ARUP

ONSHORE WIND FINANCING

Cost of Capital Benefits of Revenue Stabilisation via a Contract for Difference

An Arup report for ScottishPower Renewables
November 2018

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Contents

EXECUTIVE SUMMARY

Introduction

Onshore wind is the lowest cost, low carbon electricity generation technology[1], which can be deployed at scale in suitable locations. In 2017, onshore wind made up the highest share of renewable capacity and is, therefore, playing an important role in cost-effective power sector decarbonisation and in making progress with the UK's emissions reduction targets.

The roll-out of onshore wind in the UK has historically been facilitated by revenue guarantee mechanisms (Renewable Obligation Certificates and Contracts for Difference). Onshore wind projects are capital-intensive and like other renewable projects are financed using a mix of both debt and equity based on minimising the overall cost of capital, with debt financing generally being lower cost than equity. The key issue on a renewables investor's list is revenue stability. Without a revenue guarantee onshore wind projects are fully exposed to wholesale electricity market prices, as per any form of new build generation, which can be volatile in the short term and uncertain in the long term. Mitigating market risk through a revenue stabilisation mechanism significantly improves the investment case by allowing investors and developers to access higher debt to equity ratios, longer debt tenor and lower borrowing rates.

In this report, we have undertaken high-level desktop analysis of the benefits of revenue stabilisation, through a Contract for Difference (CfD), on onshore wind financing. Considering various investor types, we have considered the impact of a CfD (compared to merchant) on:

- Costs of debt and equity;
- The range of available debt to equity ratios (gearing);
- The overall weighted average cost of capital (WACC); and
- The impact of the WACC differential on the levelised cost of energy (LCOE).

KEY RESULTS

The UK Government's CfD mechanism provides a form of revenue stabilisation, most importantly through the removal of wholesale price risk. This has a range of benefits when financing onshore wind projects, allowing investment to come forward at a lower cost to consumers. Revenue stabilisation via a CfD would:

- Increase both the appetite of investors and availability of finance, and therefore the prospect of projects being brought forward at the volumes required to help deliver emissions reductions targets. Without revenue stabilisation, investors may prefer to invest in other lower risk assets.
- Allow investment to come forward at a lower cost of capital, enabling projects to be built at lower cost which, in turn, brings benefits to consumers. Our analysis shows that a CfD can **lower the WACC of an onshore wind project by between 140 and 320 basis points, which in turn lowers the levelised cost of energy of an onshore wind project by between £6/MWh and £12/MWh** relative to a position where no revenue stabilisation is being provided.

A competitively awarded revenue stabilisation CfD is therefore a key tool for delivering the lowest cost renewable projects for the UK consumer.

> "As the prices of low carbon technologies continue to fall, the need to subsidise low carbon generation through Contracts for Difference will reduce and, particularly in later years, the mechanism may require payments from generators. This could result in contracts that provide the certainty required for low cost investment, but which are low cost or cost neutral for consumers over the duration. This may be important, as no one know what the electricity markets will look like in the long term."
>
> National Infrastructure Commission:
> National Infrastructure Assessment, July 2018 [6]

Why do we need investment in renewable energy?

UK ENERGY POLICY

The UK was the first country to set a long-term, legally binding target for emissions reduction. The Climate Change Act 2008 commits the UK to reduce greenhouse gas emissions by at least 80% by 2050 and establishes a framework for setting rolling five-year carbon budgets. In 2016, Parliament approved the fifth carbon budget for the period 2028-2032, at a 57% reduction on 1990 levels.

So far, the UK's greenhouse gas emissions have reduced by 43% compared to 1990 levels. The first carbon budget (2008-2012) has been met and the UK is currently on track to outperform the second (2013-2017) and third (2018-2022) carbon budgets. The UK Government's Clean Growth Strategy sets out several policies and proposals that aim to drive emissions down throughout the next decade.

However, the UK is not currently on track to meet the fourth (2023-2027) and fifth (2028-2032) carbon budgets.

