



National Audit Office

Report

by the Comptroller
and Auditor General

Department of Energy & Climate Change

Controlling the consumer-funded costs of energy policies: The Levy Control Framework

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National Audit Office

Department of Energy & Climate Change

Controlling the consumer-funded costs of energy policies: The Levy Control Framework

Report by the Comptroller and Auditor General

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Sir Amyas Morse KCB
Comptroller and Auditor General
National Audit Office

14 October 2016

This report provides our independent opinion on whether the Department of Energy & Climate Change's management of the Levy Control Framework has delivered value for money for electricity consumers.

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Key facts

£7.6bn

cap on costs of low-carbon energy schemes in 2020-21 set by the Levy Control Framework¹

£7.1bn

expected Framework costs in 2020-21 according to government forecasts made in February 2015

£9.1bn

expected Framework costs in 2020-21 according to forecasts made four months later, in June 2015

20%	permitted headroom above the cap, above which HM Treasury could impose a financial penalty on the energy department (formerly the Department of Energy & Climate Change, now the Department for Business, Energy & Industrial Strategy)
19.7%	amount by which government's June 2015 forecast exceeded the cap in 2020-21
£8.7 billion	expected costs of Framework schemes in 2020-21 according to the latest government forecasts ²
£110	total amount that Framework costs are expected to add to a typical household dual-fuel energy bill in 2020 (11% of the entire bill) ²
£17	the part of the £110 that comes from exceeding the cap
£54	amount households will pay through bills in 2020 to support the Capacity Market, Warm Homes Discount, Energy Company Obligation and Smart Meters – consumer-funded schemes not currently covered by the cap ²
£1,259	average household annual energy bill in 2020, according to government forecasts in November 2014
£991	average household annual energy bill in 2020 according to the latest government forecasts: increased Framework costs have been offset by falling fossil fuel prices ²

Notes

- 1 Because the Framework's budget is defined in 2011-12 prices, we use 2011-12 prices for all figures in this report unless otherwise stated.
- 2 Forecasts as of July 2016.

Summary

Context

1 The government's energy policy has three strategic objectives: to ensure a secure energy supply; to reduce carbon emissions; and to keep energy bills as low as possible. Many of its schemes to support these objectives are funded through levies on energy suppliers rather than through general taxation. These costs are ultimately paid by households and businesses through energy bills. The government expects the cost of replacing existing electricity generation capacity with low-carbon power to be substantial. It anticipates that around 95 gigawatts of new capacity will need to be built over the next two decades. This is equivalent to around 90% of the grid's installed capacity in 2015. Most of this new capacity will come from renewable sources or nuclear power. In 2014 the former Department of Energy & Climate Change (the Department) estimated that around £100 billion of investment in the electricity system may be needed by 2020.¹

2 In 2011 the Department and HM Treasury established the Levy Control Framework (the Framework). This aimed to manage some of the tensions between the three objectives for energy policy. The Framework sets a cap on the forecast costs of certain policies funded through levies on energy suppliers. It requires the Department to take early action to reduce costs if forecasts exceed this cap, with urgent action required if forecasts exceed a 20% 'headroom' above the cap. Since November 2012 the Framework has capped the costs of three schemes to support investment in low-carbon energy: the Renewables Obligation, Feed-in Tariffs and Contracts for Difference. It sets caps on costs for each year to 2020-21, with a cap of £7.6 billion in 2020-21 (in 2011-12 prices).²

3 We last reported on the Framework in 2013.³ At the time, the Department expected costs covered by the Framework to be £6.9 billion in 2020-21, comfortably within the Framework cap. Its forecasts remained at a similar level for the next 18 months, during which the Department made significant decisions about the scale of committed costs under the Framework. In particular, it signed eight contracts to support large renewable projects in May 2014, and in February 2015 held an auction which awarded a further 27 contracts. At that time the Department predicted that 2020-21 costs would be £7.1 billion; £0.5 billion below the Framework cap.

¹ On 14 July 2016, the government announced that the Department of Energy & Climate Change would close and its responsibilities for energy markets and climate change would transfer to a new department, the Department for Business, Energy & Industrial Strategy (BEIS).

² We use 2011-12 prices for all figures in this report unless otherwise stated.

³ Comptroller and Auditor General, *The Levy Control Framework*, Session 2013-14, HC 815, National Audit Office, November 2013.

4 However, shortly after, in April 2015, the Department began to project that it would exceed the Framework cap in every year to 2020-21. By June 2015, its forecasts of costs in 2020-21 had risen to £9.1 billion; £1.5 billion above the cap and only fractionally under the 20% permitted headroom. It reported that this was due to two main factors:

- Better than expected progress in decarbonising electricity. This was partly due to more eligible projects coming forward under the Renewables Obligation and Feed-in Tariffs schemes than expected, and partly due to higher than expected rates of electricity generation (load factors) from projects.
- Costs of top-up payments under the Contracts for Difference schemes having increased due to a significant fall in fossil fuel prices.

5 The exceeding of the cap prompted widespread changes to Framework schemes. These have reduced forecast costs but not brought them within the cap. As at July 2016, Framework costs in 2020-21 were forecast to be £8.7 billion. This is equivalent to £110 of the expected average household dual fuel (electricity and gas) bill in 2020 of £991.

6 As a result of Framework schemes the government expects that renewable sources will provide 35% of electricity supply in 2020, meaning it will meet its ambition for at least 30% of electricity to come from renewables by that point. The March 2016 Budget stated that the government would announce further details of its approach to controlling consumer costs in the autumn.

Scope

7 This report is an update to our 2013 report on the Framework. We use the same evaluative criteria, reflecting the essential requirements of such frameworks: appropriate coverage, strong governance and controls, transparent reporting and robust forecasting. We also assess performance against the additional objectives that the government has set for the Framework, in particular its role in supporting investor confidence.

- Part One explains the purpose of the Framework and what has happened since our previous report.
- Part Two assesses the Framework against three of our evaluative criteria (coverage, controls and governance).
- Part Three assesses the forecasting that underpins the Framework, the Department's reporting and its impact on investor confidence.

Our audit approach and methods are in Appendices One and Two. Further appendices describe and evaluate the Framework forecasts.

Key findings

Purpose and coverage

8 The introduction of the Framework in 2011 was a valuable step forward in government's approach to controlling the costs of consumer-funded energy policies.

The costs of policies to support new generating capacity will largely be passed on to consumers through their energy bills. The Framework has ensured that government has monitored and exerted some control over an important aspect of these costs, namely the direct costs of support for renewable generation (paragraphs 1.6 and 2.7).

9 The Framework's measure of costs has the advantage of being easily understood, but leaves out some important considerations. In particular, its treatment of costs could incentivise decision makers to cut support for renewables when the wholesale price of electricity falls, regardless of whether that is the best decision in terms of longer term value for money (paragraphs 2.7 to 2.10).

10 Changes to the Framework's coverage have not been clearly explained to stakeholders. The Department and HM Treasury established the Framework as a way of monitoring and controlling the impact of **all** levy-funded energy schemes on consumer bills. In 2012 they decided that the Framework would only cap the costs of policies that support low-carbon generation. This would help it support decisions about how to trade-off policies that were all aimed at decarbonising electricity. But the two departments have not clearly explained to Parliament the reasons for not including other levy-funded schemes, such as the Capacity Market, in spending caps, despite the associated costs to consumers being substantial (paragraphs 1.9 to 1.14 and 2.4).⁴

Governance, controls and forecasting

11 The Department took too long to discover that it was on course to exceed the Framework cap. One reason for increased forecast costs was the global slump in fossil fuel prices, a development which energy market experts in general were not expecting. But this explains only £0.3 billion of the £2 billion shift in forecast 2020-21 costs that took place in early 2015. Other assumptions became outdated because market intelligence was not gathered frequently enough. One of the Department's crucial assumptions, the load factor of new-build offshore wind turbines, was not updated for 18 months, despite indications during this time that it may have been contributing to an underestimation of costs.⁵ Between 2013 and 2015, there was a two-year break between substantive exercises to gather data on technology costs. This was despite the fact that during this time the Department entered into £615 million of new commitments under the Framework by auctioning off Contracts for Difference (paragraphs 2.14 and 3.2 to 3.6).

⁴ Capacity Market payments will be around £1 billion to £3 billion annually from 2017-18.

⁵ A power plant's load factor is the proportion of time it spends generating electricity.

12 Poor governance of the Framework contributed to the delay in discovering that its forecasts needed updating. The Levy Control Board, established to provide joint HM Treasury and departmental oversight of the Framework, stopped meeting after November 2013, and by the time it reconvened in July 2015 the Framework was forecast to exceed the cap. The Department did not establish effective arrangements for sharing information between its officials until January 2015, when the introduction of regular quarterly reporting started to prompt questions about forecast assumptions (paragraphs 2.18 and 2.19).

13 The government failed to fully consider the uncertainty around its central forecasts and define its appetite for the risks associated with that uncertainty. If the Department and HM Treasury had asked more explicitly “what if the forecasts or key assumptions are wrong?” this might have prompted more robust design and monitoring of the Framework, and reduced the likelihood of significantly exceeding the Framework’s budgetary cap (paragraphs 2.20 and 3.5).

14 The Department had not learned the lessons from previous poor forecasting. In 2011 the Department discovered that its forecasts for one Framework scheme, Feed-in Tariffs, had severely underestimated take-up.⁶ The Department commissioned an internal ‘lessons learned’ review, which made broad-ranging recommendations including that governance arrangements and access to commercial intelligence needed to improve. However, the Department did not disseminate widely the findings of this review, nor did it establish a process to track progress against its recommendations (paragraphs 1.17 and 2.21).

15 The Department commissioned an internal review to learn the lessons from the events of 2015, and has significantly improved its approach. The Department has more commercial expertise and has started gathering market intelligence more frequently. There is clear senior responsibility for the Framework. Responsibility for analysis has been separated from responsibility for policy, in order to improve scrutiny of forecasting assumptions (paragraphs 2.21 and 2.22).

16 Because it fully allocated the Framework budget at an early stage and without price competition, the Department has not secured best value for money with it. The Department chose to award eight early contracts for large renewable projects in 2014, before it had established the full Contracts for Difference regime for auctions. This served to prevent a hiatus in investment and demonstrated that Contracts for Difference were an investable proposition. However, the amount of support it awarded via these early contracts limited its ability to secure value for money with future contracts. According to the latest assumptions, the early contracts now take up all budgetary space under the cap not occupied by the Renewables Obligation and Feed-in Tariffs. The Competition and Markets Authority has estimated that early contracts for offshore wind may have cost £300 million a year more than if they had also been subject to price competition (paragraph 2.14).

6 National Audit Office, *The modelling used to set Feed-in Tariffs for Photovoltaics*, November 2011.

Reporting

17 Despite clear recommendations from the National Audit Office and the Energy and Climate Change Committee, the Department has not made its Framework forecasts transparent, preventing effective oversight and challenge.

The underlying assumptions are either unpublished, or published elsewhere but not alongside the forecasts. The Department has stated that commercial sensitivity prevents it from publishing more information. But we consider that there are ways of overcoming these concerns that would enable the Department to provide more of this information, given the significant interest in it. Improving the transparency of forecasts would improve parliamentary accountability, enhance the confidence of private investors and expose the underlying assumptions to more effective external challenge (paragraphs 3.11, and 3.16 to 3.21).

18 The Department has failed to report regularly on the full impact of its policies on energy bills. We and the Energy and Climate Change Select Committee have both previously recommended that government should report regularly on the full costs and impact of all its levy-funded schemes, but it has not done so since 2014. This reporting is important because the relationship between Framework costs and the affordability of energy bills is not straightforward:

- Framework schemes can reduce energy costs as well as add to them.
- Reduced wholesale energy prices increase Framework costs but reduce costs of bills overall.
- Bills are affected by other levy-funded schemes not included in the Framework.
- Contractual commitments under Framework schemes extend well beyond its spending cap, into the 2030s and beyond.

The government's internal forecasts show that, despite forecasts of Framework costs increasing, the estimate of the total average annual energy bill in 2020 **fell** by £268 to £991 between November 2014 and July 2016 (paragraphs 2.7 to 2.10 and 3.12 to 3.15).

Investor confidence

19 The Framework has not met its potential to support investor confidence.

Maintaining investor confidence helps to keep the cost of new consumer-funded infrastructure low, because it keeps required rates of return low and encourages a healthy pipeline of competing projects. The Framework can support investor confidence in the renewables sector by giving visibility of future government support, but its potential to do so has been hampered by its:

- **Poor forecasting.** With better Framework forecasting, the Department could have discovered earlier that it needed to control costs, potentially enabling a smoother policy response (paragraphs 3.3 and 3.28).
- **Lack of transparency.** The sudden changes to forecasts in 2015 were not sufficiently explained to stakeholders and this invited speculation about whether the numbers had been manipulated. The Department has also not clearly set out the circumstances in which it would tolerate forecasts exceeding the cap, contributing to uncertainty about its implications for investors (paragraphs 3.16 and 3.28).
- **Monitoring and reporting.** The Department's regular internal reports do not mention investor confidence, and the Department does not have summary metrics on investor confidence it can report (paragraph 3.23).
- **Limited and reducing timeframe.** Government needs to strike a balance between providing certainty for investors and maintaining the flexibility to adjust its approach in response to developments in the energy market or changing political priorities. However, the timeframe of the framework cap has not been extended since 2012, and it now only extends for a period of four and a half years. By contrast, some renewable projects take around ten years to come to market. Although the government has given the private sector other valuable information about support beyond 2020 by announcing its anticipated budget for the next three Contracts for Difference auctions, this does not resolve the uncertainty for some projects (paragraph 3.29).

Conclusion on value for money

20 The government is on track to achieve its ambition of ensuring that 30% of electricity comes from renewable sources by 2020. Three government schemes funded by energy consumers have made this possible. The Framework has played an important role in making some of the impacts of these policies on consumers clearer. It has also prompted some control over their costs. However, the government has missed opportunities to exploit the full potential of the Framework and this has contributed to decisions which have not secured value for money. The government's forecasting has been poor, as has its allocation of the Framework budget, resulting in a situation in which there is little unallocated budget left for new projects between now and 2020-21, which would have been more cost-effective. Furthermore, the positive effect the Framework could have on investor confidence has been limited by the decision not to extend it beyond 2020-21, and by a lack of transparency. A wider lack of transparent reporting on the impact of policies on bills has also undermined accountability to Parliament.

Recommendations

21 The government now needs to do more to develop a coherent, transparent and long-term approach to controlling and communicating the costs of its consumer-funded policies. It should:

- a Report to Parliament every year on the impact its policies have on consumer bills.** We agree with the Competition & Markets Authority that Ofgem would be well placed to help improve transparency over the impact of policies on bills because of its independent role and expertise.
- b Develop and assess new options for controlling the costs of renewables in a formal control framework, particularly in light of the growing importance of Contracts for Difference.** The Department should develop options to address the need to:
 - give Parliament full information about the Department's long-term commitments to levy-funded energy schemes;
 - improve the visibility investors have of planned government support in the long term, to maintain confidence and thereby to promote value for money; and
 - ensure that decisions to allocate funding to renewables are informed by affordability and value for money in the long term. Government should consider moving away from a system of capping renewables' costs relative to the wholesale price of electricity, as that price fluctuates unpredictably in the medium term.

- c Whether or not the Framework is revised, publish a clear explanation of its purpose and how it is going to operate.** In particular, explain how the Department's reaction to future shifts in forecast expenditure would depend on:
- the underlying reason for the shift;
 - where the Framework's costs stand in relation to the cap and headroom; and
 - where the Department stands in relation to ensuring that bills are affordable and the country is on course to meet its carbon targets.
- d Seek to understand the possible consequences of its central forecasts being wrong, and identify its risk appetite in relation to these uncertainties.**
- e Monitor regularly all the significant intended outcomes from Framework schemes.** In particular, the Department should improve its monitoring of investor confidence to ensure that senior officials have regular information on quantitative and qualitative indicators of sentiment. This should form part of the Department's quarterly reporting arrangements for the Framework.
- f Increase the transparency of its projections of levy-funded investment in low-carbon power.** The Department must disclose more of the assumptions underlying its forecasts while respecting legitimate commercial sensitivities. At a minimum, it should seek to learn lessons from the Low Carbon Contracts Company, which has managed commercial sensitivity concerns to publish its own forecasts of the costs of Contracts for Difference.
- g Apply more widely the lessons learned from its approach to the Framework.** The Department should check that the arrangements for governance, internal reporting and exercising control over other schemes of comparable financial importance (such as the Capacity Market) are as good as those now in place for the Framework. It should also assess whether the resources devoted to forecasting for these schemes are sufficient to bring the forecasts into line with high standards of quality assurance.

Part One

The role of the Levy Control Framework

1.1 This part of the report sets out:

- the government's strategic objectives for energy and climate change policy;
- the purpose and evolution of the Levy Control Framework (the Framework) since its introduction in 2011;
- key findings of our previous report on the Framework in 2013; and
- the sudden shift in forecast costs that emerged in 2015.

Government's strategic objectives for energy and climate change

1.2 The government has three strategic objectives for energy policy, which are to:

- ensure the resilience of energy supply;
- keep energy bills as low as possible for households and businesses; and
- secure ambitious international action on climate change and reduce carbon emissions cost-effectively at home.

