405 million low carbon investment funding announced in Budget 2009 must be spent by March 2011. However, developers typically need funding over several years to develop their new technology, and some individual projects have relied on obtaining support from different schemes and sponsors at different stages in their development.

On evaluation and outcomes

13 Reflecting their different remits and objectives, the metrics used to monitor and evaluate the performance of schemes differ between organisations, so it is not possible to establish aggregate performance across the 20 schemes. There is also very little published information on the individual performance of the 20 schemes that allows an overall assessment of their cost-effectiveness specifically in relation to their contribution to the achievement of the Government's renewable energy targets and longer-term renewable energy objectives. Only one of the six case study schemes we examined had been evaluated, while the two newer schemes did not yet have evaluation frameworks in place. We have found a similar need to strengthen evaluation, including setting clear and measurable objectives and baselines, in some previous examinations of other financial support schemes.⁴

14 The schemes have supported projects that would not otherwise have proceeded and contributed to an increase in renewable energy generation, and so progress towards the achievement of the Department's targets. The Offshore Wind Capital Grants Scheme has had the largest identifiable impact on short-term targets, having contributed to an increase in installed renewable electricity generating capacity by nearly 1 gigawatt, equivalent to 14 per cent of total renewable generating capacity in 2008.

⁴ See, for example, C&AG's report, *Venture capital support to small businesses*, HC 23 2009-2010.

15 Support for projects aimed at innovation has contributed to advances in renewable energy technologies, for example by creating new patents. However, the potential impact of patents and other outputs from innovation funding on developing renewable energy can take some years to materialise, and can be difficult to measure directly. This increases the importance of having clear intermediate measures for schemes against which progress towards renewable energy targets and longer-term objectives can be measured. The Department is currently working with the Department for Business, Innovation and Skills on developing Green Book compliant guidance for capturing the innovation impacts of policies.

16 None of the delivery bodies have benchmarked the administrative cost of the support schemes we examined. Where scheme management had been contracted out, we found wide variations in costs as a proportion of financial support provided ranging from less than one per cent for the Offshore Wind Capital Grants Scheme to 18 per cent for the Department's Marine Renewables Deployment Fund.

Conclusion on value for money

17 The scale of the changes needed to meet the UK target for renewable energy and the timescale involved require that direct support is well targeted. It is essential that in progressing its work the Department follows best practice in planning, delivery and evaluation, and involves all the main delivery bodies in this process. Coordination of direct support for renewable energy has historically been limited, with each delivery body developing its own approach in accordance with its own objectives. Individually, supported projects have achieved outputs, but without a coherent delivery framework specifically for delivering the Government's plans for renewable energy or a consistent approach to evaluating and reporting performance across all the main organisations, the overall value for money of direct support for renewable energy technologies cannot be demonstrated.

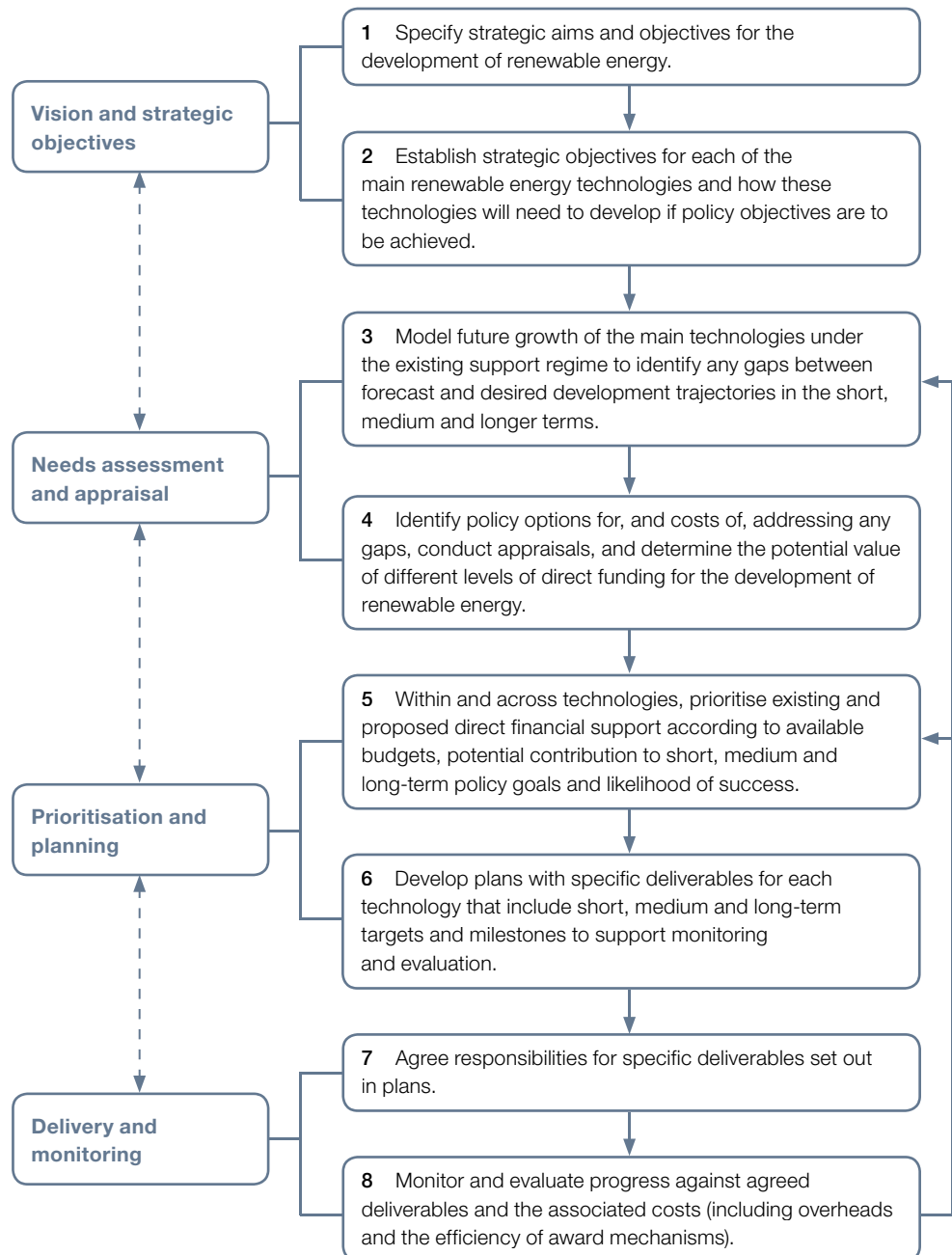
18 Following its creation in October 2008, the Department of Energy and Climate Change has taken steps to improve the legacy it inherited. It has developed a renewable energy strategy and is preparing an overarching 2020 delivery plan. The Department is also piloting the development of a technology-specific, longer-term innovation action plan, for marine energy. To protect value for money, the Department needs as a matter of urgency to demonstrate in its 2020 delivery plan and interrelated innovation plans for all key renewable energy technologies, how it is prioritising public funding; establishing a more coordinated approach to providing such support; and measuring and reporting the contribution of direct support to delivering the 2020 target and longer-term goals.

