



To Beta or not to Beta? Attracting investment in UK offshore wind through power price stabilisation

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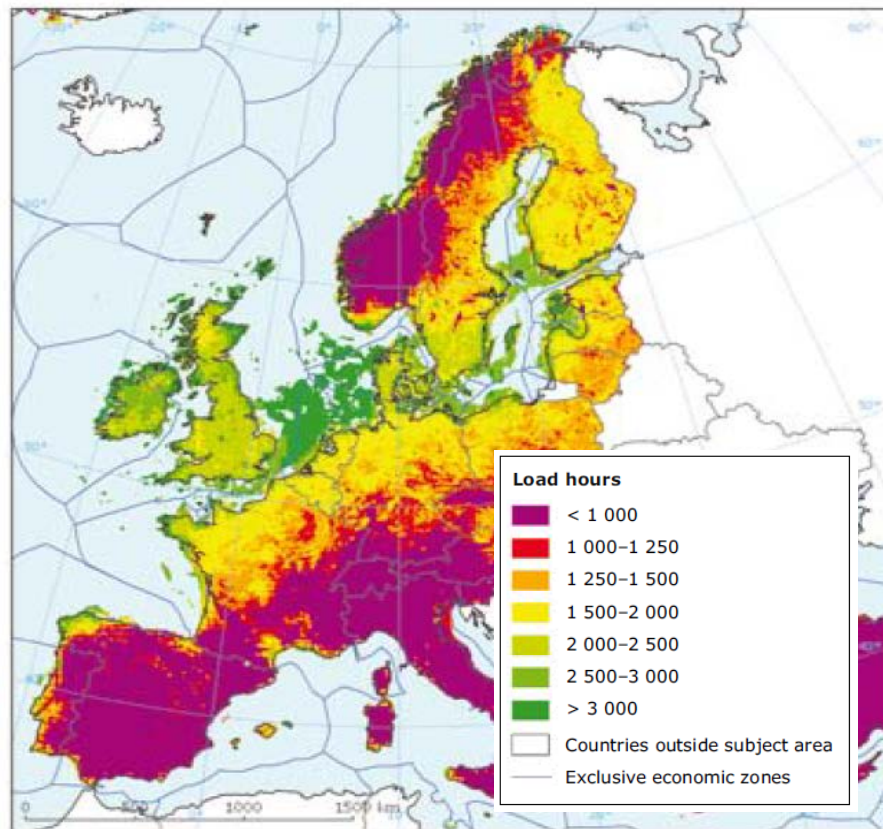


- **Why hurdle rate assumptions are important for UK offshore wind**
- **What might we expect of investor hurdle rates?**
- **Theory versus practice: Investing in offshore wind under policy uncertainty**

Offshore wind is the most significant low carbon source of power generation in the UK, and plans are in place to grow this resource

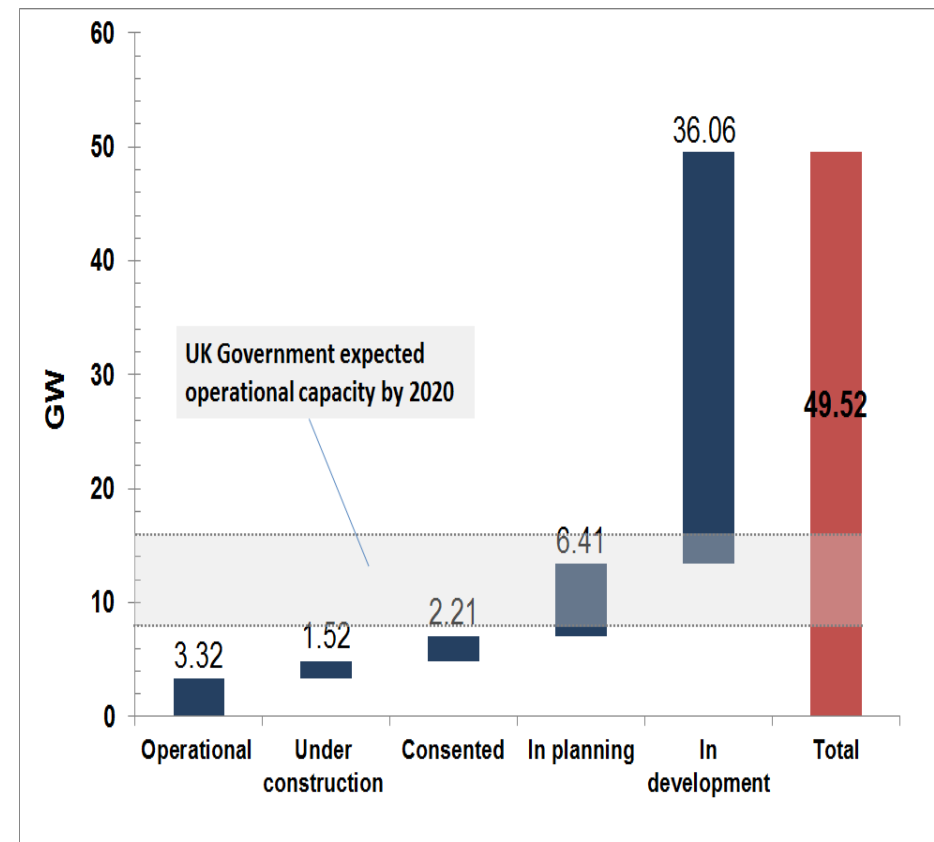


UK has the most favourable conditions for offshore wind power generation in Europe and possibly in the world.



