



National Audit Office

Report

by the Comptroller
and Auditor General

Department for Business, Energy & Industrial Strategy

Investigation into the 2017 auction for low-carbon electricity generation contracts

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Department for Business, Energy & Industrial Strategy

Investigation into the 2017 auction for low-carbon electricity generation contracts

Report by the Comptroller and Auditor General

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National Audit Act 1983 for presentation to the House of
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Sir Amyas Morse KCB
Comptroller and Auditor General
National Audit Office

14 May 2018

Following the September 2017 Contracts for Difference auction, Rt Hon Dame Margaret Hodge MP raised concerns with us that the design of the auction had resulted in higher costs for consumers. This investigation sets out: the background to the auction; how the Department for Business, Energy & Industrial Strategy designed the auction; and the potential consequences of its design decisions.

Investigations

We conduct investigations to establish the underlying facts in circumstances where concerns have been raised with us, or in response to intelligence that we have gathered through our wider work.

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What this investigation is about

1 In September 2017, the Department for Business, Energy & Industrial Strategy (the Department) awarded through an auction 11 Contracts for Difference (CfDs) to low-carbon electricity generation projects. CfDs fix the price that generators receive for the electricity they generate for a set period, typically 15 years. Consumer-funded top-up payments make up the difference between the fixed price in the contract, known as the 'strike price', and the prevailing market price. The 2017 auction resulted in lower costs for new offshore wind farms than the government expected. This continued the recent trajectory of reductions in the costs of this technology. The government has awarded more than 40 CfDs since 2014, mostly through auctions.

2 Following the 2017 auction, Rt Hon Dame Margaret Hodge MP raised concerns with us, based on correspondence she had received from a project developer that had bid unsuccessfully. The developer was unsuccessful because its project would provide more generating capacity than was permitted under the rules of the auction. This was despite the fact it had bid at a lower unit price than some competing projects that won contracts.

3 This situation occurred because of changes the Department made to the auction design before the 2017 auction. The Department decided to cap the amount of generating capacity that projects using certain technologies could be awarded, and adjusted the way this cap would apply compared with the previous auction rules. These changes meant that some projects that were too large to fit within the capacity cap did not win contracts, while some projects that were smaller but more expensive per unit of electricity did win contracts. The decision not to award a contract to the project mentioned above was therefore in line with the rules the Department had set for the auction.

4 Projects make bids into CfD auctions on the understanding that those bids will be kept confidential. The Department does not have access to information about projects' bids, and we have not shared this information with the Department during our investigation. We are aware of the sensitivities around us using bid information to report on the impact of the Department's design change and the risk that this reveals more about some projects' bids than is already in the public domain. However, we have decided that it is in the public interest to publish a broad estimate of the impact of the Department's decisions, in order to hold the Department to account. We have aimed to strike a balance between protecting commercially confidential bid information with making clear the potential additional costs to consumers as a result of the Department's design change. We have therefore only included rounded, total cost figures, and omitted detailed information that could allow readers to infer more information on specific bids than is necessary.

5 This report sets out:

- the history of CfDs, including how and when they have been awarded (Part One); and
- how the Department designed the 2017 auction, including the changes it made to the rules related to the capacity cap, and the impact these changes had (Part Two).

Summary

Key findings

Contracts for Difference

1 Contracts for Difference (CfDs) are the government's main policy mechanism to encourage investment in new, low-carbon electricity generation. The Department for Business, Energy & Industrial Strategy (the Department) introduced CfDs as part of its 2012 Electricity Market Reform programme. CfDs fix the 'strike price' that generators receive for their electricity for a set period, typically 15 years. A government company, the Low Carbon Contracts Company (LCCC), pays generators the difference between the CfD's strike price and the reference price (a measure of the average market price). LCCC then recovers these costs through a levy on electricity suppliers. Should the reference price rise above the strike price, generators will pay LCCC the difference, which it then passes on to suppliers. The government expects that these costs and benefits will be passed through to electricity consumers. Since 2012, the Department has awarded 47 CfDs to projects that use technologies such as wind, solar and nuclear power (paragraphs 1.1 to 1.2, Figures 1 and 2).

2 The Department awards CfDs primarily through auctions to reduce the costs to consumers of low-carbon electricity. When auctions are used to allocate CfDs, projects using eligible technologies submit sealed bids that include the technology type, generating capacity, start date and strike price. National Grid, which administers the auctions, ranks the projects according to their strike price and the projects are awarded CfDs on a 'pay as clear' basis. The project with the lowest strike price is awarded a contract first. Each subsequent project wins a contract if its expected cost, when added to the cost of the previous winning projects in the auction, comes below an overall budget cap. Projects that have already won a contract have their strike price raised to that of the latest project being assessed and the revised overall cost of the auction is reassessed against the budget cap. The auction stops once a project's cost breaches the budget cap when added to the costs of projects that have already won. The Department uses the auction format as it creates competition between projects, and should result in strike prices just high enough to enable construction without leading to excessive profits (paragraphs 1.3 to 1.7 and Figure 3).

2017 auction results

3 The September 2017 auction resulted in lower strike prices than the first auction in 2015, with offshore wind costs in particular falling sharply. In total, the Department awarded 11 CfDs to projects with a total capacity of 3.3 GW, enough to meet the electricity needs of approximately 3.6 million homes. Some 3.2 GW of this was for three offshore wind projects. Two of these projects are expected to begin generating electricity in 2022-23 and will receive a strike price of £57.50 per megawatt hour (MWh, 2012 prices). The third project is expected to begin generating electricity a year earlier, receiving a strike price of £74.75/MWh (2012 prices). These strike prices were lower than those awarded in the 2015 auction, in which offshore wind projects received strike prices ranging between £114/MWh and £120/MWh (2012 prices), and were lower than the government had expected for the 2017 auction. The eight other CfDs in the 2017 auction were awarded to smaller ‘fuelled-technology’ projects. This includes biomass with combined heat and power, and advanced conversion technology (ACT) projects, which use waste to produce a gas that can be used for a variety of purposes including the generation of electricity (paragraphs 1.8 to 1.10, Figures 4, 5 and 6).

4 National Grid forecasts that the cost to consumers of top-up payments for the winning projects will, over the four years assessed in the auction, peak at £176 million in 2023-24. This is less than the annual budget cap for top-up payments that the Department had set of £290 million per year, even though the auction secured more generating capacity than the Department had expected (paragraph 1.11 and Figure 7).

Changes to the auction design

5 Following the first CfD auction in 2015, the Department changed the auction rules relating to capacity caps, should they be used in a future auction. This made it possible for larger, cheaper-per-unit bids to be rejected in favour of smaller, more expensive-per-unit projects. The rules for the first auction in February 2015 gave the Department the option to cap the generating capacity that a particular technology could be awarded. The Department chose not to do this, so that bids were only subject to the budget cap. In April 2015, the Department changed the auction rules so that a capacity cap would apply differently if it was used in a future auction. Rather than stopping the auction for projects covered by a capacity cap as soon as a bid breached that cap (as would have happened if there had been a capacity cap in the February 2015 auction), projects covered by the cap bidding at a higher strike price would still be considered. Such projects would be awarded a CfD if they came under the capacity cap and did not exceed the budget cap. This created the possibility that the auction would award contracts to projects that were more expensive per unit of electricity while rejecting cheaper projects because their generating capacity was too large (paragraphs 2.4 to 2.5 and Figure 8).

6 The Department did not highlight this change to its programme management board or test whether it might lead to unintended consequences. The Department changed the auction design in relation to the capacity cap as part of a wider change that enabled bidders to submit flexible bids. At the time, it recognised that the change could enable auction results that would go against its principle that more expensive projects should not be accepted if a larger project with a cheaper unit price is rejected. But the Department has not provided us with any evidence to show that it considered how likely this was to happen. It also did not notify its programme management board, which was in place to consider changes to the auction design (paragraphs 2.6 to 2.9).