1.3 In order to ensure security of supply, the government expects that around 95 gigawatts (GW) of new electricity generating capacity will need to be built over the next two decades, equivalent to 90% of the grid's installed capacity in 2015.⁷ This is because it expects demand for electricity to increase by around 20% in the next two decades, as a result of demographic changes, economic growth and the electrification of heat and transport. Over the same period, many of the UK's existing ageing coal and nuclear power stations will shut. In 2014 the former Department of Energy & Climate Change (the Department) estimated that around £100 billion of investment in the electricity system may be needed by 2020.^{8,9}

⁷ Department of Energy & Climate Change, *Updated Energy and Emissions Projections*, November 2015.

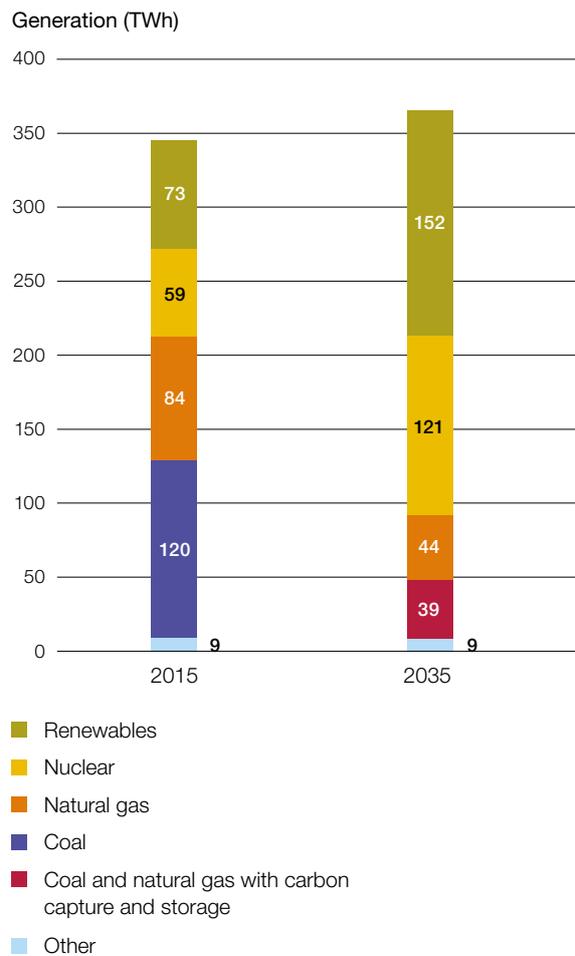
⁸ On 14 July 2016, the government announced that the Department of Energy & Climate Change would close and its responsibilities for energy markets and climate change would transfer to a new department, the Department for Business, Energy & Industrial Strategy (BEIS).

⁹ Department of Energy & Climate Change, *Delivering UK energy investment*, July 2014.

1.4 In line with the Climate Change Act, the government wants most of this new generation to be from low-carbon sources, including renewable energy such as solar, wind and biomass. By 2035, it expects around 42% of power generation to be from renewables, an increase of 79 terawatt hours (TWh) compared with the generation in 2015 (**Figure 1**). The government’s ambition for 2020 is for at least 30% of national electricity demand to be met by electricity generated from renewables. This ambition was adopted in order to help achieve an EU target of sourcing 15% of all energy (including transport fuel and heat) from renewables by 2020.¹⁰

Figure 1
Changes in electricity supply forecast by the Department of Energy & Climate Change

Renewable energy sources, alongside nuclear, will replace a large proportion of electricity generation currently provided by fossil fuels



Source: Department of Energy & Climate Change, Updated Energy and Emissions Projections 2015

10 Department of Energy & Climate Change, *National Renewable Energy Action Plan for the United Kingdom*, July 2010.

1.5 Progress against the renewable electricity ambition has been faster than expected and the latest forecasts are that 35% of electricity in 2020 will come from renewables (**Figure 2**). Despite this, the government previously said heat and transport will be challenging. The government has met interim EU targets for renewable energy to date, but analysis by National Grid has indicated that on its current course, the UK will not meet the 2020 target.¹¹

Figure 2

Change in renewable electricity forecasts

The Department expects to exceed its ambition of sourcing 30% of electricity from renewables. Between 2013 and 2015 expectations of progress against the ambition were revised upwards



Note

¹ The Department's ambition is for 30% of total demand for electricity to be served by renewable electricity supply by 2020. The ambition therefore depends upon the amount of electricity demanded in 2020, as well as the amount of renewable energy supplied. In 2015 the Department expected 30% of electricity demand in 2020 to amount to 92 TWh, shown as the purple dot on the chart. In 2013 the projection was 2 TWh lower (this is not shown on the chart). The change in projected supply of renewable electricity in 2020 has been far more significant; between 2013 and 2015 the Department revised this upwards by 14 TWh.

Source: Department of Energy & Climate Change's Updated Energy and Emissions Projections, September 2013 and November 2015

¹¹ Energy and Climate Change Committee, *2020 Renewable Heat and Transport Targets*, Second Report of Session 2016-17, HC 173, September 2016.

1.6 The costs of new generating capacity will largely be passed on to consumers through their electricity bills. The government's Electricity Market Reform programme introduced two new mechanisms to promote private sector investment in electricity generation: Contracts for Difference and the Capacity Market. Both schemes provide revenue to electricity generators, the payment of which is ultimately made by consumers via energy bills. A number of other energy policies are also consumer-funded (**Figure 3**).

1.7 Increases in the cost of energy bills have a particularly significant impact on low-income households and energy-intensive businesses, for whom energy costs represent a substantial proportion of spend. The Department estimates that there were around 2.4 million households in fuel poverty in England in 2014, representing just over 10% of all English households.¹² It estimates that energy-intensive users spent an average of £9.1 million on energy bills in 2014, although there is wide variation in this group.

1.8 Consumer-funded policies accounted for £132 (13%) of the average household energy bill of £1,029 in 2016. The government expects that the costs of these policies will grow to represent £164 of the average household energy bill in 2020. However, over the same period, government expects the typical total household energy bill to **fall** by £38 to £991 (**Figure 4** on page 18). This is because it expects energy-efficiency policies to reduce the amount of energy households consume, and wholesale energy prices to remain low. But if wholesale energy prices rise, expected improvements in energy efficiency may not be enough to offset the impact of higher prices on consumer bills.

The purpose and evolution of the Framework

1.9 The Framework is a formal budgetary control on three consumer-funded energy schemes. It was established by HM Treasury and the Department in 2011. At that time, the stated purpose of the Framework was “to make sure that [the Department] achieves its fuel poverty, energy and climate change goals in a way that is consistent with economic recovery and minimising the impact on consumer bills”. Furthermore, the Framework “requires [the Department] and HM Treasury to achieve those goals efficiently while safeguarding investor and stakeholder confidence.”¹³ Hence the cap can be understood as helping to reconcile the Department's objective of keeping energy bills as low as possible with its other objectives, to decarbonise energy and maintain security of supply (**Figure 5** on page 19).

¹² Fuel poverty in England is measured by the Low Income High Costs definition, which considers households to be in fuel poverty if they have required fuel costs that are above average (the national median level) and were they to spend that amount they would be left with a residual income below the official poverty line.

¹³ HM Treasury, *Control Framework for DECC levy-funded spending*, March 2011.

Figure 3
Consumer-funded energy schemes

	Cost (£bn)	
	2016	2020
Renewables Obligation: Requires energy suppliers to either meet targets for sourcing a set proportion of their energy from low-carbon generators, or pay a fee for any shortfall against this target into a 'buyout fund', which is redistributed among suppliers who meet the Obligation. The Obligation will close to new generating capacity on 1 April 2017.	3.8	5.2
Contracts for Difference (CfDs): The successor to the Renewables Obligation, CfDs are long-term contracts between energy generators and a government-owned company, which guarantee generators a set price per unit of electricity sold (the strike price). If wholesale prices of electricity are lower than the strike price, the difference is paid for by the government-owned company and the costs of these 'top-up payments' are recouped from energy suppliers. Conversely, payments flow in the opposite direction when wholesale prices rise above the strike price. This stabilises revenues for the generator while protecting consumers from paying higher support prices when wholesale electricity prices are higher.	0.1	2.0
Feed-in Tariffs scheme: A scheme to support investment in small-scale low-carbon electricity projects, including domestic installations. Participants in the scheme are paid set tariffs for producing electricity. The tariffs offered to new participants have reduced over time, and there are now caps on the amount of capacity that can be supported in different technologies and size bands.	1.2	1.3
Warm Homes Discount: A scheme under which some households in receipt of benefits or Pension Guarantee Credit can apply for a reduction on their energy bill.	0.3	0.3
Capacity Market: A system for providing payments to new or existing power generators in exchange for guarantees that they will provide electricity generating capacity, even if it is not actually called on to provide power. In March 2016 the Office for Budget Responsibility forecast that payments in 2020-21 would reach £0.9 billion. Since then, the government has announced its intention to procure more capacity than previously planned, meaning annual costs are likely to be higher. The first payments will be made in 2017-18. ¹	0.0	At least 0.9
The Energy Company Obligation: A regulation requiring the largest energy suppliers to install energy-efficiency measures in homes in order to cumulatively reduce CO ₂ emissions by a set amount. Suppliers face penalties if they do not comply.	0.8	0.6
Smart Meters Programme: A regulation requiring energy suppliers to take all reasonable steps to replace traditional gas and electricity meters in Great Britain with smart meters by 2020. ²	0.3	0.2

Notes

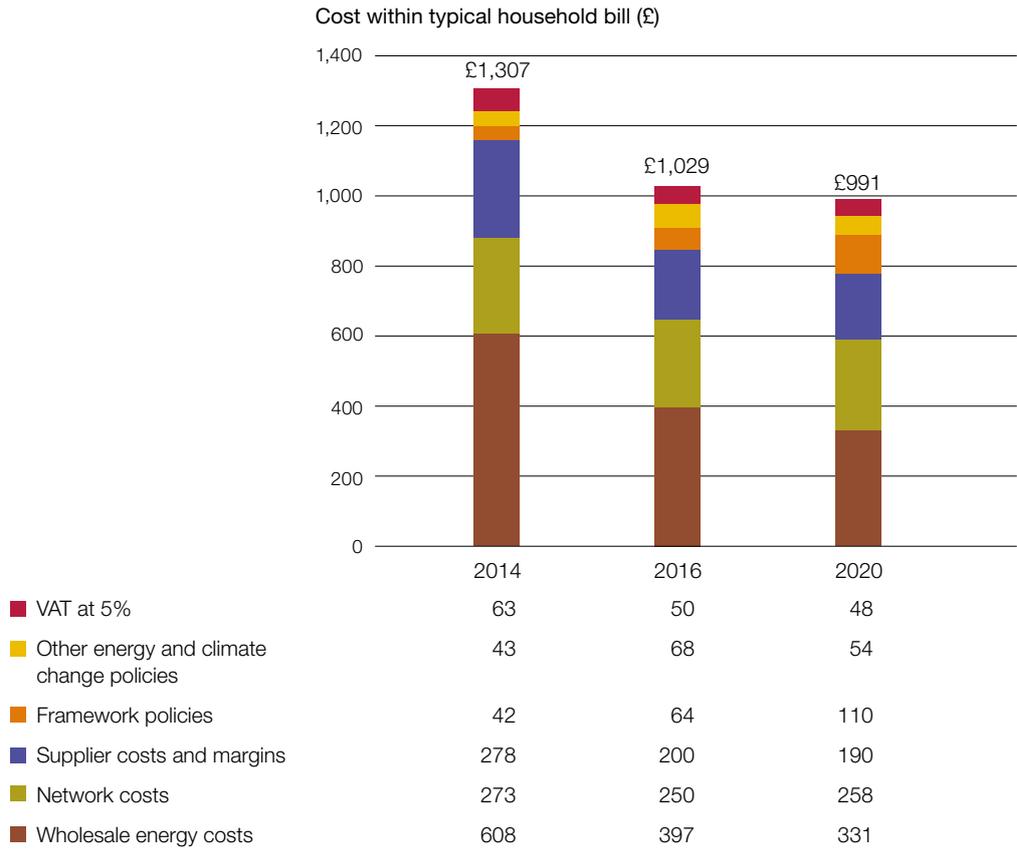
- Capacity Market payments are expected to vary from year to year and they are difficult to predict in advance. According to the Department's impact assessment, Capacity Market payments for 2017-18 may cost as much as £3 billion, significantly more than the £0.9 billion already committed for 2019-20 payments.
- The Department wishes to emphasise that smart metering is fundamentally different to other policies included in the table. Metering is already part of the core service of delivering energy to consumers. Smart metering is about modernising this core service.
- The figures in this table present only the costs of consumer funded schemes. Once the benefits to consumers are taken into account, the smart meter rollout is expected to provide a net bill saving by 2020 for the average dual fuel energy customer.

Source: National Audit Office analysis of Department for Business, Energy & Industrial Strategy data

Figure 4

Changing composition of the typical household energy bill

Household energy bills have fallen and are expected to fall further by 2020, despite the costs of consumer-funded policies increasing



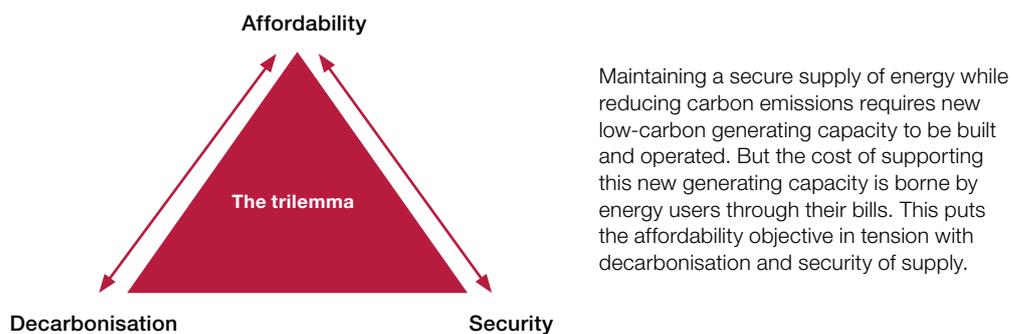
Note

1 'Other energy and climate change policies' include the Capacity Market, Energy Company Obligation, Smart Meters, Warm Homes Discount, and carbon pricing; the full set is shown in Figure 11 in Part Three.

Source: National Audit Office analysis of Department of Energy & Climate Change data, July 2016

Figure 5
The Framework’s purpose and the energy ‘trilemma’

The Framework helps to reconcile the Department’s strategic objectives



Role of the Framework	Trilemma objectives supported		
	Keeping bills as low as possible	Reducing carbon emissions	Ensuring a secure energy supply
Budgetary control The Framework acts as a constraint on one aspect of the costs of the Framework schemes (their gross costs of support).	✓		
Supporting consideration of value for money The Framework establishes a budget envelope for a group of schemes with shared objectives; this can encourage decision-makers to consider and take into account their relative cost-effectiveness.	✓	✓	✓
Investor confidence The Framework cap and forecasts give private firms visibility of the scale of future support. This can encourage investment in new low-carbon generation and improve the cost-effectiveness of renewables, for example by supporting a healthy pipeline of competing projects.	✓	✓	✓

The Framework also has a valuable potential role in supporting scrutiny and accountability to Parliament and bill payers over the costs of Framework schemes.

Source: National Audit Office

1.10 The Framework requires the Department to set policy such that the forecast costs of the scheme remain below annual limits. It requires the Department to monitor forecast costs, and to urgently develop plans to bring forecast costs back within the limits if these exceed a 20% 'headroom' or face a financial penalty. This penalty would be equivalent to the excess costs above the cap.

1.11 There is some ambiguity over the circumstances in which HM Treasury would tolerate spend in excess of the cap but within the headroom. The original document that established the Framework states that HM Treasury will need to be satisfied that there is a robust, agreed plan in place to bring costs under the cap, even where forecasts remain within the headroom, although this plan may involve costs exceeding the cap on a temporary basis. The accompanying 'questions and answers' document emphasises that there is some flexibility around the control limits, stating: "If we think that spend might be on course to exceeding its envelope (either in the short term or at some point in the future) we will consider making an adjustment to the policy, taking into account the impact on energy bills and progress towards our targets."

1.12 The Department told us that it has always seen the Framework as having the three purposes shown in Figure 5: budgetary control, supporting value-for-money considerations and investor confidence. However, the significance of the Framework's role in meeting each of these has shifted over time (**Figure 6**).

1.13 When the Framework began, the government anticipated that it would monitor and control all levy-funded schemes, defined as schemes classified, or expected to be classified, as 'imputed' tax and spend by the Office for National Statistics.¹⁴ In November 2012, the government announced that the cap on costs would in future only cover those schemes that support low-carbon generation. Thus, the budgetary cap no longer included the Warm Homes Discount, as the primary objective of this scheme is to allay fuel poverty. Similarly, the government no longer expects to include the Capacity Market, as its primary objective is security of supply.

1.14 The Department told us that despite the restricted coverage of the cap, all levy-funded schemes are still part of a wider Levy Control Framework, because it has arrangements for monitoring and controlling their costs. While we recognise that these separate arrangements exist we do not consider that they represent a strong and coherent budgetary framework for all levy-funded expenditure. The Department did not establish mechanisms for regular senior-level review of the aggregate impact of levies on bills until July 2015, and there is no similar mechanism for HM Treasury oversight of total costs of all consumer-funded levies. We have therefore focused this report on the low-carbon Levy Control Framework.

