Department of Energy & Climate Change

EMR Delivery Plan consultation workshop

28 August 2013

Department of Energy & Climate Change

Welcome and introduction

Vicky Dawe

Event Programme

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Timing	Content	Speaker
9:00	Welcome and introduction	Vicky Dawe
9:10	Delivery Plan content Q&A	Alon Carmel
10:00	Strike price setting - Explaining RO-X Q&A	James Steel
10:50	- BREAK -	
11:05	Reliability Standard Q&A	Alon Carmel
11:35	Outstanding issues and questions: Table discussions Feedback to plenary	Vicky Dawe/ Alon Carmel
12:30	Next steps	Alon Carmel
12:35	Close and opportunity to ask informal questions	Alon Carmel
13:00	ENDS	

Electricity Market reform

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- The Government's objectives for Electricity Market Reform are to:
  - ensure a secure electricity supply
  - ensure sufficient investment in sustainable low-carbon technologies and
  - maximise benefits and minimise costs to taxpayers and consumers.

- The benefits of EMR will be delivered through a mechanism to support investment in low-carbon generation in the form of:
  - Feed-in Tariffs using Contracts for Difference – CfDs,
  - a mechanism to support security of supply (the Capacity Market) and
  - the institutional arrangements to support these reforms.

- The Government committed to publishing an EMR Delivery Plan every five years.

Consultation Process on first EMR Delivery Plan

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- Consultation launched on 17th July
- Consultation closes on the 25th September

- How to submit a response
  - We would prefer comments to be submitted via the electronic consultation platform at https://econsultation.decc.gov.uk/
  - Alternatively comments can be provided by email or hard copy

- Your response will most useful if it is framed in direct response to the questions posed

Purpose of this consultation

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- The Government is seeking views on two key policy proposals that will be finalised in the first Electricity Market Reform Delivery Plan.

- The two proposals relate to:

  (1) the strike prices for the Contracts for Difference for renewable technologies; and

  (2) the reliability standard for the Capacity Market.

Next steps following consultation

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- In light of the responses to the consultation the Government may commission further analysis from the System Operator (National Grid).

- We will continue to consult with the Devolved Administrations and the Panel of Technical Experts in the further development of the final Delivery Plan.

- By the end of 2013, the Government intends to publish the EMR Delivery Plan with the confirmed strike prices for CfDs for renewable technologies and the reliability standard.

- The publication of the Delivery Plan is subject to Royal Assent of the Energy Bill as the Delivery Plan's contents are dependent on the EMR framework in the Bill being enacted.

Engagement Programme – Delivery Plan Consultation events

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Date	Location
Friday 6 September	Edinburgh
Monday 9 September	Belfast
Tuesday 10 September	Bristol
Tuesday 17 September	North Wales

EMR – Key components and milestones

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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

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Delivery Plan content

Alon Carmel

Contents

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1. Overview of the Draft Delivery Plan – published 17 July

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Chapter	Description
1	Introduction
2	Contracts for Difference for Renewables
3	Capacity Market – Reliability Standard
4	Summary of Price and Bills impact
5	Forward look to 2030
6	Next steps
Annex A	Developing the modelling and analysis
Annex B	Strike price methodology
Annex C	Reliability standard methodology
Annex D	Levy Control Framework
Annex E	Report from the System Operator (National Grid)
Annex F	Panel of Technical Experts Report

Consultation closes 25 September 2013

2. CfD Draft Strike Prices for Consultation

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Renewable Technology	Draft Strike prices (£/MWh, 2012 prices)					Illustrative Deployment in 2020 (GW)
	2014/15	2015/16	2016/17	2017/18	2018/19	
Advanced Conversion Technologies (with or without CHP)	155	155	150	140	135	c. 0.3
Anaerobic Digestion (with or without CHP)	145	145	145	140	135	c. 0.2
Biomass Conversion	105	105	105	105	105	1.2 – 4
Dedicated Biomass with CHP	120	120	120	120	120	c. 0.3
Energy from Waste with CHP	90	90	90	90	90	c. 0.5
Geothermal (with or without CHP)	125	120	120	120	120	< 0.1
Hydro	95	95	95	95	95	c. 1.7
Landfill Gas	65	65	65	65	65	c. 0.9
Offshore Wind	155	155	150	140	135	8 – 16
Onshore Wind	100	100	100	95	95	10 – 12
Sewage Gas	85	85	85	85	85	c. 0.2
Large Solar Photo-Voltaic	125	125	120	115	110	1.8 – 3.2
Tidal Stream	305	305	305	305	305	c. 0.1
Wave	305	305	305	305	305	

Our approach to calculating strike prices

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2014/15 – 2016/17

- Our approach to strike prices in 2014/15 – 2016/17 is based on “RO minus X” (or RO-X)
- The ‘minus X’ reflects the assumption that the required rate of return for a renewables project to proceed, the hurdle rate, is lower under the CfD than under the RO
- This ensures that investors face similar incentives between the Renewables Obligation (RO) and CfD regimes

Our approach to calculating strike prices

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2017/18 – 2018/19

- Strike prices are defined by factors including the affordability constraint presented by the LCF, as well as expectations of future technology costs
- In general, estimates of the cost of different electricity generating technologies in the future are driven by expectations and assumptions of technology specific learning rates and global and UK deployment

3. Forward Look to 2030

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- The generation mix beyond the Delivery Plan period will be influenced by how the costs of individual technologies develop in the coming decade
- We have used three technology scenarios and three decarbonisation scenarios to illustrate the potential range of low-carbon generation deployment in 2030

	Installed capacity in 2030 (GW)			
	Offshore wind	Onshore wind	CCS	Nuclear
100g CO_2/kWh scenario	18	14	5	14
50g CO_2/kWh scenario	23	14	9	19
200g CO_2/kWh scenario	9	11	1	9
High CCS deployment	11	14	12	12
High nuclear deployment	10	13	1	20
High offshore wind deployment	39	11	1	10

5. Levy Control Framework

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- Levy Control Framework places limit on cost to consumers
- Now extended to 2020/21 giving industry greater certainty about limits on a longer timescale
- Government will want to manage this cap on spending carefully and prudently – i.e. take account of risks, do not plan to spend full amount
- Some flexibility to use headroom (20% above limit)
- Government will publish more detail about the Governance Framework for the LCF in final Delivery Plan

Table 1: Upper Limits to Electricity Policy Levies, 2011/12 prices

2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
£4.30bn	£4.90bn	£5.60bn	£6.45bn	£7.00bn	£7.60bn

6. CfD contract terms and Allocation – part of a package on CfDs

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1. **Removal of wholesale electricity price exposure** by providing a fixed strike price to developers, therefore stabilising project revenue
2. **Robust and reliable private law contractual arrangement** providing developers with a clear set of rights and obligations, and recourse to arbitration and expert determination processes to resolve disputes
3. **Robust single counterparty** owned by government and set up as a limited liability company
4. **Early certainty and security of support levels** in the project development process
5. Provision of an element of **protection against those risks that are outside the developers control** (e.g. change in law risk, force majeure risk, risk of grid connection delay)

Draft CfD Terms

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Part	Subject	Part	Subject
Part 1	Introduction	Part 11	Change in Law
Part 2	Term	Part 12	Termination
Part 3	Conditions Precedent	Part 13	Credit Support
Part 4	Milestone	Part 14	Confidentiality, Announcements, Freedom of Information
Part 5	Metered Output, Market Reference Price, Strike Price	Part 15	Intellectual Property Rights
Part 6	Billing and Payment	Part 16	Dispute Resolution
Part 7	General Payment Mechanics	Part 17	General Provisions Regarding Liabilities, Remedies and Waivers
Part 8	Metering	Part 18	Miscellaneous
Part 9	Information Provision		Schedules and Annexes
Part 10	Representations, warranties and undertakings		

Overview of Allocation System

Balancing risks to Government, developers and consumers

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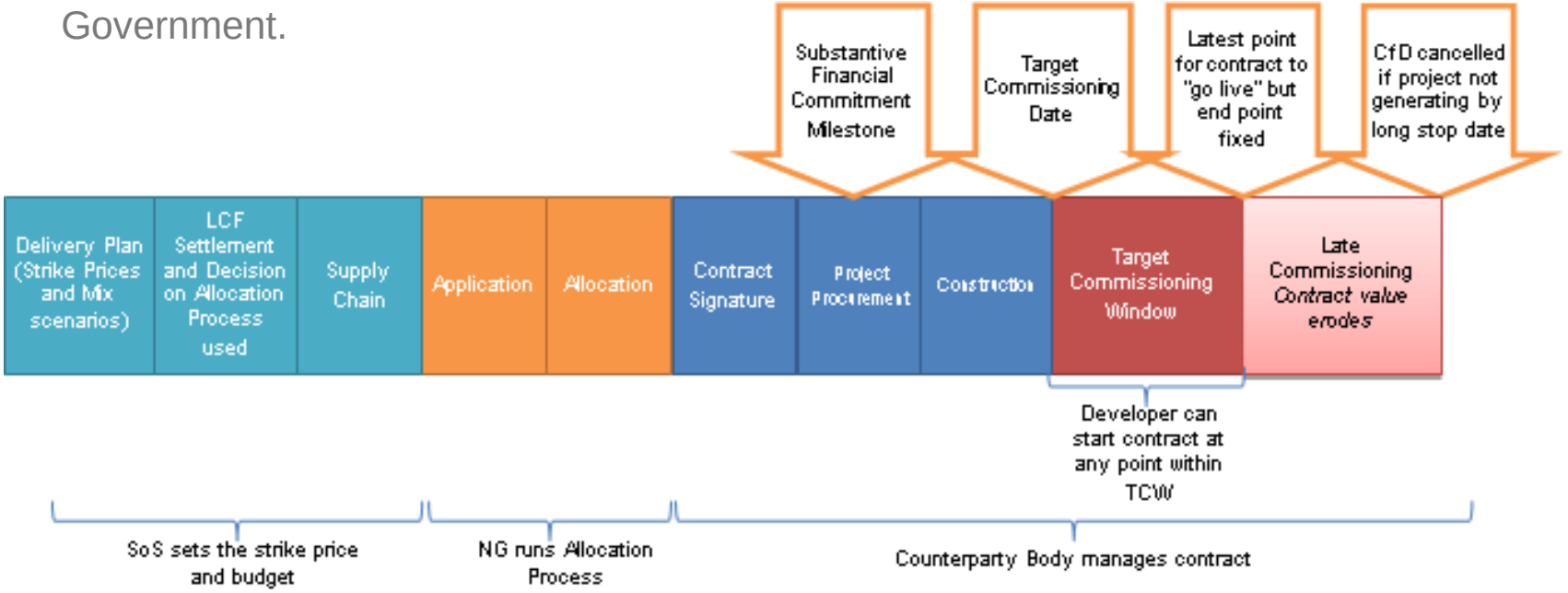
Allocation Methodology describes the journey a developer must go through in order to secure and then retain a Contract for Difference (CfD).

Key changes set out in document:

- Time-periods for Target Commissioning Windows and Longstop Dates for each technology;
- Greater flexibility for developers to adjust the capacity of their project after securing a CfD;
- Approach to phased offshore projects, including the use of a single strike price; and
- Inclusion of requirement for developers to submit an approved supply chain plan to Government.



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Strike price setting - Explaining RO-X

James Steel

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RO-X (from Annex B of the draft Delivery Plan)

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- Strike prices for 2014/15 – 2016/17 are set so that, given our current assumptions, the marginal investor incentivised under the RO is indifferent between choosing the RO or CfDs. We refer to this approach as "Renewables Obligation minus X" or RO-X.

- The 'minus X' reflects the assumption that the required rate of return for a renewables project to proceed, the hurdle rate, is lower under the CfD than under the RO. It also reflects changes to PPA discount assumptions to reflect the reduced risks in CfD PPAs.