Progress on decarbonising electricity generation is a key accomplishment of the last decade - with 75% of emissions reductions since 2012 coming from the power sector as the UK has switched away from coal and increased the share of renewables in power generation.

Given the more nascent nature of decarbonisation in the transport and heat sectors, continued progress with decarbonisation of the power sector in the 2020s - building on the successful deployment of both onshore and offshore wind - remains essential.

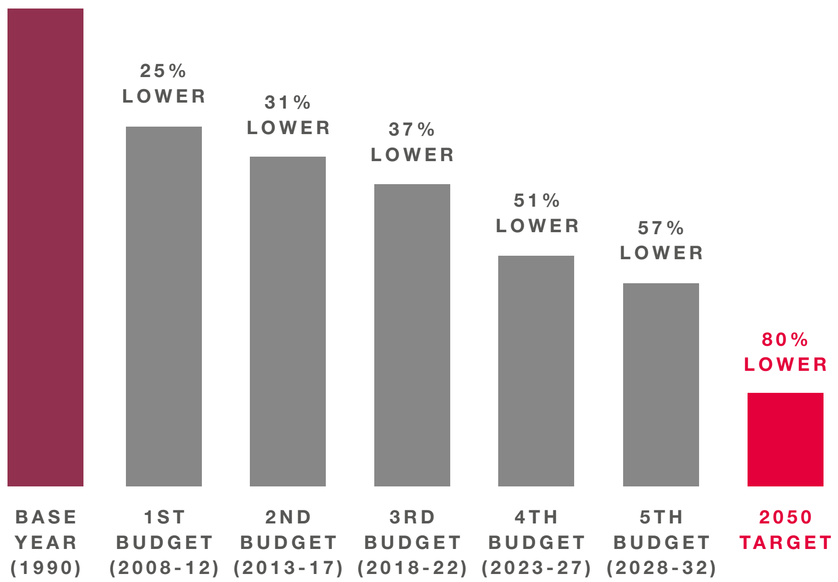

FIGURE 1
UK Carbon Reduction Targets

Source: The Committee on Climate Change

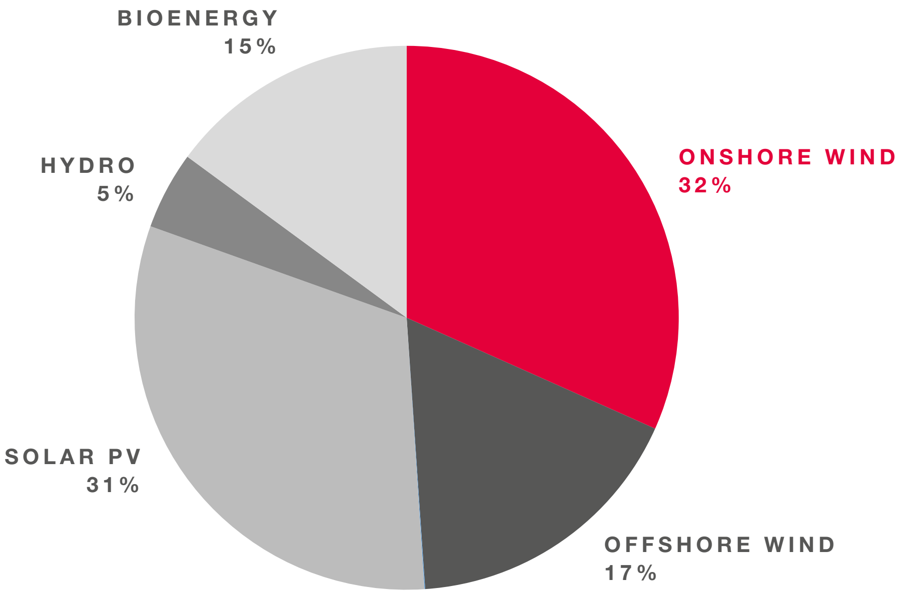

FIGURE 2
Share of Renewable Capacity in the UK by Technology in 2017

Source: The Digest of UK Energy Statistics

DECARBONISING THE POWER SECTOR – THE ROLE OF ONSHORE WIND

Between 2016 and 2017, total renewable capacity increased by 14%. Most of the increase was due to additional onshore and offshore wind capacity, accounting for 75% of the total renewable increase[3].