7 The Department subsequently decided to apply a capacity cap to ‘fuelled technologies’ in the 2017 auction. At the time the Department announced the auction in March 2017, it was considering changes to the eligibility rules for subsequent auctions. The Department was unsure whether large-scale, long-term support of fuelled technologies (such as biomass and ACT) would contribute effectively to its broader strategic objectives, but had not reached a final decision by the time the 2017 auction was announced. It therefore decided to cap the capacity that could be awarded to fuelled technologies at 150 MW to avoid making significant commitments to fuelled technologies before a final decision was made. This cap would apply using the rule the Department set in April 2015. It expected this would reduce the risk of the auction closing prematurely to technologies subject to the cap and to prevent large projects covered by the cap from gaming the auction by closing the auction to smaller applicants (paragraphs 2.10 to 2.14).

Impact of the Department’s changes

8 We have found that the 2017 auction will cost consumers significantly more, relative to the additional capacity it secured, because of the Department’s rule change. We obtained the bid information from the auction to understand what the likely outcome would have been if the Department had capped fuelled technologies in line with the February 2015 auction rules. We found that the design changes enabled small fuelled-technology projects to raise the strike price of larger projects. This increased the cost to consumers by around £100 million each year, meaning a total additional cost of around £1.5 billion over the 15-year life of the contracts. Almost all of this cost increase is due to small projects pulling up strike prices for projects that had already been accepted, rather than due to additional capacity being secured. The Department recognises that this means the outcome of the auction was suboptimal and has stated it will not apply the capacity cap rule in the same form in future auctions (paragraphs 2.15 to 2.17).

9 There were some bidding scenarios where the Department's design change would have meant better value for consumers, but it did not test the likelihood of these prior to making the change. For example, ending the fuelled-technology auction early could have enabled enough space under the budget limit for a higher bid from another technology, such as tidal stream, to set the strike price at a higher level for all winning projects. The Department has also told us that the design change was made on the expectation, shared by a number of industry commentators, that wind projects would bid at a higher price than fuelled-technology projects. If this had transpired, the small fuelled-technologies projects able to win contracts because of the rule changes would not have pulled up the strike price for offshore wind projects, which would have reduced, but not eliminated, additional costs. However, the Department has been unable to provide any evidence from when it made the changes to the auction design to show that it assessed the potential risk of bid prices for offshore wind projects being different from this expectation (paragraphs 2.18 to 2.21).

Part One

Contracts for Difference auctions

How Contracts for Difference work

1.1 The government introduced Contracts for Difference (CfDs) as part of its Electricity Market Reform (EMR) programme, which it launched in 2012. A key aim of EMR was to ensure that investment in sustainable low-carbon technologies was sufficient to enable the UK to reduce carbon emissions by at least 80% of 1990 levels by 2050.¹

1.2 CfDs give generators a fixed 'strike price' for their electricity over a set period (typically 15 years). This gives them greater financial certainty and is intended to encourage private investment in eligible low-carbon technologies. A government company, the Low Carbon Contracts Company (LCCC), pays generators the difference between the CfD's strike price and the reference price (a measure of the average market price). LCCC then recovers these costs through a levy on electricity suppliers. Should the reference price rise above the strike price, generators will pay LCCC the difference, which it then passes on to suppliers. The government expects that these costs and benefits will be passed through to electricity consumers (**Figure 1**).

CfD allocation

1.3 The Department for Business, Energy & Industrial Strategy (the Department) normally awards CfDs through auctions. This is to ensure that there is competition between projects in order to reduce the cost to consumers. The government's aim with EMR was to enable competition between low-carbon technologies as soon as practicable in order to achieve its decarbonisation objectives at the least cost to consumers. It considered that auctions were the best way to achieve this. The Department's 2010 consultation on EMR stated that the "price discovery characteristics of an auction should enable financial support to be set at a level just high enough to lead to deployment but not high enough to lead to excessive profits, with bids driven down by competition".²

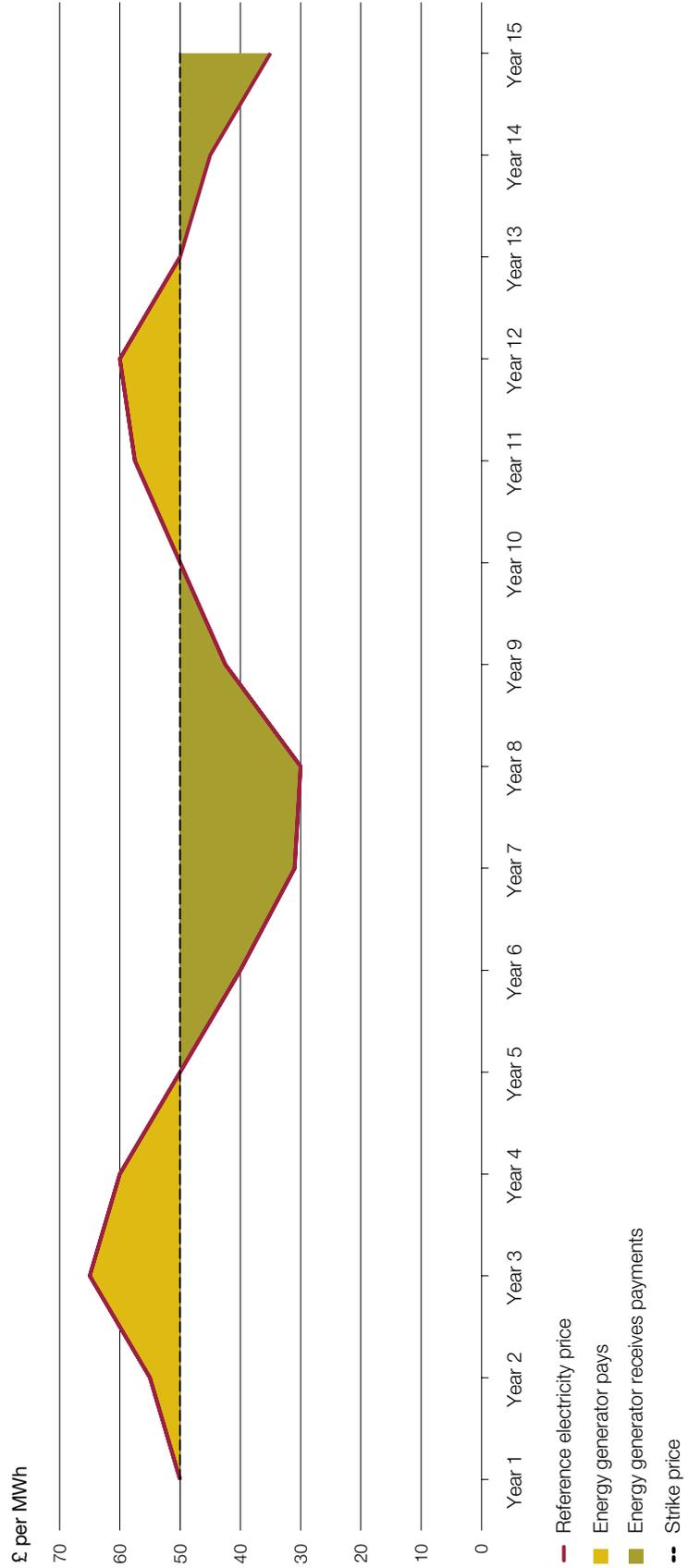
1 Department of Energy & Climate Change, *Electricity Market Reform: policy overview*, November 2012, available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/65634/7090-electricity-market-reform-policy-overview-.pdf.

2 Department of Energy & Climate Change, *Electricity Market Reform: consultation document*, December 2010, available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/42636/1041-electricity-market-reform-condoc.pdf.

Figure 1

Illustration of how Contracts for Difference work

The difference between reference price and wholesale energy price determines the direction of payments



1.4 The Department expects the auctions to enable competition across different technologies. Those technologies that are at similar stages of development are placed into 'pots' for the auctions, with all technologies in the same pot competing against one another. We previously reported that CfDs should offer better value for money than their predecessor, the Renewables Obligation.³ The Department has awarded 47 CfDs since 2014, mainly through auctions (**Figure 2** on page 14).

Auction design

1.5 The Department designed the CfD auctions to follow a 'pay-as-clear' format. Such auctions should incentivise participants to bid as close as possible to their lowest viable price rather than trying to anticipate the auction outcome, which can push up all prices in the auction.

