

Agenda

Advancing economics in business

CfDs: the (strike) price is right?

The results of the first UK auctions for contracts for differences (CfDs) for low-carbon electricity generators were published in February 2015, and demonstrated that competition between low-carbon generation technologies can reduce costs to consumers, or at least result in lower costs than official estimates. While prospective project developers await confirmation of future CfD allocation rounds, we consider the implications of recent auctions for onshore and offshore wind costs

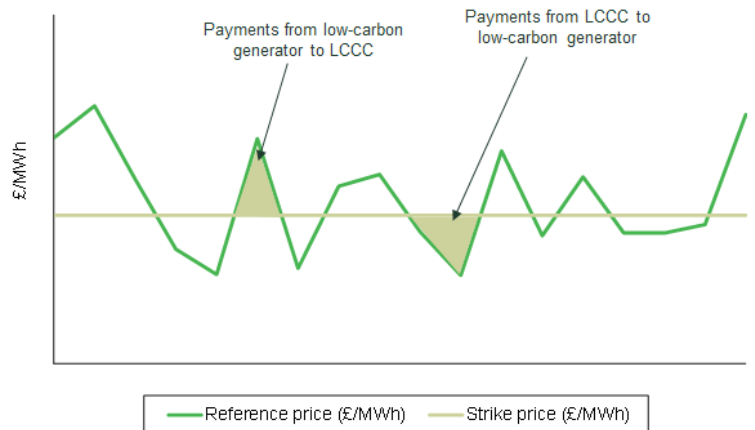
A central pillar of the UK's Electricity Market Reform (EMR), the CfD scheme is designed to create long-term price stability for low-carbon generators and lower the cost of capital for investors. It consists of a private law contract between a low-carbon generator and a counterparty, the Low Carbon Contracts Company (LCCC), which stipulates that the generator will provide electricity at a pre-determined 'strike price'. As the government planned to transition away from the existing Renewables Obligation (RO), the aim was to set the strike prices in a manner that would allow the median project within the group of potential projects for a given technology to achieve equivalent returns (accounting for differences in risk) under both the RO and the CfD.

The LCCC is a government-owned company that was established to manage CfD contracts and the resulting difference payments that would be funded by charges levied on electricity suppliers.¹ When the reference electricity price, which is based on the market price, is above the contracted strike price, a payment is made by the generator to the LCCC for the surplus revenue; when the wholesale electricity price is below the contracted strike price, a payment is made by the LCCC to the generator for the shortfall. This is shown in Figure 1.

Although CfDs were intended to be allocated through auctions in the early stages of the EMR, there were concerns that this could not be achieved quickly enough to prevent an 'investment hiatus'. In April 2014, the Department of Energy & Climate Change (DECC) approved eight projects (five wind farms and three biomass-related projects) for early CfD contracts.²

This non-competitive CfD allocation was subsequently criticised by the National Audit Office (NAO) for allocating £16.6bn, or around 58% of the funds available through the Levy Control Framework, for renewable generation CfDs,

Figure 1 Illustration of CfD payments



Source: Oxera.

thereby potentially crowding out other projects that could have been procured more efficiently at a later date. The NAO considered that DECC might have 'provide[d] higher returns than needed to secure the investment'.³

The early allocation of CfDs also raised concerns that state aid approval might not be granted to the projects in question in the absence of a competitive allocation process. While the European Commission has stated that it does not intend to raise objections to the early CfDs for the five wind projects, it has yet to decide on the compatibility of the proposed CfDs with two biomass conversion projects (Drax and Lynemouth).⁴

How do CfD auctions work?