In 2017, onshore wind made up the highest share of renewable capacity at 31.7% and is playing an important role in both cost-effective power sector decarbonisation and in making progress towards the UK's wider emissions reduction targets.

Despite being the cheapest form of new large-scale low carbon electricity generation[4], cheap utility-scale onshore wind currently has no route to market[5] as it is unable to compete in CfD auctions. In its 2018 Progress Report to Parliament[6], the Committee on Climate Change identified further actions required in the power sector to help deliver progress towards future carbon budgets, including offering CfDs to support the lowest cost low carbon generation, such as onshore wind.

"The Committee is clear that Government should also provide a route to market for onshore wind, beyond remote island providers. Onshore wind is the cheapest form of electricity generation, support for which would be likely to lower consumer bills in the 2020s."

Lord Deben, Chairman,
Committee on Climate Change, 23 July 2018[7]

What are renewables investors looking for?

CHARACTERISTICS OF LARGE SCALE RENEWABLE PROJECTS

Renewable generation technologies are characterised by high upfront capital investment and low running costs. Without a revenue stabilisation mechanism, renewable technologies are exposed to the full volatility of the wholesale price. By way of contrast, gas generation is largely protected from such price fluctuations. Gas generation generally sets the wholesale price and any reduction in its revenues (as a result of a declining wholesale price) would typically be accompanied by a corresponding reduction in its operating costs (i.e. the cost of gas).

Additionally, renewable development opportunities are costly to pursue due to the amount of development and preparation work to be undertaken. These types of infrastructure projects give rise to significant development risk with the potential that projects do not proceed, due to a variety of reasons, and incur significant sunk costs.

FINANCING RENEWABLE PROJECTS

Capital-intensive renewable energy projects are financed either as stand-alone entities (project finance) or as part of a corporate balance sheet, or a combination of both, throughout the project life.

These projects are financed using a mix of both debt and equity based on minimising the overall cost of capital, with debt financing generally being lower cost than equity (reflecting risk to reward). Mitigating market risk through revenue stabilisation allows investors, including developers, to access higher debt to equity ratios, longer debt tenor and lower borrowing rates.

The nature of an infrastructure project spend profile means that equity financing, and frequently debt financing, has to be put in place to bridge the 2-6 year period of construction (reflecting development risk) until revenue generation. This period is often financed using higher cost short-term loans or venture capital. Post construction, long-term investors look for stable returns.

SOURCE OF CAPITAL	COST OF FINANCE	INVESTOR APPETITE
DEBT: BANKS OR FUNDS	Debt is generally cheaper than equity due to the risk level and tax shield.	High degree of certainty of debt repayment earning relatively small return. Lower gearing if revenues are unsecured.
BALANCE SHEET: UTILITY / DEVELOPER	Cost dependent on company WACC.	Strategic investors deliver commercially viable projects that create secure long-term shareholder value. Willing to shoulder development risk using own capital.
EQUITY: FUNDS AND PRIVATE INVESTORS	Greater return reflecting equity risk.	Stable, index-linked returns to match liabilities, such as inflation linked pensions.

TABLE 1
Sources of Long-Term Capital and Investor Appetite for Renewable Projects

STABLE RETURNS MATTER

Projects significantly exposed to trading on the wholesale electricity market attract relatively less overall financing due to their exposure to price volatility.

Ofgem data[8] shows that the monthly average price of electricity on the wholesale day ahead market in Great Britain has been around £45/MWh since June 2010, but during that period (even on an average basis) has fluctuated as high as circa £68/MWh and as low as circa £34/MWh. Daily or hourly price fluctuations can be even higher.

