Oxera

Renewing the Renewables Obligation?

Prepared for BIEE 7th Academic Conference

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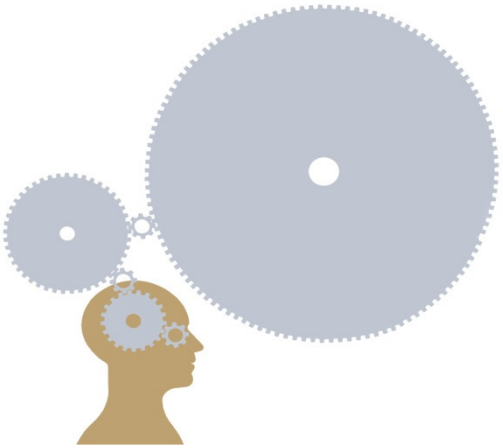


September 25th 2008

Overview

- making the most of the UK's renewable energy resources

- modelling the Renewables Obligation (RO) and renewables market outcomes

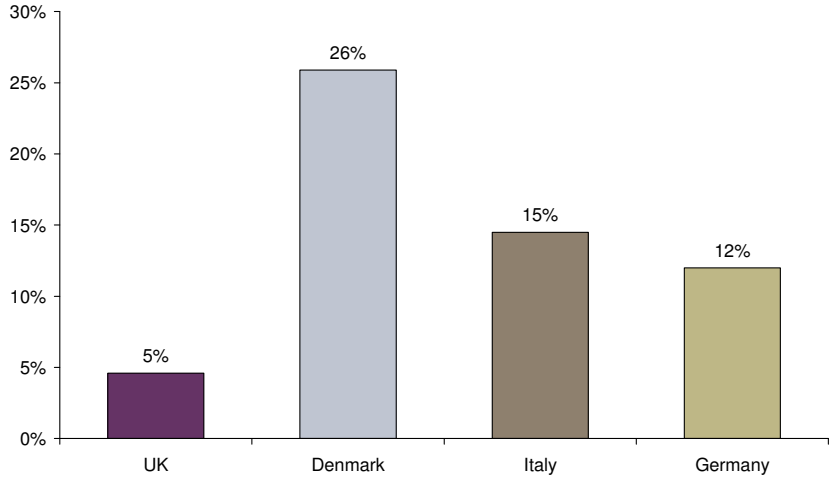
- barriers to renewables deployment, dealing with uncertainty

See, also, Oxera (2008), 'Renewing the Renewables Obligation: Getting the most out of green energy?', *Agenda*, September 2008. Available at: http://www.oxera.com/main.aspx?id=4907.

The potential for UK renewable generation
The envy of Europe?

- the UK has some of Europe's most enviable renewable resources
  - estimates of the theoretical wind-generating potential have been as high as 1,000TWh per annum[1]
- but deployment of renewable generation is low compared with other countries

Percentage of electricity consumed generated from renewable sources[2]



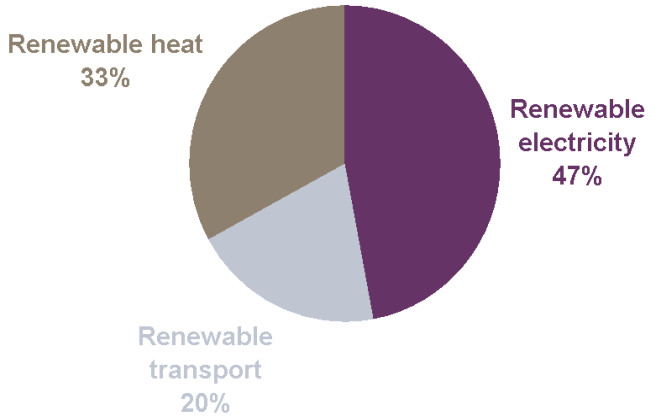
[1] Enviros (2005), 'The Costs of Supplying Renewable Energy', September.
[2] Source: Eurostat.