RO-X: the calculation (from Annex B of the draft Delivery Plan)

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Calculating strike prices on the basis of RO-X involves the following steps:

I. Calculate, for each technology in each year, an RO range of the net present value (NPV) of lifetime costs of plants commissioning in that year based on plant capital, operating, fuel and financing cost estimates. Variation in costs is derived from low, central and high capital costs, with other costs held constant;

II. Combine these costs with revenue assumptions to determine the discounted NPV of the marginal investment under the RO;

III. Calculate a range of costs under CfDs, based on the same cost assumptions, except for lower financing costs. Combine this with revenue assumptions under the new EMR arrangements and vary the strike price in £1 increments until the NPV of the same marginal investment under CfDs is as close as possible to that under the RO; and finally,

IV. Round strike prices to the nearest £5.

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Timing of costs and revenues under the RO and CfDs

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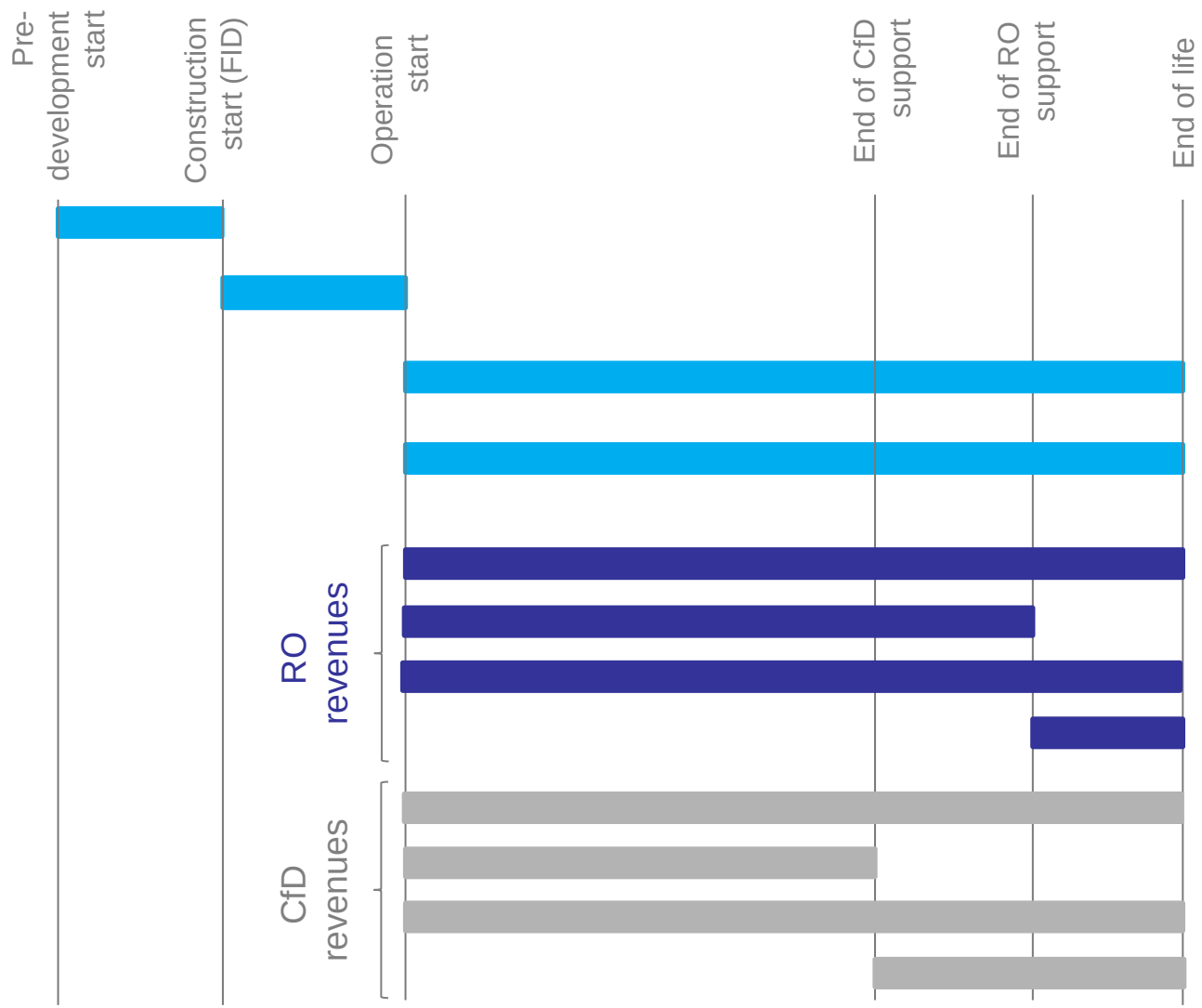

- Predevelopment costs
- Capital costs
- Fixed operational expenditure
- Variable operational expenditure

- Wholesale revenue
- ROC revenue
- LEC revenue
- CM revenue

- Wholesale revenue
- CfD revenue
- LEC revenue
- CM revenue

Costs (underlying costs are the same under the RO and CfDs, but hurdle rates are different)

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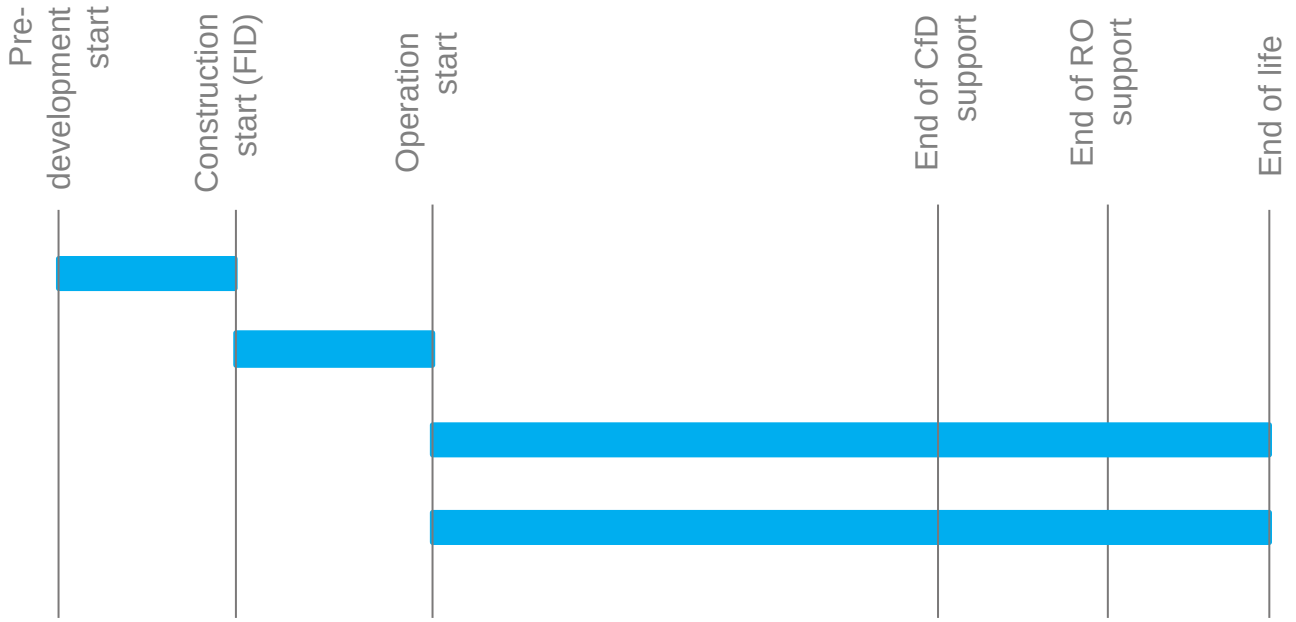

- Predevelopment costs
- Capital costs
- Fixed operational expenditure
- Variable operational expenditure

Calculation of costs

Predevelopment costs

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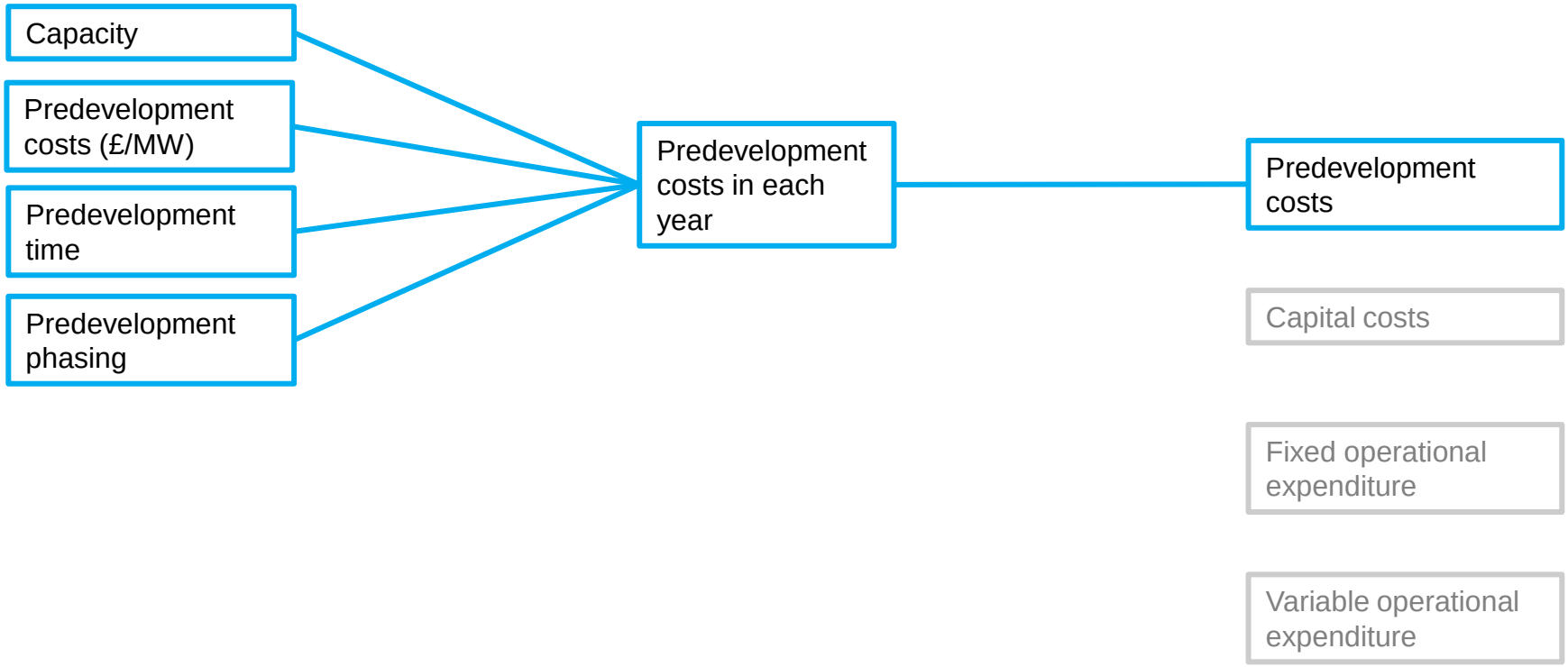

Calculation of costs

Capital costs

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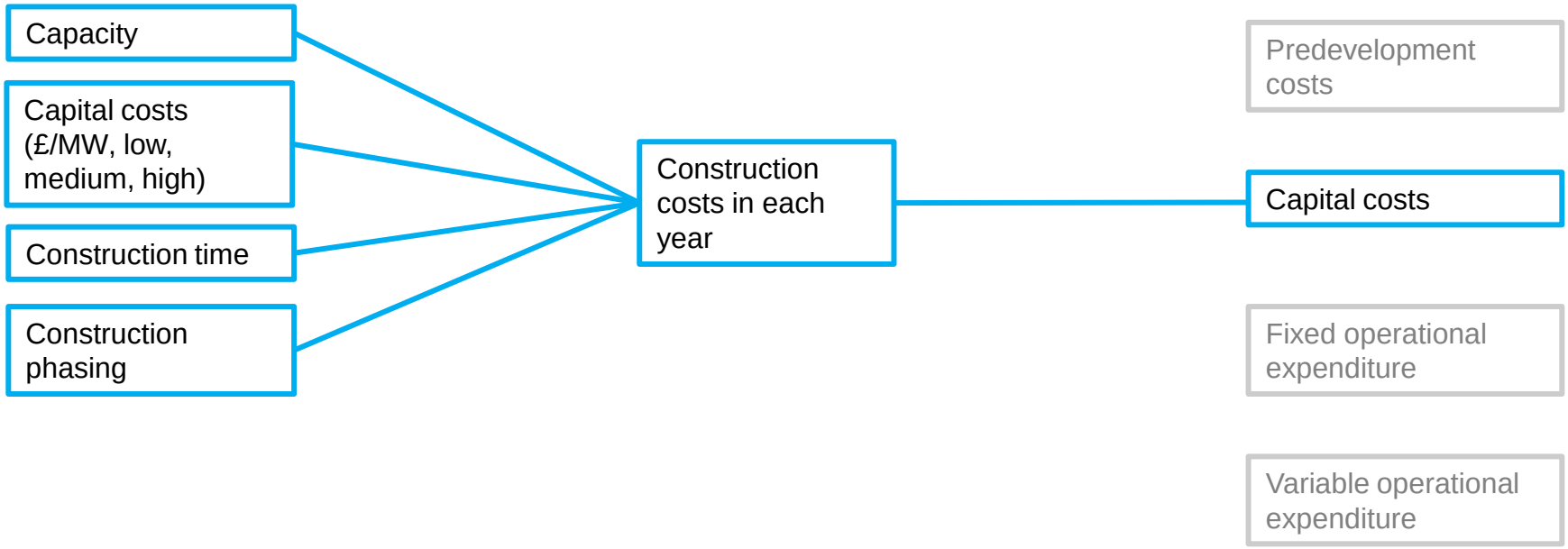

Calculation of costs

Fixed operational expenditure

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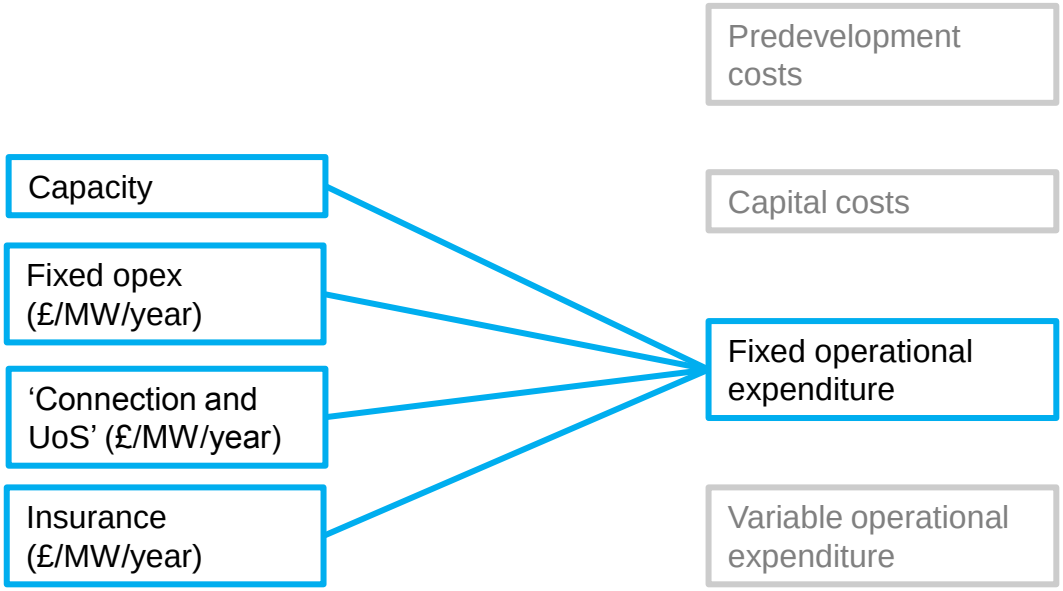