¹⁴ 'Imputed tax' in this context means money which HM Treasury never receives into its ownership, but nonetheless raises and allocates as tax and spend.

Figure 6

The evolution of the Framework

	Main objectives	Schemes covered	Timescale
Phase 1 (2011 – November 2012)	To monitor and control the costs to consumers of all levy-funded schemes	Renewables Obligation Feed-in Tariffs Warm Homes Discount	Spend capped to 2015-16
Phase 2 (November 2012 – present)	To monitor and control the costs of a subset of levy-funded schemes: those that support low-carbon generation To support investor confidence in the market for renewables To allow trade-offs between policies with the same objective	Renewables Obligation Feed-in Tariffs Contracts for Difference	Caps extended to 2020-21, rising steadily in real terms from £2 billion in 2011-12 to £7.6 billion in 2020-21

Note

1 Government announced in November 2012 that it would restrict the spending cap to 2020-21 to a subset of levy-funded schemes, although it did not announce the profile of the annual caps until June 2013.

Source: National Audit Office

Our previous reports on the Framework

1.15 We previously reported on the Framework in November 2013. Our assessment was that the Framework was a valuable tool for supporting control of the costs of consumer-funded energy schemes. However, its operation had not been fully effective in some key areas. The joint HM Treasury and Departmental governance board for the Framework had not strongly linked spending and outcomes in its deliberations. Reporting on Framework schemes had not supported effective public and parliamentary scrutiny of the overall costs and outcomes from levy-funded spending.

1.16 Our recommendations for improvement included that the Department assure Parliament and the public that it had robust arrangements to monitor, control and report on all consumer-funded spending, including for schemes not covered by the Framework cap such as the Capacity Market. We also highlighted that the Department would need to monitor the risk of under- or over-allocating Contracts for Difference and the risk of breaching the cap if the wholesale price of electricity fell.

1.17 Prior to this, we had also reported on problems the Department had experienced with forecasting for one Framework scheme, Feed-in Tariffs.¹⁵ In 2011 the Department discovered that its forecasts for this scheme had severely underestimated take-up. Successful applications from solar projects were more than double the level its models had anticipated. As a result, the Department commissioned an internal 'lessons learned' review, which made broad-ranging recommendations including that governance arrangements and access to commercial intelligence needed to improve.

The sudden change in Framework forecasts in 2015

1.18 In the first half of 2015, it emerged that the Department was on course to exceed the Framework cap for 2020-21 (**Figure 7**). As at February 2015, the Department had predicted that 2020-21 costs would be £7.1 billion, £0.5 billion below the Framework cap. However, shortly after, in April 2015, the Department began to project that it would exceed the Framework cap in every year to 2020-21. By June 2015, its forecasts of costs had risen to £9.1 billion in 2020-21, £1.5 billion above the cap and only fractionally under the 20% permitted headroom. This excess above the cap would equate to an addition of roughly £20 on the typical household bill in 2020.

1.19 In response, the Department made far-reaching changes to two of the Framework's constituent schemes to cut costs. The most significant were:

- for the Feed-in Tariffs scheme: setting caps on the amount of renewable electricity capacity that can be supported within different technologies and size bands, and reducing tariff rates; and
- for the Renewables Obligation: closing the scheme to all wind and solar projects a year earlier than previously expected, and removing 'grandfathering' for certain projects.¹⁶

1.20 As of July 2016, excess Framework costs are forecast to add £17 to the average household energy bill in 2020. Despite the increase in forecast Framework costs, the Department's estimate of the total average annual energy bill in 2020 fell between November 2014 and July 2016, by £268, to £991, largely because increases in Framework costs were offset by cuts to forecast wholesale energy prices (see Box 1 in Part Two).

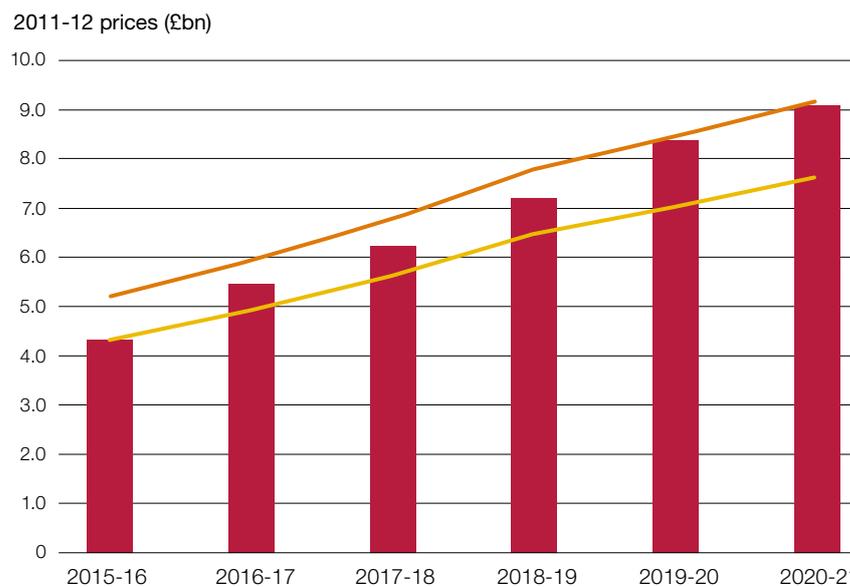
¹⁵ National Audit Office, *The modelling used to set Feed-in Tariffs for Photovoltaics*, November 2011.

¹⁶ Grandfathering is the policy whereby a project, once accredited under the Renewables Obligation, is guaranteed to maintain support at the same level for the lifetime of the project.

Figure 7

Department's forecast of the Framework's scheme costs (June 2015)

In June 2015 the Department reported that the Framework's costs were on course to exceed the cap in every coming year, and just within the 20% headroom in 2020-21



■ Forecast costs	4,335	5,455	6,235	7,205	8,375	9,100
— Cap plus 20% headroom	5,160	5,880	6,720	7,740	8,400	9,120
— Framework cap	4,300	4,900	5,600	6,450	7,000	7,600

Note

1 The results of this forecast were published by the Office for Budget Responsibility in its July 2015 Economic and Fiscal Outlook.

Source: National audit office analysis of Department of Energy & Climate Change data

Part Two

Coverage, controls and governance

2.1 This part assesses the low-carbon Levy Control Framework (the Framework) against three of our evaluative criteria: coverage, controls and governance. We assess Framework reporting and forecasting in Part Three. The criteria reflect the necessary conditions for effective cost control of frameworks and also underpin accountability, both within an organisation and to Parliament (**Figure 8**).¹⁷

Coverage

2.2 There are three aspects of coverage that are relevant to the Framework:

- Decisions to include or exclude schemes from the Framework should be consistent with the Department of Energy & Climate Change's (the Department's) objectives for it.
- The timeframe of forecasts should be long enough to cover the cost implications of government commitments, and the timeframe of the budgetary cap should be informed by the objectives of the Framework.
- Decisions to include or exclude components of costs from the Framework should be consistent with the Department's objectives for it.

¹⁷ We established these criteria in our first report on the Framework in 2013, drawing on a maturity model we had developed earlier to assess Departments' management of direct spending. We have since applied these criteria in our assessment of the welfare cap. See Comptroller and Auditor General, *The Levy Control Framework*, Session 2013-14, HC 815, National Audit Office, November 2013, and Comptroller and Auditor General, *Managing the welfare cap*, Session 2015-16, HC 952, National Audit Office, April 2016.

Figure 8

Our evaluative criteria for cost control frameworks

Coverage	Framework coverage has a clear rationale, which fits its purpose.
Controls	The Department has effective controls for the costs of Framework schemes and uses them appropriately, including by exercising appropriate control over the allocation of budget to different schemes over time.
Governance	The Department's and HM Treasury's governance arrangements for the Framework make responsibilities clear, and adequately engage skilled and empowered people in decision-making.
Reporting	The Department reports actual and forecast costs and outcomes from Framework schemes transparently, promptly and accurately to ministers, Parliament and the public.
Forecasting	Spending or cost forecasts are based on a sound understanding of the factors influencing costs and outcomes, and reasonable assumptions regarding future levels of those factors.

Source: National Audit Office

Schemes

2.3 As we set out in Part One, the Department has changed its objectives for the Framework. It chose to restrict the spending cap to a subset of consumer-funded schemes, namely those that support low-carbon generation. The coverage of the budgetary cap is currently consistent with that rationale, covering all consumer-funded schemes that support low-carbon generation: the Renewables Obligation, Feed-in Tariffs, and Contracts for Difference.

2.4 However, there is confusion among stakeholders and Parliament as to why the spending cap only covers a subset of levy-funded schemes, and concern that this reflects an unfair targeting of support for renewable energy.¹⁸ This perception has been reinforced by a lack of transparency over control arrangements for levy funded schemes that fall outside of the spending cap. The Department has not, for example, updated the primary official document that sets out the scope and operation of the Levy Control Framework to specify these arrangements.¹⁹

¹⁸ Energy and Climate Change Committee, *Investor Confidence in the UK energy sector*, Third report of Session 2015-16, HC 542, February 2016.

¹⁹ HM Treasury, *Control framework for DECC levy funded expenditure*, 2011.

Timeframe

2.5 The Framework cap currently extends for four and a half years, to March 2021. The government's rationale for this has been to strike a balance between two considerations: investors should be given certainty, but forecasts become less reliable as they extend further into the future. However, we do not consider that the government has taken a sufficiently long-term approach to controlling and signalling the budget for low-carbon levy-funded schemes, because:

- the time period covered by the cap is decreasing over time. Government has not extended the end date since November 2012. By contrast the welfare cap, another government budgetary framework, rolls the end date forward each year so that it always covers the next five years;²⁰
- consumers will continue to pay the costs of Framework schemes well beyond March 2021. Most Contracts for Difference are for 15 years. The Contract for Difference for a new nuclear power station at Hinkley Point C, which may cost consumers £30 billion in top-up payments, extends for 35 years and falls entirely outside the Framework as it will not begin generating electricity until 2025 at the earliest;²¹
- some renewable projects have a lead time of 10 years, so the cap on its own does not give developers of these technologies visibility of the scale of support that might be available when their products come to market; and
- the government expects that it will be necessary to continue to grow and support the market in low-carbon power after 2020, in order to meet government's carbon targets under the Climate Change Act.

2.6 The government has mitigated the impact of the short timeframe of the cap on investor confidence by announcing plans to auction up to £730 million of Contracts for Difference for 'less established technologies', which has been welcomed by industry. But for some developers government has not clarified whether support will be available in the 2020s (paragraph 3.29).

²⁰ Comptroller and Auditor General, *Managing the welfare cap*, Session 2015-16, HC 952, National Audit Office, April 2016.

²¹ The £30 billion figure is in 2015-16 prices and discounted. See Comptroller and Auditor General, *Nuclear power in the UK*, Session 2016-17, HC 511, National Audit Office, July 2016.

Costs

2.7 The Framework sets a cap on one aspect of the costs to consumers of support for renewable generation, the direct costs of support, and so ensures that the government monitors these costs closely. However, the costs it caps are not the full costs of consumer support for renewables because they exclude:

- **The cost reductions for consumers** that renewables bring via their dampening effect on wholesale prices (the ‘merit order effect’ – explained in **Box 1** overleaf).
- **Wider system costs** of renewables. In particular the additional costs associated with limiting the impact of intermittent supply from wind and solar sources, in order to balance supply and demand. If more energy comes from intermittent sources, greater reserve capacity may be required in order to ensure security of supply at peak times.

2.8 The Framework’s measure of costs also ignores the fact that alternative investments would have to be made if renewables were not supported. New capacity is needed in order to ensure security of supply. If the new capacity was provided by fossil fuel power plants instead of renewables, those would also require support payments.²² More fossil fuel power plants would also create additional costs of decarbonisation, because fossil fuel plants are given partial relief from the full social costs of their CO₂ emissions. Although they are taxed for the CO₂ they emit, the level of this tax is lower than government’s estimate of the cost of reducing CO₂ in line with the Climate Change Act.²³

²² Such support payments are made through the Capacity Market, which is described in Figure 3.

²³ See Department of Energy & Climate Change, 2014, Updated short term carbon values for policy appraisal, and Committee on Climate Change, 2015, Power sector scenarios for the fifth carbon budget, October 2015. At the March 2014 Budget, the government decided that instead of increasing carbon taxes steadily, as it had planned to at the inception of the Framework, it would freeze them from 2016-17 to 2019-20 in order to limit the increasing differential between the price of emitting carbon in the UK and the rest of the EU. Because lower carbon taxes result in lower wholesale prices of electricity, the knock-on effect of this decision will be to increase Contracts for Difference top-up payments. The Committee on Climate Change estimated that the impact on Framework costs was to increase them by £0.3 billion in 2020-21.

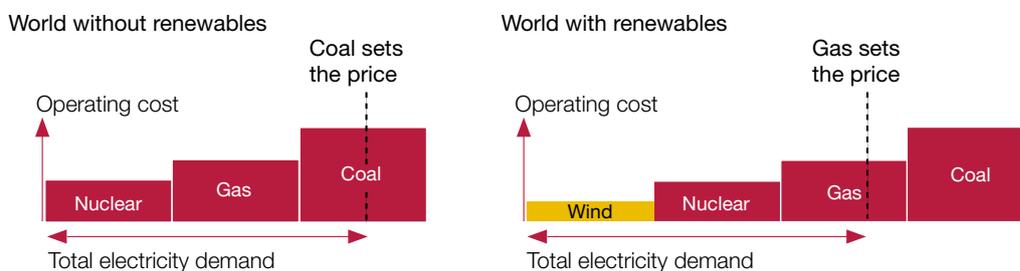
Box 1

The merit order effect

In the electricity market, the wholesale price of electricity at any given time is determined by the operating cost of the ‘marginal’ power plant. The marginal power plant is the last one that would come online if plants were switched on one by one, in order of their operating costs, and no more plants were switched on once total supply matched total demand. When more capacity from renewables is added to the energy mix, there will be more power plants with low operating costs, and consequently, costly-to-run power plants like coal-fired plants will be less frequently called upon and set the market price. This effect on wholesale prices is known as the ‘merit order effect’.

Illustration of the merit order effect

With renewable energy sources like wind in the energy mix, costly-to-operate sources like coal are less frequently called upon and allowed to set the market price of electricity.



The Department published an estimate of the merit order effect in its 2014 report on prices and bills.¹ The Department’s estimate is smaller than that of some other stakeholders, because it measures the effect against a different baseline scenario. The Department uses a baseline scenario in which renewables were never commissioned, and new gas turbines were commissioned in their place to provide the same capacity. Other studies of the merit order effect² have modelled the merit order effect against a baseline in which renewables were never commissioned, and nor was any additional gas. The merit order effect is greater when measured against this latter baseline, which would lead to more frequent calls on expensive coal power plants when demand is high.

The Department has also performed additional tests to check what its models indicate the merit order effect would be if measured against a baseline scenario with no additional gas, and found results that are broadly similar to other studies.

Estimated savings on the typical household energy bill in 2014 from the merit order effect

	Baseline scenario	Annual saving nationally	Saving per bill
Department of Energy & Climate Change (published) ³	No renewables, additional new gas plant make up the ‘missing’ capacity	£0.4bn	£5
Committee on Climate Change ⁴		<£0.4bn	<£5
Good Energy	No renewables, no new gas to compensate for ‘missing’ capacity	£1.5bn	£17
Department of Energy & Climate Change (unpublished)		£0.8bn – £1.4bn	£10 – £16

Notes

- 1 Department of Energy & Climate Change, *Estimated impacts of energy and climate change policies on energy prices and bills*, 2014.
- 2 Such as Good Energy, *Wind and solar reducing consumer bills*, October 2015.
- 3 The baseline scenario for the Department’s published estimate also excludes the effect of its energy-efficiency policies to date. This is not thought to have a major impact on the estimated merit order effect.
- 4 Committee on Climate Change, *Power sector scenarios for the fifth carbon budget*, October 2015.

Source: National Audit Office

2.9 The Framework's focus on the direct costs of support has the virtue of being simple to measure and explain. But because of the way Contracts for Difference are designed, measured Framework costs rise when wholesale electricity prices fall, and vice versa. This makes Framework costs volatile and difficult to forecast accurately. It could also encourage decision makers to increase investment in renewables when wholesale prices are high, and cut back when wholesale prices fall. This pattern of investment may not support longer-term value for money, as, with contracts extending for 15 years or more, it could lock consumers in to unsustainable levels of investment. Or it could lead to a 'stop start' approach which undermines investor confidence. This pattern of investment may also not accord with affordability considerations. The costs of top up payments under already-signed Contracts for Difference actually become more affordable when wholesale prices fall because increased top up payments are offset by the wider impact on bills of low wholesale prices (see **Box 2**).