Delivering renewables

The challenge ahead

- the new EC targets for the UK set the proportion of final energy consumption coming from renewable sources by 2020 at 15%[1]
- achieving this would require a 10x increase in the consumption of renewable energy compared with current levels (≈1.5% in 2006)[2]
- this would imply that >30% of total electricity output would need to be from renewable sources by 2020
- alternatively, >40% of all renewable energy would need to be from renewable generation [3]

Illustrative contribution of renewable technologies to 15% target



[1] European Commission (2008), 'Proposal for a Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources', 2008/0016 (COD).

[2] BERR (2008), 'UK Renewable Energy Strategy, Consultation', June, p. 3.

[3] BERR (2008), 'UK Renewable Energy Strategy: Consultation', June, p. 35.

The UK Renewables Obligation
Policy description

- the principal financial mechanism to support the deployment of renewables
- target set each year for electricity suppliers to source a proportion of their electricity from renewable generators
- suppliers prove compliance by presenting Renewables Obligation Certificates (ROCs) purchased either from:
  - green electricity generators at the prevailing market price

  or
  - Ofgem at a pre-specified 'buyout' price
- the value to a supplier of holding a ROC is therefore the buyout cost avoided plus a share of the buyout fund recycled to ROC holders

$$\text{ROC value} = \frac{\text{buyout price} * \text{overall RO size}}{\text{total volume of ROCs}}$$

Potential policy levers

RO policy levers

- the Obligation size (currently increases to 15.4% of supplier demand by 2015)
- the level of the cap (currently 20%)
- duration (currently limited to 2027)
- applying a 'banding' regime for qualifying technologies
- applying a 'headroom' mechanism
- the buyout price
- changes in the level of capital grants
- changes in the value of LECs

Other options

- feed-in tariffs (FITs) could be applied as:
  - fixed prices

  or
  - a premium on top of the electricity price
- minimum price agreements
- tax incentives
- additional capital grants/subsidies
- cap-and-trade mechanisms
- tendering mechanisms