Calculation of costs

Variable operational expenditure

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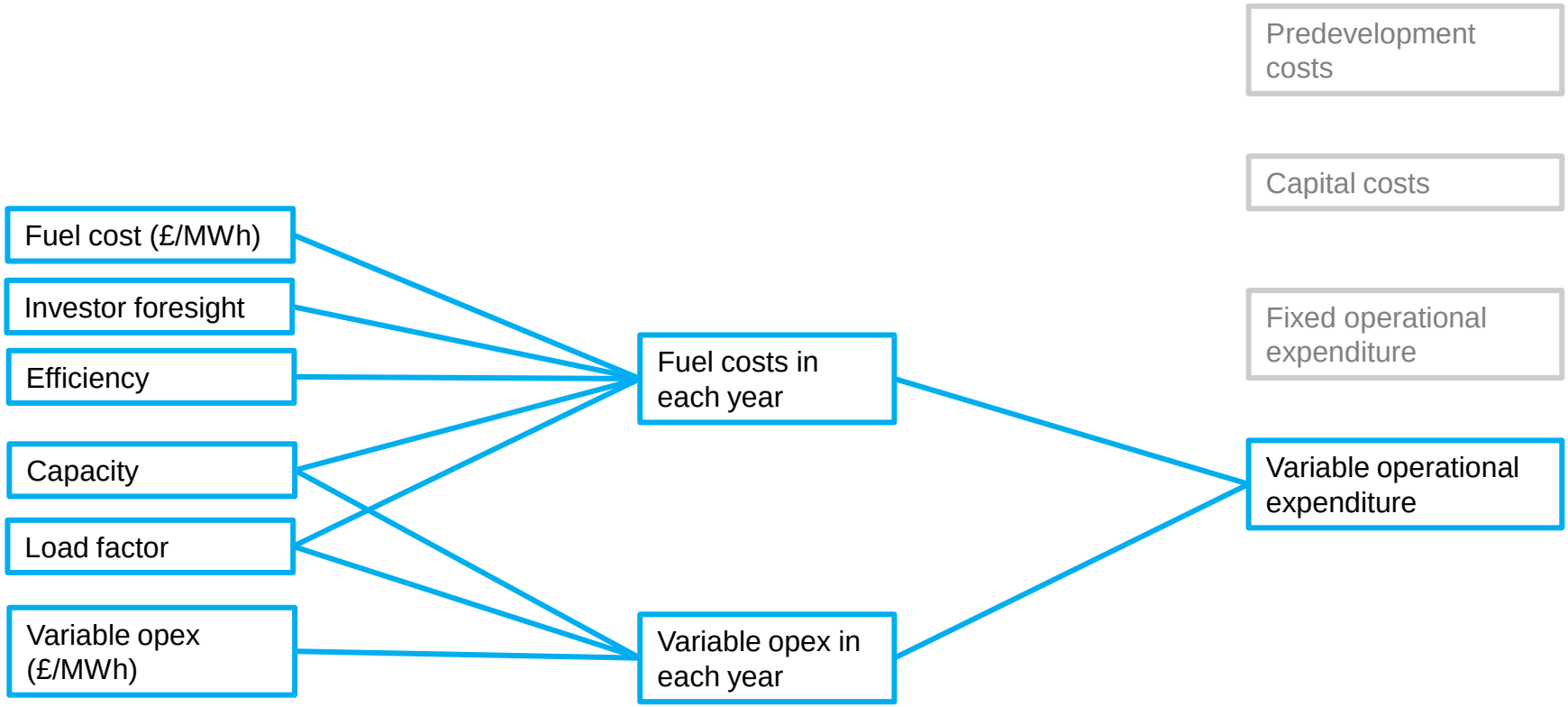

Revenue under the RO

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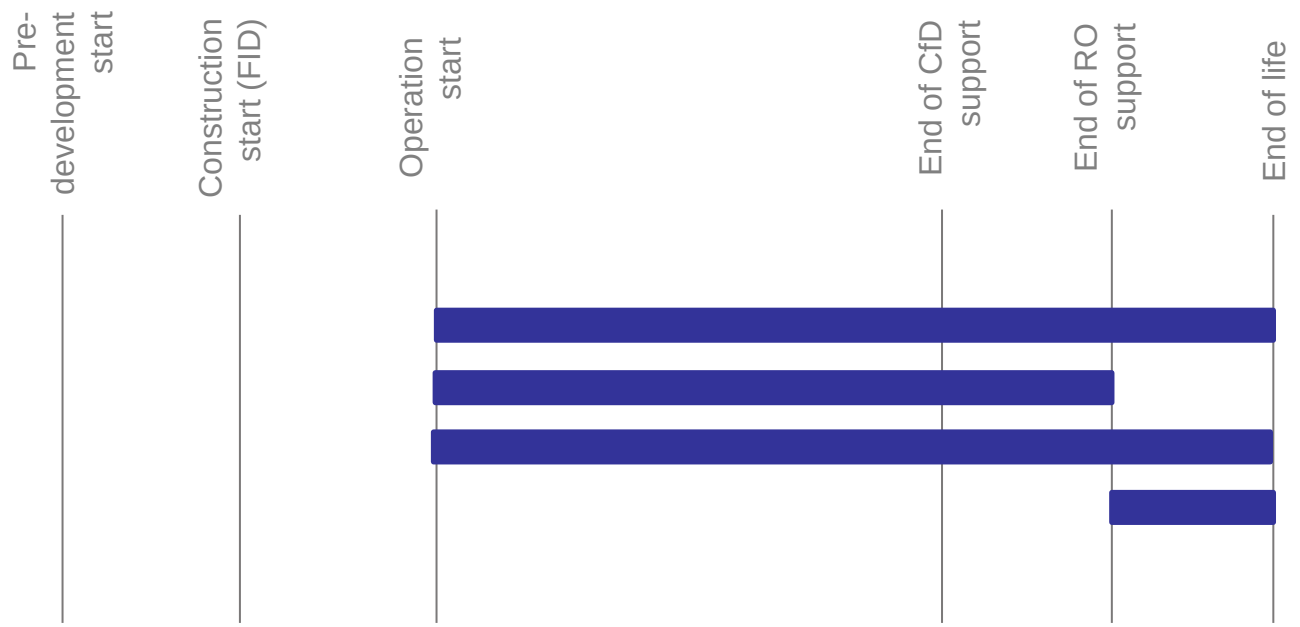

Calculation of revenue under the RO

Wholesale revenues

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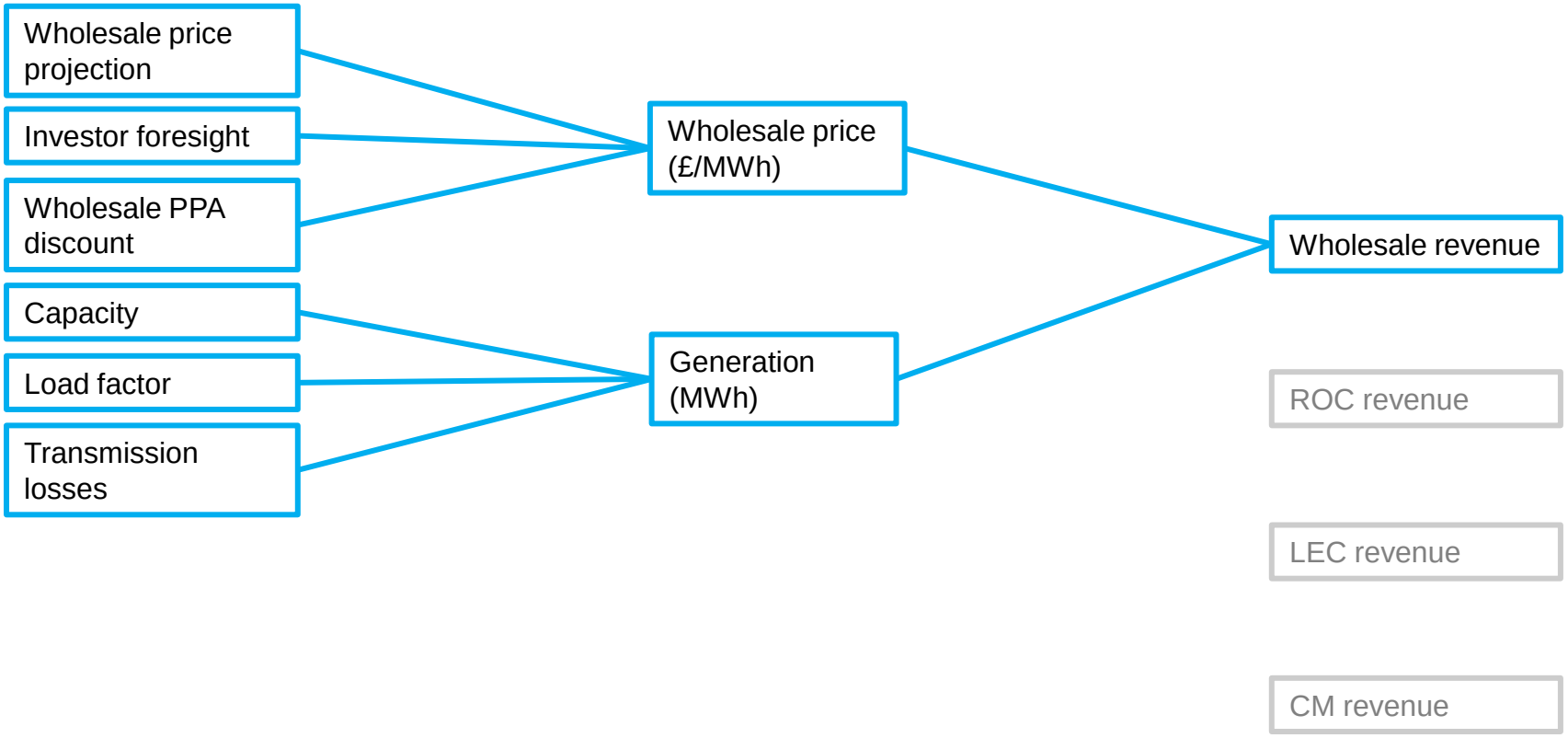
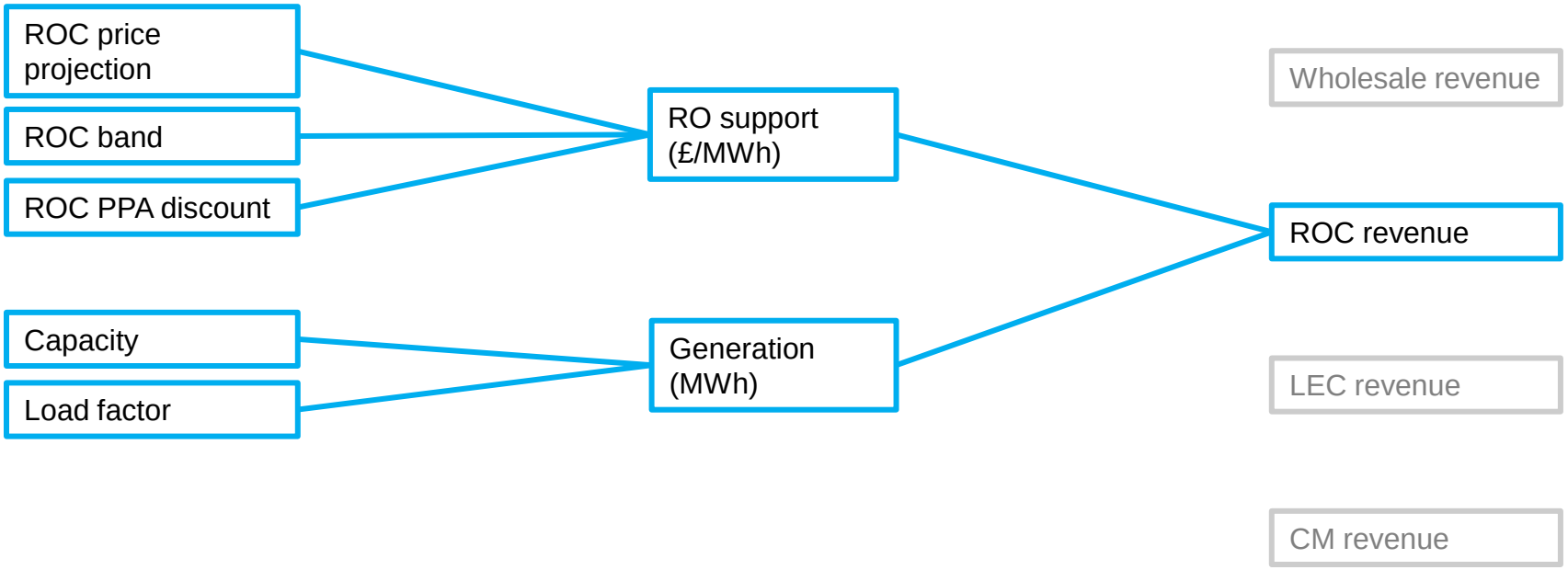