Box 2

Wholesale electricity price movements

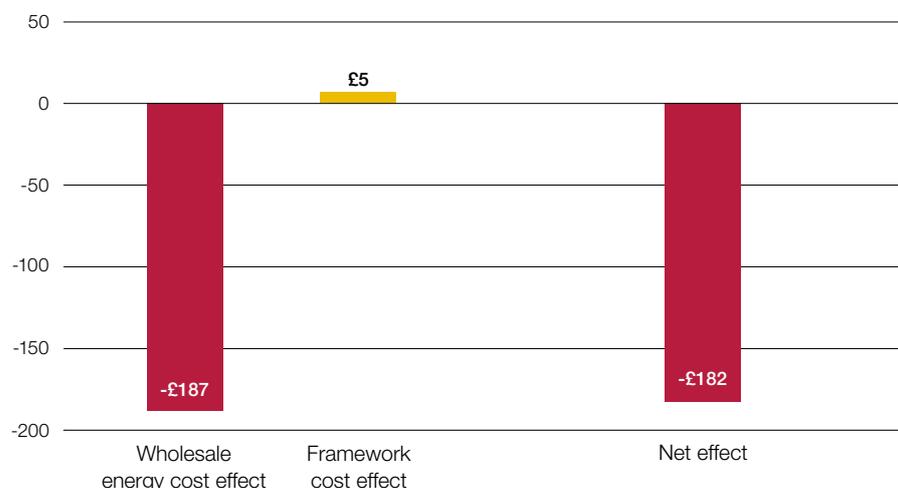
Between November 2014 and July 2016, the Department revised its projections of fossil fuel prices (particularly the gas price) downwards. This also led to lower projected wholesale prices of electricity (Figure 17 in Appendix Three).

The effect of this has been to add around £0.4 billion to the projected costs of the Framework in 2020, equivalent to £5 on the typical household bill. However, the lower wholesale prices for both gas and electricity will also put downward pressure on consumer bills, equivalent to a £187 reduction for the typical household. Only the £5 increase is captured within the Framework.

Changes in forecast household bills resulting from changes in wholesale energy price projections, November 2014 to July 2016

The net effect of lower wholesale prices has been to reduce bills, despite increasing Framework costs

Effect on household bills in 2020 (£)



Source: National Audit Office analysis of Department of Energy & Climate Change forecasts, November to July 2016

2.10 Adjusting the design of the Framework's measure of cost would be one way to better reflect these cost considerations, although it would make it more difficult to forecast Framework costs and explain them in simple terms. The Committee on Climate Change and others have recommended government measures Framework costs against the cost of new gas capacity, with the full social costs of carbon emissions included.

Controls

2.11 The Department has various means of controlling Framework costs: it can vary the rules and parameters of schemes to affect their costs, and it can plan the allocation of the Framework budget to the different schemes over time.

2.12 At the time of our 2013 report on the Framework, the Department had improved its arrangements to control the costs of Framework schemes by varying their rules. This included:

- for the Renewables Obligation – adjusting the support levels for individual technologies as part of its 2012 banding review; and
- for Feed-in Tariffs – introducing a mechanism known as “degression” whereby tariff rates for new applicants reduce automatically as demand increases.

2.13 However, the Department had not put in place rules that would ensure the costs of these two schemes could not go over a certain limit: the schemes were demand-led and all eligible applicants received support. Therefore it was important that the Department had robust forecasting and strong governance arrangements, to give early sight of potential cost over-runs, and inform decisions about whether to tighten the schemes' parameters, or introduce new controls. We discuss below aspects of the Department's approach to Framework governance and forecasting before June 2015 (paragraphs 2.19 to 2.20 and 3.2 to 3.6).

2.14 One of the Department's most significant means of controlling overall costs was by deciding how much support to offer through successive allocations of Contracts for Difference. But the Department has not made effective use of its control over the allocation of budgets for these Contracts:

- In 2014 it allocated a large proportion of the remaining Framework budget to projects without price competition. In our 2014 report on these contracts we estimated that they had taken up 58% of the budget not already allocated to the other schemes, leaving £2.8 billion available up to March 2021 for further Contracts.²⁴ Lower-than-expected wholesale prices mean that the projected cost of these contracts has since grown by £1.1 billion. The costs of the Renewables Obligation and Feed-in Tariffs have also grown so that they take up all remaining room under the cap.

²⁴ Comptroller and Auditor General, *Early contracts for renewable electricity*, Session 2014-15, HC 172, National Audit Office, June 2014.

- One of the Department's aims in making these early awards was to demonstrate that projects with Contracts for Difference could find financial backing, and thereby avoid a hiatus of investment as it transitioned away from use of the Renewables Obligation as the main scheme for supporting renewables. But we concluded that awarding so many of the contracts early was unnecessary, and limited the Department's ability to secure better value for money with later awards which would be subject to greater price competition via auction. The first auction took place in 2015, and demonstrated that auctions of Contracts for Difference can successfully drive down prices. Based on the evidence of this auction, the Competition and Markets Authority has estimated that lack of price competition in the early awards to offshore wind projects may have led to additional costs of around £250 million to £310 million per year.²⁵
- In February 2015, the Department conducted an auction of Contracts for Difference worth £615 million in top-up payments by March 2021, without first conducting a substantive exercise to update its assumptions on the costs of generation technologies. The Department discovered that its forecasts exceeded the cap just one month after holding the auction.

2.15 Later in 2015, after discovering that it was on course to exceed the Framework cap, the Department introduced stronger controls on the costs of the Renewables Obligation and Feed-In-Tariff schemes. In particular, it closed the Renewables Obligation early and introduced cash limits on the support available under the Feed-in Tariff scheme. Forecast costs of Framework schemes will continue to fluctuate, largely because the cost of top up payments under Contracts for Difference will fluctuate depending on wholesale energy prices. This is a factor over which the Department has no control.

2.16 The Department told us that one of the objectives of the Framework is to support decision-making about the trade-offs between schemes. Over time, the Department has transitioned away from use of the Renewables Obligation, and towards Contracts for Difference, which it expects to achieve better value for money. This is an example of how the Department has considered some of the value-for-money trade-offs between schemes included in the Framework.

2.17 There are also complex trade-offs to be made in supporting different technologies. The Department currently offers higher levels of support to less mature technologies, to help develop the technology and supply chain and so bring costs down over time. With Contracts for Difference, it provides this differentiated support via a system of 'pots'. The Department puts technologies into groups partly according to their maturity, and allows projects in each group to bid for their own 'pot' of support funding. The Competition and Markets Authority has expressed its concern that although in principle there may be good reasons for having a pot system, it has seen no significant analysis from the Department to explain its pot allocation decisions, or demonstrate how these would result in the best outcome for consumers.²⁶

²⁵ Competition and Markets Authority, *Energy market Investigation: Final report*, June 2016.

²⁶ See footnote 25.

Governance

2.18 During the course of 2014, the Department started to improve governance arrangements over the Framework and in January 2015 it introduced a system of quarterly reporting. It considers that this helped bring to light the need to update assumptions. Nevertheless, we consider that this could and should have been initiated earlier.

2.19 Weaknesses in governance contributed to a delay in the discovery of the Framework's breach in 2015:

- The Levy Control Board, the forum for HM Treasury's oversight of the Framework, did not meet between November 2013 and July 2015, by which point the Framework was already projected to exceed the cap. During this time HM Treasury's oversight consisted of participation in the budget-setting process for Contracts for Difference, as well as receiving Framework forecasts twice a year and participating in meetings the Office for Budget Responsibility held with the Department in order to challenge those forecasts.
- In early 2014 the Department transferred overall responsibility for the Framework from the Levy Control Board to the Electricity Market Reform Board. This board was not required to report upwards on the Framework unless forecast costs exceeded the cap.
- Intelligence that senior officials received about the renewables industry was not always passed to those responsible for producing the Framework forecasts.
- Senior officials did not have a good enough understanding of how the uncertainties associated with individual assumptions accumulated into an overall level of risk. There was also a tendency to focus too much on the central forecast rather than the forecast range.

2.20 Governance of the Framework should have reflected the degree of uncertainty inherent in projecting costs, and addressed important questions such as "what if our forecasts or key assumptions are wrong?" and "how would we respond in that case?" These would have helped the government to explicitly consider what level of risk it was willing to accept (its 'risk appetite'). This in turn might have influenced the design of the Framework, for example, to build in scheme rules that automatically curtail the availability of support as costs rise. It might have also caused the government to put in place stricter requirements for regular upward reporting, and focus more on forecast uncertainty.

2.21 Following the sudden jump in forecast costs in early 2015, the Department initiated an internal review to learn lessons. The findings and recommendations of this review echoed those raised by an earlier lessons-learned exercise following the problems with forecasting for one of the Framework schemes in 2011 (paragraph 1.17). However, the Department had not widely disseminated the findings of this earlier review, nor had it established a process to track progress against its recommendations.

2.22 The 2015 internal review prompted a step-change in governance (**Figure 9** overleaf).

- The Department has expanded its commercial expertise and started gathering market intelligence more frequently. In 2016 the Department also began liaising more with the Low Carbon Contracts Company to share intelligence.
- The information provided in quarterly internal reports to senior Departmental and HM Treasury officials has improved, and now includes a more detailed explanation of risks and uncertainty.
- There is clear senior responsibility for the Framework. Responsibility for policy split is from responsibility for analysis, in order to enhance scrutiny of forecasting assumptions.
- The Levy Control Board and the boards reporting to it now meet at least once a quarter.

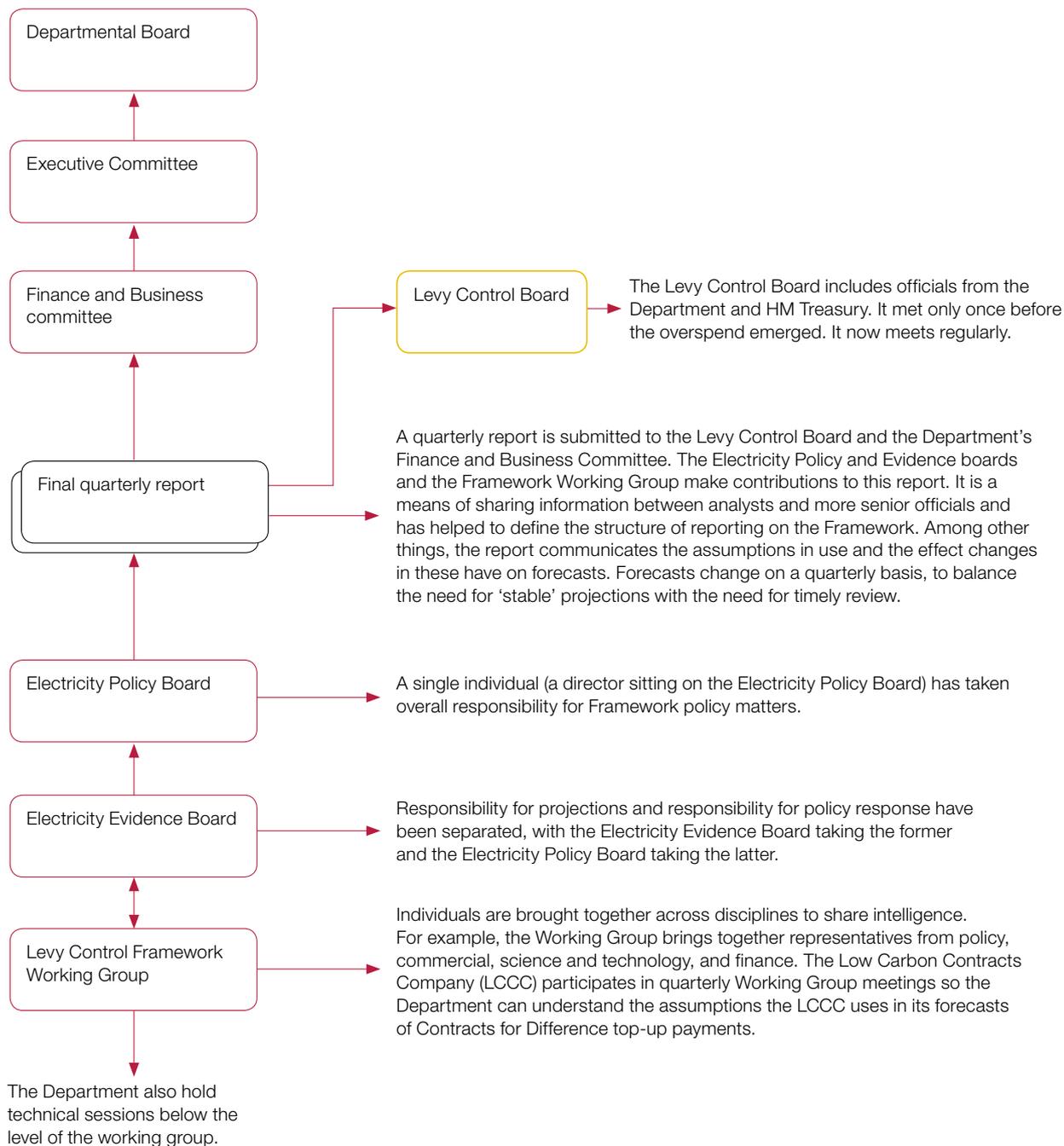
2.23 Although governance of the Framework has improved, the Department could do more to regularly consider the long-term costs of Framework schemes. Its quarterly reports only show costs to 2020-21. The Department produced a one-off forecast of the total costs of the Framework schemes in April 2015 (see Figure 16 in Appendix Three), but this only extended to 2025-26, and it is now 18 months out of date.

2.24 The Department could also develop the information on outcomes in its quarterly internal reports. While the reports include valuable information on the impact of Framework costs on bills and on forecast renewable generation, they do not cover investor confidence, despite this being one of the main objectives of the Framework.

2.25 The OBR provides summary details of Framework forecasts in its *Economic and Fiscal Outlook* which is published alongside each Budget and Autumn Statement. The OBR requires the Department to explain movements in forecasts, but lacks the sector knowledge to challenge some assumptions such as the costs of different technologies for electricity generation. The OBR provides more limited challenge of Framework forecasts than it does for Departmental tax and spending forecasts, because Framework schemes do not affect measures of government borrowing or debt, which are central to the OBR's role. The Committee on Climate Change does not have a formal role in reviewing the robustness of Framework forecasts. This is despite the Committee holding relevant information and expertise. For example, the Committee reviews evidence on how the efficiency of renewable technologies may improve over time, and publishes its own reports on the likely impacts on bills of meeting legislated carbon targets.²⁷

²⁷ Committee on Climate Change, *Energy prices and bills – impacts of meeting carbon budgets 2014*, December 2014.

Figure 9
Governance arrangements for the Levy Control Framework



- Department
- Department and HM Treasury

Part Three

Forecasting, reporting and investor confidence

Overview

3.1 This part covers our assessment of:

- the Department of Energy & Climate Change's (the Department's) forecasting for the Levy Control Framework (the Framework);
- reporting on the Framework; and
- the Framework's role in supporting investor confidence.

Forecasting

Historic approach to forecasting

3.2 Between February 2015 and June 2015 the Department's forecasts of Framework costs in 2020-21 shifted significantly, from £7.1 billion to £9.1 billion (paragraph 1.18). One reason for increased forecast costs was the global slump in fossil fuel prices, a development which experts in general were not expecting. This represents 15% (£0.3 billion) of the £2.0 billion increase between February and June 2015 in forecast 2020-21 costs.

3.3 However, other changes in assumptions could and should have been updated earlier. In particular:

- one of the Department's crucial assumptions, the load factor of new-build offshore wind turbines, was not updated for 18 months, despite indications that it may have been contributing to an underestimation of costs. Changes to assumed offshore wind load factors account for £0.6 billion of the increase between February and June 2015 in forecast 2020-21 costs; and
- between 2013 and 2015 there was a two-year break between substantive exercises to gather data on technology costs. This was despite the fact that during this time the Department entered into £615 million of new commitments under the Framework by auctioning off Contracts for Difference. An earlier assessment of technology costs could have highlighted that the Department's expectations of take up under the Feed-in-Tariff schemes were too cautious. Changes to expectations of deployment under this scheme accounts for a quarter (£0.5 billion) of the increase between February and June 2015 in forecast 2020-21 costs.

3.4 The internal review commissioned by the Department in May 2015 concluded that part of the reason for the weaknesses in collecting and using market intelligence was that officials were too stretched implementing the Department's major programme, Electricity Market Reform.

3.5 We discussed in Part Two above how shortcomings in the Department's governance of the Framework also contributed to the forecasting failure (paragraphs 2.19 and 2.20). Senior officials tended to place too much emphasis on central "point" projections of future costs, at the expense of forecast ranges reflecting the high degree of uncertainty around future costs. More explicit consideration of forecast uncertainty might have encouraged the Department to think through the implications of its central forecasts being wrong, and caused the Department to decide on its risk appetite.

3.6 Appendix Three gives further detail on our assessment of the Department's historic forecasting.

Current approach to forecasts

3.7 The Department is now in a better position to forecast Framework costs. Following the internal review it conducted in 2015 the Department has made a step-change in its governance arrangements for scrutiny and challenge of Framework costs. It has taken on more commercial specialists and is committed to collecting market intelligence more frequently (paragraph 2.22). It is also now much more straightforward to forecast the likely costs of two of the schemes because:

- the Renewables Obligation is largely closed to new applications; and
- the rules of the Feed-in Tariffs scheme now impose a hard limit on total costs.

3.8 The cost of top-up payments via Contracts for Difference remains inherently difficult to forecast because of their sensitivity to wholesale electricity prices. The Department's latest forecast of these costs falls within the range of reasonable estimates that we developed as part of our audit of the Department's financial statements in 2015-16. However, the uncertainties involved are significant (see Appendix Four).