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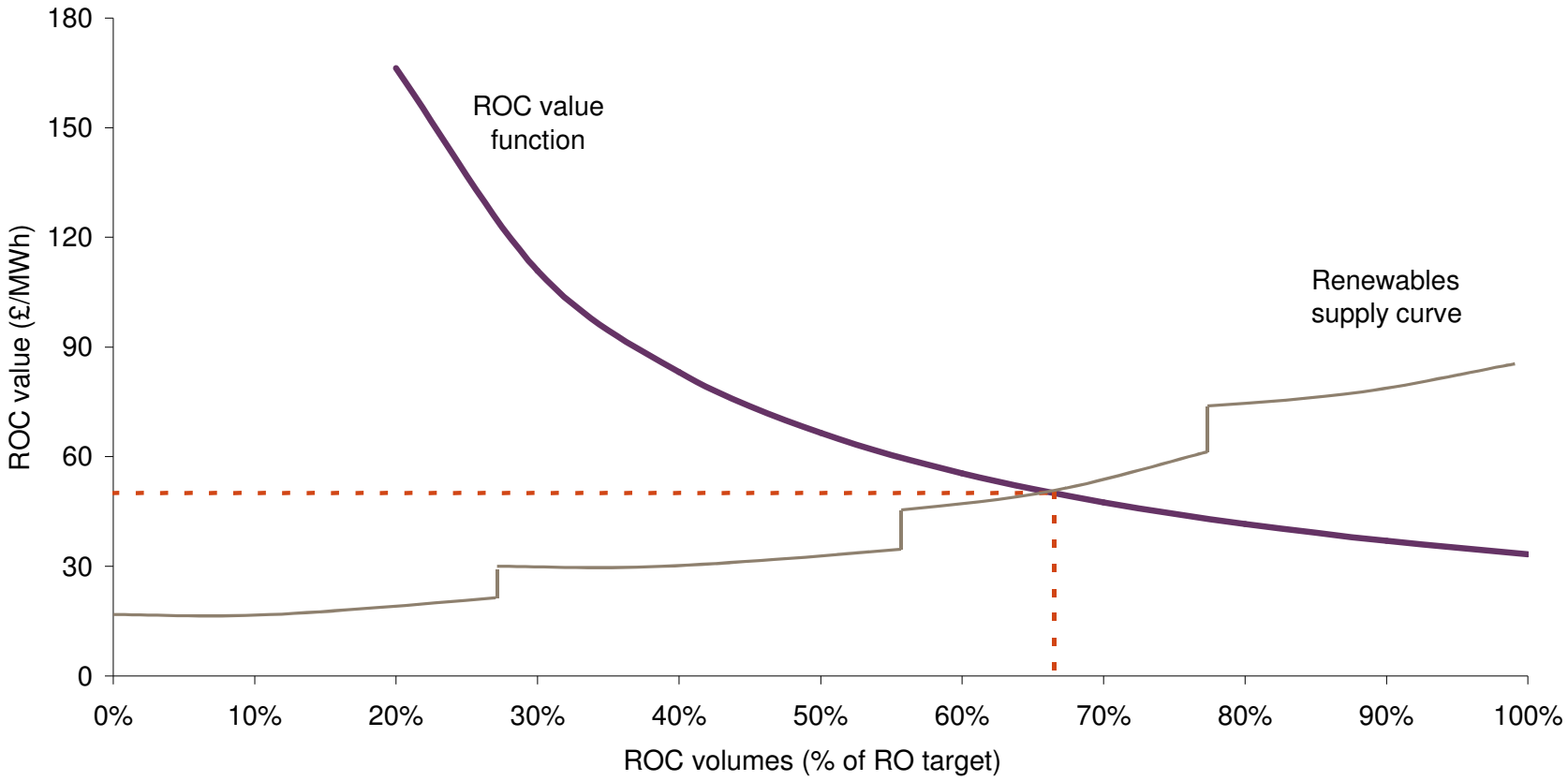