Source: European Environment Agency

3GW of offshore wind are already operating and a further 10GW are in the pipeline. The government is hoping that by 2020 some 8-16 GW will be operational



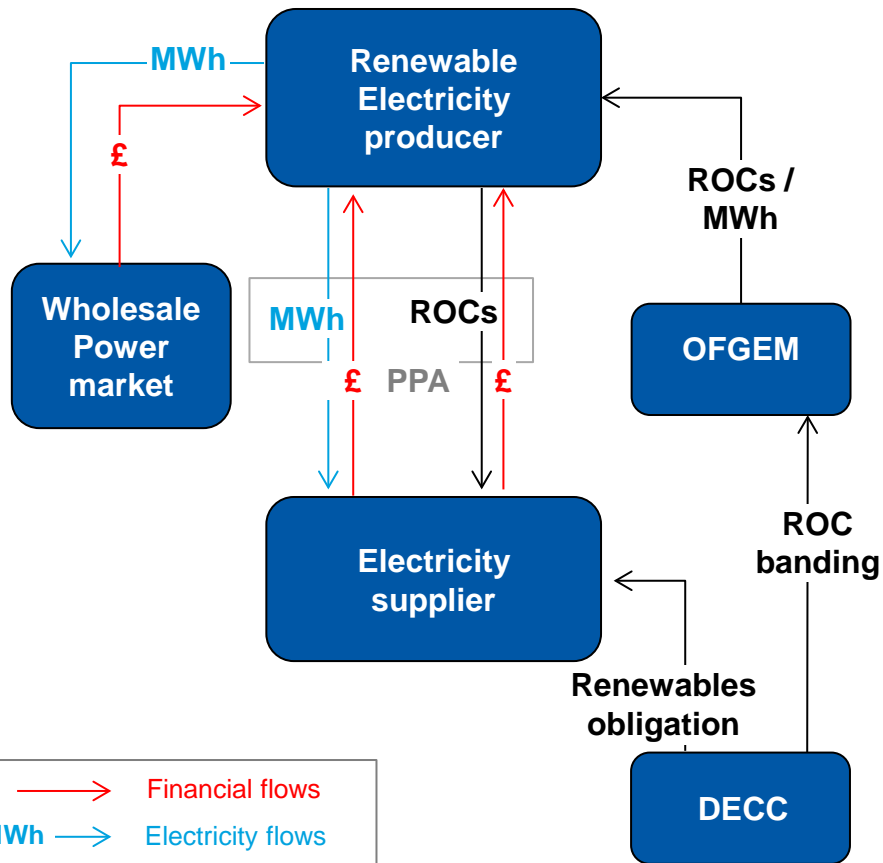
Source: RenewableUK and DECC

The UK government has supported offshore wind through the RO, but is now planning to change the support model to a more revenue-centric mechanism

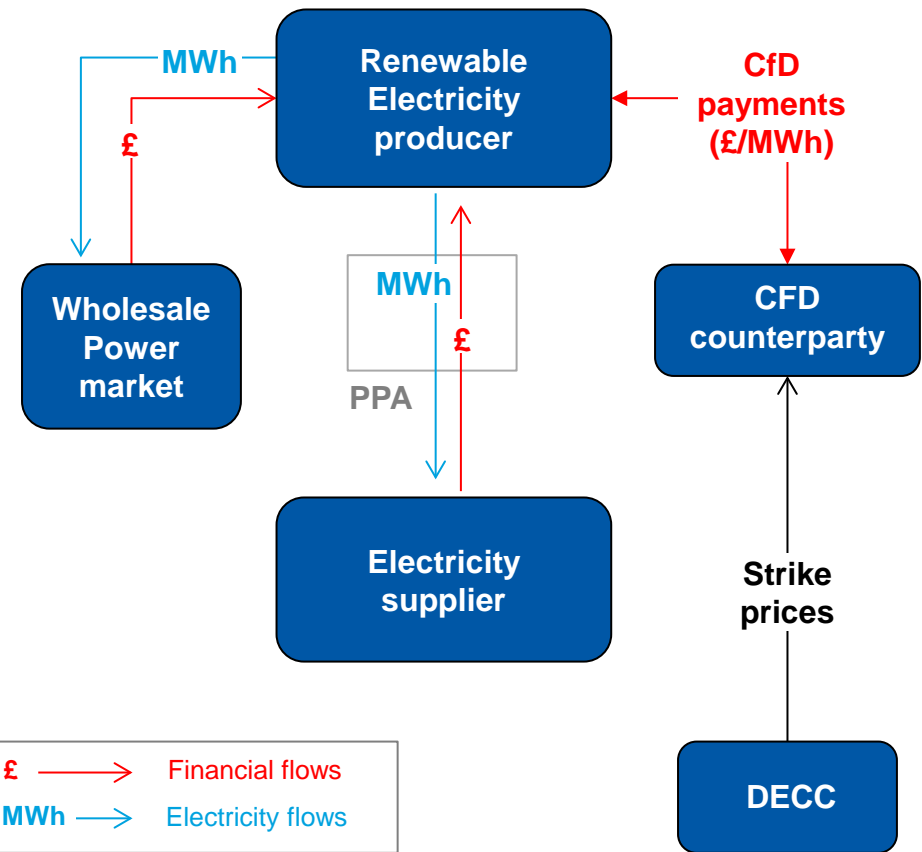


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Renewables Obligation (RO)



Contracts for Difference (CfD)