3.9 The Department does not regularly produce forecasts of Framework costs beyond the timeframe of the spending cap, despite the fact that committed or planned costs under Framework schemes extend well beyond 2021:

- Existing agreements under the Renewables Obligation and Feed-in Tariffs schemes do not start to expire until the mid-2020s.
- The last top-up payment of a currently signed Contract for Difference for renewable electricity is expected to be made on or around the year 2036.
- The Government has signed a Contract for Difference for a new nuclear power station at Hinkley Point C. It is expected that this would generate electricity from 2025 to 2060 and may cost consumers £30 billion in top-up payments.²⁸
- It is likely that further Contracts for Difference will need to be awarded to achieve long-term decarbonisation targets. According to the Department's projections, 236–250 terawatt hours (TWh) of electricity will be sourced from low-carbon sources by 2030, whereas existing commitments will only provide 176 TWh (**Figure 10** overleaf).

3.10 The last time the Department included a long-term forecast of Framework costs in its internal reporting was April 2015, despite the fact that there have been substantive changes to Framework schemes since then.

Reporting

3.11 Transparent reporting in relation to the Framework and levy-funded schemes is important because it:

- facilitates parliamentary accountability;
- can improve the accuracy of forecasts by exposing them to external challenge; and
- supports investor confidence by demonstrating the evidential basis for decisions about spend on renewables.

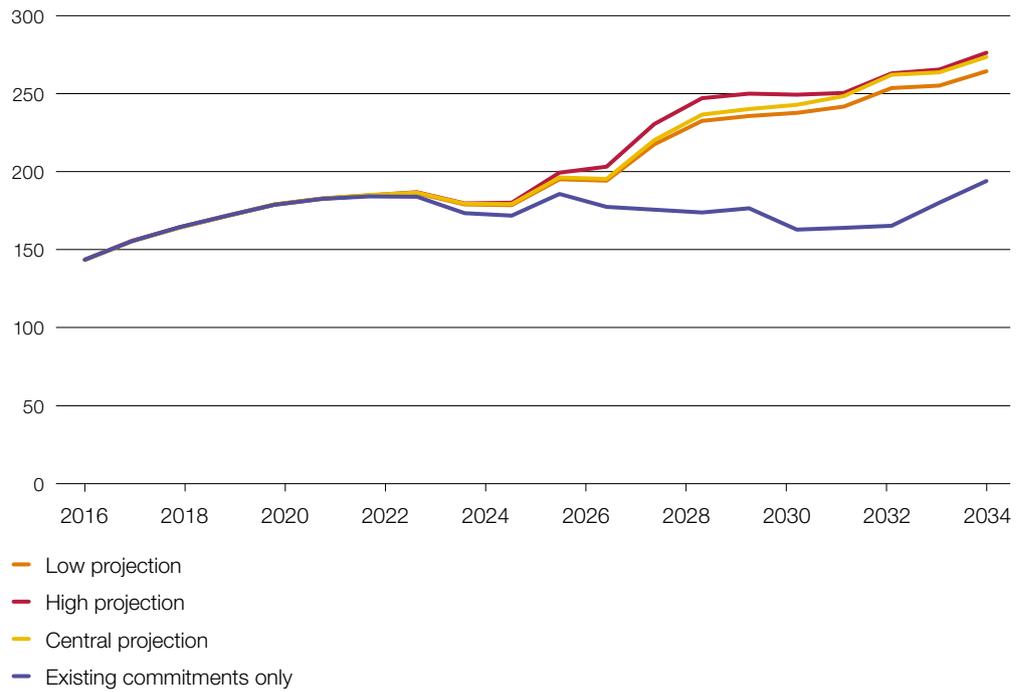
²⁸ The value of top-up payments is highly uncertain; £30 billion is an estimate (in 2015-16 prices, with discounting) based on current wholesale price projections. See Comptroller and Auditor General, *Nuclear Power in the UK*, Session 2016-17, HC 511, National Audit Office, July 2016.

Figure 10

Predicted growth in low-carbon energy versus existing policy commitments

The gap between existing commitments and likely future growth in renewable energy implies further Contracts for Difference will be awarded

Electricity generation (TWh)



Note

1 Low-carbon energy includes generation from nuclear and renewable sources.

Source: Department of Energy & Climate Change, Updated Energy and Emissions Projections, November 2015

Reporting to Parliament

3.12 As we set out in Part One, the Department has designed the scope of the Framework so that it only includes a subset of levy-funded schemes and only considers their gross costs. There are significant costs to consumers from policies which are not part of the Framework (**Figure 11** overleaf). In addition, some consumer-funded policies create cost savings for consumers. It is therefore important that the Department's reporting to Parliament extends beyond the Framework to explain the overall impact of the Department's policies on consumer bills, distinguishing between effects of past and future schemes.

3.13 We recommended in 2013 that the Department should establish routine reporting along these lines. It has failed to do so, with its last report on this topic in 2014. Some of the determinants of consumer bills have changed significantly since then. The most significant change has been to wholesale energy prices (Box 2 in Part Two). And in November 2015 more of the burden of paying for Framework schemes was shifted onto consumers, in order to make energy-intensive industry exempt from some costs. The government expects that this decision will add around £5 to the average household bill from 2017-18 onwards.²⁹

3.14 The Competition and Markets Authority has also highlighted the lack of transparency over the impact of policies on energy markets and bills, and concluded that Ofgem is well-placed to improve reporting, given its independent role and expertise.³⁰ It recommended that Ofgem produce an annual assessment of the cumulative policy impacts on energy markets in Great Britain, including an analysis of the factors that have contributed to changes in energy prices and bills.

3.15 The forecast cost of Contracts for Difference included in the Framework differs from the forecast of those Contracts included in the Department's annual accounts, partly because the latter is constrained by standards for financial reporting (paragraphs 10 to 12 in Appendix Four). Unless the Department explains its reasons for producing a forecast that diverges from the valuation used in its accounts, there is a risk that the trustworthiness of the Framework forecast will be called into question. The Department should therefore explain how and why the Framework forecast diverges from the accounts as part of its regular reporting to Parliament.

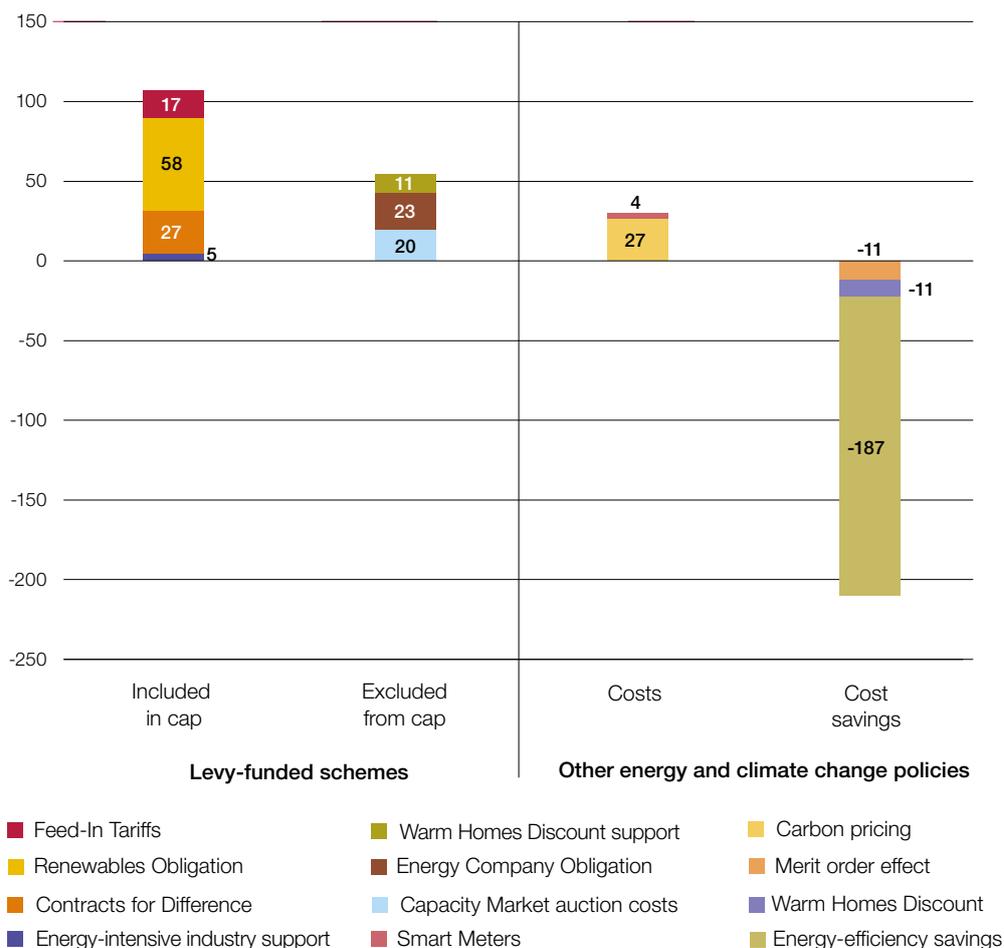
²⁹ HM Treasury, *Autumn Statement*, November 2015.

³⁰ Competition & Markets Authority, *Energy market investigation*, June 2014.

Figure 11
Effects of energy policies on bills in 2020

There are significant gross costs to consumers from energy policies which are not part of the Framework

Effect on bills in 2020 (£)



Notes

- 1 This figure shows impacts on the typical household bill for electricity and gas.
- 2 Energy-intensive industry support: energy-intensive industry has been given exemptions from the costs of the Renewables Obligation and Feed-in Tariffs. This does not affect the total costs of the schemes, but increases the share of their cost that is ultimately borne by other electricity consumers.
- 3 This figure is based on February 2016 projections whereas most of the rest of this report, including Figure 4 in Part One, is based on July 2016 projections. Several of the Department's assumptions changed between February and July, and therefore the figures here do not reconcile precisely with those presented elsewhere.
- 4 The leftmost bar in this figure is equivalent to the 'Framework policies' portion of the bill in Figure 4. All other policies except for energy-efficiency savings are equivalent to the 'other energy and climate change policies' portion of the bill in Figure 4.
- 5 Energy-efficiency savings do not appear as part of the bill in Figure 4 because energy-efficiency improvements affect bills by reducing energy consumption, and energy that is not consumed is not billed for. The energy-efficiency savings shown here are the estimated impacts of several policies introduced by UK and EU governments including building regulations and product policy. The estimated savings include savings from home energy-efficiency schemes whose funding came to an end over a decade ago, because the impacts of these schemes on bills are ongoing.

Source: National Audit Office analysis of Department of Energy & Climate Change data, February 2016

Reporting for the renewables industry

3.16 The Department publishes a large amount of information on its assumptions in relation to the renewable energy market, such as the costs of different renewable energy technologies, and its projections of wholesale electricity prices. Despite this, the Framework forecasts are not sufficiently transparent to external observers, because the assumptions supporting them are not stated clearly alongside the forecasts, and some information is withheld entirely. Stakeholders have complained in particular that the significant shift in forecasts that occurred in 2015 has not been fully explained. The Energy and Climate Change Committee, in its March 2016 report on investor confidence, concluded that the lack of transparency about the Framework's assumptions and methodologies had invited speculation about whether the numbers were manipulated in some way, especially when the policy changes that resulted from the sudden shift in forecasts were so dramatic.³¹

3.17 Withholding information or poor communication creates a risk that even reasonable changes in forecasts will appear arbitrary. The Department could do more to mitigate this risk. For example, the Department does not currently disclose which of its fossil fuel projections (low, central or high) it is using in the Framework. In April 2015 a change from the central to the low fossil fuel projection, to bring the Department's projection closer to market expectations, led to a £320 million increase in forecast 2020-21 costs. External observers may have been anticipating that there would be a change in the Department's fossil fuel price assumptions, but they were never told when it actually occurred.

3.18 The Department has cited commercial sensitivity as a reason why it does not provide more information on assumptions underlying its forecasts. We recognise that the Department has legitimate reasons for being concerned about disclosing certain information, but we believe there are ways of working around some of these concerns to safely disclose more.

3.19 For example, the Department's forecasts incorporate its view on whether certain specific projects are likely to bid in upcoming Contracts for Difference auctions. If it is revealed to other bidders, this information could undermine competition. This is a risk the Department has rightly tried to mitigate, but it has done so by heavily restricting publication of its assumptions. We believe the Department could reveal more assumptions without undermining competitive tension. It could, for instance, release variants of its forecasts, depicting different scenarios depending on bidders' behaviour. This would allow it to disclose more information while maintaining enough ambiguity to preserve competition between bidders.

³¹ Energy and Climate Change Committee, *Investor confidence in the UK energy sector*, Third Report of Session 2015-16, HC 542, March 2016.

3.20 The Low Carbon Contracts Company (LCCC) has managed similar commercial sensitivity concerns in order to publish its own detailed forecast of Contracts for Difference payments over the next 15 months. The LCCC has done this by:

- where possible, publishing assumptions on projects in aggregate rather than individual projects;
- keeping assumptions on some of the most commercially sensitive information – such as project start dates – slightly vague, without withholding these entirely;
- publishing assumptions that come from analysis of non-privileged information; and
- publishing not only a central forecast, but ‘sensitivities’ around this that employ reasonable alternative assumptions.

3.21 The Department should explore similar options. Cabinet Office guidelines state that there should be a “presumption in favour of disclosing information,” and decisions to withhold information should be based on a narrow definition of commercial confidentiality.³² Furthermore, both we and the Energy and Climate Change Committee have previously called upon the Department to improve the transparency of the Framework forecasts.³³

Investor confidence

3.22 As explained in Part One, one of the objectives of the Framework has been to support investor confidence in the market for renewable energy. The Framework has the potential to play an important role supporting investor confidence, in particular, for those investors who might make investments in new projects or the supply chain, by signalling planned support for renewables for several years ahead. Maintaining the confidence of these investors is important because it reduces finance costs and encourages investment in the early stages of long term and risky projects. This in turn reduces the amount of public money that projects require to be viable, and helps to ensure a healthy pipeline of potential projects and so strong price competition at auctions.

The evidence for a dip in investor confidence in 2015

3.23 Although supporting investor confidence is an objective of the Framework, the Department does not report on the state of investor confidence within its quarterly internal reports. The Department told us it does not have summary metrics for investor confidence. It does, however, have a dedicated Investor Relations Unit, which holds regular discussions with energy companies, developers investors, using this both to explain policy and to take feedback on the policy making process.

³² Cabinet Office, *The Transparency of Suppliers and Government to the Public*, March 2015.

³³ See Comptroller and Auditor General, *The Levy Control Framework*, Session 2013-14, HC 815, National Audit Office, November 2013, and Energy and Climate Change Committee, *Investor confidence in the UK energy sector*, Third Report of Session 2015-16, HC 542, March 2016.

3.24 Drawing on a range of evidence from stakeholders in the industry, an Energy and Climate Change Committee inquiry concluded that investor confidence in the future of the UK renewables industry had dipped since the general election in May 2015.³⁴ One indication of a fall in investor confidence is that between June 2015 and May 2016 the UK fell from 8th to 13th place on Ernst & Young’s (EY’s Renewable Energy Country Attractiveness Index (**Figure 12**).

3.25 Confidence varies from one investor to the next and it is difficult to definitively assess general changes in investor confidence. A submission from officials to the Secretary of State in 2015 indicated that the Department believed investor confidence had dropped (investor confidence was one of several considerations included in advice to ministers, alongside progress against renewable electricity targets, and affordability). In the long run we would expect a significant fall in investor confidence to affect the pipeline of renewable projects and/or costs of capital in the sector. Both of these are also difficult areas to assess. Our analysis of them suggests any adverse impact has not yet materialised in a major way. The project pipeline for emerging technologies the government intends to support in future appears to remain healthy, and we have not found a noticeable increase in costs of capital. The level of investment in low carbon energy in the UK remains high in international terms (fourth highest globally for each of the past five years).³⁵

3.26 However, the effects of reduced confidence may have been masked by a rush to bring projects forward under the Renewables Obligation before its early closure. Unusual economic conditions in the UK and other advanced economies (low interest rates and a general shortage of low-risk assets) may have also offset lower confidence in the sector. Impacts of reduced investor confidence may become more apparent over time.

Figure 12

UK position on EY Renewable Energy Country Attractiveness Index

The UK slid from eighth to thirteenth position between June 2015 and May 2016

	September 2014	March 2015	June 2015	September 2015	May 2016
UK rank	7	8	8	11	13

Notes

- 1 Each year’s rankings are out of 40 countries and based on EY’s assessment of the factors driving market attractiveness, including economic stability and market access, policy, the technological potential for renewables and the national need for them.
- 2 EY refined its methodology for the May 2016 publication, which may have had a small effect on rankings.

Source: EY

34 Energy and Climate Change Committee, *Investor confidence in the UK energy sector*, Third Report of Session 2015-16, HC 542, March 2016.

35 Bloomberg New Energy Finance, *European Policy Outlook*, 2012–2016.

The impact of the Framework on investor confidence

3.27 While it is difficult to find objective measures of investor confidence, it is harder still to be sure about the relative importance of different potential causes of changes in investor confidence. That said, the Energy and Climate Change Committee cited six reasons for a loss of investor confidence:

- sudden and numerous policy announcements;
- a lack of transparency in the decision-making process;
- insufficient consideration of investor impacts;
- policy inconsistency and contradictory approaches;
- lack of a long-term vision; and
- a policy “cliff-edge” in 2020.