Calculation of revenue under the RO

RO revenues

Department of Energy & Climate Change



Calculation of revenue under the RO

LEC revenues

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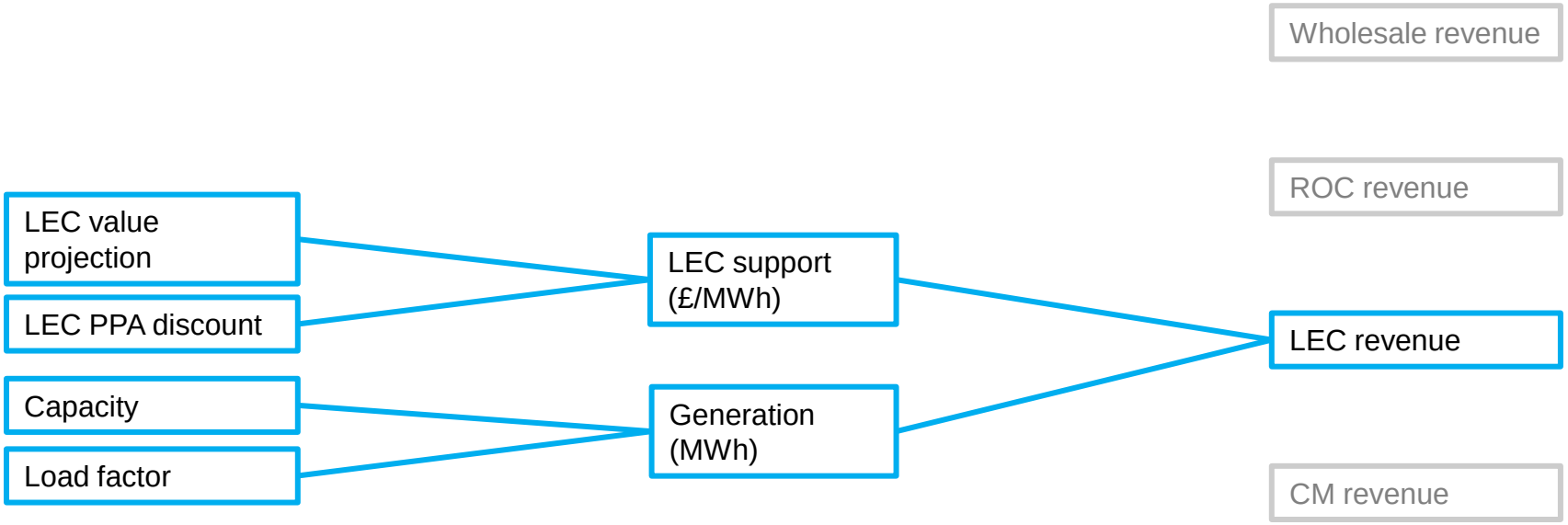

Calculation of revenue under the RO

Capacity market revenues

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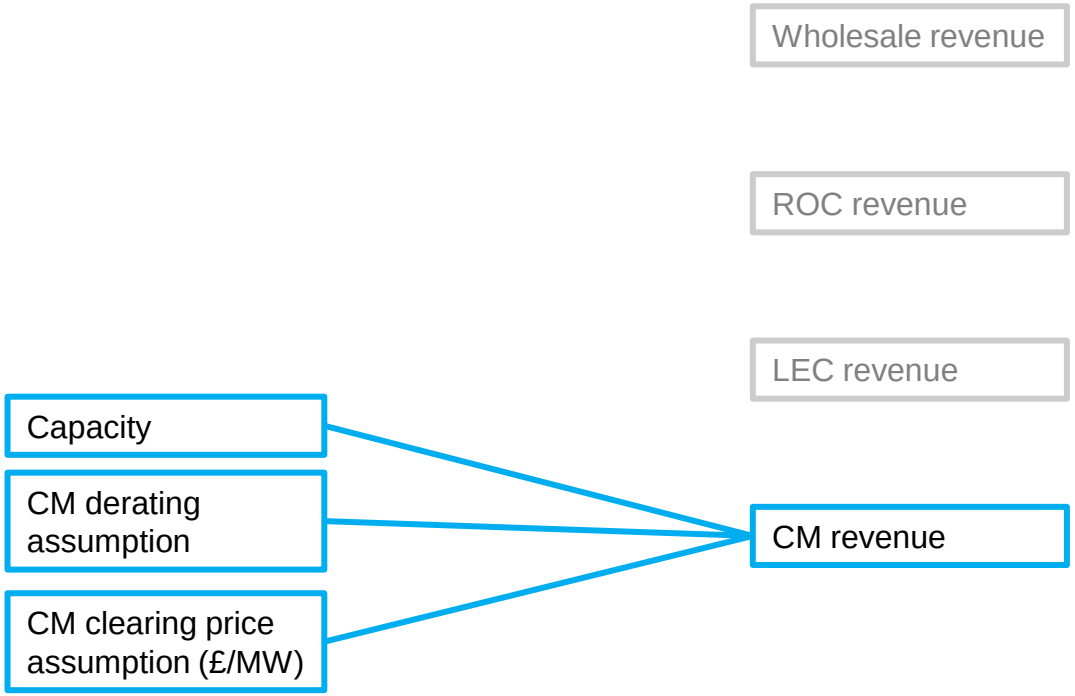

Cashflows for a project under the RO are compared to the levelised cost to estimate RO deployment

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- Using the range of capital costs (low, medium, high) construct a supply curve of [20] points
- At each point on the supply curve, use the calculated revenues and the RO hurdle rate to determine the NPV of an investment with those capital costs
- The most expensive point on the supply curve with an NPV>0 is the marginal investment under the RO

Revenue under CfDs

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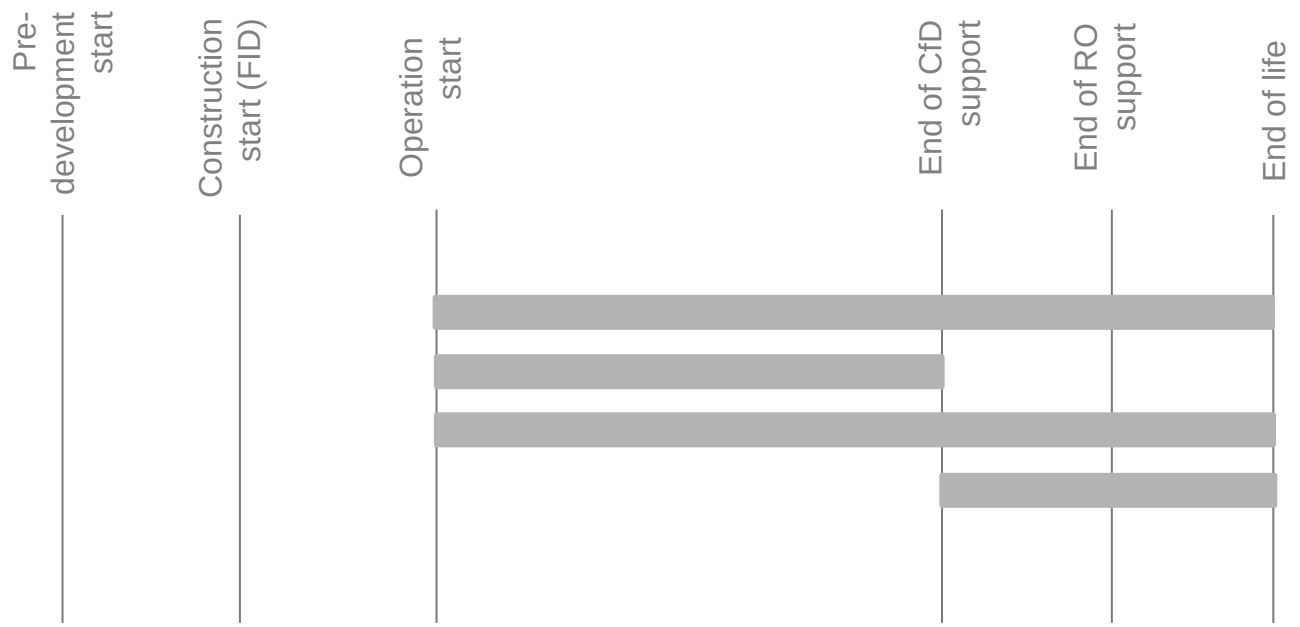

- Wholesale revenue
- CfD revenue
- LEC revenue
- CM revenue

Calculation of revenue under CfDs

Wholesale revenues

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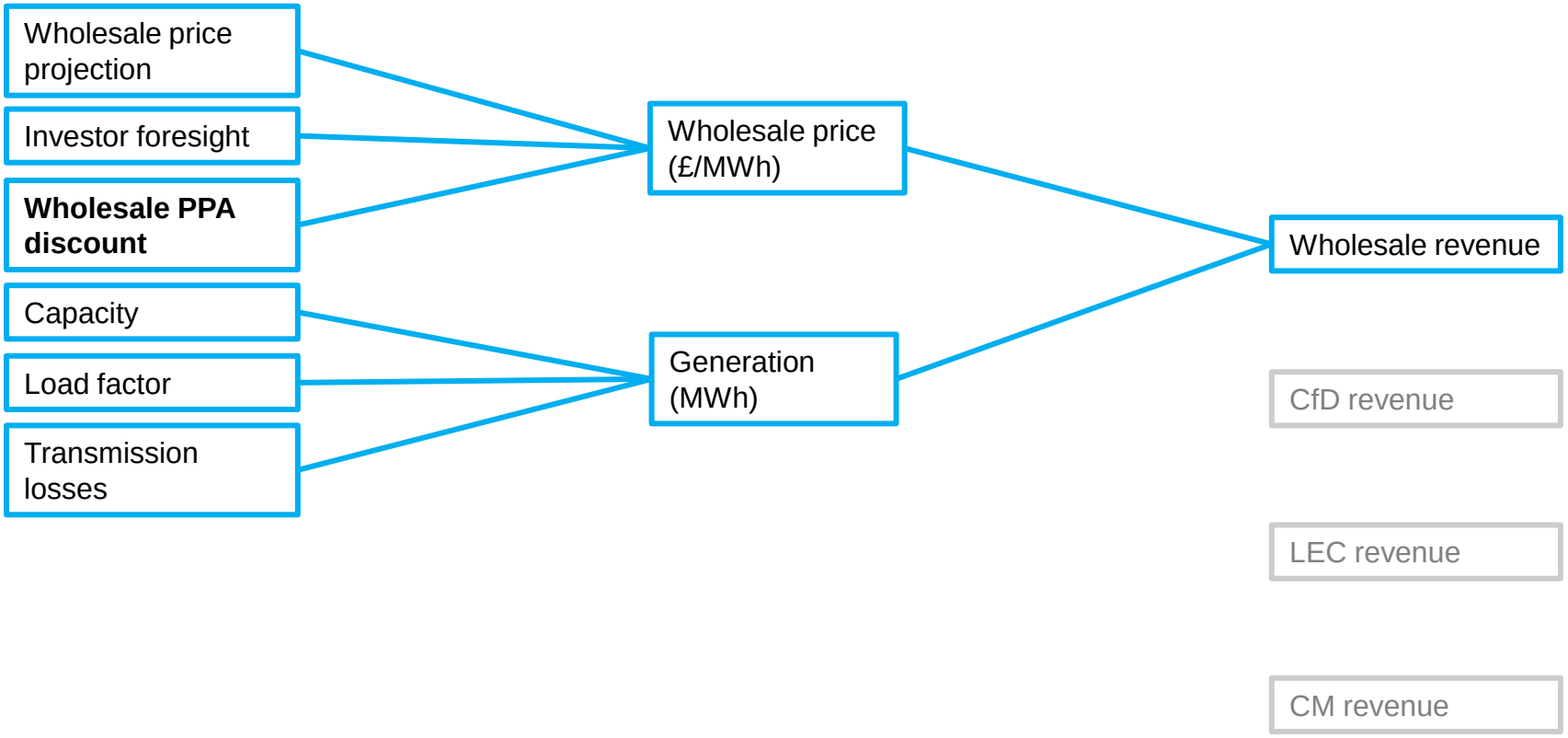

Calculation of revenue under CfDs

CfD revenues

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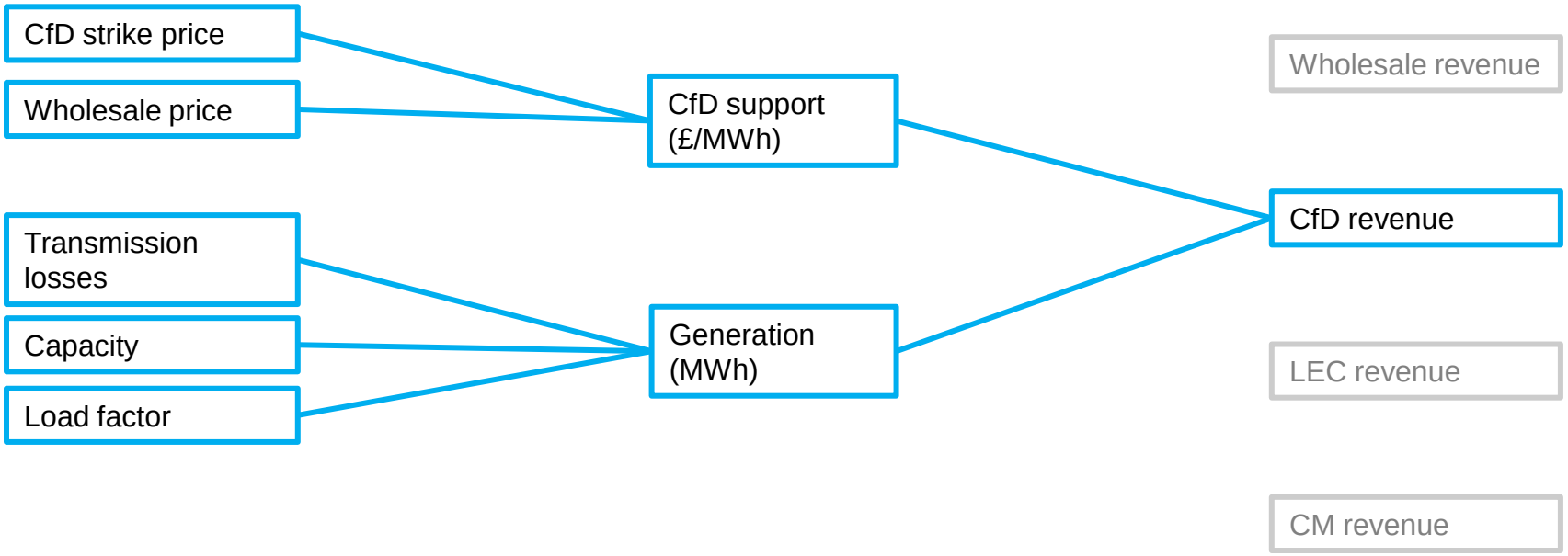