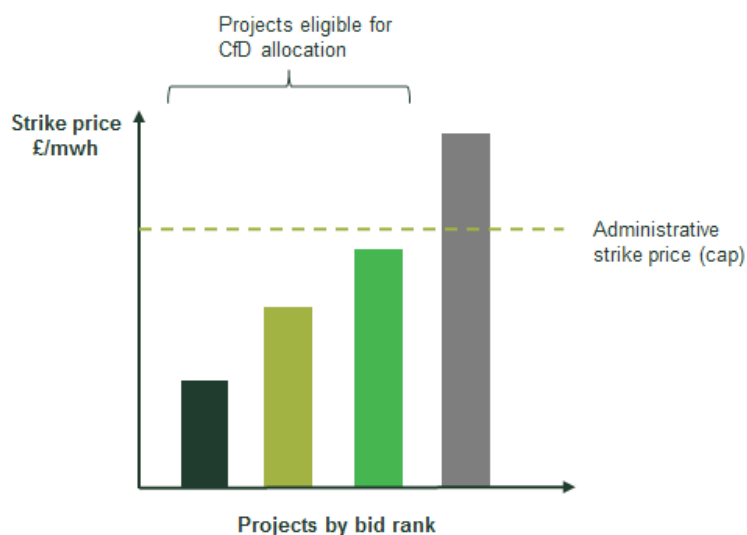
The NAO's concerns relate to the expected difference in prices achieved in a non-competitive, as opposed to a

competitive, allocation mechanism. In the case of early CfD allocation, DECC has less information than the generator about the latter's true cost and required return from building and operating a wind farm, and therefore cannot accurately determine the strike price that is necessary to bring forward the investment (i.e. there is 'asymmetric information'). As a result, DECC's published administrative strike prices (ASPs) may offer the early CfD generators a higher rate of return than they would have otherwise needed to proceed with deployment. An auction allocation mechanism allows DECC to determine the true cost of establishing renewable generation from various prospective projects, and to approve the most efficient of these.

The first CfD auction consisted of a basic sealed-bid auction format, with modifications that allowed for flexible bids. The budget was also allocated across different pots, with minimum and maximum budgets set according to technology type.⁵ Funding in the first allocation round was divided into three pots: pot 1 for established technologies, such as solar and onshore wind; pot 2 for less established technologies such as offshore wind; and pot 3 for biomass projects.⁶ Prospective generators were invited to submit a sealed bid for the strike price they would be willing to accept in order to operate their generation unit, up to the ASP published by DECC. For each commissioning year, DECC ranked the bids from lowest to highest; if the combined value of all applications within a commissioning year did not exceed the relevant budget or pot, all applications were approved at the ASP (see Figure 2). If the budget or pot was exceeded, DECC held an auction for the relevant criteria of the CfD mechanism (either a minimum or a maximum).

In theory, auctions incentivise projects to reveal their true costs. A bid that is too low could result in a loss if it were accepted. A bid that is higher than the true strike price of a project could be rejected if there were lower bids from competitors, and the total value of the pot were exceeded; overstating the strike price could result in the project being declined when it otherwise might have been approved.

Figure 2 Illustrative ranking of bids



Source: Oxera.

The complexity in the allocation framework could also open up potential opportunities for strategic bidding, or for bids that are not truly cost-reflective.⁷

What can explain competitive CfD strike prices?

The first CfD auction was held in late 2014, and it confirmed that the costs of the winning low-carbon generation projects could be considerably lower than administratively determined costs. For example, approximately 1,910MW was allocated to wind farms, and for onshore wind farms the lowest strike price was £79.23/MWh, around 17% lower than the ASP of £95/MWh for a project to be delivered in 2016/17. Similarly, offshore wind projects had a minimum clearing price of £119.89/MWh, around 18% lower than the ASP of £140/MWh for projects to be delivered in 2017/18.⁸

The large discrepancy between the competitive clearing prices and the ASPs suggests that the auction mechanism was successful in delivering a competitive outcome.

For example, it is possible that the auction process revealed which projects were most efficient, and could therefore operate at a cost that was lower than that which DECC was using in its strike price calculations. The discrepancy might be due to the auction winners having lower predevelopment costs, capital expenditure (CAPEX), and fixed and variable operating costs than those assumed in DECC's median project calculation. The required rate of return under the CfD mechanism might also be lower than that assumed by DECC.