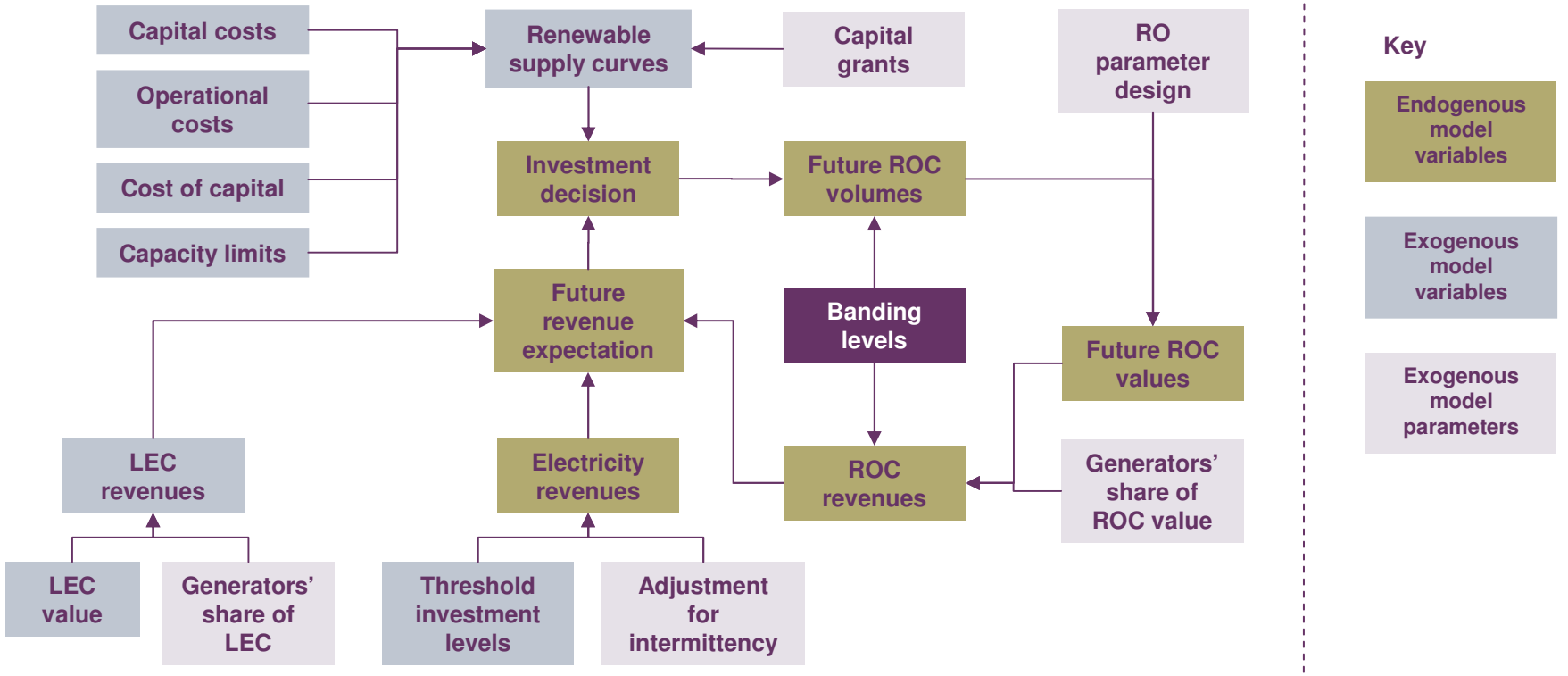
The UK Renewables Obligation