Beneath the change of type of support are several other differences



	Renewables Obligation (RO)	Contracts for Difference (CfD)
Type of support	Eligible generators receive RO certificates (ROCs) that can be sold to suppliers (who are required to meet the obligation).	Eligible generators receive a top up on the wholesale power price up to a predetermined “strike price”
Level of support	<u>Offshore wind ROC banding</u> 2014/15 - 2.0 ROCs / MWh 2015/16 - 1.9 ROCs / MWh 2016/17 - 1.8 ROCs / MWh	<u>Strike prices (Dec. 4, 2013)</u> 2014/15 - £ 155 / MWh 2015/16 - £ 155 / MWh 2016/17 - £ 150 / MWh 2017/18 - £ 140 / MWh 2018/19 - £ 140 / MWh
Reception of support	ROCs received for actual electricity generated, no prior “allocation”	Allocation occurs early in the project lifecycle (before construction)
Support “counterparty”	Supplier purchasing the ROC	Government’s “CfD Counterparty”
Duration of support	20 years	15 years, if “Long Stop Date” not exceeded.
Duration of the scheme	Started in 2002, will cease new accreditations from 2017. Will support accredited capacity up to 2037.	Starts in 2014.
Transition period	Between 2014-2017, projects will be able to choose between the RO and the CFD	

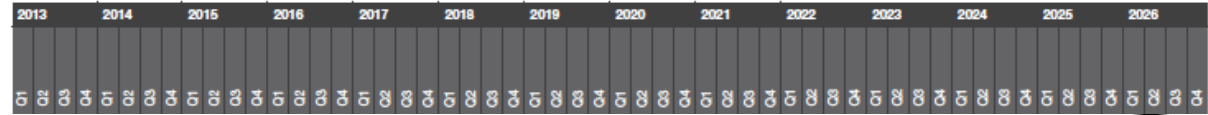
The majority of currently planned offshore wind project Financial Investment Decisions (FID) will happen during the RO-CFD transition period



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Wind Projects Currently in Development

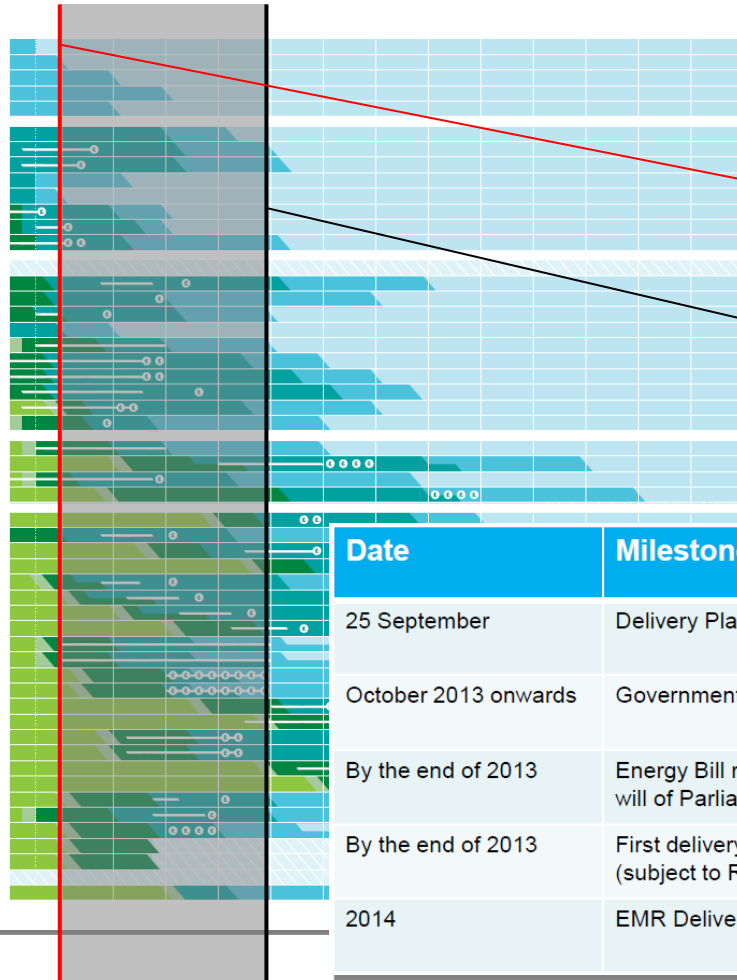
Reference	Round	Project	Current Phase	MW	Number of Turbines	Foundation*			Avg Water Depth (m)	Distance to Shore (km)
						Monopile	Jacket	Grid Connection		