In 2013, Oxera conducted an analysis of DECC's ASPs and tested their robustness under a number of assumptions.⁹ The prices were calculated for 2016/17, where the strike price for a notional onshore and offshore wind farm was set so as to achieve a comparable rate of return under both the Renewables Obligation Certificate scheme and the CfD. All revenues and costs were expressed in 2012 constant prices. Table 1 overleaf shows Oxera's modelled strike prices relative to DECC's ASPs for onshore and offshore wind farms commissioning in 2016/17. Table 2 overleaf lists the assumptions about notional onshore and offshore wind farms used in DECC's 2013 analysis.

In order to assess the possible sources of this discrepancy, Oxera examined the impact of various sensitivities within its own CfD valuation model, which is based on an ASP that is equivalent to the observed competitive CfD strike prices.¹⁰ Table 2 illustrates the baseline assumptions used in the Oxera CfD model.

For illustrative purposes, Oxera assessed how the strike price would fall by adjusting various baseline assumptions. For both onshore and offshore wind (round 2), costs (predevelopment, CAPEX, fixed and variable OPEX) were adjusted downwards by 10%, and the capacity factor was

Table 1 Summary of strike prices

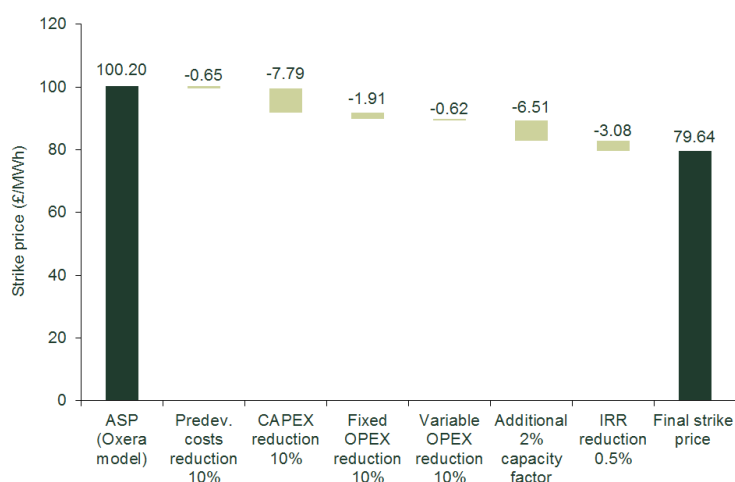
	Oxera CfD model based on DECC assumptions (rounded to the nearest £5/MWh)	ASP as of December 2013	Lowest strike price from competitive CfD allocation round
Onshore wind	£100/MWh	£95/MWh	£79.23/MWh
Offshore wind	£150/MWh	£150/MWh	£119.89/MWh

Note: 2012 prices.

Source: Department of Energy & Climate Change (2015), 'CFD Auction Allocation Round One - a breakdown of the outcome by technology, year and clearing price', 26 February; Department of Energy & Climate Change (2013), 'Investing in renewable technologies – CfD contract terms and strike prices', December.

adjusted upwards by an additional two percentage points while the rate of return was held constant. A final reduction of the return by 50 basis points brought the predicted strike price within close proximity of the most efficient bid in both cases.

As shown in Figures 3 and 4, the most significant impact on the strike price, based on Oxera's illustrative changes, was from increased CAPEX efficiency, a greater capacity factor, and a lower rate of return. Together, these three elements of increased 'efficiency' comprised roughly 85–90% of the difference between the ASP and the competitive auction outcome for both onshore and offshore wind. This suggests that the competitive CfD auctions were driven by the most economic projects being developed first (i.e. those with the lowest costs and highest capacity factors); and/or that they were delivered more efficiently than previously anticipated; and/or that the risks perceived by investors were lower than previously estimated.