1.6 The auction works as follows (**Figure 3** on pages 15 to 17):

- Developers submit sealed bids, specifying the delivery year in which their project will begin generating electricity. All bids are then ranked from lowest to highest based on their strike price, regardless of their delivery year.
- National Grid, which administers the auction, accepts bids sequentially, beginning with the bid with the lowest strike price.
- It continues to award contracts as long as the total costs of all the bids up to and including the one being assessed fall below a budget cap, which the Department sets. The budget cap is the maximum level of forecast top-up payments allowed each year; essentially the additional annual cost of the electricity being generated through the CfDs over the prevailing market price of electricity.
- Each bid assessment assumes that all the projects that will begin generating in the same delivery year (for the 2017 auction there were two delivery years, 2021-22 and 2022-23) will receive the same strike price. The assessment assumes that projects that have already won a contract have their strike price raised to that of the latest bid being assessed.

³ Comptroller and Auditor General, *Early contracts for renewable electricity*, Session 2014-15, HC 172, National Audit Office, June 2014.

- Bids continue to be assessed and accepted until a project causes the total cost of projects to breach the budget cap. That bid is rejected and the auction for that delivery year (that is, the delivery year that the rejected bid intended to begin generating electricity in) stops. Developers of offshore wind projects are also allowed to 'phase in' additional generating capacity during the subsequent two years, provided that the project began generating electricity in one of the delivery years.
- Strike prices are capped at the Department's administrative strike prices, which are specific to each technology. The Department also has the option to implement a cap on the capacity that certain technologies can win in the auction.

1.7 Developers face penalties if they are unable to fulfil a contract that they have been awarded. In such a case, the developer will be subject to a 'non-delivery disincentive', which means they are not able to participate in the next CfD auction if it occurs in the following two years. To date, one winning generator from the 2017 auction has not signed its contract, in addition to two generators from the 2015 auction. These generators are therefore subject to the non-delivery disincentive.

The 2017 auction

1.8 The Department launched the second CfD auction in March 2017. The auction was open to low-carbon electricity-generating projects that would begin producing electricity in 2021-22 (delivery year 1) or 2022-23 (delivery year 2). Projects starting in delivery year 1 did not affect the strike prices of projects starting in delivery year 2, and vice versa. The auction had just one pot, covering a range of 'less established' technologies (**Figure 4** on page 18). The Department set administrative strike prices for each eligible technology, with contracts capped at these prices if the price resulting from the auction would otherwise have been higher.

1.9 The Department announced the results of the auction on 11 September 2017. CfDs were awarded to 11 projects across the two delivery years with a total generating capacity of 3.3 GW (**Figure 5** on page 19). One project, an 8 MW Advanced Conversion Technology (ACT) project, which was due to begin generation in 2022-23, subsequently did not sign its CfD. Together, the remaining 10 projects are expected to produce 14,255 GWh per year by the time they reach full capacity in 2025-26. This is enough to power approximately 3.6 million homes, and is equivalent to around 4% of total UK generation in 2016.

Figure 2

Contracts for Difference (CfDs) awarded prior to the 2017 auction

The Department for Business, Energy and Industrial Strategy had awarded 36 CfDs before the second auction was held in 2017

2014



May 2014

The first eight CfDs are announced at administratively set strike prices ranging from £105 – £150 per MWh. We reported in June 2014 that this may have resulted in higher prices being paid than were needed to secure investment. The eight projects will generate a combined 4.55GW.

2015



Feb 2015

The results of the first competitive CfD auction are announced: 27 CfDs are awarded to projects generating a combined 2.14GW at strike prices ranging from £50 – £119.89 per MWh.

2016



Sep 2016

The government announces that a 35-year CfD has been awarded to the proposed nuclear plant at Hinkley Point C. The strike price is set at £92.50 per MWh and the plant has a planned capacity of 3.2GW. The earliest point at which Hinkley Point C is expected to begin generating electricity is 2025.

2017



Apr 2017

The second CfD auction opens for 'less established' technologies. The government allocates a budget of £290 million per year to the CfDs.

Notes

- 1 Three of the solar photo voltaic projects that were successful in the February 2015 auction were subsequently cancelled: the bidders for two of the projects due for delivery in 2015-16 did not sign a CfD with the Low Carbon Contracts Company; and the LCCC terminated the contract for one of the 2016-17 projects as it had failed to meet a milestone delivery date.
- 2 All strike prices are in 2012 prices.

Source: National Audit Office analysis

Figure 3

Illustration of a 'pay-as-clear' auction

The Department designed the Contracts for Difference (CfD) auctions to follow a 'pay-as-clear' format

Step 1: Projects are ranked from cheapest to most expensive based on strike price

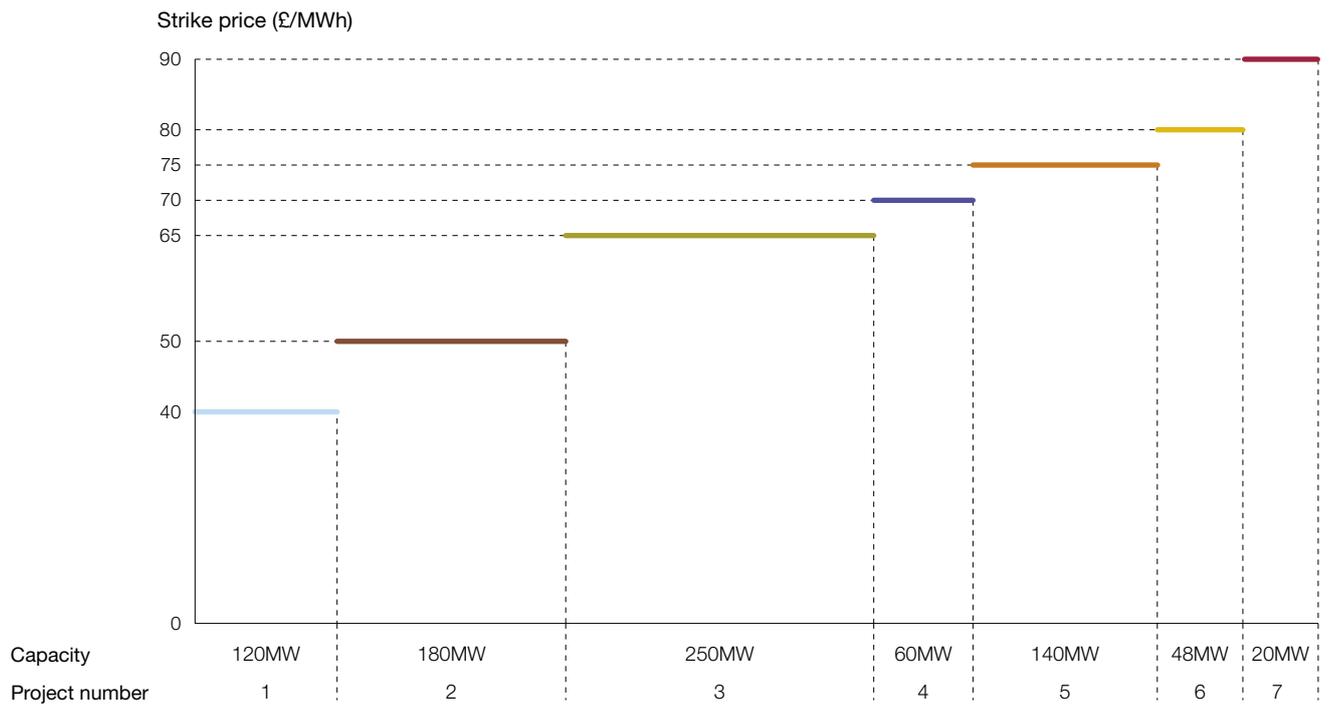


Figure 3 *continued*

Illustration of a ‘pay-as-clear’ auction

Step 2: Each project is assessed to see if it comes under the budget cap (assumed here to be £290 million). The strike price of previous winning contracts in the same delivery year is raised to the latest bid to calculate the combined cost. For example, assessment of project 3’s affordability would be based on the cost of 550MW at £65/MWh