Of 90 respondents to the Energy and Climate Change Committee inquiry, 35 pointed to the role that the Framework had played in these issues³⁶

3.28 We consider that the Framework has not met its potential to support investor confidence, for several reasons:

- the jump in forecasts in 2015 which took forecast costs over the Framework cap played a part in prompting numerous policy announcements over the course of 2015 (**Figure 13** on page 46). Internally, the government acknowledged that these announcements had led the public to question the government’s commitment to low-carbon technology, and this had caused a drop in investor confidence. Protecting consumers is an important function of the cap and taking action to bring costs down will unavoidably affect investor confidence. However, it is possible that if the significant shift in forecast costs had been discovered earlier, some of the policy changes would not have needed to be imposed as quickly, after significant investments had already been made;
- uncertainty for the industry and the level of perceived policy risk could also be mitigated by making the Framework more transparent. The forecasts are currently opaque (paragraphs 3.16 and 3.17). Furthermore, the Department has not clearly explained its approach to operating the Framework. It has never clarified whether it will implement cost-reduction measures if a breach is caused only by changing wholesale prices of electricity, or whether this breach would be tolerated because wholesale price movements are beyond the Department’s control and do not affect the total cost to consumers of the Framework schemes (paragraph 1.11).

³⁶ In total 96 written submissions were received and published by the inquiry, but six respondents contributed two published submissions each.

- while the length of time over which the UK government is signalling the extent of financial support for renewables is long by international standards, the duration of the cap still does not correspond to the 10-year lead times of some renewable technologies (paragraph 2.5).³⁷

3.29 The Department told us it has strengthened investor certainty beyond 2020-21 by announcing some details of future budgets for Contracts for Difference. In March 2016 the Chancellor announced £730 million would be awarded to “less established technologies” over the current Parliament, with a first auction of £290 million.³⁸ Although this provided significant additional certainty to many investors, the profile of government support for low-carbon electricity over the coming decade remains uncertain in several respects:

- it is not clear if the government intends to hold back any of the £730 million budget for projects currently in an early stage of development that will come to market on or around 2025;
- it is not clear whether biomass projects will be given a budget to bid for.
- It is not clear whether planned wind farms in Shetland, Orkney and the Western Isles, which the Department previously proposed to treat as a ‘new and innovative technology,’ will be able to bid for support;³⁹
- the government has neither ruled in nor ruled out holding additional auctions of Contracts for Difference for ‘established’ technologies such as solar; and
- Caps on applications for support from Feed-in Tariffs have been defined as far as 2019; after this it is not clear if any additional support will be made available for small-scale generation.

The Department told us that details of the next allocation round of Contracts for Difference will be made available shortly.

3.30 Industry’s demand for certainty will always conflict to some extent with the fact that governments seek to retain flexibility in their decision-making, and administrations change. One reason that flexibility can be desirable is that the future of energy is uncertain, and therefore there is a risk that long-term commitments may prove to be poor value for money in hindsight. Government therefore needs to strike a balance between providing the industry with certainty and maintaining the right level of flexibility.

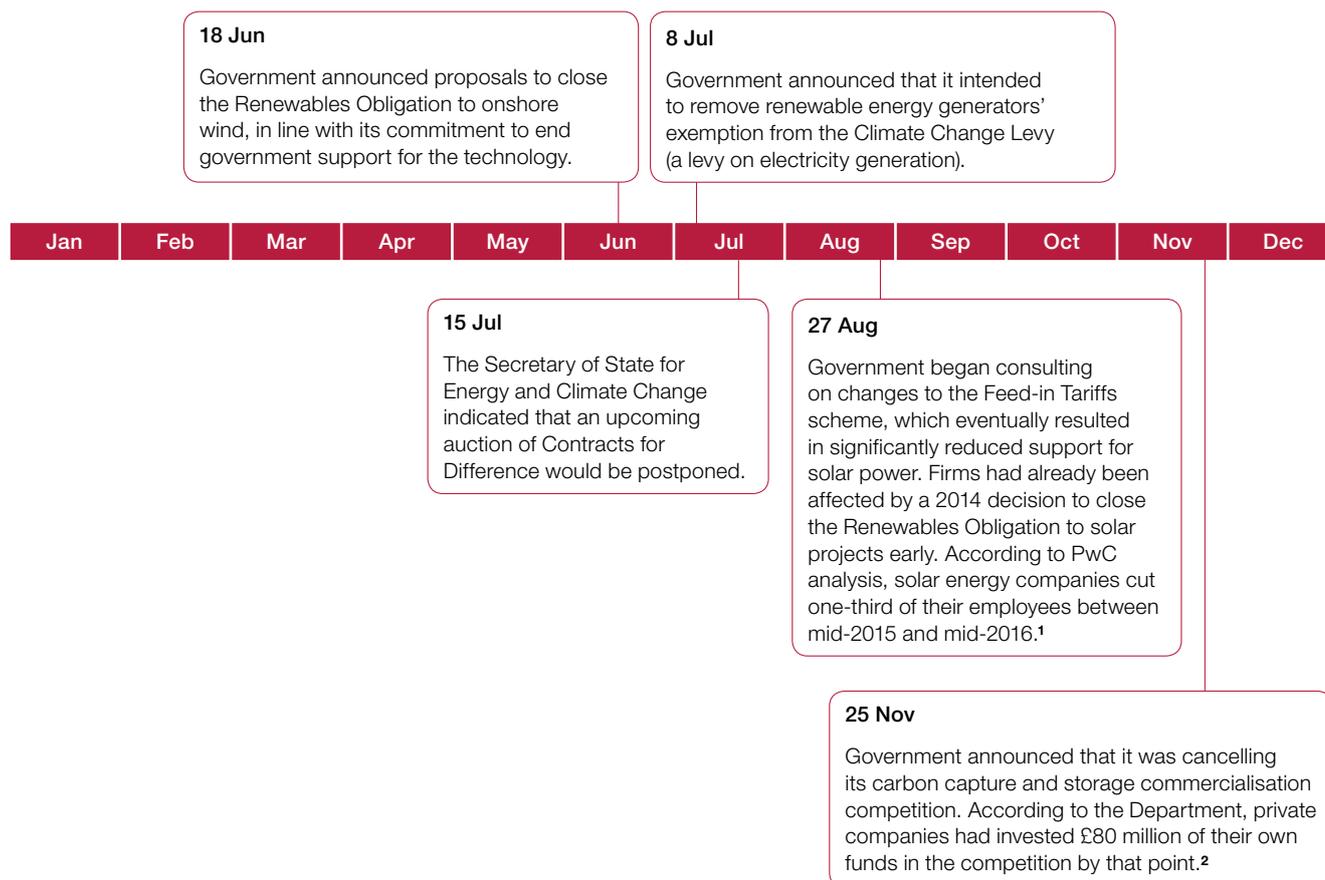
³⁷ Other countries often budget for renewables on a year-ahead basis only.

³⁸ The Chancellor announced that the first auction would take place in 2016, but this has now been delayed.

³⁹ Department of Energy & Climate Change, *Electricity Market Reform: Allocation of Contracts for Difference*, January 2014.

Figure 13
Policy announcements in 2015 relating to renewable energy

Stakeholders told us that investor confidence in the sector was affected by numerous policy announcements in 2015, partly prompted by the jump in forecast Framework costs



Notes

- 1 PricewaterhouseCoopers, *Seeing through the gloom*, July 2016.
- 2 We previously reported on the decision to cancel the competition in the National Audit Office, *Sustainability in the spending review*, July 2016. We also plan to publish a report dedicated to the cancelled competition later this year.

Source: National Audit Office analysis

Appendix One

Our audit approach

1 This report provides our independent opinion on whether the Department of Energy & Climate Change's (the Department's) management of the Levy Control Framework (the Framework) has delivered value for money for electricity consumers. Our work has focused on the following:

- tracking the changing aims of the Framework over time;
- an assessment of whether the Framework meets these stated aims; and
- an assessment of the past quality and future reliability of forecasts of future costs under the Framework.

2 In making our assessment of the Framework, we evaluated it against both its present and historic objectives. We have also assessed the Framework against the National Audit Office's (NAO's) evaluative criteria for cost control frameworks. This relies upon a maturity model developed to assess Departmental management of direct spending, and consists of five elements (see **Figure 14** overleaf):

- Coverage
- Controls
- Governance
- Reporting
- Forecasting

3 Our audit approach is summarised in Figure 14. Our evidence base is described in Appendix Two.

Figure 14

Our audit approach

The objectives of the framework

In 2010, the Framework was established as a cost control mechanism on the Department's consumer-funded schemes. The current and historic objectives of the Framework are:

- to support monitoring and control of costs;
- to maintain and enhance investor confidence; and
- to support decisions about how to make trade-offs between policies with a common objective.

Our study

The study traces how the purpose of the Framework has changed over time. It examines whether the Framework has proved effective in meeting these changing objectives, and evaluates it against our principles for judging the effectiveness of cost control frameworks.

Evaluative criteria

Coverage: Framework coverage has a clear rationale, which fits with its purpose.

Controls: The Department has effective controls for the costs of Framework schemes and uses them appropriately, including by exercising appropriate control over the allocation of budget to different schemes over time.

Governance: The Department's and HM Treasury's governance arrangements for the Framework make responsibilities clear, and adequately engage skilled and empowered people in decision-making.

Reporting: The Department reports actual and forecast costs and outcomes from Framework schemes transparently, promptly and accurately to ministers, Parliament and the public.

Forecasting: Spending or cost forecasts are based on a sound understanding of the factors influencing costs and outcomes, and reasonable assumptions regarding future levels of those factors.

Support for investor confidence: The Framework supports investor confidence in the market for renewable electricity generation.

Enabling trade-offs between policies: The Framework enables the Department to make optimal trade-offs between different policy options with similar objectives.

Our evidence

(see Appendix Two for details)

- Documentation from the Department relating to governance arrangements and meeting papers.
- Interviews with staff from the Department, HM Treasury, the Office of Budget Responsibility and industry stakeholders.
- Documentation of models used to forecast expenditure under the Framework.
- Analysis of government forecasts and forecasting processes.
- Analysis of industry data.
- Review of financial audit evidence.

Our conclusions

See our conclusion on value for money in paragraph 20.

Appendix Two

Our evidence base

1 We reached our independent conclusions on the Department of Energy & Climate Change's (the Department's) management of the Levy Control Framework (the Framework) and whether the Framework met its stated aims following our analysis of evidence collected between December 2015 and July 2016.

2 Our audit approach is outlined in Appendix One.

3 We reviewed the role of the Framework in supporting the government's strategic objectives for energy and climate change (Part One):

- We interviewed officials from the Department to understand the role and function of the Framework.
- We reviewed published and unpublished documents produced by the Department to track the changing scope and purpose of the Framework.
- We spoke to representatives from industry and other interested parties to understand their perception of the role of the Framework.

4 We assessed the performance of the Framework (Part Two):

- We spoke to officials at the Department and reviewed published and unpublished documents to assess the coherence and clarity of the Framework.
- We interviewed officials at the Department and HM Treasury to understand the effectiveness of the Framework as a cost control mechanism for levy-funded expenditure.
- We reviewed the economic modelling undertaken to understand the impact of wholesale price movements and Framework costs on forecast household bills.
- We reviewed published and unpublished documents, and interviewed officials at the Department, to ascertain when the Department realised it was on course to breach the Framework cap, as well as to understand the actions taken to reduce the costs of the scheme.
- We spoke to officials at both the Department and HM Treasury to review the effectiveness of the Framework's governance arrangements.

- We reviewed the Department's published and unpublished reporting under the Framework, and spoke with stakeholders to understand their perception of the Framework's reporting arrangements.
- We spoke to officials from the Department and stakeholders in the renewables energy industry to assess the role of the Framework in supporting investor confidence.

5 We analysed the Framework forecasts (Part Three):

- We conducted interviews with officials at the Department to understand the process by which it forecasts Framework costs.
- We spoke to officials and reviewed documents to understand the causes of the changes in Framework forecasts between March and July 2015.
- We analysed historic industry data to assess whether the Department's forecasting assumptions were based on the best available evidence.
- We reviewed evidence received as part of our financial audit of the Department.

Appendix Three

Historic forecasts

1 This appendix provides more detail on our assessment of the Department of Energy & Climate Change's (the Department's) forecasts for the Levy Control Framework (the Framework), focusing on the significant changes to the forecasts that were made in the first half of 2015.

Changes over the first half of 2015

2 Forecast costs increased significantly over the first half of 2015 due to the following changes in assumptions:

- An increase in the amount of capacity coming forward under the Renewables Obligation and Feed-in Tariffs schemes (**'deployment'**).
- An increase in the estimated amounts of electricity that will be generated by the power plants that deploy (their rates of electricity generation are known as **'load factors'**).
- Lower wholesale prices of electricity, mainly because this affected the value of Contracts for Difference) top-up payments (**Figure 15** overleaf).

The following sections review each of these factors in turn.

Deployment

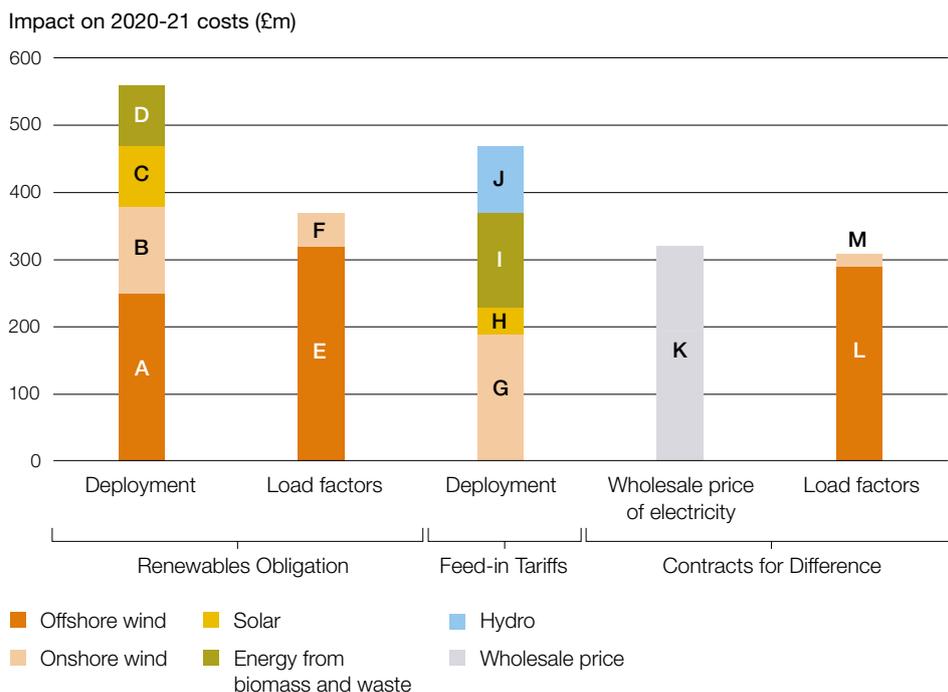
3 Changes to deployment projections between January and June 2015 resulted in a £1 billion increase in forecast 2020-21 costs. Just over half of this increase came from changes to the forecast for the Renewables Obligation, and the remainder came from Feed-in Tariffs (Figure 15).

4 The Department underestimated deployment under Feed-in Tariffs partly because its forecasts were dependent on an unreliable source of evidence. The Department forecasts deployment by modelling how profitable it is for developers to commission a new project such as a solar power array. For certain technologies, such as solar and anaerobic digestion, the Department based this modelling on information provided by developers, who had an incentive to understate their likely profits in order to secure higher tariffs. As a result, the tariffs were more generous than the Department anticipated, and deployment was greater than it expected. Using an independent source of information on costs might have helped the Department to avoid this.

Figure 15

Principal changes to the Department's forecasts between January 2015 and June 2015

The forecasts shifted as a result of new assumptions on deployment, load factors and wholesale prices



Change	Impact on 2020-21 costs (£m)	Explanation
A	250	Increase in expected deployment of offshore wind
B	130	Increase in expected deployment of onshore wind
C	90	Increase in expected deployment of solar
D	90	Increase in expected deployment of advanced technologies for converting waste to energy ('advanced conversion technologies')
E	320	Increase in the assumed load factors for offshore wind
F	50	Increase in the assumed load factors for onshore wind
G	190	Increase in expected deployment of onshore wind
H	40	Increase in expected deployment of solar
I	140	Increase in expected deployment of anaerobic digestion
J	100	Increase in expected deployment of hydro
K	320	Change to a lower forecast wholesale price of electricity
L	290	Increase in the assumed load factors for offshore wind
M	20	Increase in the assumed load factors for onshore wind
Total	2,030	

Notes

- 1 Impacts are rounded to the nearest £10 million.
- 2 This is a summary of the major changes, rather than a precise and exhaustive account.

Source: National Audit Office analysis of Department of Energy & Climate Change data

Load factors

5 For a period of 18 months between 2013 and 2015, the Department did not update its assumptions relating to the load factors that new offshore wind farms would achieve, despite indications that this could lead to an underestimation of costs. The Department's forecasts of future load factors were based upon a highly simplistic trend analysis of annualised factors for the existing fleet of offshore wind farms. As a consequence of technological progress, the load factors achieved by new wind farms have increased, with a key driver for this trend being the construction of larger turbines at sites further offshore.