Figure 3 Competitive strike price versus ASP: onshore wind

Note: IRR, internal rate of return. Predev., predevelopment.

Source: Oxera.

Table 2 Strike price assumptions

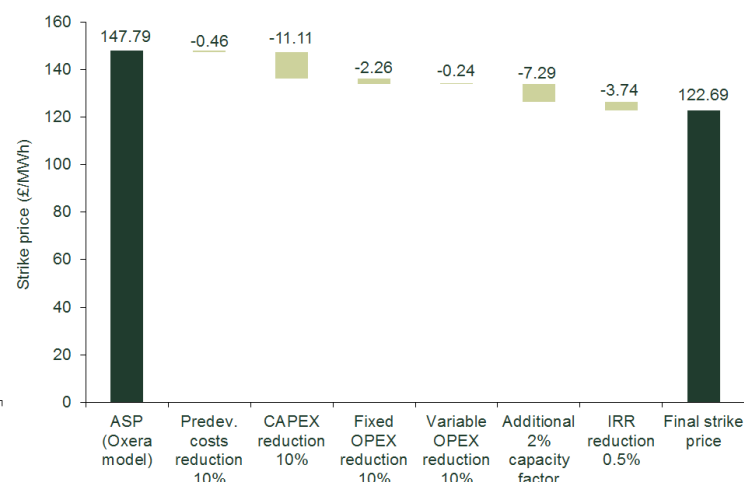
	Onshore wind farm commissioned in 2016	Offshore wind farm commissioned in 2016
Pre-tax rate of return under RO	7.91%	9.76%
Hurdle rate adjustment under CfD (relative to RO scheme)	-0.4%	-0.6%
Capacity factor	28%	38%
Predevelopment costs	£0.1m/MW	£0.07m/MW
CAPEX	£1.5m/MW	£2.5m/MW
Fixed OPEX	£37.1/kW/year	£62.9/kW/year
Variable OPEX	£5/MWh	£2/MWh

Note: OPEX, operating expenditure.

Source: Department of Energy & Climate Change (2013), 'Electricity Generation Costs 2013', July.

What next?

Given the outcome of the first competitive CfD allocation, it is natural that the UK government would reflect on how it can improve the auction process still further, particularly given the NAO's concerns.¹¹ Indeed, following recent announcements by DECC, there is much uncertainty regarding the Levy Control Framework as well as the timing and format of future CfD allocation rounds.¹² Moreover, given the closure of the RO scheme to all new generators from 2017 and to new onshore wind projects from 2016, it is possible that future CfD strike prices may be determined without any reference to the RO scheme.¹³

Figure 4 Competitive strike price versus ASP: offshore wind

Source: Oxera.

In the context of continuing uncertainty over the delivery of other low-carbon generation projects (notably, the Hinkley Point C nuclear power plant), as well as the lack of any binding national targets for renewable generation beyond 2020 (or details of European arrangements to achieve sufficient investment in renewable generation), the risk is that the pipeline of future projects may be weakened.¹⁴ To the extent that this has the potential to reduce competition in future CfD allocation rounds, it risks reversing the benefits already realised from competitive auctions.

Meanwhile, the decision to end the exemption of qualifying renewable generators from the Climate Change Levy may also put upward pressure on CfD strike prices.¹⁵ For

example, the strike prices for the onshore and offshore wind projects shown in Figures 3 and 4 would need to increase by up to £6/MWh to maintain the same rate of return.

As technological advancements bring down the costs of building and operating renewable generators, they potentially bring down CfD strike prices. However, the first round of CfD allocations has perhaps also removed the lowest-cost projects in the best locations from the pool of potential future bidders. The longer it takes for the government to clarify its position on the future for CfDs, the greater the risk that the pipeline of projects will be limited and the competition for CfDs less vigorous. The combined effect on winning bids remains to be seen.