Modelling ROC price formation (illustrative)



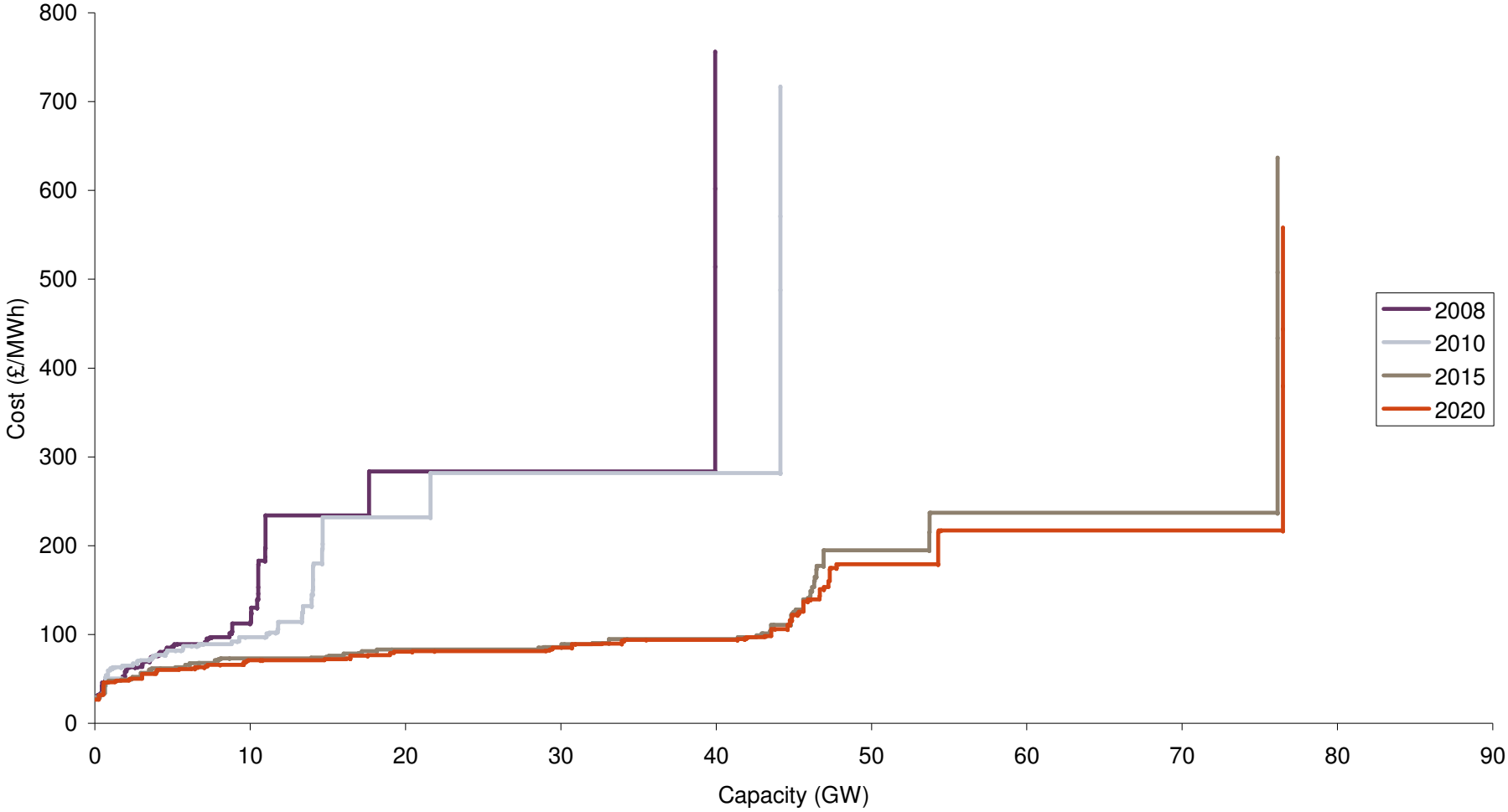
The renewables market model
Model structure