Expected project timelines

19	1	Teesside	Construction	62	27							
20	2	Lincs	Construction	270	75	*		HVAC	12	9		
21	2	Gwynn y Môr	Construction	576	160	*		HVAC	20	13		
22	2	Humber Gateway	Construction	219	73	*		HVAC	15	10		
23	2	West of Duddon Sands	Construction	389	108	*		HVAC	20	35		
84	2	London Array (Phase 2)	Conditional	370								
85	2	Dudgeon	Consented	400	60-70			HVAC	21	40		
86	2	Race Bank	Consented	534	89	*		HVAC	16.5	33.5		
87	2	Westernmost Rough	Consented	240								
88	Demo	Energy Park Fife	Consented	7								
89	Extn	Kendish Flats 2	Consented	51	17	*		HVAC	5	10		
90	Demo	Aberdeen Bay (EOWDC)	Consented	<100	11				28	3.5		
91	Extn	Galløper	Consented	504	50-140	*		HVAC	35	30		
92	2	Dockage Street	Refused	540								
93	2	Tilton Knot	Planning	1200	150-280	*		HVAC	18	40		
94	STW	Basseterre	Planning	1000	142-277	*			45	18.4		
95	STW	Near na Gaolithe	Planning	450	75-90	*	*	HVAC	50	25		
96	Demo	Narac	Planning	<100								
97	Extn	Burbo Bank Extension	Planning	258	<68	*	*	HVAC	3.5-17	7-12		
98	3	Moray Firth – Telford Project	Planning	500		*	*	HVDC	35-60	22		
99	3	Moray Firth – Stevenson Project	Planning	500	339	*	*	HVDC	35-60	22		
99	3	Moray Firth – MacColl Project	Planning	500		*	*	HVDC	35-60	22		
99	3	East Anglia Offshore Wind 1	Planning	1200	150-325	*	*	HVDC	40	45.4		
40	3	Rampion	Planning	700	100-175	*	*	HVAC	30	17		
41	Extn	Walney Extension	Development	750	207	*	*	HVAC	21-55	19-29		
42	STW	Argyll Array	Development	1800	180-300	*	*	HVDC	40	100		
43	STW	Inch Cape	Development	905	213	*	*		60	22		
44	STW	Islay	Development	690	<117	*	*	HVDC	60	25		
45	3	Moray Firth – Western Dev Area	Development	380	60				35-50			
46	3	Firth of Forth Phase 1	Development	1050	<150				45	60		
46	3	Firth of Forth Phase 2	Development	1800					45	70		
46	3	Firth of Forth Phase 3	Development	1000					60	70		
47	3	Dogger Bank Creyke Beck	Development	2400	120-300			HVDC	27	140		
47	3	Dogger Bank Teesside A&B	Development	2400	120-200			HVDC	27	190		
47	3	Dogger Bank Teesside C&D	Development	2400	120-200			HVDC	32	175		
47	3	Dogger Bank (Tranche D)	Development	2400	120-200			HVDC	37	240		
46	3	Hormsea – Heron Wind	Development	600		*	*	*	30	130		
46	3	Hormsea – Njord	Development	600	330	*	*	*	30	130		
46	3	Hormsea – Optimus Wind	Development	900		*	*	*	35	120		
46	3	Hormsea – Breezea	Development	900	380	*	*	*	35	120		
46	3	Hormsea (remaining)	Development	2000	330	*	*	*	35	120		
49	3	East Anglia Offshore Wind 2	Development	1200								
49	3	East Anglia Offshore Wind 3	Development	1200	120-240				39	79		
49	3	East Anglia Offshore Wind 4	Development	1200	120-240				35	91		
49	3	East Anglia Offshore Wind 5	Development	1200	itbc							
49	3	East Anglia Offshore Wind 6	Development	1200	itbc							
60	3	Navitus Bay	Development	1100	136-218	*	*	*	HVAC	27	25	
61	3	Atlantic Array	Development	1200	150-240				45	29.5		
62	3	Celtic Array Rhianon Stage 1	Development	500	147-400				46.4	30		
62	3	Celtic Array Rhianon Stage 2	Development	500								
62	3	Celtic Array Rhianon Remaining	Development	1200								
62	3	Celtic Array Remaining	Development	2000								
64	NI	First Flight Wind	Development	600								

*Where multiple foundation types are indicated, a mixture of foundation types may be considered, or a decision is pending



2014- CFD regime starts

2017 - No more new RO accreditations

Date	Milestone
25 September	Delivery Plan consultation closes
October 2013 onwards	Government consultations on Secondary Legislation for EMR
By the end of 2013	Energy Bill receives Royal Assent, subject to Parliamentary time and the will of Parliament
By the end of 2013	First delivery plan, including final renewable CfD strike prices published (subject to Royal Assent)
2014	EMR Delivery mechanisms up and running