Calculation of revenue under CfDs

LEC revenues

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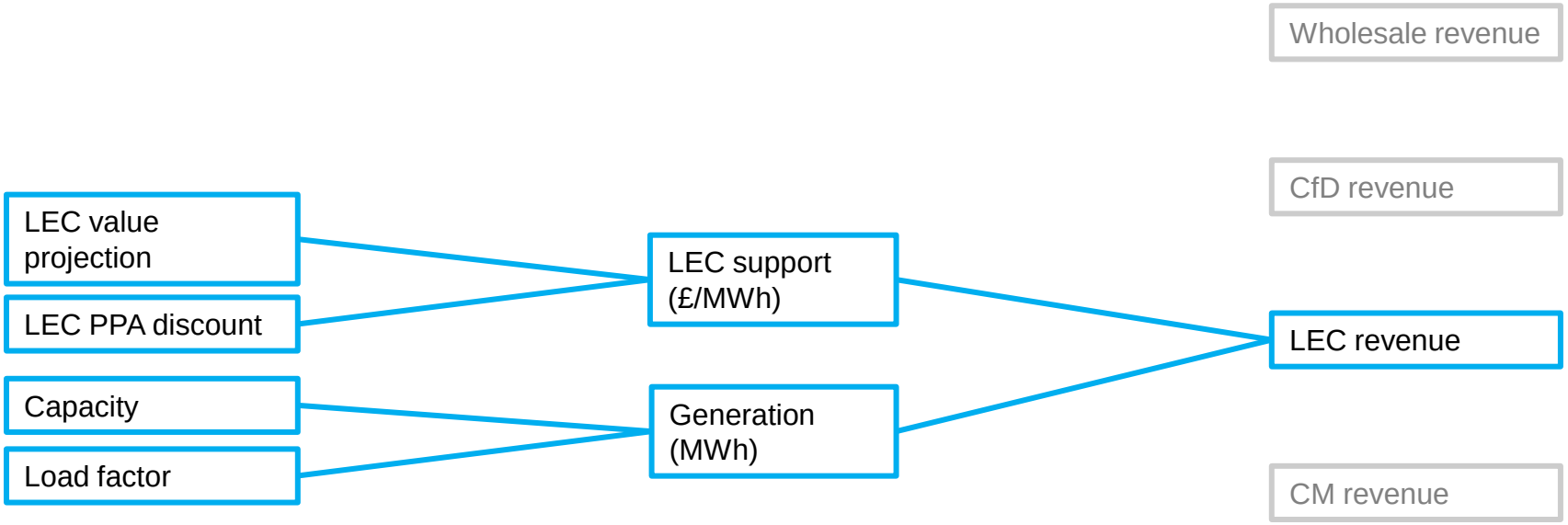

Calculation of revenue under CfDs

Capacity market revenues

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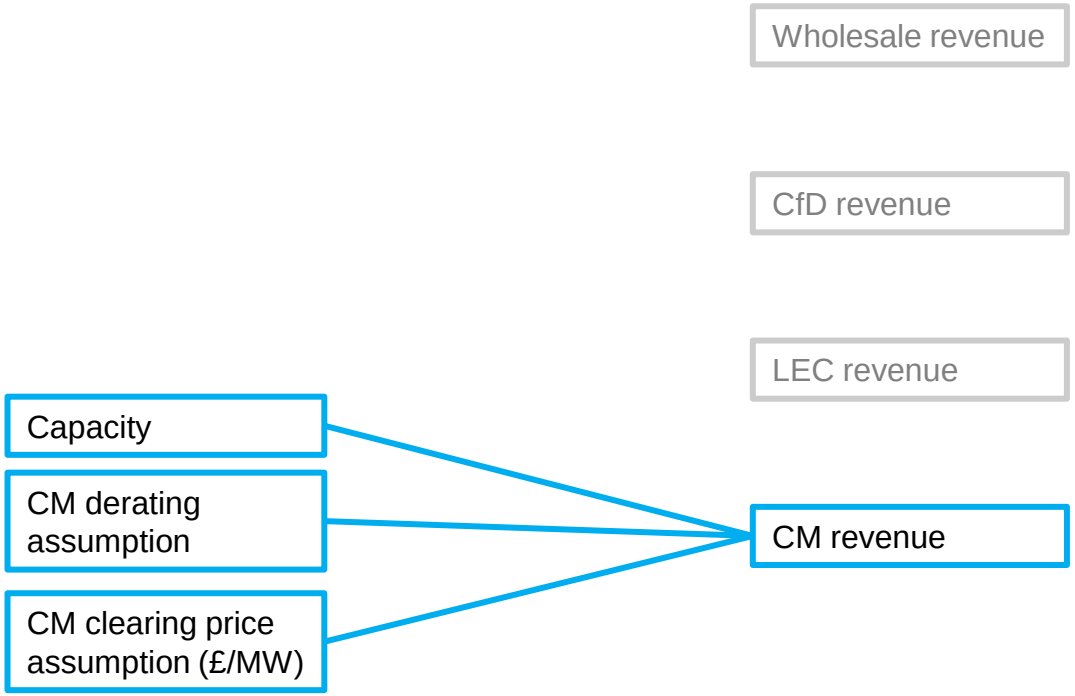

Calculating RO-X strike prices

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- Using the range of capital costs (low, medium, high) construct a supply curve of [20] points
- At each point on the supply curve, use the calculated revenues and the CfD hurdle rate to determine the NPV of an investment with those capital costs
- Adjust the strike price (in £1/MWh increments) so that the NPV of the investment that was marginal under the RO has the same NPV under CfDs.
- Round the final strike price to the nearest £5/MWh

Contents

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Data sources

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Data	Source
Predevelopment costs, predevelopment time, construction costs, construction time, fixed opex, UoS, insurance, variable opex	Electricity Generation Costs (unrounded figures used)
Generic unit size, predevelopment phasing, construction cost phasing	Consistent with Electricity Generation Costs
PPA discounts, load factors, hurdle rates, wholesale prices	EMR Draft Delivery Plan Annex E (unrounded figures used)
Transmission losses, ROC values, LEC values, capacity mechanism derating, capacity mechanism clearing price	Consistent with analysis in EMR Draft Delivery Plan Annex E

Costs for offshore wind, 2016/17

Predevelopment costs

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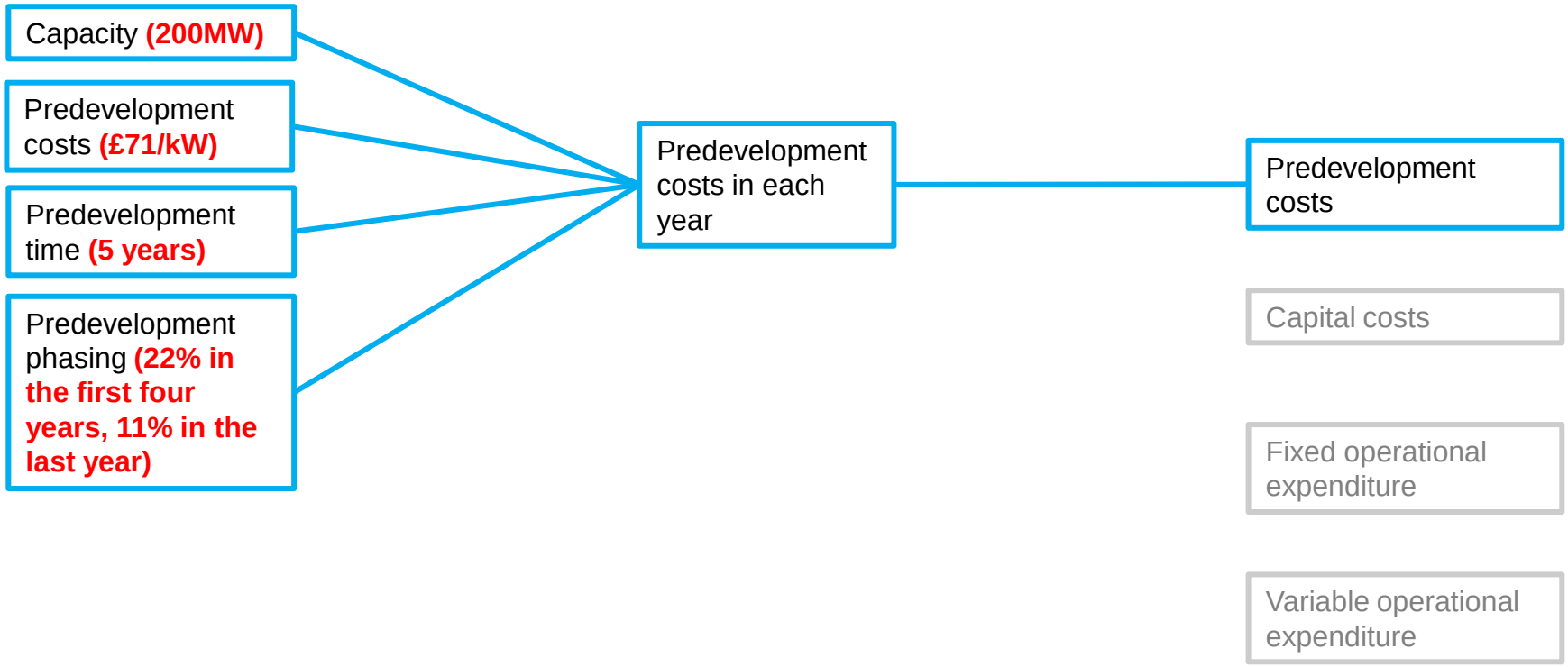

Costs for offshore wind, 2016/17

Capital costs

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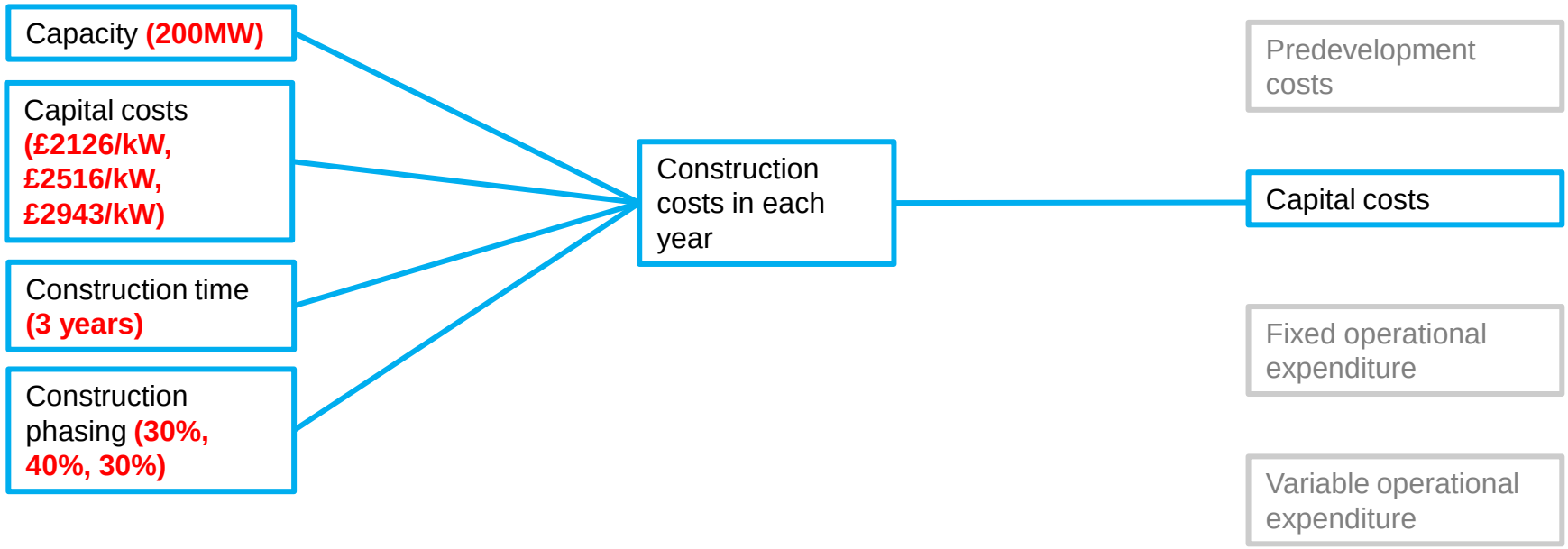