As the fixed cost of financing is often a significant element of the operating period costs, any drop in revenues, even temporary, can put significant pressure on a project's ability to meet its obligations. This applies to the range of investor types:

- Price volatility will deter many lower cost investors from financing any significant capital outlay where the returns and repayments may vary substantially (or disappear completely).
- Developers who finance on balance sheet also have internal WACC hurdles to satisfy and seek price stability to protect shareholder value.

Ultimately, price volatility results in a higher rate of finance and reduces the pool of potential investors, thereby hindering the development of projects.

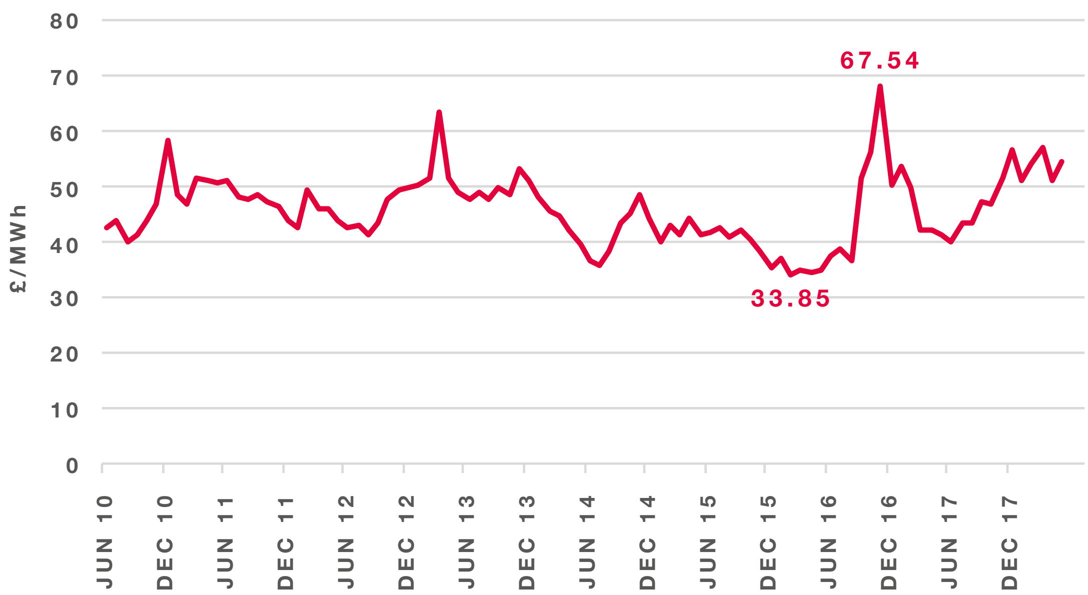

FIGURE 3
Historical Day Ahead Baseload Power Price (£/MWh)

Source: Ofgem

Methodology and Assumptions

BACKGROUND

In our 2017 report on Market Stabilisation[9], we considered two methodologies for assessing an appropriate administrative strike price (ASP) for onshore wind projects competing for a market stabilisation CfD. This analysis indicated that an ASP in the region of £50-55/MWh (2012 prices) reflects a market stabilisation concept, inclusive of system integration costs.

By adopting the market stabilisation CfD, government imports some price risk it would not otherwise have under a merchant scheme, with price fluctuations (positive and negative) socialised across consumer bills. In return, projects receive stable revenue streams, with the CfD strike price being determined through competitive auctioning.

In this report, we have undertaken high-level desktop analysis of the benefits of revenue stabilisation, via a CfD on the cost of capital, which then feeds into the levelised cost of energy ('LCOE').

METHODOLOGY

We have undertaken this analysis to focus on the cost of financing for onshore wind projects. We have taken a high-level approach to estimating the WACC ranges for a CfD-backed project and a merchant project. The parameter assumptions were informed by a literature review and our own renewable project experience.

The difference between the two WACCs provides an indication of the financing benefits of a revenue stabilisation mechanism (e.g. CfD). We have then applied these WACCs to the LCOE model which Arup delivered for DECC in 2015 to generate the LCOEs that customers face under different WACC assumptions.