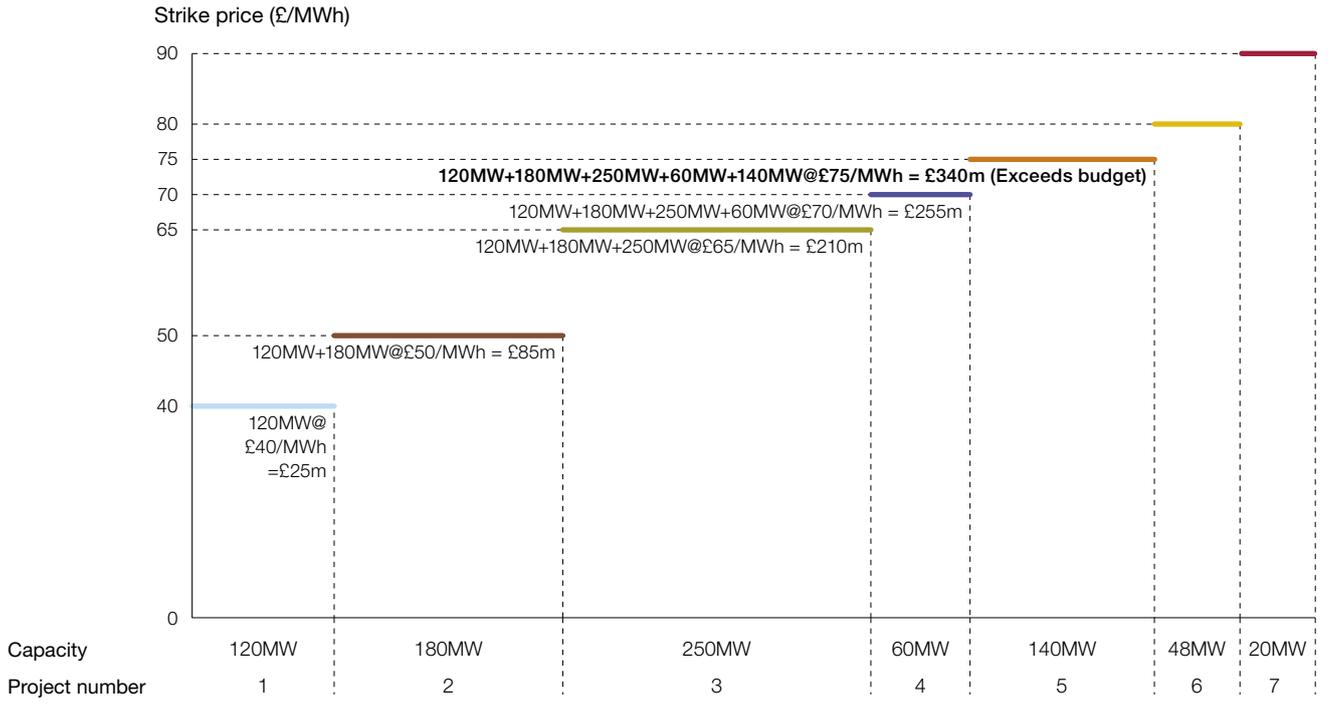
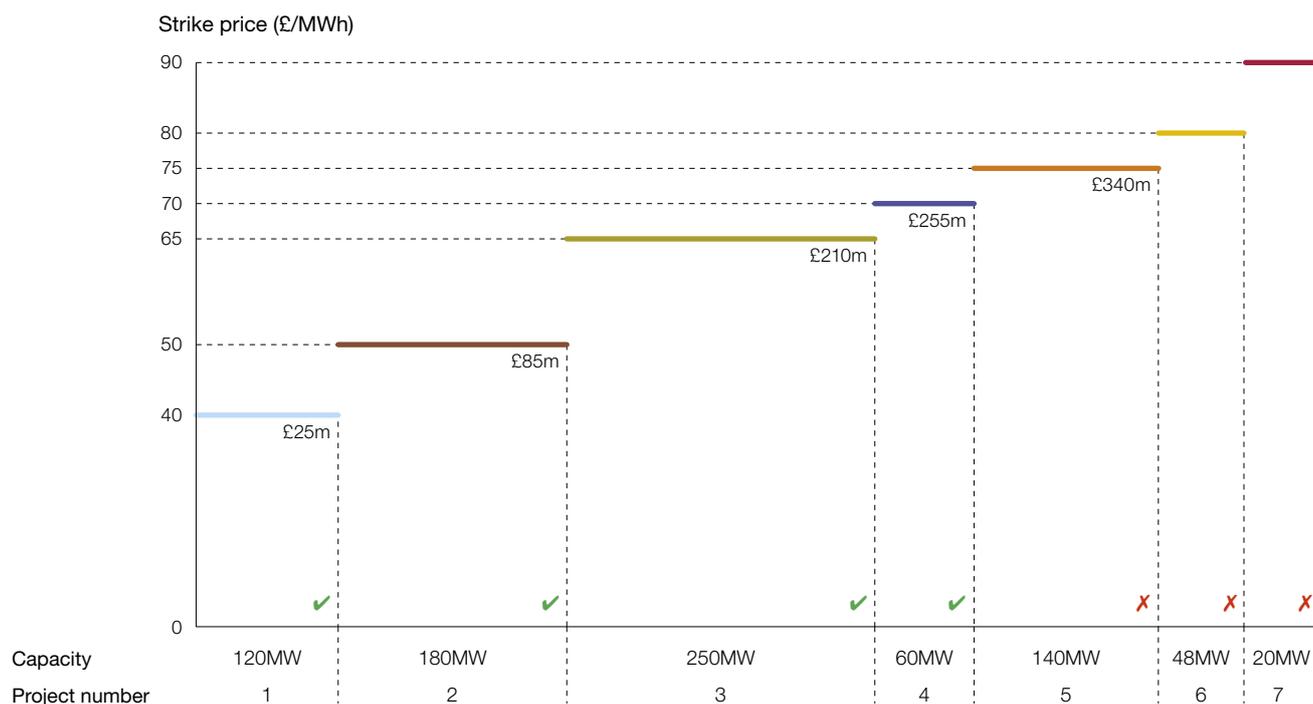


Figure 3 *continued*

Illustration of a 'pay-as-clear' auction

Step 3: The auction for each delivery year stops once a project breaches the budget cap (assumed here to be £290 million). The project which causes the breach and all more expensive projects do not receive a contract. All winning contracts receive the same strike price (in this case £70/MWh)

**Note**

1 This illustration assumes that no capacity cap has been put in place for the auction.

Source: National Audit Office analysis

1.10 The strike prices awarded in the 2017 auction were all lower than the strike prices awarded administratively in 2014, and the strike prices achieved in the 2015 auction. The 2017 auction results continue offshore wind's trajectory of cost reductions since the Department awarded the first CfDs (**Figure 6** on page 20). Two offshore wind projects will receive £57.50/MWh (2012 prices), bringing the strike price close to the current wholesale electricity price, which is around £45/MWh. The strike price that these two offshore wind projects were awarded is also similar to what the Department expects electricity from new gas-fired power stations to cost in the mid-2020s.⁴

⁴ The Department's analysis, which fed into its business case for Hinkley Point C in September 2016, showed that it estimated the cost to consumers of gas-fired power stations would be £54–£55/MWh once the market cost of carbon (£17/MWh) was removed.