Source: DECC

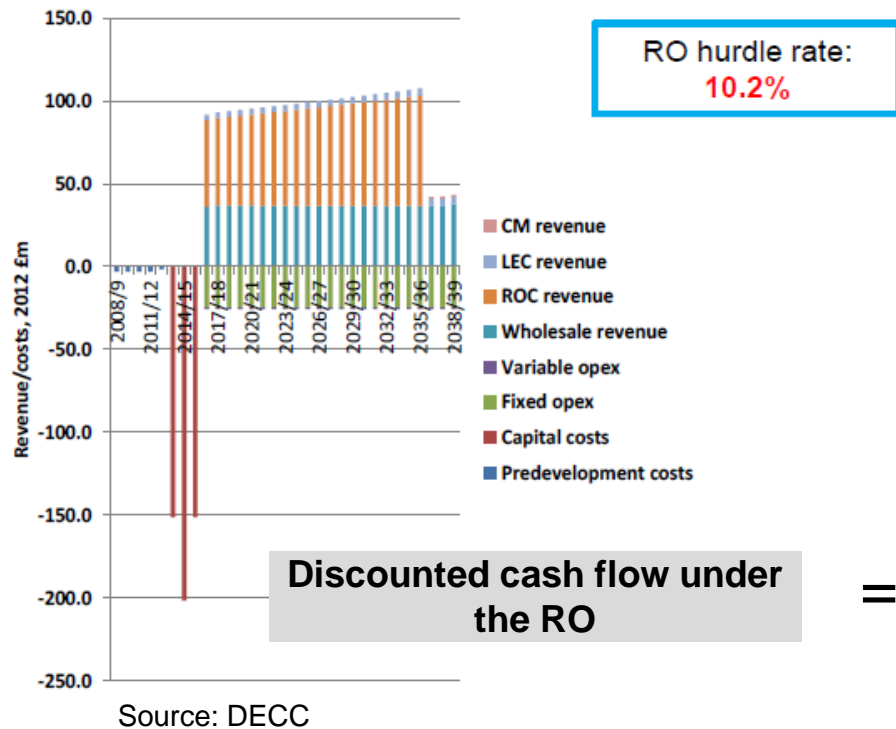
Source: RenewableUK

RO – CFD
Transition period

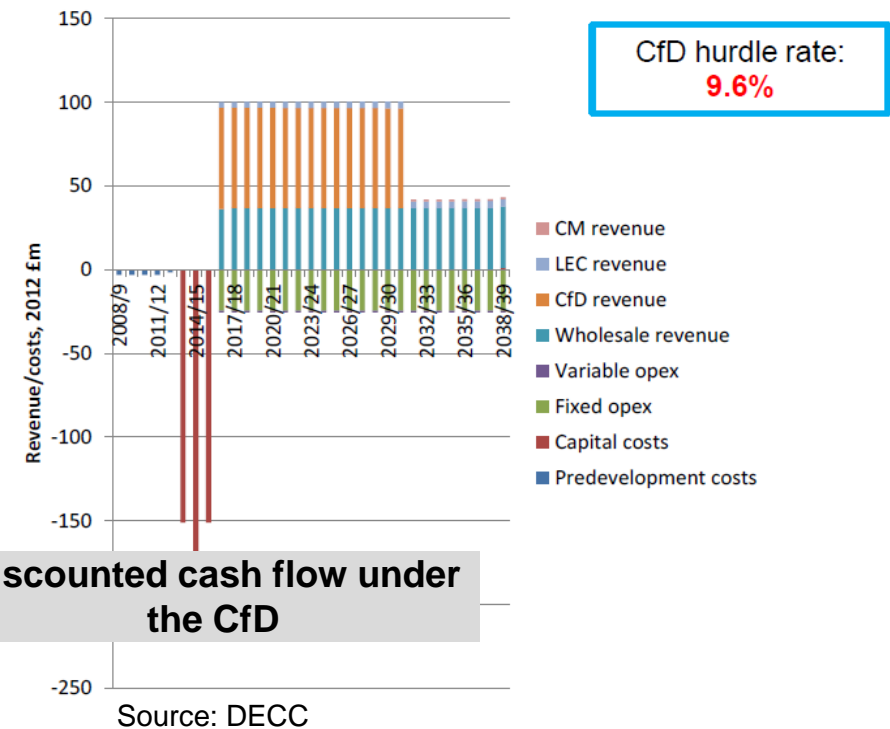
A key component of the CFD is how strike prices are calculated



“DECC’s approach to strike prices in 2014/15 – 2016/17 is based on “RO minus X”, where ‘minus X’ reflects the assumption that the required hurdle rate is lower under the CfD than under the RO, [...] ensuring that investors face similar incentives between the Renewables Obligation (RO) and CfD regimes”



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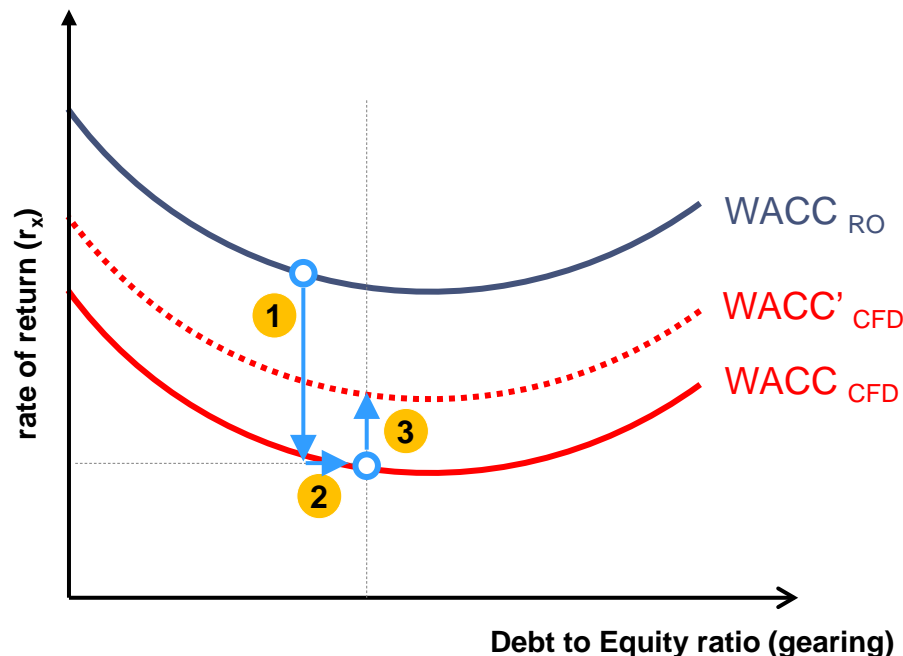
Following from the “minus-X” lower hurdle rate assumption, CfD strike prices are set to make a project NPV-neutral between the two instruments

The assumption on the hurdle rate required by investors is a key determinant of effective support levels and is backed by solid economic principles



Economic rationale for assuming a lower hurdle rate under the CFD:

- 1 Fixed revenues means correlation of earnings and market portfolio is reduced (i.e. lowers asset beta in CAPM)
- 2 Higher and stable guaranteed revenue levels may mean increased scope for higher gearing though improved DSCRs for lenders
- 3 Could other risk factors introduced by the policy could mitigate the cost of capital reduction scope of the two effects above?