Costs for offshore wind, 2016/17

Fixed operational expenditure

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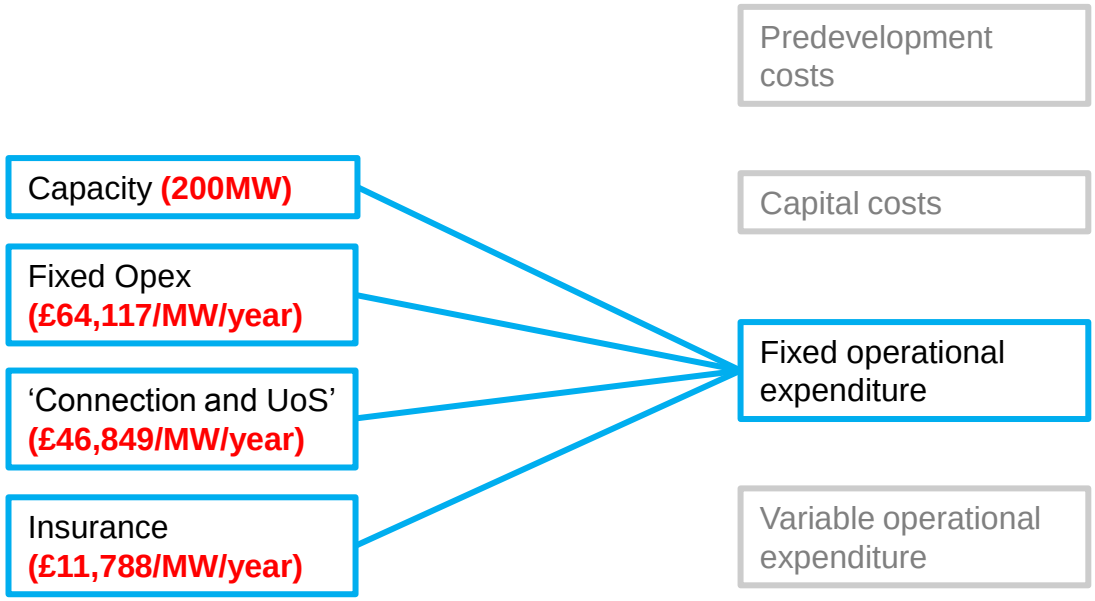

Costs for offshore wind, 2016/17

Variable operational expenditure

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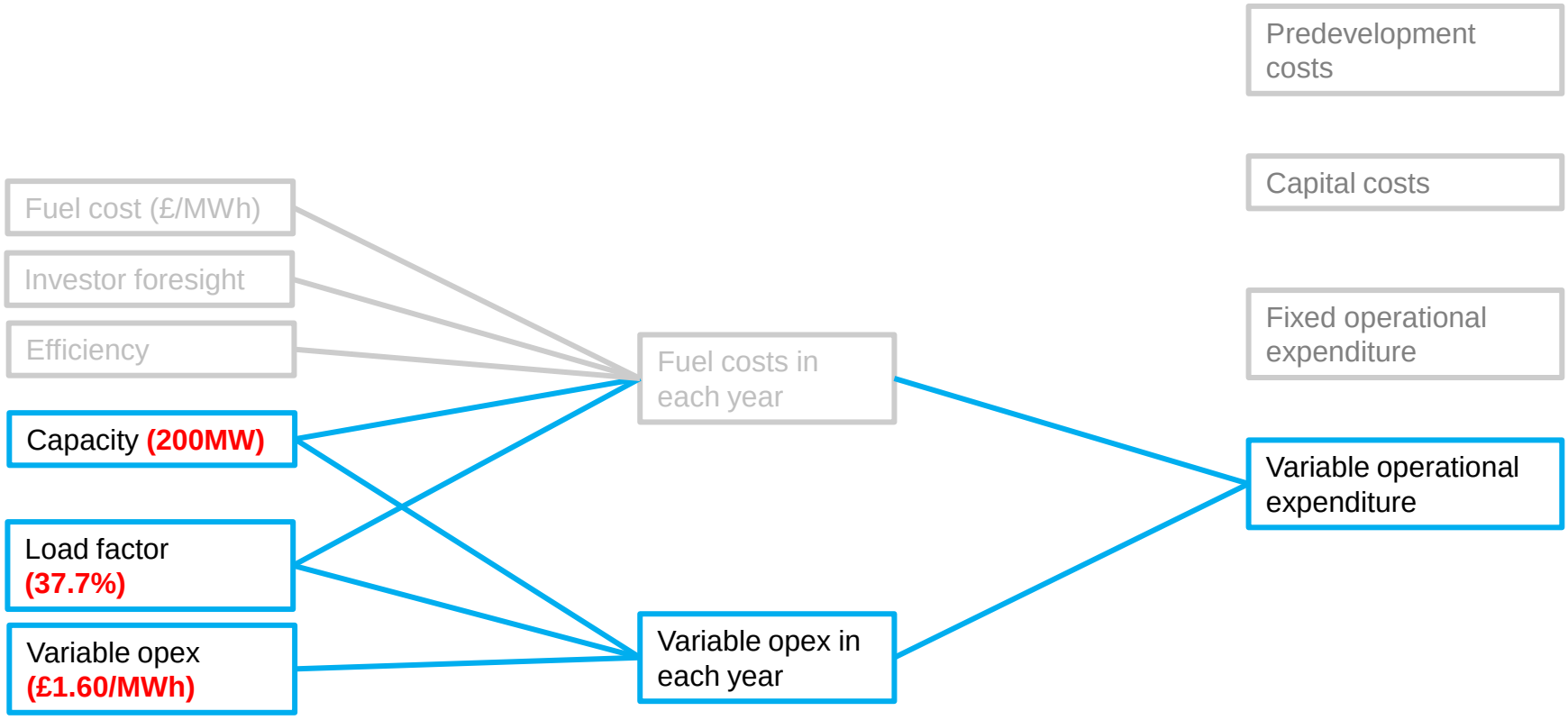
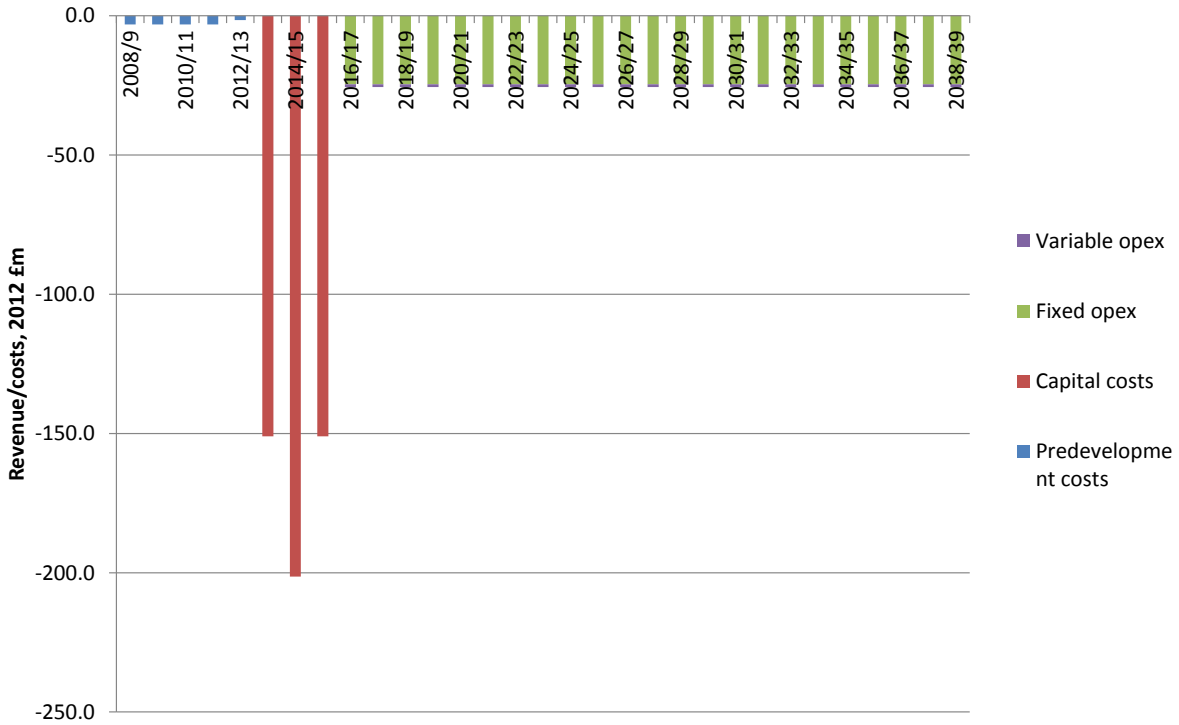


Costs for offshore wind, 2016/17

Department of Energy & Climate Change



	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39
Predevelopment costs	-3	-3	-3	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capital costs	0	0	0	0	0	-151	-201	-151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Fixed opex	0	0	0	0	0	0	0	0	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Variable opex	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

Revenue under the RO for offshore wind, 2016/17

Wholesale revenues

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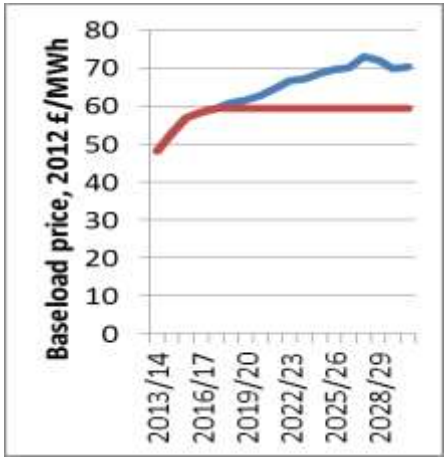
- Wholesale price projection
- Investor foresight **(5 yrs)**
- Wholesale PPA discount **(5%)**
- Capacity **(200MW)**
- Load factor **(37.7%)**
- Transmission losses **(~1%, time dependent)**

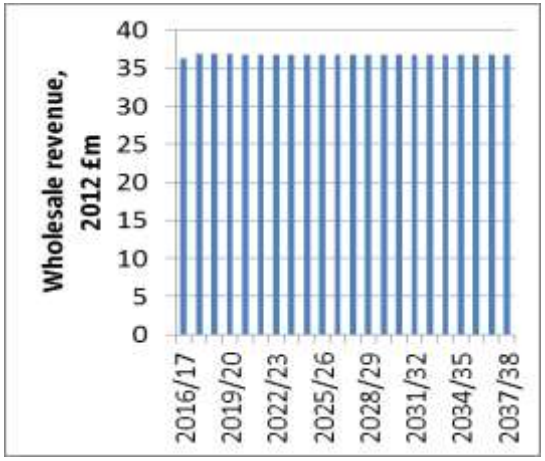
→ Wholesale price (£/MWh)

→ Generation **(654 GWh)**

→ Wholesale revenue

- ROC revenue
- LEC revenue
- CM revenue





Revenue under the RO for offshore wind, 2016/17

RO revenues

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ROC price projection

ROC band **(1.8)**

ROC PPA discount **(5%)**

Capacity **(200MW)**

Load factor **(37.7%)**

RO support (£/MWh)

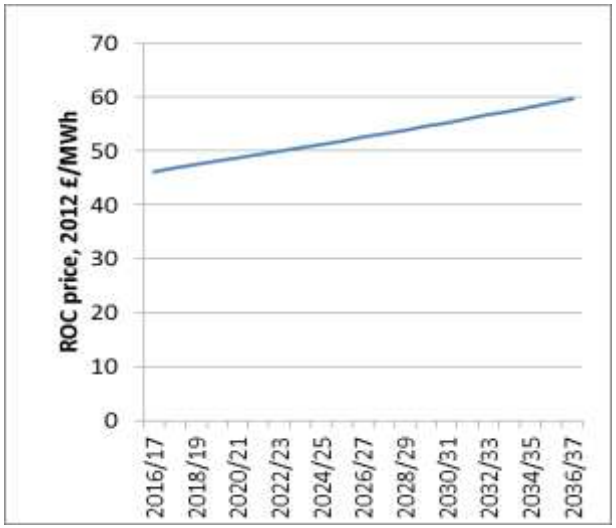
Generation **(661GWh)**

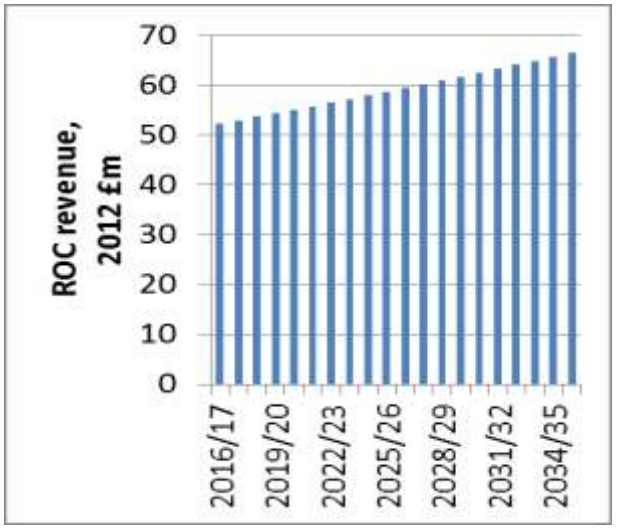
Wholesale revenue

ROC revenue

LEC revenue

CM revenue





Revenue under the RO for offshore wind, 2016/17

LEC revenues

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LEC value projection

LEC PPA discount **(5%)**

Capacity **(200MW)**

Load factor **(37.7%)**

LEC support (£/MWh)