¹ Department of Energy & Climate Change (2014), 'Low Carbon Contracts Company and Electricity Settlements Company operational costs 2015/2016 – consultation on operational cost levies', 5 November, para. 2.

² European Commission (2014), 'State aid SA.38758 (2014/N), SA.38759 (2014/N), SA.38761 (2014/N), SA.38763 (2014/N) & SA.38812 (2014/N) – United Kingdom Support for five Offshore Wind Farms: Walney, Dudgeon, Hornsea, Burbo Bank and Beatrice', C(2014) 5075 final, 23 July.

³ National Audit Office (2014), 'Department of Energy and Climate Change: Early contracts for renewable energy', 27 June.

⁴ For details, see European Commission state aid cases SA.38758, SA.38759, SA.38761, SA.38763, SA.38812, SA.38796, [2014] EWHC 2377 and SA.38762.

⁵ Department of Energy & Climate Change (2014), 'Contract for difference: Allocation process high level process', 8 April.

⁶ Department of Energy & Climate Change (2014), 'Budget Notice for CFD Allocation Round 1', 2 October.

⁷ For further details about the CfD auction design and what auction theory predicts about bidding strategies, see Oxera (2014), 'CfD auctions, bidding strategies, and insights from auction theory', *Agenda*, September, <http://www.oxera.com/Latest-Thinking/Agenda/2014/CfD-auctions,-bidding-strategies,-and-insights-fro.aspx>.

⁸ Department of Energy & Climate Change (2015), 'CFD Auction Allocation Round One - a breakdown of the outcome by technology, year and clearing price', 26 February. CfD strike prices are in 2011/12 terms.

⁹ Oxera (2013), 'Assessment of draft Contracts-for-Difference strike prices and contract terms', report prepared for ScottishPower, 12 November, <http://www.oxera.com/Latest-Thinking/Publications/Reports/2013/Assessment-of-draft-CfD-strike-prices.aspx>.

¹⁰ In our assessment of how efficiency changes can affect the final strike price, we assumed an absence of strategic bidding behaviour, and that bids are reflective of the true costs of projects. See Oxera (2013), 'Assessment of draft Contracts-for-Difference strike prices and contract terms', report prepared for ScottishPower, 12 November, <http://www.oxera.com/Latest-Thinking/Publications/Reports/2013/Assessment-of-draft-CfD-strike-prices.aspx>.

¹¹ This is in addition to the published adjustments following feedback from the participants in the first CfD auction. Department of Energy & Climate Change (2015), 'Electricity Market Reform – Contracts for Difference: government response to the consultation on changes to the CfD contract & CfD regulations', June.

¹² See Department of Energy & Climate Change and Lord Bourne of Aberystwyth (2015), 'Levy Control Framework cost controls', 22 July, <https://www.gov.uk/government/speeches/levy-control-framework-cost-controls>; and Energy and Climate Change Committee (2015), 'Chair reacts to DECC announcement on renewables', press release, 22 July, <http://www.parliament.uk/business/committees/committees-a-z/commons-select/energy-and-climate-change-committee/news-parliament-2015/chair-statement-decc-announcement/>.

¹³ Department of Energy & Climate Change and The Rt Hon Amber Rudd MP (2015), 'Changes to onshore wind subsidies protect investment and get the best deal for bill payers', news story, 18 June, <https://www.gov.uk/government/news/changes-to-onshore-wind-subsidies-protect-investment-and-get-the-best-deal-for-bill-payers>.

¹⁴ See European Commission (2014), 'Communication from the Commission to the European Parliament, the European Economic and Social Committee and the Committee of the Regions: a policy framework for climate and energy in the period from 2020 to 2030', 22 January, p. 6.

¹⁵ Hansard (2015), House of Commons debate, 8 July, column 331, <http://www.publications.parliament.uk/pa/cm201516/cmhansrd/cm150708/debtext/150708-0001.htm>.