WACC

$$WACC = (g)r_{\text{debt}} + (1-g)r_{\text{equity}}$$

Where:

g = gearing

r_{debt} = return on debt

r_{equity} = return on equity

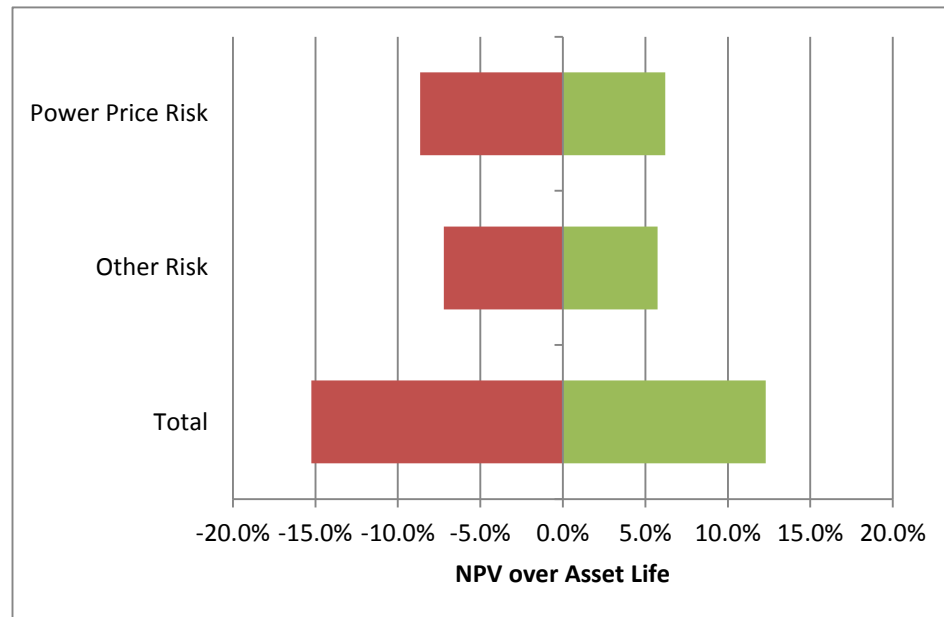
The relative impact of each of these effects could differ significantly

Analysis: Risk reduction from power prices is important but not the only consideration



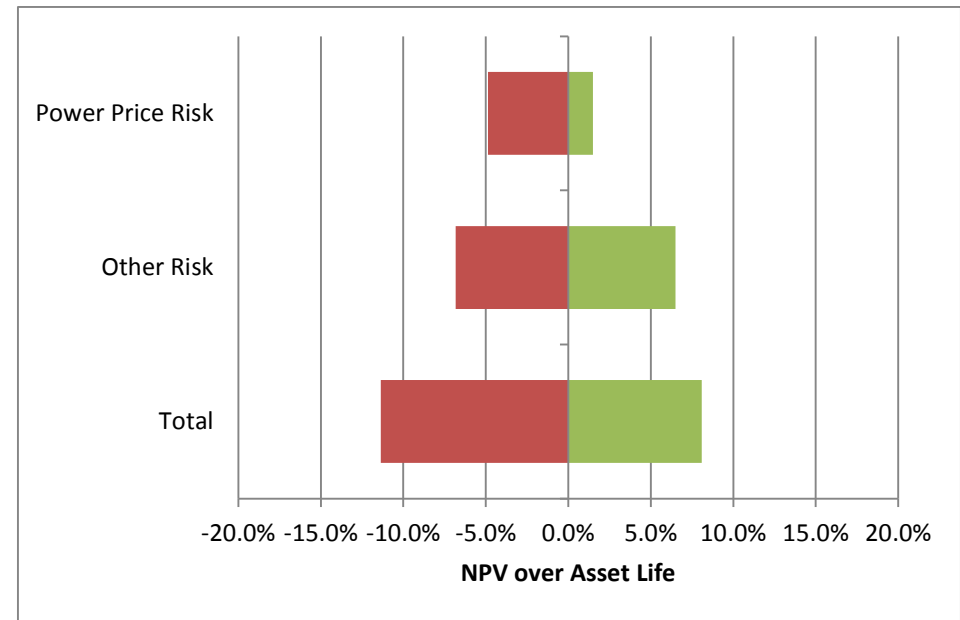
Risks to discounted cash flow of a hypothetical offshore wind project based on Monte Carlo simulation