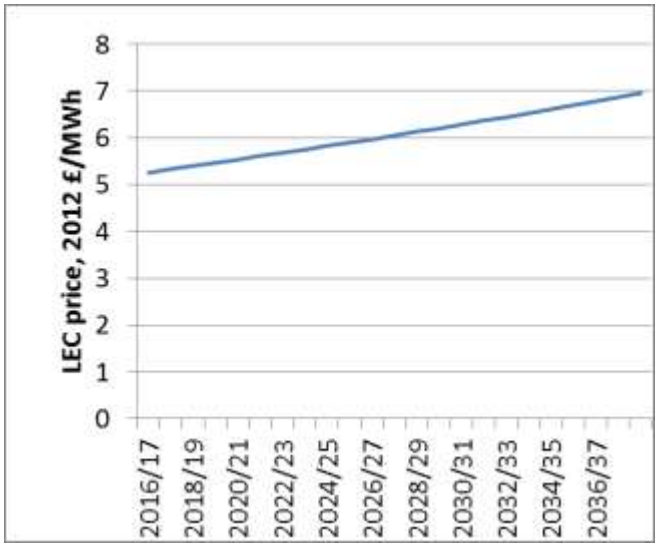
Generation **(661 GWh)**

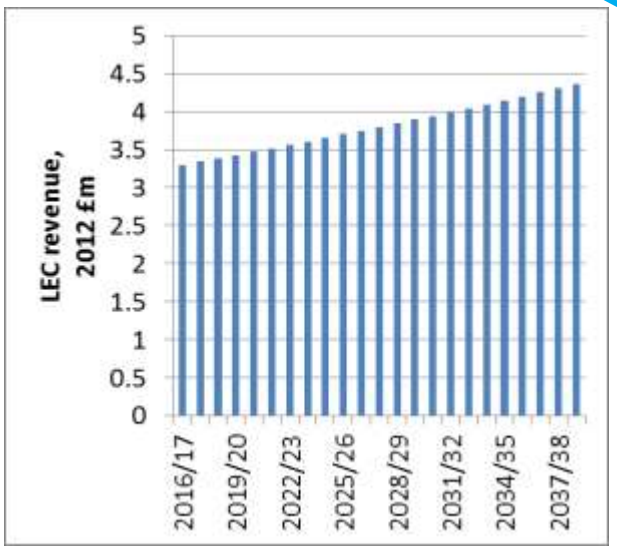
Wholesale revenue

ROC revenue

LEC revenue

CM revenue

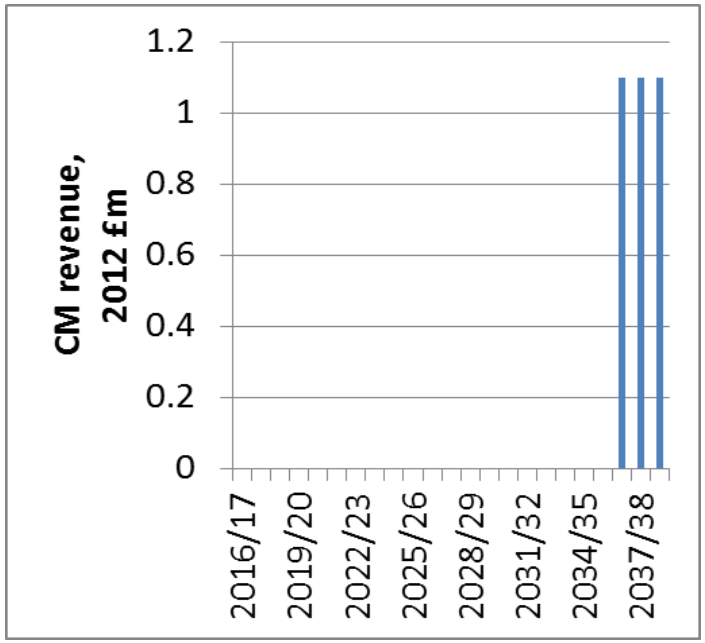




Revenue under the RO for offshore wind, 2016/17

Capacity market revenues

Department of Energy & Climate Change



Capacity **(200MW)**

CM derating assumption **(22%)**

CM clearing price assumption **(£25/kW)**

Wholesale revenue

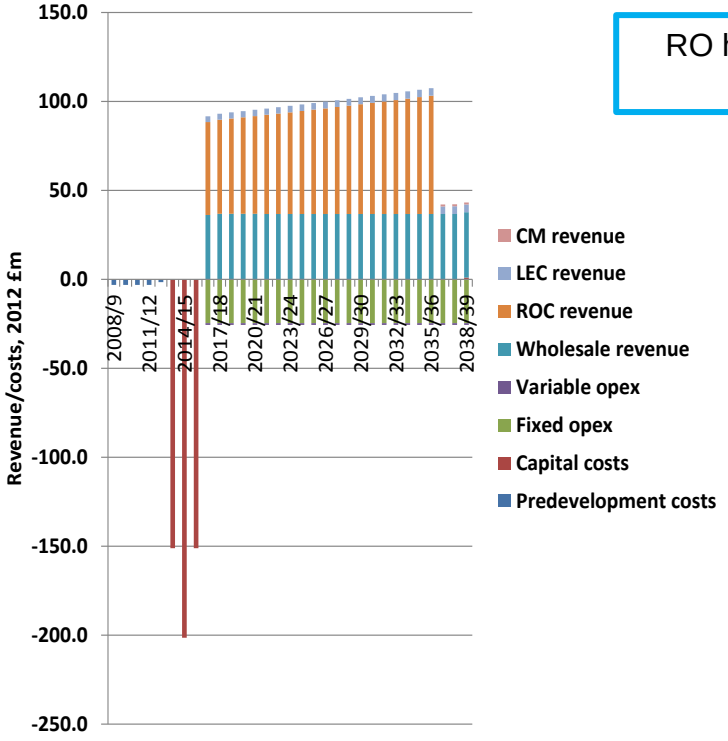
ROC revenue

LEC revenue

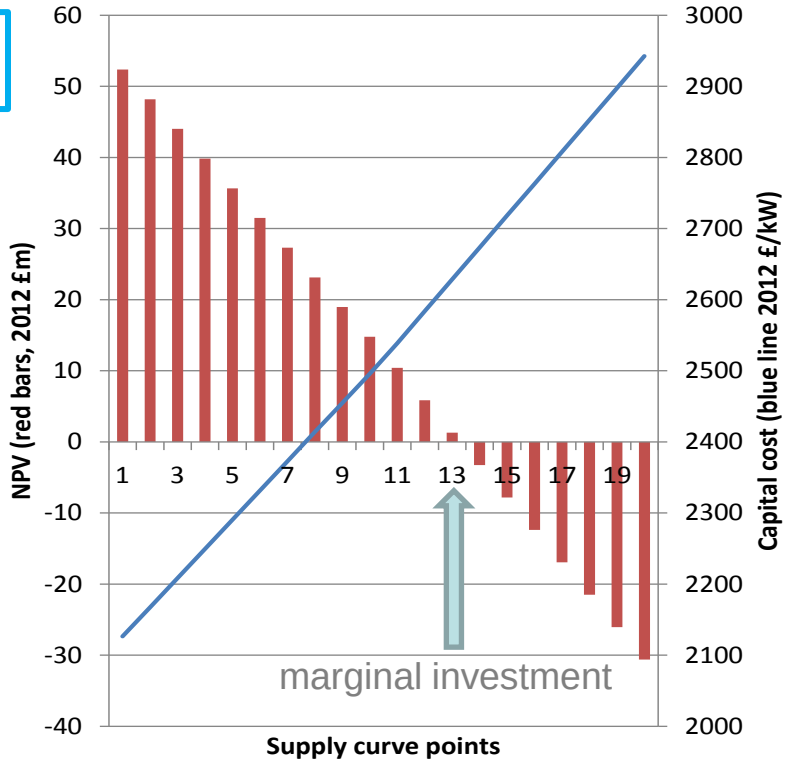
CM revenue

Project cashflows for offshore wind commissioning in 2016/17 under the RO

Department of Energy & Climate Change



RO hurdle rate:
10.2%



	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39
Predevelopment costs	-3.1	-3.1	-3.1	-3.1	-1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital costs	0.0	0.0	0.0	0.0	0.0	-151.0	-201.4	-151.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Fixed opex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6
Variable opex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Wholesale revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.2	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8
ROC revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.1	52.9	53.6	54.3	55.0	55.7	56.4	57.1	57.9	58.6	59.3	60.1	60.9	61.6	62.4	63.2	64.0	64.8	65.7	66.5	0.0	0.0	0.0
LEC revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	3.3	3.4	3.4	3.5	3.5	3.6	3.6	3.7	3.7	3.7	3.8	3.8	3.9	3.9	4.0	4.0	4.1	4.1	4.2	4.3	4.3	4.4
CM revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	1.1	1.1

Revenue under CfDs for offshore wind, 2016/17

Wholesale revenues

Department of Energy & Climate Change

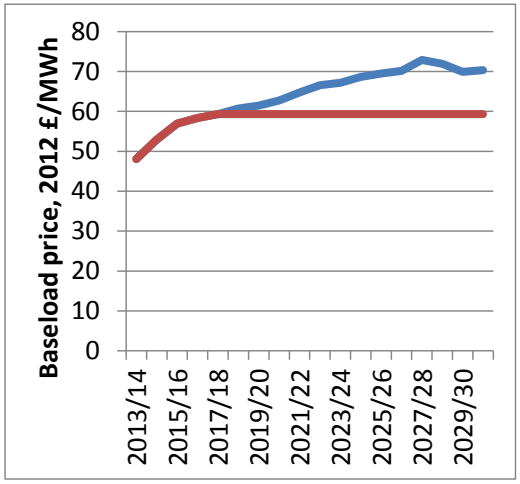
- Wholesale price projection
- Investor foresight **(5 yrs)**
- Wholesale PPA discount **(5%)**
- Capacity **(200MW)**
- Load factor **(37.7%)**
- Transmission losses **(~1%, time dependent)**

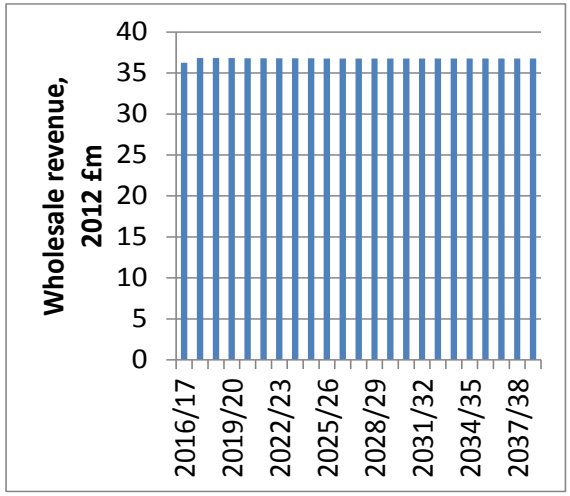
Wholesale price (£/MWh)

Generation **(654GWh)**

Wholesale revenue

- CfD revenue
- LEC revenue
- CM revenue





Revenue under CfDs for offshore wind, 2016/17

CfD revenues

Department of Energy & Climate Change

CfD strike price **(£150/MWh)**

Wholesale price

Transmission losses **(~1%, time dependent)**

Capacity **(200MW)**

Load factor **(37.7%)**

CfD support (£/MWh)

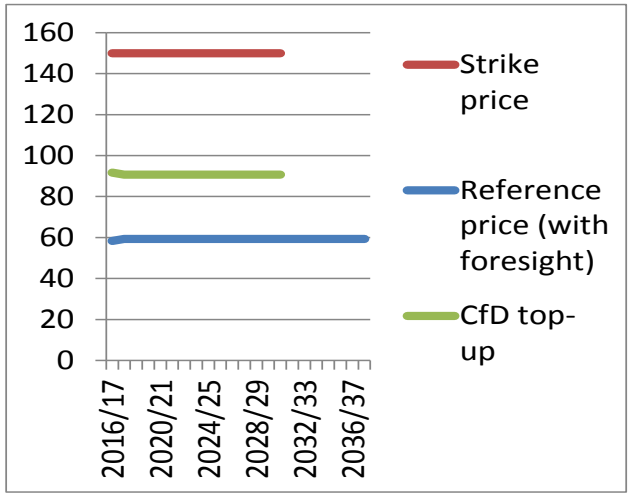
Generation **(654GWh)**

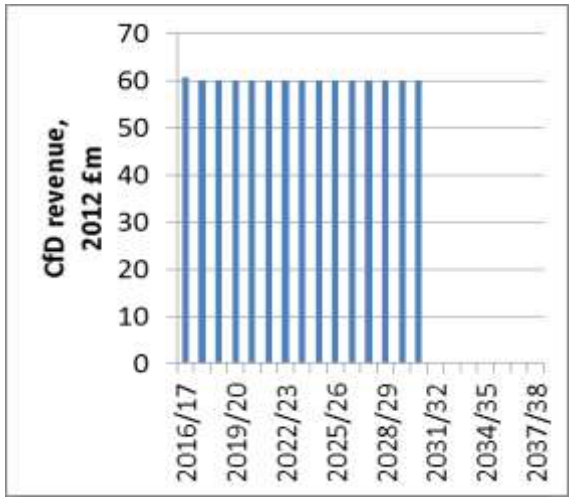
Wholesale revenue

CfD revenue

LEC revenue

CM revenue





Revenue under CfDs for offshore wind, 2016/17

LEC revenues

Department of Energy & Climate Change

LEC value projection

LEC PPA discount **(5%)**

Capacity **(200MW)**

Load factor **(37.7%)**

LEC support (£/MWh)