Figure 4

Description and administrative strike prices for ‘less established’ technologies eligible for Contracts for Difference (CfDs) in the 2017 auction

The Department set maximum strike prices for each technology before the auction

	Description	Administrative strike price for delivery year 1, 2021-22 (£/MWh)	Administrative strike price for delivery year 2, 2022-23 (£/MWh)
Advanced Conversion Technology	Generates electricity from fuel created by the gasification and pyrolysis of organic matter or waste.	125	115
Anaerobic digestion	Generates electricity from a gas formed from the bacterial fermentation of organic material.	140	135
Dedicated biomass with Combined Heat and Power (CHP)	Generates electricity by burning wood or other organic matter. Only eligible for a CfD if it also generates heat for domestic or business use.	115	115
Geothermal	Generates electricity using naturally occurring subterranean heat.	140	140
Offshore wind	Generates electricity from wind at a generating station that is offshore.	105	100
Tidal stream	Generates electricity from the capture of the energy created from the motion of the naturally occurring tidal currents in water.	300	295
Wave	Generates electricity from the capture of the energy created from the motion of the naturally occurring waves on water.	310	300

Note

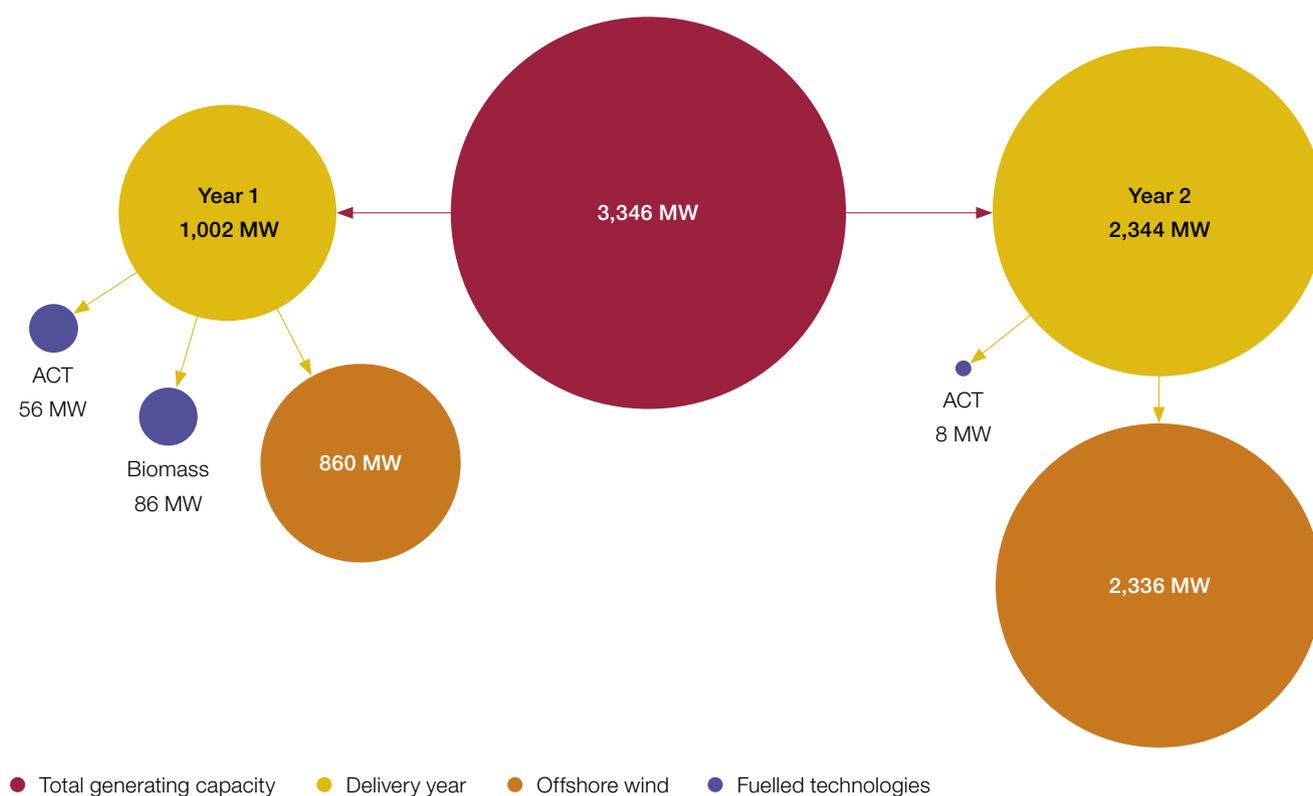
1 All strike prices are in 2012 prices.

Source: Department for Business, Energy & Industrial Strategy, *Contracts for Difference: Allocation Framework for the second Allocation Round*, March 2017. Available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/601120/Allocation_Framework_for_the_second_Allocation_Round.pdf

Figure 5

Results of the 2017 Contracts for Difference (CfD) auction

The 2017 CfD auction awarded contracts to 11 projects across the two delivery years with a total generating capacity of 3.3 GW



		Number of projects	Range of projects' capacity (MW)	Total generating capacity (MW)	Strike price (£/MWh)
2021-22	Advanced Conversion Technologies	5	0.05–25.5	56.31	74.75
	Dedicated Biomass with CHP	2	0.64–85	85.64	74.75
	Offshore wind	1	860	860	74.75
		8		1,001.95	
2022-23	Advanced Conversion Technologies	1	8	8	40
	Offshore wind	2	950–1386	2,336	57.5
		3		2,344	
	Total	11		3,345.95	

Note

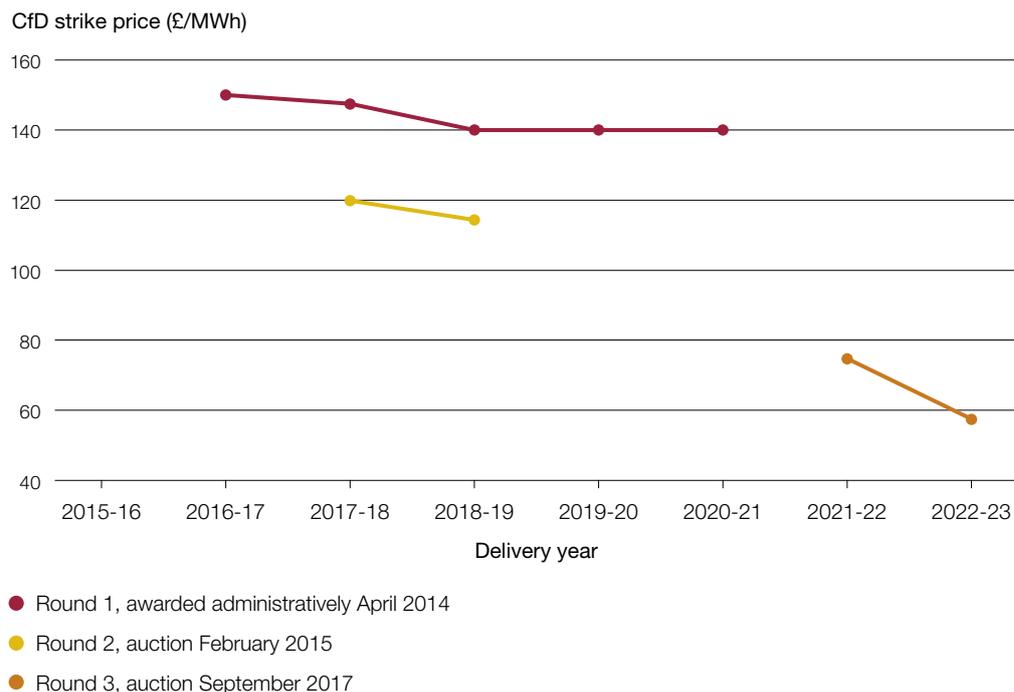
1 Strike prices are given in 2012 prices.