ROC



Power price risk includes balancing risk

CfD

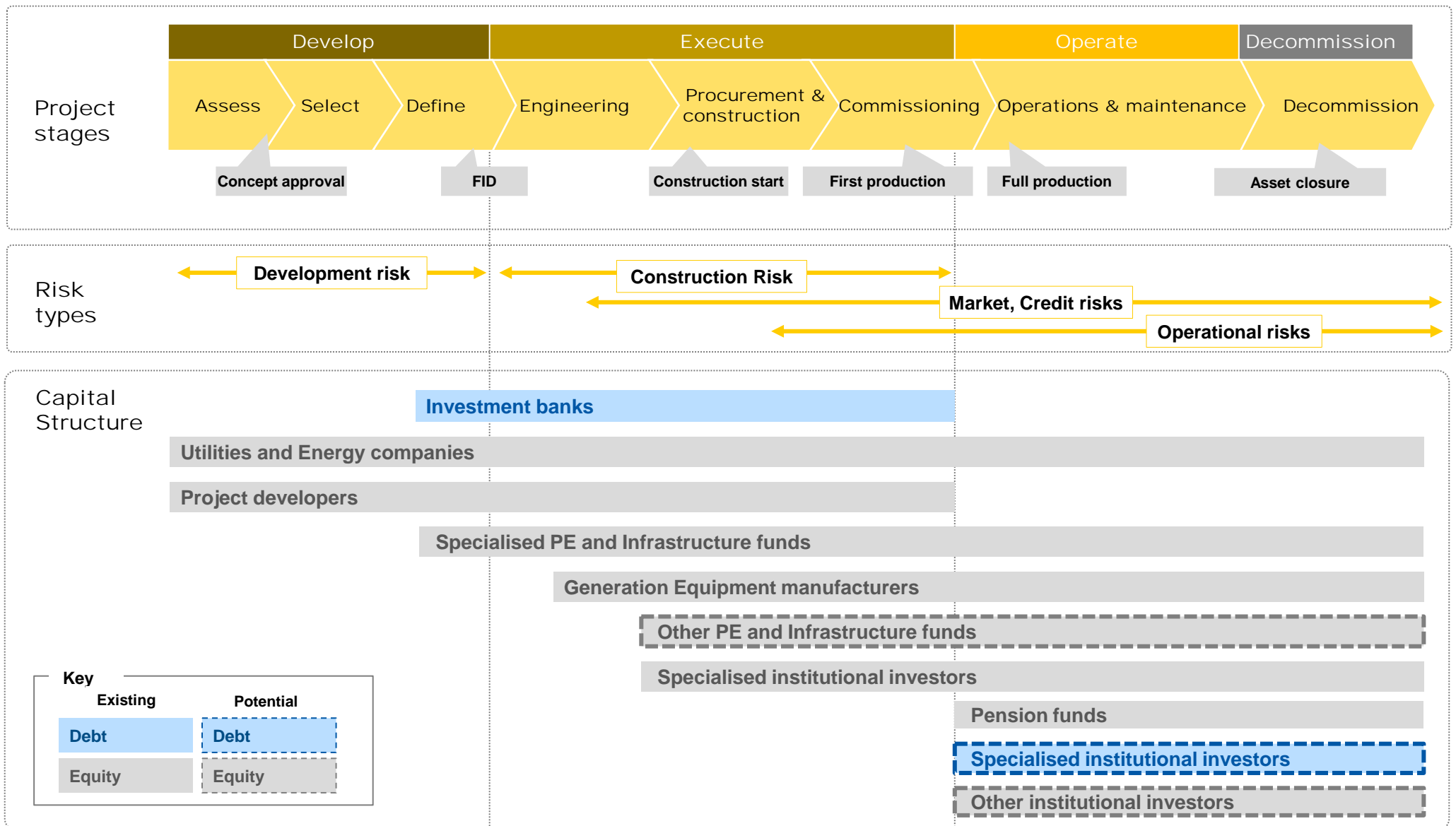


Power price risk includes basis and balancing risk

Source: NERA Analysis

Figures show the 5% and 95% percentile of discounted cashflows from a hypothetical offshore wind farm, assuming (1) Price risk (incl. balancing/basis) only (2) Other risk only (mostly volume risk) and (3) All modeled sources of risk

For the CFD to be an effective driver of new investments, it must make projects bankable AND attract funds from new capital pools and/or investor types