Source: Oxera analysis.

The renewables market model

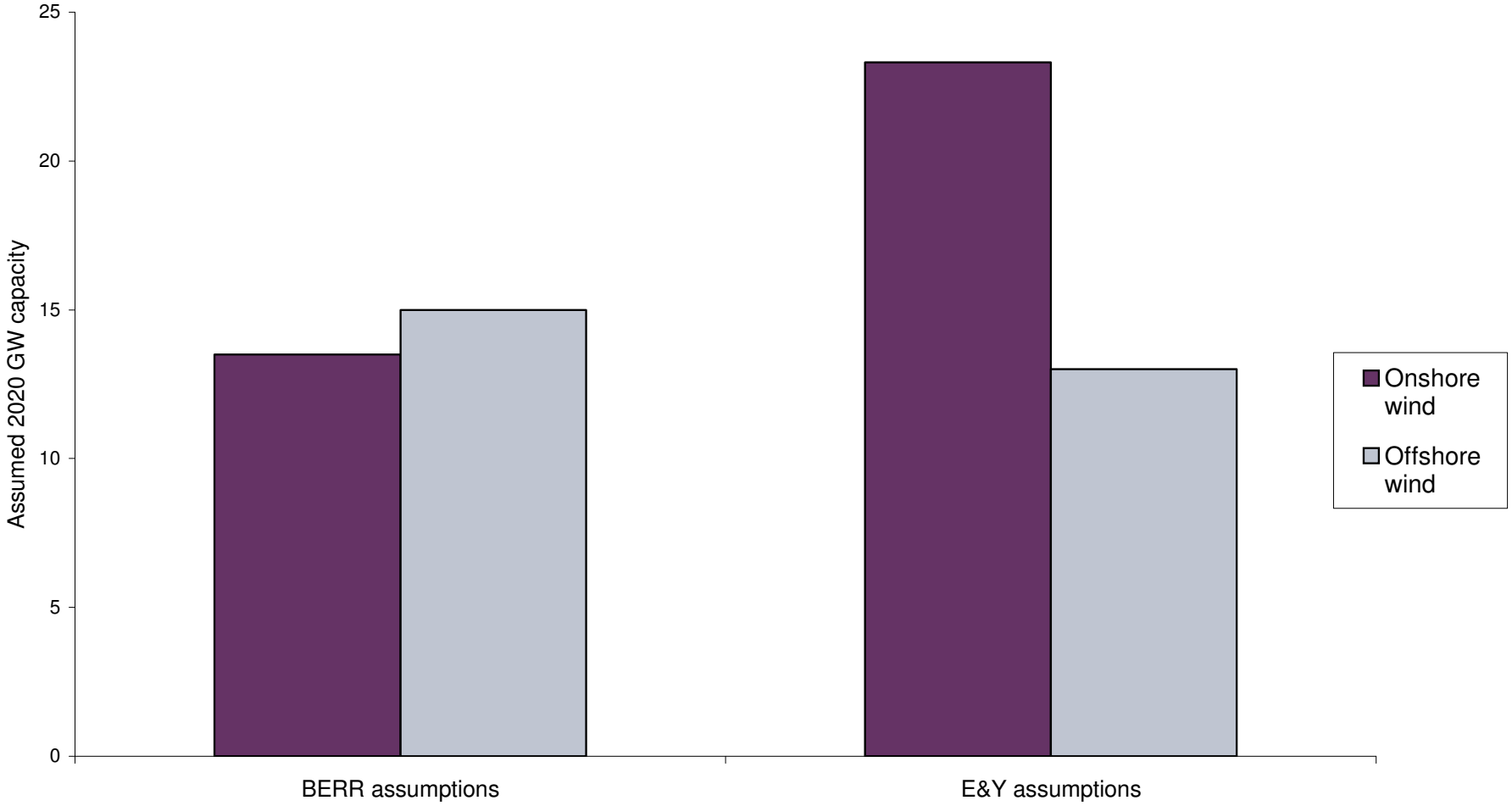
Supply curve assumptions



Source: Adapted from Ernst & Young (2007), 'Impact of Banding on the Renewables Obligation: Costs of Electricity Production', April.

The renewables market model

Capacity assumptions



Sources: BERR (2008). 'UK Renewable Energy Strategy, Consultation', June; Ernst & Young (2007), 'Impact of banding on the Renewables Obligation: Costs of electricity production', April.

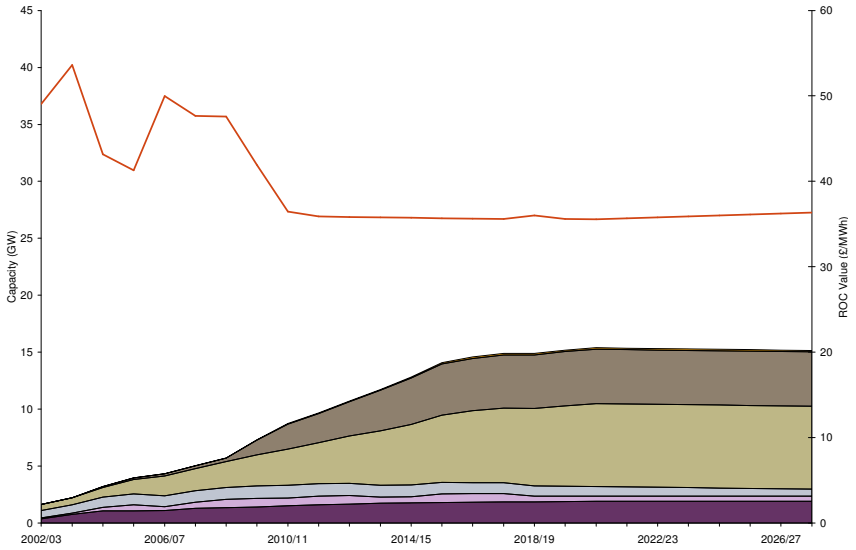
Hypothetical policy scenarios
Policy assumptions