Recommendations

19 To help the Department build on work it has started, to achieve a more disciplined approach to planning and managing direct support, we have developed a model that draws on approaches used in research and development planning, technology roadmapping and portfolio management (**Figure 2** overleaf). Comparing our key findings against this, we have identified the following recommendations.

Figure 2

The steps required to achieve a disciplined approach to planning and managing direct support for renewable energy technologies



Source: National Audit Office

- a** Having developed its renewable energy strategy, the Department is now preparing a supporting delivery plan for 2020 and is piloting a longer-term technology-specific action plan for the marine sector. In preparing and delivering its plans, the Department, following a disciplined approach as set out in Figure 2, should:
- as a matter of urgency clarify in its delivery plan for 2020 the extent to which direct support will be used to achieve deployment targets, based on a clear assessment of need for and type of support for specific technologies and projects. The Department should review and update its delivery plan at least annually; and
 - prepare associated plans for delivering innovation in key renewable energy sectors to achieve longer-term carbon reduction commitments.
- b** The development of individual renewable energy technologies may need financial support over the long term, but direct support for projects has generally not been guaranteed beyond the three year spending review period. Where the Department identifies a need for direct funding to achieve future targets, it should work with its delivery partners and the Treasury to establish how they can devise schemes that provide sufficient certainty to recipients and private sector co-investors over the long-term development lifecycle for renewable energy technologies.
- c** The Department does not have comprehensive information on direct support for renewable energy technologies. The Department should base its renewable energy strategy delivery plan and associated technology plans on:
- good quality information on the amount and type of current and planned support;
 - clear appraisals of the level of funding needed and lessons from evaluating previous support; and
 - close cooperation with other organisations involved in delivery to draw on their expertise.
- d** Gaps in the coordination of support for renewable energy technologies have occurred partly as a result of the various autonomous delivery bodies having differing remits and objectives, but this is starting to improve. The 2020 delivery plan that the Department is developing is an opportunity to coordinate funding in support of the Government's renewable energy targets. The Department should agree with each of the main delivery bodies how they will contribute to implementing the plan and associated long-term innovation plans, and include them in supporting coordination and reporting arrangements.

e Arrangements are not currently in place to link schemes and their support for individual renewable energy projects to the overarching delivery plan.

In delivering the plan, the Department working with delivery bodies should:

- establish the fit between the objectives of relevant projects and the plan;
- identify risks to achieving targets and interim milestones for development and deployment, and approaches for mitigating them; and
- develop performance reporting to include common metrics across organisations that allows evaluation on a consistent basis across the portfolio, and regular re-appraisal of funding priorities.

f Direct support for renewable energy technologies is not reported in a transparent way in aggregate or in relation to some individual schemes.

The Department should gather information from delivery bodies on their spending on renewable energy and impacts achieved, and publish it annually.