Source: Department for Business, Energy & Industrial Strategy, *Contracts for Difference Second Allocation Round Results*, September 2017. Available at: www.gov.uk/government/publications/contracts-for-difference-cfd-second-allocation-round-results

Figure 6

Contracts for Difference (CfD) strike prices for offshore wind projects over the three allocation rounds

The strike prices for offshore wind projects have fallen sharply since the first CfDs were awarded in 2014

**Note**

1 All strike prices are in 2012 prices.

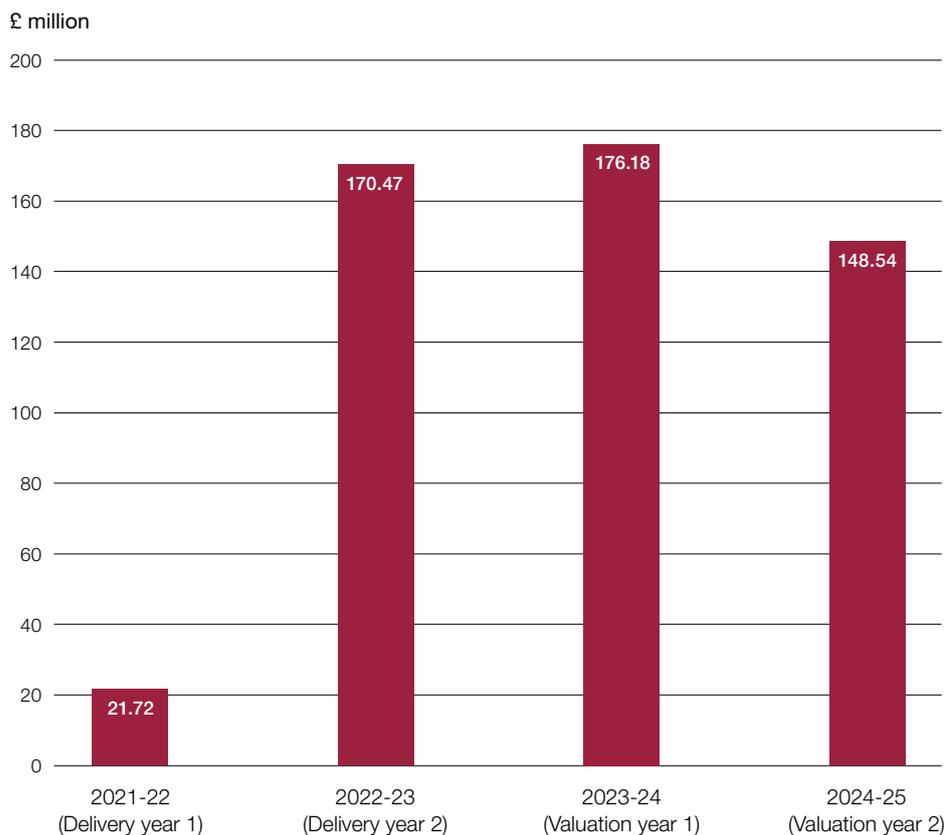
Source: National Audit Office analysis of Department CfD allocation documents

1.11 The auction resulted in forecast costs to consumers below the Department's budget cap. National Grid forecasts that the highest annual cost once all winning projects have begun generation will be £176 million, compared with the Department's budget of £290 million (**Figure 7**). This was despite the auction securing more capacity than the government had expected. The government had announced in the 2016 Budget that it expected a series of CfD auctions out to 2020 to support up to 4 GW of new offshore wind generating capacity. The 2017 auction awarded contracts to more than 75% of this amount. The government has committed up to £557 million for further CfDs, with the next auction planned for spring 2019.

Figure 7

Budget impact of the 2017 auction

The expected cost of the Contracts for Difference (CfD) awarded through the 2017 auction is below the Department's budget cap of £290 million

**Note**

- 1 The Department's valuation methodology calculates the expected cost of the subsidy the CfDs will require. This is done by estimating how much electricity each project is likely to generate in any given year, and then multiplying this by the difference between the contract's strike price and the expected reference (market) price. The Department's methodology assumes that the reference price of electricity will rise across the four-year period, bringing down the cost of the subsidy for each MWh generated. As a result, although the 11 projects awarded CfDs will be generating more electricity in valuation year 2 than in valuation year 1, the anticipated cost of the subsidy is lower. We have not assessed the reliability of the Department's price forecasts for this investigation.

Source: Department for Business, Energy & Industrial Strategy

Part Two

The changes to the auction design and the implications for consumers

2.1 From the outset, the Contracts for Difference (CfD) auction rules have enabled the Department for Business, Energy & Industrial Strategy (the Department) to cap the capacity that certain technologies can be awarded in auctions, which would work in addition to the overall budget cap. In the first CfD auction in February 2015, the Department elected not to cap the capacity of any technologies, meaning eligible projects were subject only to a budget cap.

2.2 Between the first and second CfD auctions, the Department made important decisions at two points:

- **April 2015:** The Department changed the auction rules so a capacity cap would be applied in a different way in future auctions, if it chose to introduce one.
- **March 2017:** The Department released the allocation framework for the second CfD auction, which indicated that fuelled technologies would be subject to a capacity cap of 150 MW. This cap would apply in line with the rule changes made in April 2015.

2.3 The rest of this part sets out these events in more detail and the potential consequences of the April 2015 rule change.

April 2015 rule change

2.4 The rules for the February 2015 auction included provision for a capacity cap to be applied to one or more technologies eligible to bid for a CfD. Those rules stated that the auction would close to technologies covered by a capacity cap once it reached a project that exceeded the capacity cap when added to the capacity of previous winning projects also covered by the cap. This meant that more expensive-per-unit projects covered by the cap could not win a contract, even if headroom remained under the capacity and budget caps. The Department did not apply a capacity cap in the February 2015 auction.

2.5 In April 2015, the Department changed how a capacity cap would apply in future auctions. The auction for projects covered by the cap would not automatically close once a project had breached the capacity cap. Instead, National Grid would continue to consider other, higher-priced (but smaller-capacity) bids, and would award them a contract provided that the project did not breach either the capacity or budget caps (**Figure 8** on pages 24 and 25). The auction consequently could award contracts to bidders who bid at higher strike prices than those who were unsuccessful, if they offered to produce less electricity, and so were able to fit under the capacity cap, while also staying within the budget cap.

2.6 The Department changed the capacity cap rule to ensure it would operate in conjunction with new rules aimed at encouraging flexible bids in future auctions. The first CfD auction in February 2015 had enabled bidders to submit more than one bid relating to the same project, with variances on the strike price, capacity or delivery year. The Department wanted these flexible bids to increase competition in the auction to achieve greater value for money for consumers. After the first auction, it concluded that the rules at the time did not enable flexible bids to entirely fulfil this intention, because bidders would only vary the price of their bids by a very small amount and might not submit an optimal bid balancing size and price. The Department consequently introduced a new ‘interleaving’ rule, to address these risks.⁵ The Department deemed it necessary to change the capacity cap rule in conjunction with the introduction of interleaving.

2.7 The Department recognised at the time that changing the capacity cap rule could result in auction results that would go against its own ‘fairness principle’. This is that if one project is deemed unaffordable, a more expensive-per-unit project should not then be accepted, even if it is smaller and therefore within budget. However, the Department deemed as remote the risk of a more expensive-per-unit project being allocated a contract where a cheaper-per-unit project had not. The Department has not been able to provide us with any analysis to support this assessment.