For each type of project, we have looked at a High and Low scenario as WACCs vary depending on individual project risks:

- The Low CfD scenario represents projects that have the highest level of cashflow guarantee and can thus secure a cost of equity close to competitively tendered regulated assets; and a high level of gearing with low debt margins. This represents the absolute lowest value in an aggressive upside scenario.
- The Low Merchant scenario represents lowest rates quoted by investors in surveys or in our project experience.
- Both High scenario assumptions are based on existing survey data or our market intelligence.

ASSUMPTIONS

In combination with our own analysis and experience, we have undertaken a comprehensive literature review of the make-up of a typical onshore wind project WACC. When analysing the impact of a CfD compared to a merchant project, we have assumed:

Cost of Equity (CoE)

- Merchant CoE is based on market intelligence and figures quoted by NERA in 2015 survey for DECC[10] (9.1%) and JLL in 2013[11] (9-10%). The NERA survey also indicates that as construction risk reduces, the CoE could reduce to 8%. Hence, we assume 9% for Low and 10% for High.
- CoE under a CfD is expected to be lower than merchant due to lower equity risk. We assume 7% for lower bound (based on NERA hurdle rate analysis). Depending on construction risk, the CfD CoE could go up to 9%.
- For comparison, Grant Thornton's 2017 discount rate survey[12] shows a WACC range of 6.75-8.25% (nominal) for onshore wind investment, this is in line with our estimates for merchant projects.

Cost of Debt (CoD)

- CoD estimates are based on an interest rate swap rate[13] as of October 15 2018 of 1.50% for CfDs (assuming 15-year tenor and 7.5-year average loan life) and 1.30% for merchant (shorter term 7-year loans and 3.5-year average loan life).
- CoD scenarios differ with the margin or debt premium: 1.5% or 2.5% for CfD and 2.5% or 3.0% for merchant. Margin assumptions are based on our observations in the market.
- CoD estimates are sense-checked against publicly available estimates.[14]

Gearing

- Gearing assumptions are based on a range of public sources and project experience (e.g. NERA 2015 survey[15] for onshore wind at 77% on average but ranging from 50% upwards; JLL survey[16] of 85% under CfDs).
- For CfD we assume gearing of 80% (lower bound) and 60% (upper bound) respectively.
- For merchant projects we assume lower gearing due to higher risk but we consider onshore wind as a well-established sector that lenders are comfortable with, hence assuming 50% in both scenarios.

Tax rate

- We assume a 17% tax rate as this would be the rate to apply to projects being built after April 2020.

WACC uplift to hurdle rate

- Project hurdle rates often differ from cost of capital levels as the WACC may assume a level of certainty that the individual project may not deliver. This includes any risk up to project start or to the point of fully securing a CfD. Based on evidence from a range of published sources[17], to reflect full project development risk we have uplifted the WACC by 100-150bps to arrive at the hurdle rates. This is relatively conservative compared to industry evidence which indicates a differential between 100-200bps between WACC and hurdle rate.

What is the effect of a Contract for Difference on cost of capital?

RESULTS

THE COST OF FINANCING (WACC IMPACT)

The cost of financing (WACC) is an important element of any new build onshore windfarm. The inherent nature of onshore wind projects means the cost of capital used to finance upfront capital investment has a material effect on the overall cost of bringing forward new projects. In this context, ensuring that new renewable generation has access to the lowest possible capital enables projects to be built at lowest cost which, in turn, brings benefits to consumers.

Based on the methodology and assumptions set out previously, our high-level analysis of the impact of CfD protection on onshore wind WACC is summarised below.

As a sense-check, the WACC differential estimates are roughly in line with other studies, which show between 100-300bps difference in WACC due to the removal of market risk for generation technologies. For example, NERA's 2015 survey for BEIS indicates that this could be up to 200bps.