6 The trend analysis used by the Department did not allow for the possibility that newer wind farms with larger turbines would achieve significantly higher load factors. This oversight could have been avoided had the Department sought the available technical and commercial evidence. For example, a June 2013 report for the Committee on Climate Change that examined 64 planned offshore wind projects suggested these would achieve load factors of 46% on average, compared with the Department's new-build assumptions of 38%–39% at that time.⁴⁰ Additionally, there was evidence that some recently completed offshore wind farms were exceeding the Department's assumptions. From October 2013 onwards, the actual load factors of several recently built farms were higher than the load factors the Department was assuming for as yet unbuilt farms, which are likely to further advance the technology (**Figure 16** overleaf). In spite of this evidence, it was only in 2015 that the Department gathered new market intelligence and drew on in-house engineering expertise to estimate the likely impact this trend would have on load factors of new-build wind farms, resulting in a significant upward revision to 50%.

7 The revised assumptions resulted in the Department increasing forecast 2020-21 costs by £0.6 billion between January and June 2015. This accounts for around 30% of the total shift in the forecasts over that period (Figure 15).

Wholesale price of electricity

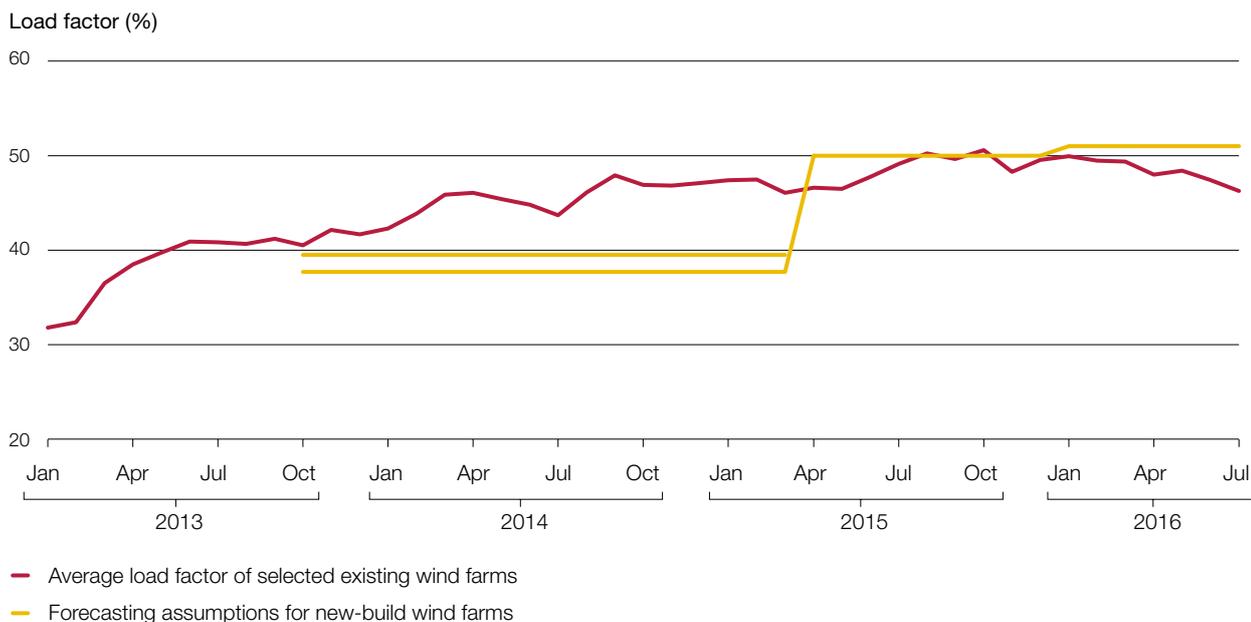
8 In order to forecast the costs of Contracts for Difference, the Department must use projections of wholesale prices of electricity, because the top-up payments associated with these contracts depend on the difference between the strike price and the wholesale price of electricity. Wholesale prices of electricity are inherently difficult to predict because they depend upon future fossil fuel prices, which in turn depend upon a large number of unknowns, including developments in technology, economics and policy across the globe.

⁴⁰ Pöyry Management Consulting (UK) Ltd, *Technology Supply Curves for Low-carbon Power Generation: a report to the Committee on Climate Change*, June 2013.

Figure 16

The Department's assumptions on offshore wind load factors

Some of the best-performing existing wind farms had higher load factors than the Department was assuming for as yet unbuilt farms

**Notes**

- 1 This chart compares the load factors of a subset of existing offshore wind farms with the Department's load factor assumptions for new-build wind farms. The subset shown here are newer and larger-than-average installations representing the most advanced technology. To smooth out some of the random variation due to weather, the load factors of these wind farms have been calculated as the rolling average of the previous 12 months. The wind farms included in the average are: Burbo Bank; Gunfleet Sands; Thanet; Robin Rigg; Barrow; Ormonde; Walney; Greater Gabbard; Sheringham Shoals; London Array; Lincs; West of Duddon Sands; and Westmost Rough.
- 2 The Department used two slightly different assumptions for wind farms due to begin operating at different dates; these are shown as two parallel yellow lines from 2013 to early 2015.

Source: National Audit Office analysis

9 In 2014 and 2015 wholesale prices were at historically low levels but the Department's central forecasts had been that prices would soon rise steeply. So far, wholesale prices have remained low. In April 2015 the Department decided that it should use a different price forecast for the Framework – a forecast in which low prices persist into the 2020s (**Figure 17**). The Department's decision to switch to this forecast was reasonable in that it was informed by market expectations. Although the original prediction of a near-term increase in fossil fuel prices was wrong, we do not believe that the Department deserves to be criticised for those projections, given that other informed energy market experts made the same prediction.

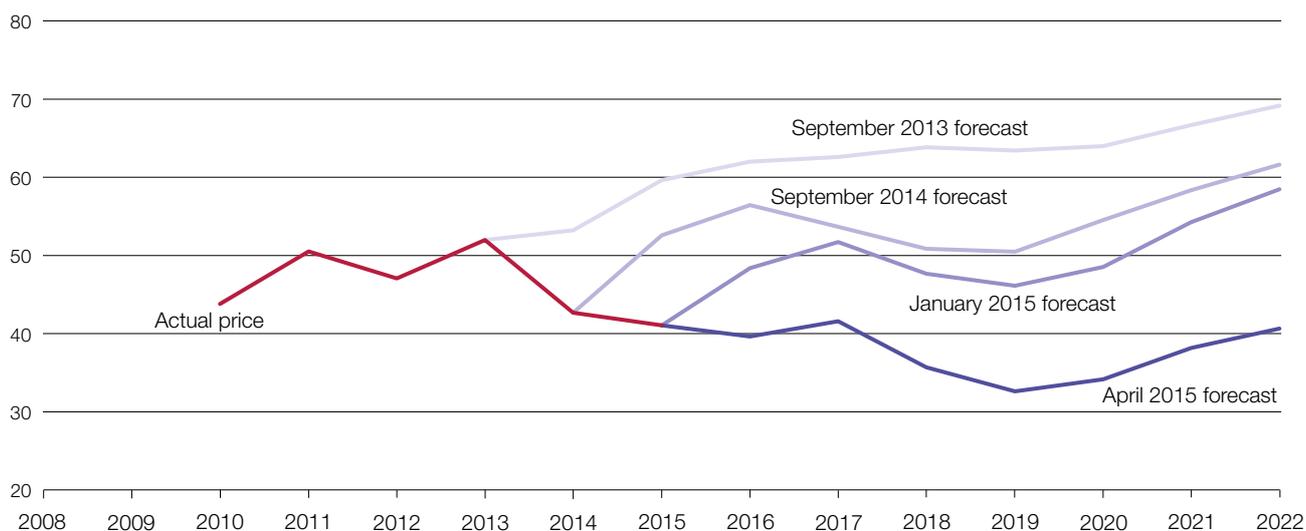
10 Changes to wholesale price projections in the first half of 2015 resulted in the Department increasing forecast 2020-21 costs by £0.3 billion, approximately 15% of the total increase over that period (**Figure 15**).

Figure 17

The Department's wholesale electricity price projections

Projections were revised downwards significantly in 2015

Wholesale electricity prices (£/MWh)

**Notes**

- 1 The Department produces low, central and high wholesale price projections. Up until April 2015, the projection used in the Framework forecasts was the central projection. In April 2015, the Department switched to its low projection. In early 2016, the Department began using a new methodology for projecting wholesale prices for the Framework.
- 2 The assumptions driving these projections include departmental assumptions about the future trajectory of carbon prices as determined by EU and UK government policy.
- 3 The price base for this figure is 2015.

Source: Department of Energy & Climate Change, Updated Energy and Emissions Projections 2013–2015

Further details of historic forecasts

11 In this section:

- **Figure 18, Figure 19** and **Figure 20** on pages 58 and 59 provide detailed breakdowns of the forecasts produced in January 2015, June 2015 and July 2016 respectively.
- **Figure 21** on pages 60 to 62 shows the principal reasons why movements in the forecasts took place between June 2015 and July 2016.

Glossary of terms used in tables

Contracts for Difference

- **FIDeR** Final Investment Decision enabling Renewables; the set of Contracts for Difference awarded early, before auctions were used to make awards.
- **Auction pot 1/pot 2** Prior to the 2015 auction, the Department's forecasts for auctioned Contracts for Difference were split into a budget for 'established' technologies like onshore wind and solar (pot 1), and a budget for less-established technologies like offshore wind.
- **Auction round 1/round 2** After the first auction had been made, the Department's forecasts for auctioned Contracts for Difference were split between the first round of auctions, and an anticipated second round.
- **CCS** Carbon capture and storage, which was to be supported by Contracts for Difference included within the Framework.
- **LCCC costs** Costs incurred by the Low Carbon Contracts Company as it administers Contracts for Difference.

Renewables Obligation)

- **Fuelled technology** The following technologies: advanced conversion technologies, anaerobic digestion, dedicated biomass and biomass combined heat and power.
- **Co-firing/conversions** Biomass conversions and co-firing biomass plants.
- **Sewage and landfill** Energy from sewage gas and landfill gas.
- **Other** The following technologies: hydro, energy from waste, geothermal, and any generation in Northern Ireland.

Figure 19
Details of the Department's June 2015 Framework forecast

	Wholesale price of electricity (£/MWh)												
	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21							
	40.1	40.7	39.8	40.3	39.4	40.9							
	Capacity deployed (MW)						Cost (£m)						
	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	
CfDs													
FIDeR	637	1,007	1,685	2,906	3,610	3,930	37	233	435	870	1,369	1,595	
Auction round 1	–	84	197	1,123	1,808	2,058	–	1	11	62	227	432	
Auction round 2							–	25	45	45	45	45	
CCS							–	–	–	–	390	570	
LCCC costs							10	10	15	15	15	15	
RO													
Offshore wind	5,041	5,381	6,327	6,382	6,382	6,382	1,121	1,536	1,674	1,869	1,869	1,869	
Onshore wind	9,267	10,262	10,262	11,462	11,462	11,462	854	965	1,057	1,182	1,182	1,182	
Solar	5,183	6,436	6,436	6,436	6,436	6,436	269	357	386	386	386	386	
Fuelled technology	1,414	1,816	2,128	2,128	2,128	2,128	447	559	674	723	723	723	
Co-firing/conversions	1,165	1,165	1,165	1,165	1,165	1,165	348	336	336	336	336	336	
Sewage and landfill	1,081	1,086	1,086	1,086	1,086	1,086	220	220	221	221	221	221	
Wave and tidal	8	20	20	20	20	20	1	3	6	6	6	6	
Other	716	814	814	814	814	814	99	110	119	119	119	119	
FITs													
Solar	4,011	4,997	5,967	6,985	8,069	9,095	656	725	784	835	882	920	
Wind	405	545	682	780	877	972	121	154	187	208	230	250	
Hydro	156	268	380	460	540	619	47	77	105	127	148	169	
Anaerobic digestion	245	369	489	568	646	721	116	150	181	203	224	243	
	Total cost						Central²	4,346	5,461	6,236	7,208	8,372	9,083

Notes

- Summary details of this forecast (in nominal prices) were published in the Office for Budget Responsibility's July 2015 Economic and Fiscal Outlook.
- The Department did not produce a high and low range for this forecast.

Source: Department of Energy & Climate Change

Figure 20

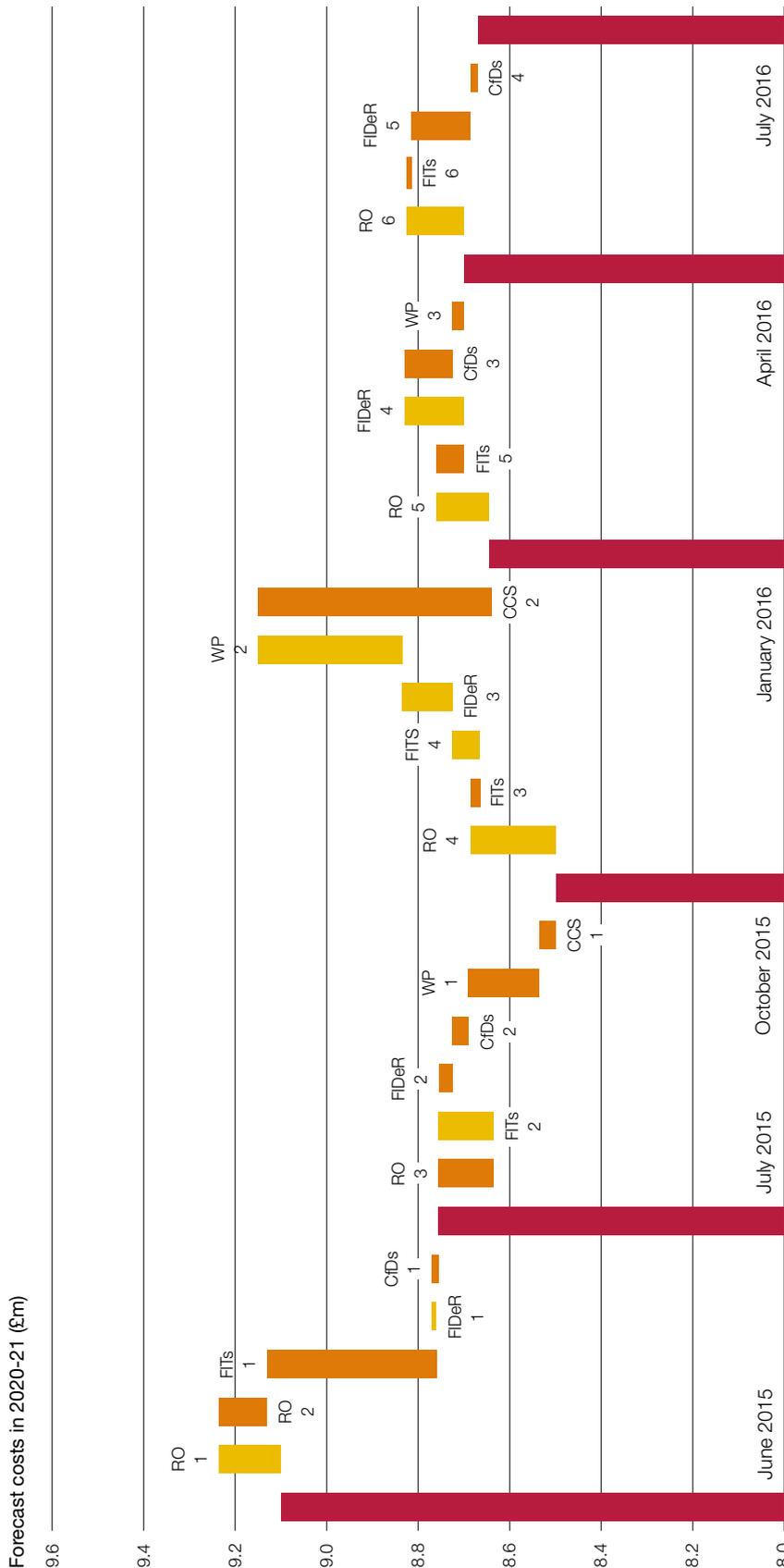
Details of the Department's July 2016 Framework forecast

	Wholesale price of electricity (£/MWh)									
	2016-17	2017-18	2018-19	2019-20	2020-21					
	35.3	35.3	35.0	35.1	36.0					
	Capacity deployed (MW)					Cost (£m)				
	2016-17	2017-18	2018-19	2019-20	2020-21	2016-17	2017-18	2018-19	2019-20	2020-21
CfDs										
FIDeR	933	1,910	2,589	3,927	4,317	140	635	1,045	1,395	1,755
Auction round 1	22	102	770	1,322	1,578	–	5	60	190	360
Auction round 2						–	–	25	50	50
CCS						–	–	–	–	–
LCCC costs						20	20	20	20	20
RO										
Offshore wind	5,084	6,570	6,570	6,570	6,570	1,334	1,501	1,830	1,875	1,875
Onshore wind	11,497	11,628	11,628	11,628	11,628	1,026	1,258	1,257	1,257	1,256
Solar	6,769	8,614	8,614	8,614	8,614	401	517	517	517	517
Fuelled technology	1,482	2,122	2,122	2,122	2,122	467	676	804	803	802
Co-firing/ conversions	1,300	1,274	1,274	1,274	1,274	411	385	385	385	385
Sewage and landfill	1,057	1,044	1,036	1,027	1,018	202	208	207	205	203
Wave and tidal	13	11	11	11	11	1	0	0	0	0
Other	792	1,036	1,036	1,036	1,036	105	127	127	127	127
FITs										
Solar	5,220	5,583	5,974	5,974	5,974	746	756	767	771	771
Wind	864	926	984	984	984	227	232	236	239	239
Hydro	212	242	272	272	272	95	100	104	106	106
Anaerobic digestion	276	293	304	304	304	204	205	206	206	206
				Total cost	Central	5,379	6,626	7,590	8,145	8,672
					Low	5,230	5,930	6,645	6,920	7,130
					High	5,470	7,075	8,115	8,980	9,410