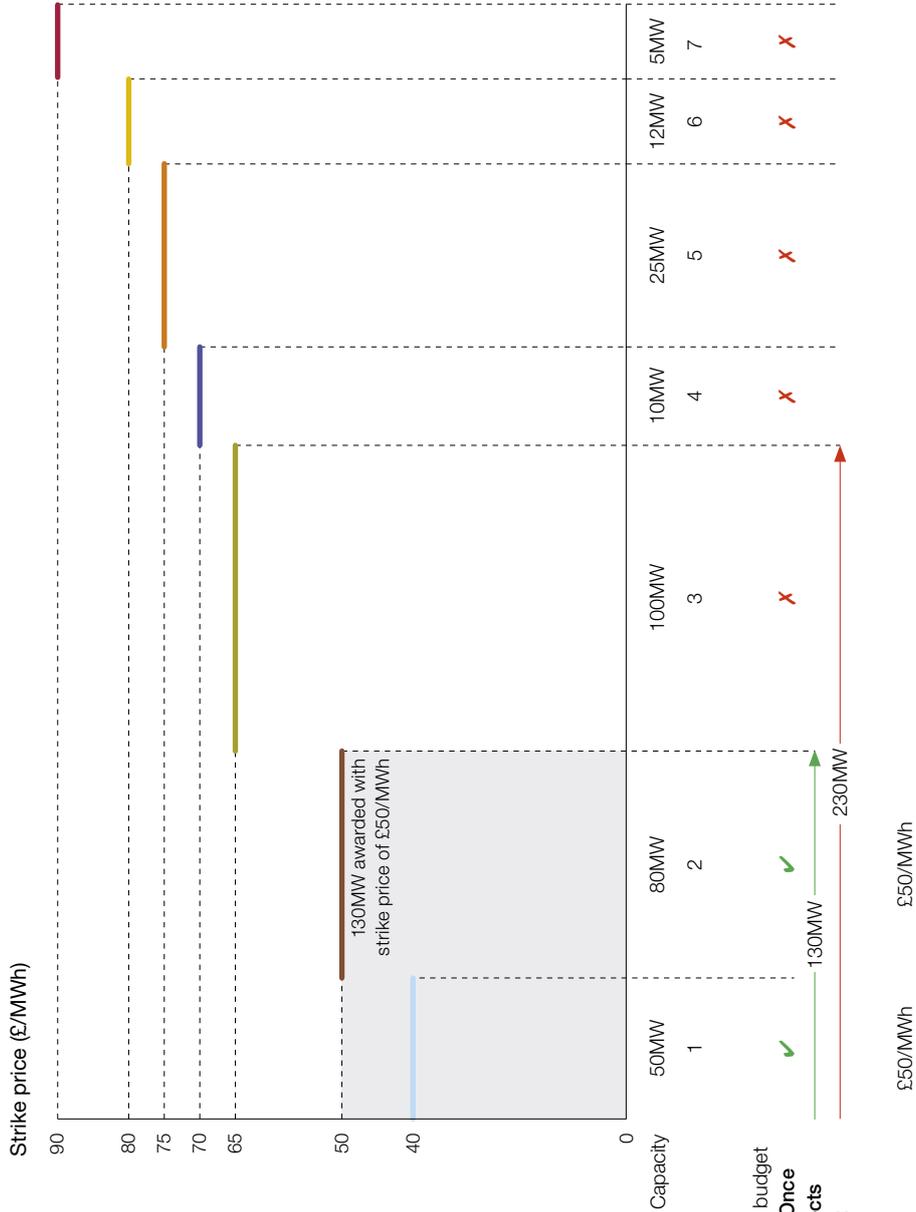
2.8 The Department also amended the ‘maxima clearing rule’ in April 2015. This meant that projects covered by a capacity cap could not have their strike price increased by projects not covered by the capacity cap. The Department made this change because it wanted to prevent projects covered by a capacity cap from bidding at an unfeasibly low strike price to secure a contract, in the expectation that their strike price would be set by a higher-priced project not covered by the cap. However, for projects not covered by the capacity cap the usual rules for a pay-as-clear auction still applied (that is, having their strike price increased if a winning project which was covered by the capacity cap bid a higher price).

⁵ More details on the interleaving rule are available in: Department for Business, Energy & Industrial Strategy, *The interleaving rule*, December 2016, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/573894/Interleaving_Rule_Summary.pdf

Figure 8
Illustrative representation of change to capacity cap

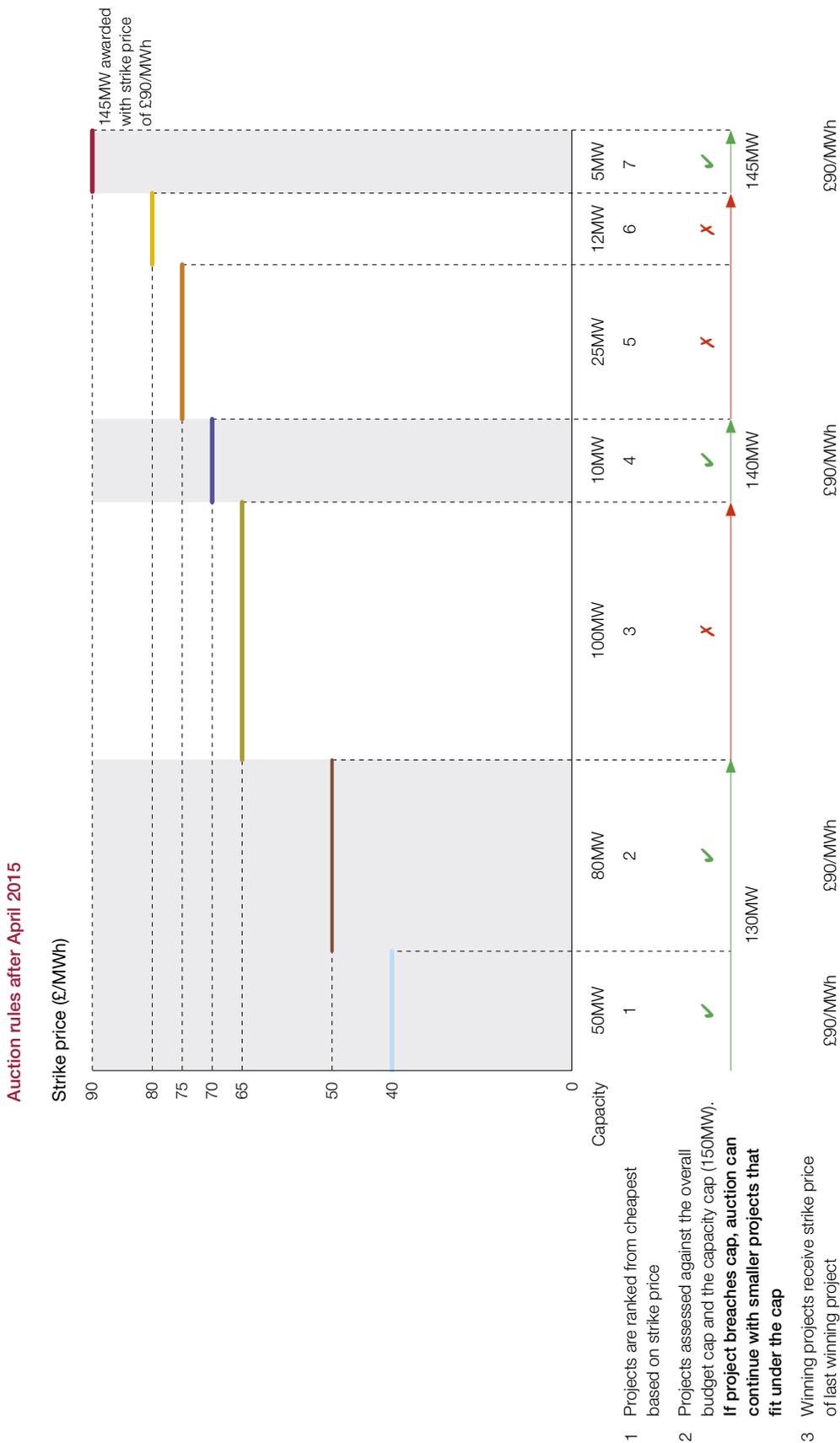
In April 2015, the Department changed how a capacity cap would apply in future auctions

Auction rules before April 2015



- 1 Projects are ranked from cheapest based on strike price
- 2 Projects assessed against the overall budget cap and the capacity cap (150MW). **Once capacity cap is breached, no projects covered by cap can win a contract**
- 3 Winning projects receive strike price of last winning project

Figure 8 continued
 Illustrative representation of change to capacity cap



- 1 Projects are ranked from cheapest based on strike price
- 2 Projects assessed against the overall budget cap and the capacity cap (150MW). **If project breaches cap, auction can continue with smaller projects that fit under the cap**
- 3 Winning projects receive strike price of last winning project

Source: National Audit Office

2.9 The Department did not highlight the change to how the capacity cap would apply to its Electricity Market Reform Programme Management Board. This departmental board met monthly to review the progress of EMR programmes, including discussing changes to programmes' design. The April 2015 board minutes show the new capacity cap rule described in a paper about the maxima clearing rule amendment. However, the paper did not notify the board that the capacity cap rule had been changed.

Applying a capacity cap for 'fuelled technologies' in the 2017 auction.

2.10 For the 2017 auction, the Department decided to implement a cap of 150 MW on the capacity that could be awarded to projects using certain technologies, known as 'fuelled technologies'. These include dedicated biomass with combined heat and power, anaerobic digestion and advanced conversion technology (ACT). This cap would be applied in line with the rule change that the Department made in April 2015.