This analysis shows that **revenue stabilisation via a CfD can lower the WACC of an onshore wind project by between 140-320 bps.**

A CfD allows projects to access:

- A lower cost of debt: ranging from 3.00% to 4.00% compared to 3.80% to 4.30% under a merchant scenario.
- A lower cost of equity: ranging from 7% to 9% compared to 9% to 10% under a merchant scenario.
- A higher gearing ratio: ranging from 80% to 60% compared to 50% under a merchant scenario.

Overall, this indicates that it is more efficient from a WACC perspective to finance new build onshore wind projects under a CfD relative to a scenario with no revenue stability.

TABLE 2
WACC Rates under CfD vs. Merchant Scenarios (%)

	CFD		MERCHANT		MERCHANT - CFD DIFFERENTIAL	
	LOW (%)	HIGH (%)	LOW (%)	HIGH (%)	LOW (%)	HIGH (%)
COST OF DEBT (NOMINAL)	3.00	4.00	3.80	4.30	0.80	0.30
GEARING (NOMINAL)	80.00	60.00	50.00	50.00	-30.00	-10.00
POST-TAX COST OF EQUITY (NOMINAL)	7.00	9.00	9.00	10.00	2.00	1.00
PRE-TAX NOMINAL WACC	4.09	6.74	7.32	8.17	3.23	1.44
PRE-TAX CPI-REAL WACC	2.05	4.64	5.22	6.05	3.17	1.41
UPLIFT TO HURDLE RATE	1.00	1.50	1.00	1.50	0.00	0.00
HURDLE RATE REAL	3.05	6.14	6.22	7.55	3.17	1.41

LEVELISED COST OF ENERGY IMPLICATIONS

The cost of financing has a direct impact on the levelised cost of energy. The LCOE of a wind power project is driven by total installed costs, wind resource quality, the technical characteristics of the wind turbines used, O&M costs, the cost of financing (WACC) and the economic life of the project.

By varying the cost of finance (based on the hurdle rates above) and holding everything else constant, we have analysed the impact on LCOE for CfD protection and merchant.

This analysis shows that providing a revenue stabilisation CfD mechanism can lower the levelised cost of energy of an onshore wind project by between £6/MWh and £12/MWh (2018 prices) relative to a position where no revenue stabilisation is being provided.

In short, the CfD mechanism provides long-term revenue stability and predictability, facilitating investment at scale and at a lower cost of capital.

SCENARIO	HURDLE RATE (%)	LCOE 2018 PRICES	LCOE 2012 PRICES
CFD			
LOW	3.05%	45.62	42.15
HIGH	6.14%	57.34	52.97
MERCHANT			
LOW	6.22%	57.64	53.24
HIGH	7.55%	63.33	58.50
MERCHANT - CFD DIFFERENTIAL			
LOW	3.17%	12.01	11.10
HIGH	1.41%	5.99	5.54

TABLE 3
LCOE for Onshore Wind Project (£/MWh)

Are PPAs an alternative route to market?

CURRENT PPA MARKET

Despite being the cheapest form of new large-scale generation[18], onshore wind currently has a limited route to market. In the absence of clear market arrangements, Power Purchase Agreements (PPAs) have been suggested as a possible route to bring forward new projects.

Whilst a number of renewable developers have announced their hope to be able to bring forward projects in due course without a government support mechanism, to date only two small-scale projects have been realised[19] both benefiting from synergies (such as shared infrastructure) with adjacent Renewables Obligation supported sites.

This type of arrangement is new to investors and there is no significant market appetite for swapping the relative certainty of a long term (i.e. 15 year) government-backed instrument for the uncertainty of merchant wholesale market exposure or short-term contracts backed by corporations.

EVOLUTION OF PPAS

There are a number of significant barriers or challenges to be overcome for the PPA market to evolve in the UK as a realistic route to market:

Corporate and Industrial PPAs

For these to become viable, the driver has to be more than the voluntary Corporate Social Responsibility (CSR) of large technology firms. They need to become a good alternative to the status quo energy procurement route. In addition, Corporate and Industrial off-takers must become comfortable signing off on longer-term energy deals in place of the short to medium term contracts that they are accustomed to. Developers also need to fully assess the long term credit risk associated with the offtaker.