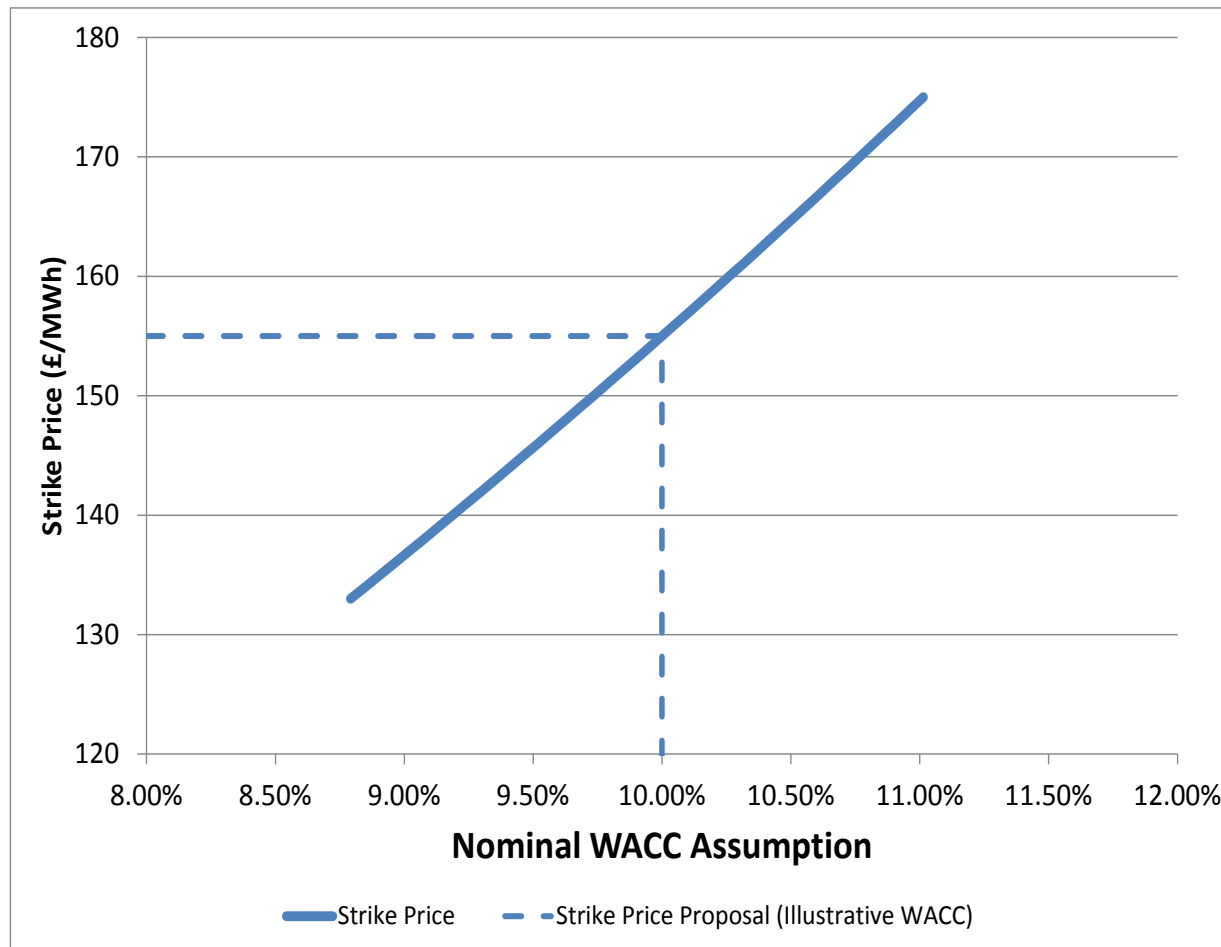


* Scope for each actor type is illustrative and varies across different capital firms of a same type

Analysis: simulations suggest that the hurdle rate assumption is a significant determinant of the strike price level



Impact of discount rate on strike price (approximate)




How has the market responded so far?



13/11/2013

HOME > OFFSHORE WIND > SSE CUTS GALLOPER BY THIRD

SSE cuts Galloper by third



13/11/2013

SSE is cutting the size of the consented Galloper offshore wind farm to 340MW.

The utility, which is working with partner RWE, said it is working to establish the most efficient and viable scale for the market climate.

Last updated: November 26, 2013 12:50 pm

RWE axes £4bn UK wind-farm project

By John Aglionby



The developer of a proposed £4bn wind farm off the coast of Cornwall would have to withdraw the project because of RWE, over energy supply and overcome challenges in the Bristol Channel, including the difficult conditions, meant the Atlantic Array project had

Posted on 05 November 2013

Centrica plans to abandon £2bn offshore wind farm

Posted on 05 November 2013 by Tom Grimwood



The British Gas owner Centrica is preparing to abandon plans for a £2 billion offshore wind farm because government subsidies are too low, according to reports.

In June DECC announced draft strike prices of £155/MWh for offshore wind projects that begin operating in 2014-15, dropping down to £135/MWh for projects that start running in 2018-19.

But Centrica won't carry on with plans to invest £200 million in the Race Bank wind farm unless the strike price receives a significant boost, the Telegraph has been told by three sources.

Some news appears to be negative...

How has the market REALLY responded so far?



- Industry responded to DECC consultation over H2 2013
 - Market news and industry statements revealed a mixed bag of support
 - Some widely quoted public reports (Brodies) suggested there are additional risks that COULD offset the benefits of power price stabilisation, such as:
 - Construction delay risk
 - Allocation risk
 - Basis risk
- ...and some others
- NERA recently supported DECC in reviewing its cost of capital assumptions, in a study due to be published alongside the Delivery Plan

Following DECC's consultation process, final strike prices were published last week (Dec. 4) with slight upwards improvement in strike prices for offshore wind, a move that has so far been well received by the industry....

Market reactions to new CFD strike prices



Brent Cheshire, DONG Energy UK Chairman said: "We welcome the announcements from the Government on the FID-Enabling process and the strikes prices today. This is a concrete step in the right direction from the Government towards fulfilling the next phase of offshore wind development in the UK. The strong commitment to offshore wind demonstrated by the Government today gives us the confidence to move forward with our future pipeline of projects."



Statkraft welcomes update on UK strike prices and contract terms



RenewableUK's Deputy Chief Executive **Maf Smith** said: "We welcome the fact that the Government has heeded the wind industry's call for a more realistic level of financial support for offshore wind. It sends an important political signal that the Government recognises the need to back this sector, if we are to attract big wind turbine manufacturers to the UK to open up factories creating tens of thousands of jobs. The Chief Secretary to the Treasury Danny Alexander said today he wants at least 10 gigawatts of offshore wind installed by 2020, trebling current capacity. Industry can deliver this and more."

... but others suggest the industry is satisfied with the new mechanism



- CFD price stabilisation has the **potential to attract new investor types** into the development of UK offshore wind infrastructure.
- The CFD mechanism introduces **other types of risk that could offset some of the risk reduction gains** from price stabilisation
- Although still early days, **industry has reacted positively** to the revised level of support from the UK government.
- Key question outstanding: **will new sources of finance (providing for a lower WACC) be effectively drawn in** by the new mechanism



Thank you.

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