2.11 At the time the Department launched the auction, it was reviewing the ongoing role of fuelled technologies in CfD auctions. In November 2016, the Department launched a public call for evidence on the way in which fuelled technologies are supported through CfDs. The European Commission's state aid approval for the CfD auctions, granted in 2014, also required the Department to consider the role of biomass conversion for future auctions after 2016. Furthermore, the Department indicated that it was uncertain about the cost reduction and environmental benefits that could be achieved through supporting fuelled technologies as defined in the current rules.⁶

2.12 The Department implemented a cap on fuelled technologies because it had not resolved its concerns by the time it launched the auction in March 2017. The Department considered it appropriate to limit the amount of support that could be given to such projects while the review was being carried out, particularly given the long-term nature of the support awarded through auctions.⁷ It set the capacity cap for fuelled technologies at 150 MW because this was in line with the amount that had been awarded for such contracts in the 2015 auction, and so that a sufficient level of competition between projects would be maintained. The Department set one cap to cover all fuelled-technology projects rather than having technology-specific caps. This was for simplicity and to encourage competition between fuelled-technology projects.

2.13 Between December 2017 and March 2018, the government ran a consultation proposing new criteria that would mean it directs support in future auctions towards fuelled-technology projects that complement its strategic objectives. For example, the Department wants to draw a clear distinction between certain types of technology and to require projects to be sufficiently innovative and efficient.

⁶ Department for Business, Energy & Industrial Strategy, *Call for Evidence – Contracts for Difference*, November 2016, www.gov.uk/government/uploads/system/uploads/attachment_data/file/566356/Call_for_Evidence_fuelled_techs_in_CfD_FINAL.pdf

⁷ Department for Business, Energy & Industrial Strategy, *Accompanying Note to the Budget Notice for the Second CFD Allocation Round*, March 2017 www.gov.uk/government/uploads/system/uploads/attachment_data/file/598813/Accompanying_note_for_Final_Budget_Notice_Second_Round__2_.pdf

2.14 During this investigation the Department told us that it considered the revised capacity cap rule should apply to fuelled technologies:

- It wanted the auction to award contracts to the cheapest projects. It was concerned that removing projects covered by the capacity cap from the auction once the cap was breached (that is, the pre-April 2015 rules) would mean contracts being awarded to more expensive projects using technologies not covered by the cap.
- It was concerned about the risk of large projects covered by the capacity cap gaming the auction by bidding in at a low price to close the auction prematurely to smaller applications also covered by the capacity cap.
- It wanted to avoid ‘overly penalising’ projects covered by the cap by closing the auction early. This could have left a significant amount of capacity under the cap unused, and leave the Department open to criticism that its rules were disproportionately punitive.

Consequences of the 2017 auction design

2.15 The April 2015 rule changes introduced new features to the auction dynamics:

- The auction could reject bids that were cheaper per unit of electricity than the eventual winners in each delivery year. This would not have been possible under the rules before April 2015, because the auction for those projects covered by the capacity cap would have closed as soon as any such project breached the capacity cap. But under the revised auction rules, smaller but more expensive-per-unit projects covered by the capacity cap could be awarded CfDs (and pull up the price of cheaper-per-unit projects not covered by the cap) meaning that consumers would pay a higher unit price.
- The change to the capacity cap meant the auction was more likely to award contracts to very small projects even if they were more expensive in terms of strike price. The auction rules meant that with each additional project covered by the capacity cap, the remaining headroom for subsequent, more expensive projects decreases, with projects rejected until one is found that is small enough to fit within the cap. The published results confirm that the rule change increased the chances of small fuelled-technology projects winning and ensured that the entire capacity cap was filled: there were four winning projects with a capacity of less than 10 MW, and a total of 149.95 MW out of the maximum 150 MW possible was awarded.
- Consequently, the capacity cap design made it possible that very small fuelled-technology projects could set the strike price for other, much larger projects. It is possible to infer from the published auction results that a fuelled-technology project was likely to have set the strike price for the one winning (large) offshore wind project in delivery year 1, because of the Department’s ‘maxima clearing rule’ change which broke the price link from projects not covered by the cap to those that were (paragraph 2.8).

2.16 We have assessed the impact that the Department's April 2015 rule changes had on the 2017 auction results. To do this, we have obtained the information showing what each project bid into the auction and re-run the auction applying the capacity cap for fuelled technologies as it was written into the auction rules before April 2015. We estimate that, because of a combination of the above reasons, the 2017 auction will cost consumers around £100 million per year more than if the Department had not changed the rules. This equates to around £1.5 billion over the 15-year life of the CfDs. Almost all of these additional costs were due to small fuelled-technology projects pulling up the strike prices being paid to larger projects that had already been accepted. Only a tiny fraction of these additional costs relate to additional capacity.

2.17 Our assessment assumes that bids would have remained the same without the change to how the capacity cap would apply. It is possible that bidding behaviour would have been different under different auction rules. For example, the rule change may have led to more fuelled-technology projects bidding into the auction, given the Department's rule change made it likely that more contracts would be awarded to these projects.

2.18 It is not possible to evaluate an auction's design entirely based on one set of bids. It is possible for well-designed auctions to result in poor outcomes because of an unlikely bidding scenario occurring. There were possible bidding scenarios in the 2017 auction that would have resulted in better value for money than if the Department had not made its design change in April 2015. For example, ending the fuelled-technology auction early under the old rules could have enabled enough space under the budget limit for a higher-priced bid from another technology, such as tidal stream, to set the strike price at a higher level for all winning projects. Additionally, the Department and a number of industry commentators expected wind projects to bid at a higher price in the auction than fuelled-technology projects.⁸ If this had transpired, the small fuelled-technology projects able to win contracts because of the rule changes would not have pulled up the strike price for offshore wind projects, which would have reduced, but not eliminated, additional costs.

2.19 The Department has been unable to provide any evidence from when it made the changes to the auction design to show that it assessed the potential risk of unintended outcomes, such as large projects' strike prices being pulled up by very small projects.

2.20 Overall, we consider that the Department's April 2015 change made it more likely that the auction would result in worse value for money for consumers. The Department recognises that the outcome of the auction was suboptimal and has stated it will not apply the capacity cap rule in the same form in future auctions.

⁸ This is contrary to the administrative strike prices set for the auction (see Figure 4). The Department told us that the administrative strike prices reflected the expected wide range of potential bid prices from fuelled-technology projects but that it expected most fuelled-technology projects would bid lower than offshore wind projects.

2.21 The Department considers that the introduction of the 150 MW capacity cap on fuelled technologies saved consumers money compared with a situation where there was no cap at all. By running an auction scenario where no capacity cap had been applied and using the actual 2017 bids, National Grid concluded that the cost to consumers would have been 65% greater for just 15% more capacity than the actual results. But it is unlikely that the bids would have been the same if a capacity cap had not been applied, making this comparison less reliable. The Department itself noted before the auction that most biomass projects are either below 50 MW or above 150 MW, because economies of scale only really accrue above 150 MW as fuel has to be imported. Therefore, if the 2017 auction had been run without a capacity cap, it is likely that large-scale fuelled-technology projects would have bid into the auction, which could have led to very different results.

Appendix One

Our investigative approach

Scope

1 We conducted an investigation into the Department for Business, Energy & Industrial Strategy's (the Department's) design of the 2017 Contracts for Difference auction after receiving correspondence that indicated the auction results did not maximise value for money. In particular, the correspondence suggested that the auction had awarded contracts with a higher price than was potentially necessary. We investigated:

- the roles and responsibilities of different parties involved in the auction;
- how the Department designed the auction;
- why the Department changed the auction design prior to the 2017 auction;
- the quality assurance to which the Department subjected its change to the auction design; and
- the potential impact that the Department's design change could have had.

Methods

2 We interviewed Department officials involved in the design and running of Contracts for Difference auctions, as well as representatives from National Grid, Ofgem, the Low Carbon Contracts Company and HM Treasury.

3 We reviewed key documents including:

- information showing what different projects had bid in the auction;
- the auction allocation frameworks for the 2015 and 2017 auctions, which includes the auction rules and the method by which the Department values projects against the budget;
- Department documents explaining changes to the auction design;
- the Department's consultations on changes to the auction design; and
- National Grid documents explaining how the auction works.

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