Utility and Supplier PPAs

It is unlikely that a utility / suppliers will offer long-term PPAs at price levels aligned to the LCOE of renewable technologies. Instead they are typically offering short to medium term PPAs at a discount to the wholesale market forward curve which increases towards the end of the term. This is because a utility / supplier typically looks to hedge their customer's energy demand based on short term electricity contracts.

Whilst it is conceivable that a small number of relatively small-scale renewable projects might be built under a niche PPA market, we are currently a long way from the reality of PPAs providing sufficient long-term guarantees to mitigate merchant risk within the UK.

Furthermore, under the PPA route to market, domestic consumers will not reap the benefits of low-cost renewable generation reserved for corporate entities.

Conclusion

Due to the capital-intensive nature of onshore wind projects, combined with the wholesale electricity market exposure, the investment case for onshore wind technology is challenging without a form of revenue stabilisation to mitigate market risk.

The UK Government's CfD mechanism provides revenue stabilisation, most importantly through the removal of long-term wholesale price risk. This has a range of benefits for financing onshore wind projects, allowing investment to come forward at a lower cost of financing.

Revenue stabilisation via a CfD:

- Significantly increases the appetite of investors and the availability of finance. Without such revenue stabilisation, investors are likely to prefer to invest in other lower risk assets.
- Allows investment to come forward at a lower cost of capital, enabling projects to be built at lower cost which, in turn, brings benefits to consumers. Our analysis shows that a CfD **lowers the WACC of an onshore wind project by between 140-320 basis points, which in turn lowers the levelised cost of energy of an onshore wind project by between £6/MWh and £12/MWh,** relative to a position where no revenue stabilisation is being provided.

Annex

THE CONTRACTS FOR DIFFERENCE MECHANISM AND COMPETITIVE ALLOCATION

The UK Government has sought to incentivise investment in new low-carbon generation via Contacts for Difference (CfDs), providing clear, stable and predictable revenue streams for investors.

A CfD is a long-term contract (15 years) between a generator and the Low Carbon Contracts Company (LCCC), an arm's length governmental body. Under a CfD, the generator is paid the difference between the 'strike price' – a price for electricity reflecting the cost of investing in a particular low carbon technology – and the 'reference price'– a measure of the average wholesale power price in the GB day-ahead market.

Where the reference price is less than the strike price the LCCC makes a 'difference payment' to the generator. Where the reference price is greater than the strike price, the generator pays LCCC.

FIGURE 4
CfD Mechanism

Source: EMR Settlement, LCCC, ESC

CFD RISK PROTECTION

The CfD provides a number of risk protections which are summarised in the table below.

RISK	DESCRIPTION OF CFD PROTECTION/ MITIGATION EFFECT
PRICE	Long term wholesale electricity price risk removed, stabilising revenues through contracting around the CfD strike price for 15 years.
CHANGE OF SUPPORT LEVELS	Strike price set in contract with no mechanism for government to change support levels.
VISIBILITY OF THE FUTURE MARKET	CfD allocation and strike price are determined by success in a CfD auction. The minimum strike price level required to make the project viable is known by the project developer ahead of the auction. BEIS has announced that up to £557 million will be made available for future CfD auctions, with the next one to be held by May 2019 with further auctions every two years from 2021 and into the 2020s.
CREDIT	The CfD Counterparty (a government-owned private body, but with no direct guarantee) will establish a framework of backstops to ensure payment, including the requirement for suppliers to post collateral, a mutualisation system and a Supplier of Last Resort Scheme and Energy Company Administration Scheme.
CHANGE IN LAW	Some contractual protection is provided for both specific and discriminatory changes, and for general changes in law that have discriminatory effects without objective justification. This includes protection against events that would not be reflected in the wholesale price.
	Partial protection against certain changes in network charges, relating to the costs of the balancing system and transmission losses.
	Protection against changes in law that limit a generator's ability to either deliver its output or to receive appropriate payment.
INDEXATION	Strike price fully indexed to CPI. For certain Generators the CfD contract also provides for other annual adjustments such as adjustments based on balancing system charges and transmission losses.
DURATION	The support duration of 15 years is contractually secured.