Source: Department for Business, Energy & Industrial Strategy

Figure 21 Principal reasons for changes in the Department's forecasts, June 2015 to July 2016

Forecast costs reduced after June 2015



RO = Renewables Obligation; FITs = Feed-in Tariffs; FIDeR = Final Investment Decision enabling Renewables; CCS = Carbon capture and storage Contracts for Difference; CIDs = Other Contracts for Difference; WP = Wholesale price of electricity

Figure 21 *continued*

Principal reasons for changes in the Department's forecasts, June 2015 to July 2016

Change	Impact on 2020-21 costs (£m)	Explanation provided by the Department
RO 1	135	For a subset of projects, the Department changed its assumptions as to whether the projects would receive support from the Renewables Obligation or from Contracts for Difference.
RO 2	-105	The Department began including the expected impacts of proposed measures to close the Renewables Obligation to small-scale solar and onshore wind, which were approximately £85 million and £20 million respectively.
FITs 1	-370	The Department revised its cost estimates upwards in line with new data on deployment and new modelling assumptions. It commented that it had recently seen surges of deployment creating additional costs of up to £120 million per year. Offsetting these upward revisions to costs, the Department also introduced into the forecast its agreement with HM Treasury to limit future spending on Feed-in Tariffs to an additional £100 million from January 2016 to 2018/19 when the scheme would close (or close more quickly). It was estimated that if this was implemented it would result in estimated savings of around £390 million.
FIDeR 1	10	The Department made changes to assumed load factors, commissioning dates and installed capacities of biomass conversion projects.
CfDs 1	-15	Onshore wind load factor assumption increased from 25% – 28% to 29% – 34%, energy from waste load factor assumptions increased from 43% to 83%, and solar load factor assumptions decreased from 11.1% to 11%. Estimated costs of supporting Advanced Conversion Technologies and Energy from Waste were affected by a change to the assumed 'Renewable Qualifying Multiplier,' a parameter determining the amount of support these projects receive per unit of electricity.
RO 3	-120	The Renewables Obligation 2016-17 budget setting process resulted in the Department decreasing its cost projections for the scheme, with a peak reduction of £150 million in 2016-17.
FITs 2	120	At this point, no changes were made to tariffs compared to the July forecast, as no final policy decision had been made to alter tariffs. But the Department included a £120 million increase to forecast costs from 2015/16 onwards, which represented an expected 'spike' in demand.
FIDeR 2	-30	Commissioning dates for certain projects were pushed back. Changes were made to assumed load factors for biomass conversion projects. Offshore wind load factors decreased from 50% to 47.7%.
CfDS 1	-35	Change to onshore wind load factor from 29% – 34% to 30% – 33%. Load factors for all other technologies changed to reflect those used in Renewables Obligation 2016-17 budget setting.
WP 1	-155	The projected wholesale electricity price in 2020-21 was increased from £41MW/h to £47MW/h, in line with the Department's draft November 2015 central projection.
CCS 1	-35	Changes were made to assumptions on carbon capture and storage projects (for example, capture rates).
RO 4	185	The Department projected another 30MW of offshore wind capacity would come forward from 2018-19, based on evidence from developers. Biomass capacity was reduced from 2017-18, based on evidence from developers and the Renewable Energy Planning Database. Load factors were uplifted for solar, wind and biomass new build plant in the Renewables Obligation. Renewables Qualifying Multiplier assumptions were corrected. Tidal energy load factors were changed.
FITs 3	-20	Underlying Feed-in Tariffs assumptions changed in line with the policy changes announced in December 2015, including the review of tariffs.
FITs 4	60	The Department increased its projections of deployment, in anticipation of surges in demand.
FIDeR 3	110	Load factors were uplifted for solar, wind and biomass. Assumed commissioning dates of certain projects changed.
WP 2	310	The projected wholesale price of electricity reduced from £47/MWh to £35/MWh in line with the Department's revised modelling.

Figure 21 *continued*

Principal reasons for changes in the Department's forecasts, June 2015 to July 2016

Change	Impact on 2020-21 costs (£m)	Explanation provided by the Department
CCS 2	-515	Cost projections for Contracts for Difference support for carbon capture and storage projects were removed in light of the cancellation of the carbon capture and storage commercialisation competition.
RO 5	115	For biomass and waste to energy projects, a greater amount of new-build capacity was projected. Some projects' load factors also changed.
FITs 5	-60	The Department largely removed the projected demand surge it introduced in January, in light of evidence on actual demand.
FIDeR 4	135	Additional offshore wind capacity of 164MW was assumed. Some offshore wind projects' start dates were changed. Some biomass projects' expected start dates and load factors were changed.
CfDs 3	-105	Two projects' Contracts for Difference were terminated by the Low Carbon Contracts Company. Other projects' expected start dates were changed and their expected capacity was reduced by 91MW.
WP 3	-25	An update to the expected trajectory of the carbon price floor resulted in a change in the wholesale price of electricity, from £35/MWh to £36/MWh in 2020-21.
RO 6	125	Changes were made to assumed capacity from several different technologies. Among these changes, an additional 900MW of solar capacity was predicted for 2016-17, an additional 131MW of onshore wind capacity was predicted for 2016-17, and an additional 100MW of offshore wind capacity was predicted for 2017-18. Changes were also made to assumed capacities of biomass, waste to energy, and hydro projects.
FITs 6	-10	The Department adjusted its projection of an expected surge in demand slightly.
FIDeR 5	-130	Changes were made to expected load factors.
CfDs 4	-15	Offshore wind factors were revised downwards from 50.3% to 47.7%. Other changes to load factors were made as a result of considering the effects of the merit order and curtailment within the Department's model of the electricity market (the Dynamic Dispatch Model).

Source: National Audit Office analysis of Department for Business, Energy & Industrial Strategy data

Appendix Four

Production and assurance of forecasts

Overview

- 1 This section describes:
 - the Department of Energy & Climate Change's (the Department's) approach to forecasting for the Levy Control Framework (the Framework);
 - the extent to which we assure the forecasts; and
 - sources of publicly available information on forecasting assumptions.

How the Department forecasts for the Framework

2 The Framework forecasts reflect the future costs of existing commitments and policy announcements the government has made. Additionally, they incorporate the Department's view of likely future policy decisions which have not yet been announced or decided. This means that historically the forecasts have included assumptions on the future trajectory of carbon prices, the budgets of future auctions for Contracts for Difference (CfD), and the likely impact of cost control measures for the Renewables Obligation and Feed-in Tariffs, which were under consideration but not legislated.

Renewables Obligation

3 To forecast the costs of the Renewables Obligation, the Department forms a view of likely deployment of capacity under the scheme, and the load factors of different technologies and power plants. Much of the Department's information on projects that are going to be built comes from the Renewable Energy Planning Database (REPD), which is intended to provide a recent snapshot of the planning status of large-scale renewables projects. The Department's forecast effectively takes account of each individual project, and analysts will telephone developers to verify or update the information they have from the REPD on individual projects' planned commissioning dates and capacities.

Feed-in Tariffs

4 Forecasting for Feed-in Tariffs is in some ways similar to forecasting of the Renewables Obligation, but because the scheme is made up of a very large number of small installations, it is not practicable for the Department to monitor the likelihood of each individual installation commissioning. Instead, the Department looks at the total amount of capacity planned in different categories of technology, size band and user, and then uses economic modelling to determine whether and when it thinks these projects will apply for support and come online. After the Department began changing support tariffs significantly, it realised that these tariff changes cause surges in deployment additional to the deployment the Department's modelling predicted. Once the first surges had been observed, the Department used its data on those as a basis for ad hoc forecasts of the magnitude of future surges.

Contracts for Difference

5 Compared to the Renewables Obligation and Feed-in Tariffs, forecasting the cost of CfDs relies on a smaller set of assumptions, namely: strike prices, load factors, and wholesale prices of electricity. The mechanics of forecasting are simpler, as there is no need to model behaviour, but the forecasts are unavoidably subject to large amounts of uncertainty because scheme costs are dependent on the wholesale price of electricity, which is difficult to predict.

6 As of September 2016, the Department assumes all projects with signed CfDs will commission. Until November 2015, when the carbon capture and storage commercialisation competition was cancelled, the Department's forecasts included costs of supporting one or both of two carbon capture and storage projects with CfD from 2019-20. As of July 2016, forecasts of Framework costs to 31 March 2021 have never included potential CfDs for tidal lagoons.

Our assurance of Framework forecasts

7 This section describes the extent to which our annual financial audit of the CfD liability provides assurance on Framework forecasts. We do not directly provide assurance on the Framework forecasts as they do not form part of the Department's accounts, but we have reviewed the most uncertain part of the Framework forecast as it stood at the end of 2015-16, namely the projected costs of CfD.

8 The cost of CfD is uncertain mainly because it is very difficult to predict the wholesale price of electricity over the lifetime of the Contracts. Changes in the Department's forecast wholesale prices during the 2015-16 financial year increased its estimate of the lifetime cost of CfD already signed by £5.6 billion.

9 We checked the reasonableness of the Framework CfD forecast by comparing it with a valuation range we constructed for another purpose: our audit of the Department's and the Low Carbon Contracts Company's (the LCCC's) financial statements in 2015-16.

10 The Department and the LCCC disclose CfD in their financial statements, and for that purpose they work closely together to estimate the fair value of payments from these Contracts over their lifetime. It should be emphasised that this accounting valuation is distinct from the forecast of CfD the Department produces for the purposes of the Framework (paragraph 12). We provide annual assurance for the accounting valuation by recalculating it, and sense-checking the validity of the assumptions used in it against third-party sources where possible. The value of the Contracts is highly uncertain. We construct a range, with reference to independent views of future wholesale prices, using reasonable assumptions for key variables. The Department's estimate of the lifetime liability falls within our range, and we therefore have a strong degree of confidence that it is a reasonable estimate.

11 Our check of the CfD forecast for the Framework indicated that it was reasonable, in that it was also consistent with the range we had constructed for the accounting valuation. **Figure 22** overleaf shows the forecast costs of early CfDs as an example.

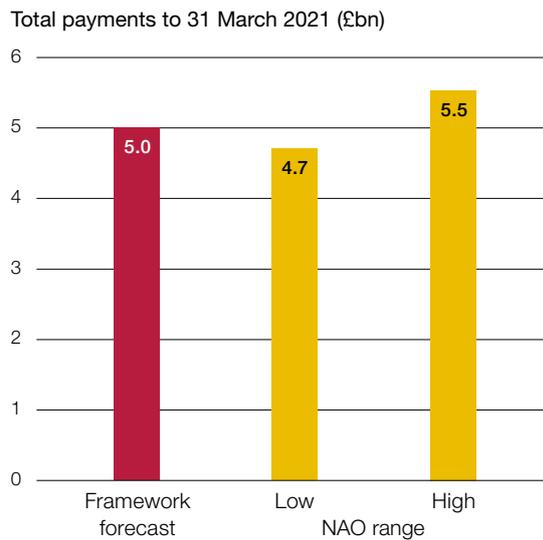
12 However, our annual assurance of the Department's and the LCCC's financial statements cannot be relied upon as giving ongoing assurance over the Framework CfD forecast, because:

- the Framework forecast will not necessarily be consistent with that used by the Department and the LCCC for their accounting valuation. The Framework forecast is not subject to the financial reporting requirements, which apply to the accounting valuation, and although the LCCC shares some information with the Department it has no formal influence over the Framework forecast; and
- our auditors' range was designed to cover reasonable estimates of the lifetime value of the payments, not the value of payments to 2020-21. When modelling lifetime payments, it is reasonable to use certain simplifying assumptions, such as an assumption that a power plant's load factor will remain constant over its lifetime. In short-term forecasts, it may be appropriate to model in greater detail, for example by taking into account expected changes in load factors over time.

Figure 22

Early Contracts for Difference

Framework forecasts versus the National Audit Office's (NAO's) range of plausible valuations

**Notes**

- 1 The Framework forecast shown here is the forecast as of January 2016.
- 2 The set of CfDs included here are the set awarded under the Department's Final Investment Decision enabling for Renewables (FIDeR).

Source: National Audit Office analysis

Published information on the Department's forecasting assumptions

13 Several of the assumptions used by the Department to forecast the Framework are disclosed in publicly available documents. While there is often broad agreement between these published documents and the forecasts, for various reasons assumptions in the forecasts can deviate from the publicly available material (**Figure 23**).

Figure 23

Framework forecasting assumptions in the public domain

Wholesale prices of electricity	The Department's wholesale price projections are published annually as part of the Updated Energy and Emissions Projections (UEP). However, the Department sometimes deviates from the central projection in UEP to better align its projections with market expectations, and has historically not disclosed this.
Strike prices	The Low Carbon Contracts Company's Contracts for Difference register includes strike prices for signed CfD contracts, which are used in the construction of the Framework forecasts. However, it does not include the strike prices for any unsigned CfDs government assumes it will sign.
Load factors	The Renewables Obligation budget-setting document sets out load factor assumptions by technology and build date. For the most part, the assumptions used in the Framework forecasts are the same as those provided in this document. However, the Framework forecasts will sometimes include more up-to-date information on load factors, or additional information on the likely load factors of specific large generators.
Commissioning dates	The Low Carbon Contracts Company's Contracts for Difference register gives some information on target commissioning dates for projects with Contracts for Difference. However, the Department's assumptions on the likely commissioning dates of projects do not necessarily coincide exactly with these, as the Department draws on other sources of market intelligence to form its own view.
Inflation	The Department forecasts in 2011-12 prices, whereas OBR publish summary details of the forecast in nominal prices. The Department plans to clarify for stakeholders the basis on which the inflation adjustment is made, but has not yet done so.

Source: National Audit Office

Report by the Comptroller and Auditor General

Controlling the consumer-funded costs of energy policies: The Levy Control Framework

HC 725 Session 2016-17

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CORRECTION

Box 1, The merit order effect (page 28) of the report was produced in error.

The labels 'World with renewables' and 'World without renewables' above the 2 illustrations were the wrong way around.

Please see the corrected figure below:

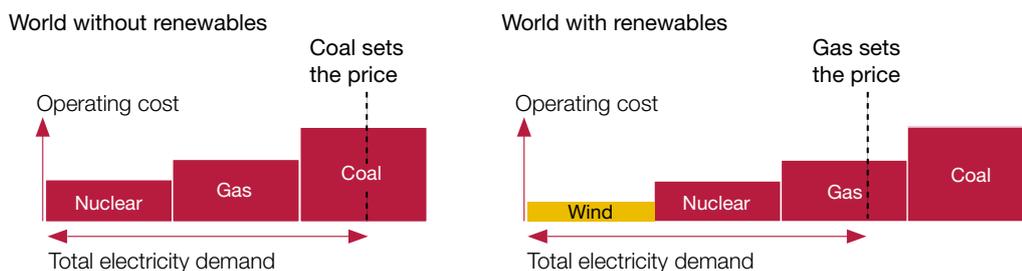
Box 1

The merit order effect

In the electricity market, the wholesale price of electricity at any given time is determined by the operating cost of the 'marginal' power plant. The marginal power plant is the last one that would come online if plants were switched on one by one, in order of their operating costs, and no more plants were switched on once total supply matched total demand. When more capacity from renewables is added to the energy mix, there will be more power plants with low operating costs, and consequently, costly-to-run power plants like coal-fired plants will be less frequently called upon and set the market price. This effect on wholesale prices is known as the 'merit order effect'.

Illustration of the merit order effect

With renewable energy sources like wind in the energy mix, costly-to-operate sources like coal are less frequently called upon and allowed to set the market price of electricity.



The Department published an estimate of the merit order effect in its 2014 report on prices and bills.¹ The Department's estimate is smaller than that of some other stakeholders, because it measures the effect against a different baseline scenario. The Department uses a baseline scenario in which renewables were never commissioned, and new gas turbines were commissioned in their place to provide the same capacity. Other studies of the merit order effect² have modelled the merit order effect against a baseline in which renewables were never commissioned, and nor was any additional gas. The merit order effect is greater when measured against this latter baseline, which would lead to more frequent calls on expensive coal power plants when demand is high.

The Department has also performed additional tests to check what its models indicate the merit order effect would be if measured against a baseline scenario with no additional gas, and found results that are broadly similar to other studies.

Estimated savings on the typical household energy bill in 2014 from the merit order effect

	Baseline scenario	Annual saving nationally	Saving per bill
Department of Energy & Climate Change (published) ³	No renewables, additional new gas plant make up the 'missing' capacity	£0.4bn	£5
Committee on Climate Change ⁴		<£0.4bn	<£5
Good Energy	No renewables, no new gas to compensate for 'missing' capacity	£1.5bn	£17
Department of Energy & Climate Change (unpublished)		£0.8bn – £1.4bn	£10 – £16

Notes

- 1 Department of Energy & Climate Change, *Estimated impacts of energy and climate change policies on energy prices and bills*, 2014.
- 2 Such as Good Energy, *Wind and solar reducing consumer bills*, October 2015.
- 3 The baseline scenario for the Department's published estimate also excludes the effect of its energy-efficiency policies to date. This is not thought to have a major impact on the estimated merit order effect.
- 4 Committee on Climate Change, *Power sector scenarios for the fifth carbon budget*, October 2015.

Source: National Audit Office

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