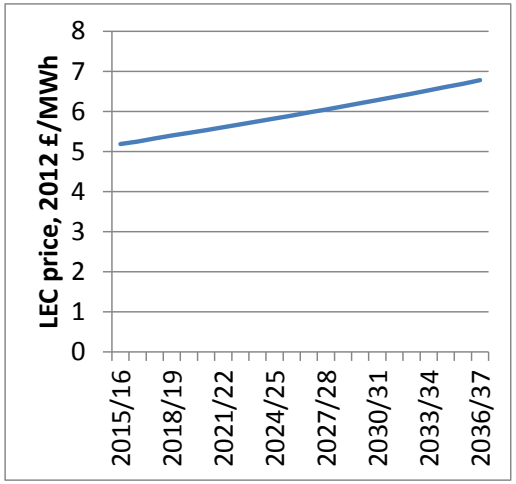
Generation **(661GWh)**

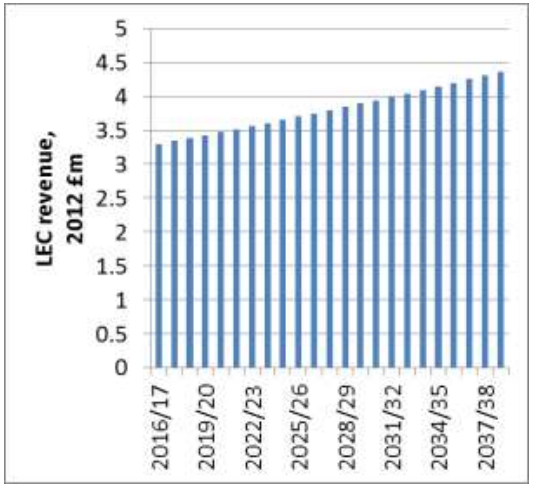
Wholesale revenue

CfD revenue

LEC revenue

CM revenue





Revenue under CfDs for offshore wind, 2016/17

Capacity market revenues

Department of Energy & Climate Change

Capacity **(200MW)**

CM derating assumption **(22%)**

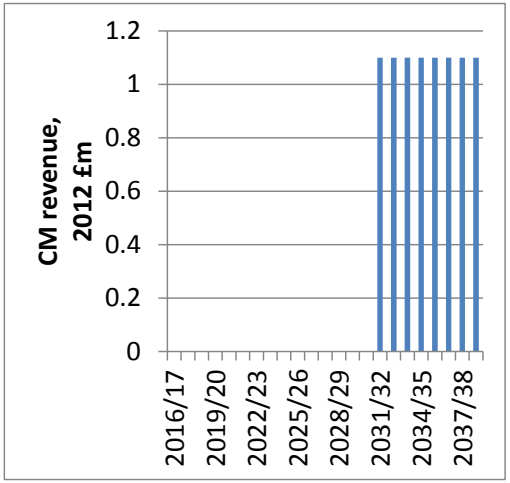
CM clearing price assumption **(£25/kW)**

Wholesale revenue

CfD revenue

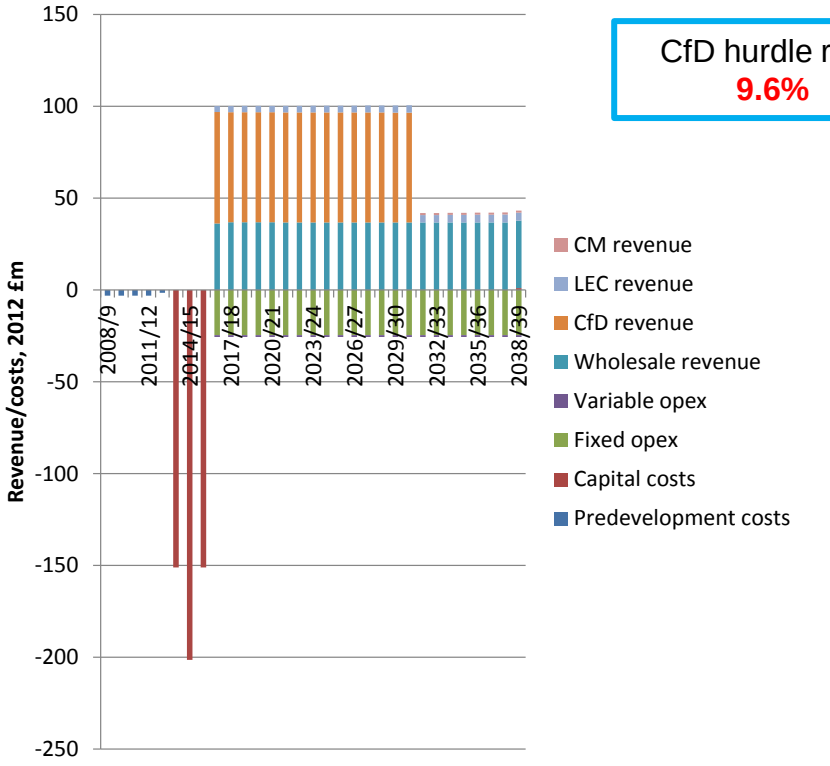
LEC revenue

CM revenue

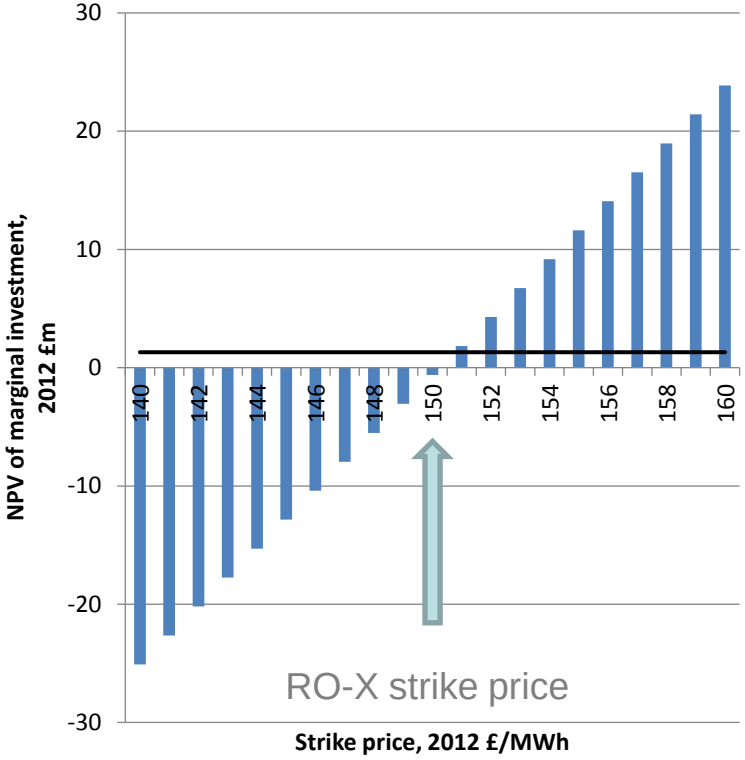


Project cashflows for offshore wind commissioning in 2016/17 under CfDs

Department of Energy & Climate Change



CfD hurdle rate:
9.6%



	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37
Predevelopment costs	-3	-3	-3	-3	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capital costs	0	0	0	0	0	-151	-201	-151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixed opex	0	0	0	0	0	0	0	0	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
Variable opex	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Wholesale revenue	0	0	0	0	0	0	0	0	36	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
CfD revenue	0	0	0	0	0	0	0	0	61	60	60	60	60	60	60	60	60	60	60	60	60	60	60	0	0	0	0	0	0
LEC revenue	0	0	0	0	0	0	0	0	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
CM revenue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

Department of Energy & Climate Change

Reliability Standard

Alon Carmel

What is the Reliability Standard?

Department of Energy & Climate Change

- The Reliability Standard represents the level of electricity security of supply that we aim for
- Idea is to reflect the right balance between security of supply and the cost of that security
- Captures risk of unmet demand caused by having insufficient generating capacity
- We propose that the Reliability Standard be set on an enduring basis in order to provide assurances to Capacity Market participants on the level of security that HMG wants
- We expect to express the Reliability Standard in terms of a Loss of Load Expectation. This is the metric used by all of our interconnected neighbours as well as in markets in the United States which have Capacity Markets
- We prefer this metric of security of supply to Capacity Margins which is are not as good an indicator of risk and will get worse over time as we add more wind onto the system

How is the Reliability Standard calculated?

Department of Energy & Climate Change

- The proposed Reliability Standard reflects the tradeoff between the benefits of security of supply and the costs.
- The benefits of security of supply are represented by the marginal cost to consumers of having their electricity disconnected. We have carried out a joint study with Ofgem to determine this value. The headline figure suggests a Value of around £17,000/MWh
- The costs of security of supply are represented by the costs of additional "peaking" capacity. Analysis by Parsons Brinckerhoff suggests that the marginal cost of additional capacity is around £47,000/MW

- These values suggest that the optimal value is around 3 **hours** of expected lost load per year or in other words a reliability level of 99.97%

- This is within the bounds of other countries as suggested below

LOLE (hours/yr)	**Equivalent to Standard of..**
3	France
4	Netherlands
8	Ireland

Value of Lost Load

Department of Energy & Climate Change

- We carried out a joint study with Ofgem to look at customers value of lost load.
- London Economics carried out the analysis using survey techniques
- Individuals and businesses will have different VoLLs and they will vary by the time of year and time of day.
- Analysis suggests that the average value of domestic and SME electricity users at times of system peak is around £17,000/MWh
- This is the result of a choice experiment approach. Customers are asked to choose between 2 different scenarios each involving compensation. Their responses inform the estimated value of lost load based on econometric analysis

Cost of New Entrant Capacity

Department of Energy & Climate Change

- The cost of new entrant capacity represents the cheapest possible capacity that could be built to cover peak periods.
- Technical definition: it is the yearly amount needed to pay for capacity such that the discounted value (NPV) of its operations is zero over its technical operating lifetime, assuming the plant never runs and receives no energy market revenue
- At the moment the cheapest plant of this type is an OCGT peaking plant.
- We have had Parsons Brinckerhoff calculate this.

Central OCGT assumptions

Department of Energy & Climate Change

Timings		
Operating horizon		25 years
Capital Cost	***£/kW***	
EPC Cost		274
Fixed Operating Costs	***£/kW-yr***	
Operating & Maintenance		10
Insurance, Connection and UoS charges		4

- Above figures provided by consultancy Parsons Brinckerhoff for DECC (2013).

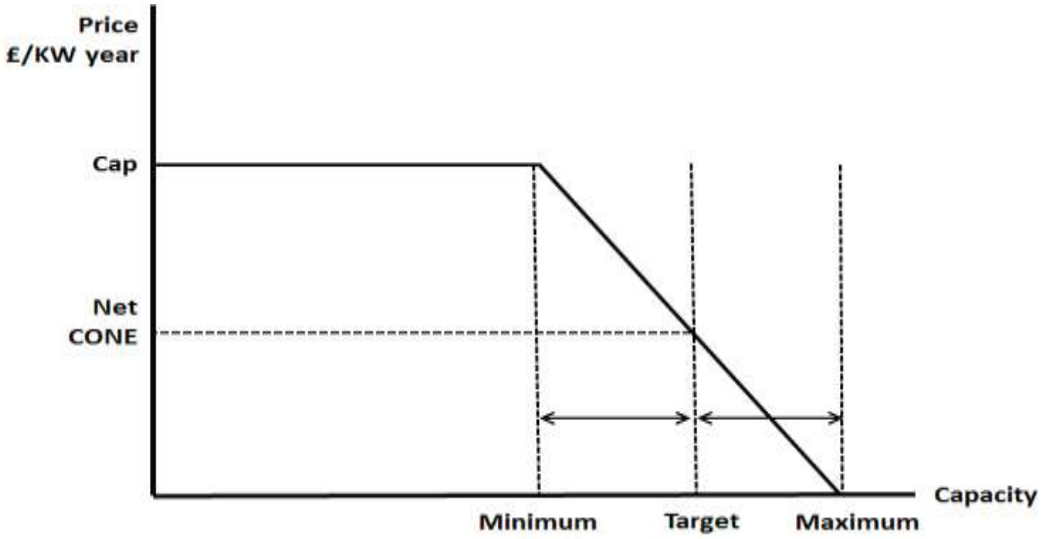
Hurdle Rate

- Report on technology costs for the Committee on Climate Change (2012) suggested range of 6-9% so we have used a central figure of 7.5%

Capacity Market demand curve

Department of Energy & Climate Change

- Government will set out a demand curve in a Capacity Auction to ensure that there is some elasticity of demand and to take account of uncertainty over the parameters



- Target based on analysis from SO
- Net CONE based on Gross CONE minus expected energy market revenues
- Cap based on a multiple of Net CONE
- Slope based on Target +/- XGW of capacity

As part of the development of the Capacity Market these parameters are being developed and we intend to consult on them as part of the Secondary Legislation for the Energy Bill.

Consultation questions

Department of Energy & Climate Change

1. Do you agree with our proposed reliability standard of 3 hours LOLE?
2. Do you agree with the methodology underpinning the reliability standard – that is to calculate this using the value of lost load and the cost of new entry? If not, please explain why and provide supporting evidence.
3. Do you agree with the analysis of the value of lost load as described on Page 48 and in Annex C? If not, please explain why and provide supporting evidence.
4. Do you agree with our estimate of the cost of new entry as described on page 49 and in Annex C? If not, please explain why and provide supporting evidence.
5. Do you agree the reliability standard should be reviewed every five years to reflect any future evidence in the value of lost load and the cost of new plant entry?
6. Do you agree with the proposed methodology for the auction demand curve? If not, please explain why and provide supporting evidence.

Department of Energy & Climate Change

Outstanding issues and questions – table discussions

Department of Energy & Climate Change

Next steps

Alon Carmel

Department of Energy & Climate Change

Close and informal questions