TABLE 4
CfD Mechanism Protections

	ROUND 1 (2015)				ROUND 2 (2017)	
	2015/16	2016/17	2017/18	2018/19	2021/22	2022/23
ADVANCED CONVERSION TECHNOLOGIES	-	-	119.89	114.39	74.75	40.00
DEDICATED BIOMASS	-	-	-	-	74.75	-
ENERGY FROM WASTE (WITH CHP)	-	-	-	80.00	-	-
OFFSHORE WIND	-	-	119.89	114.39	74.75	57.50
ONSHORE WIND	-	79.23	79.99	82.50	-	-
SOLAR PV	50.00	79.23	-	-	-	-

TABLE 5
CfD Auction Strike Price by Technology (£/MWh)

COMPETITIVE ALLOCATION

CfDs are awarded through competitive allocation rounds.

Onshore wind projects were eligible to participate in Allocation Round 1 but were not included in Allocation Round 2.

Allocation Round 2 held in 2017 resulted in a substantial drop in CfD strike prices for offshore wind, which secured the majority of the CfD contracts and capacity.

Glossary

BEIS	Department for Business, Energy and Industrial Strategy
bps	Basis Points
CfD	Contracts for Difference
CoD	Cost of Debt
CoE	Cost of Equity
DECC	Department of Energy & Climate Change
LCCC	Low Carbon Contracts Company
LCOE	Levelised Cost of Energy
MWh	Megawatt Hour
WACC	Weighted Average Cost of Capital

Gearing	The level of debt as a proportion of equity capital
Hurdle rate	An investor's minimum rate of required return on an investment
Swap rate	An interest rate swap is a contract to exchange floating interest rate payments for fixed interest rate payments and is used to manage exposure to fluctuations in interest rates. At inception of the swap contract the total value of fixed interest rate cashflows will be equal to the value of the expected floating interest rate cashflows (implied by the forward LIBOR curve). In this analysis, absent a debt repayment profile, we use a market-quoted swap rate for a maturity close to the assumed average life of the debt as a proxy for a reference interest rate to which the margin is added.

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[1] Electricity Generation Costs Report, BEIS, 2016

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[9] Market Stabilisation Analysis: Enabling Investment in Established Low Carbon Electricity Generation, Arup, 2017

[10] Electricity Generation Costs and Hurdle Rates. Lot 1: Hurdle Rates update for Generation Technologies. NERA. 2015

[11] Developing onshore wind under ROCs versus CfDs. JLL 2013

[12] Renewable energy discount rate survey results – 2017. Grant Thornton. 2018.

[13] An interest rate swap is a contract to exchange floating interest rate payments for fixed interest rate payments and is used to manage exposure to fluctuations in interest rates. At inception of the swap contract the total value of fixed interest rate cashflows will be equal to the value of the expected floating interest rate cashflows (implied by the forward LIBOR curve). In this analysis, absent a debt repayment profile, we use a market-quoted swap rate for a maturity close to the assumed average life of the debt as a proxy for a reference interest rate to which the margin is added.

[14] For example, Triton Knoll Offshore Wind Farm recently secured debt margins of 150bps with step ups to 200bps.

[15] Survey conducted for Electricity Generation Costs and Hurdle Rates. Lot 1: Hurdle Rates update for Generation Technologies. NERA. 2015

[16] Survey conducted for Developing onshore wind under ROCs versus CfDs. JLL 2013

[17] Global Offshore Wind: Equity Research. Credit Suisse. 2017

[18] Electricity Generation Costs Report, BEIS, 2016

[19] Energikontor (8.2MW wind farm extension) and Anesco (10MW solar farm / 6MW storage units)

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