Policy levers	RO base case [1]	Extended RO	RO base case with FIT [2]
RO duration	2027	2032	2027
RO size (2020)	15.4	32	15.4
RO cap (2020)	20	40	20
RO buyout price (£, 2006 prices)	33.24	33.24	33.24
Headroom (%)	8	8	8
Banding	Yes	Yes	Yes
Offshore wind build rate (GW/year)	1	3	1
Other support	None	None	FIT (post-2015) [3]

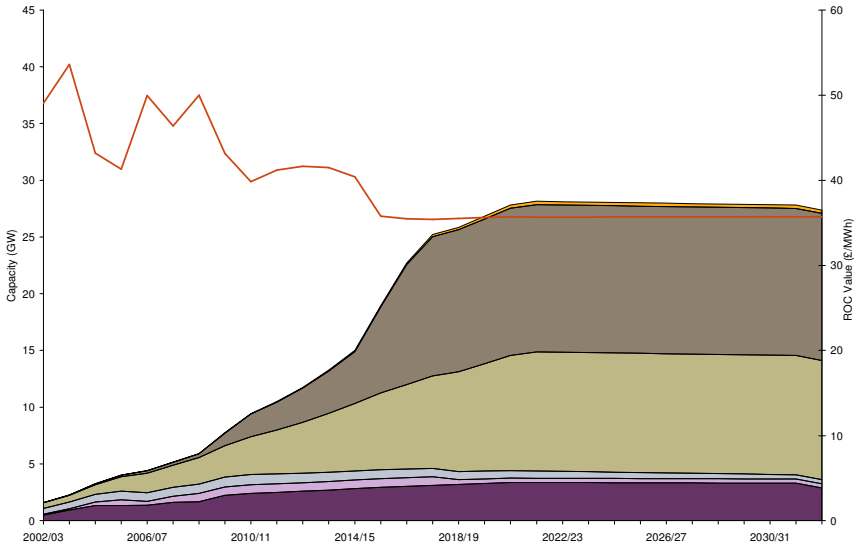
Notes: [1] Based on BERR response to the Renewables Obligation consultation. [2] This scenario models a feed-in-tariff premium £50–£70), depending on wind generation technology), which is applied alongside the RO base case policy. [3] FIT applied after 2015 for offshore wind and high-cost onshore wind technologies.
Source: BERR (2008), 'Renewables obligation consultation: Government response', January; Oxera analysis.

Hypothetical policy scenarios
Implications for the RO

RO base case

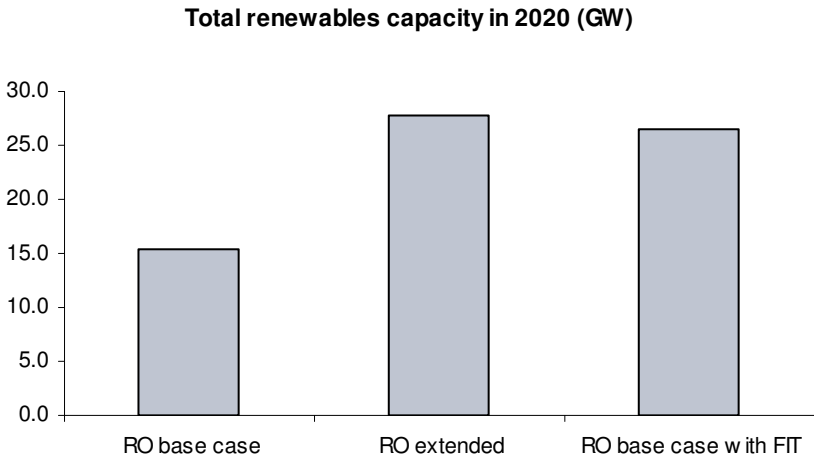


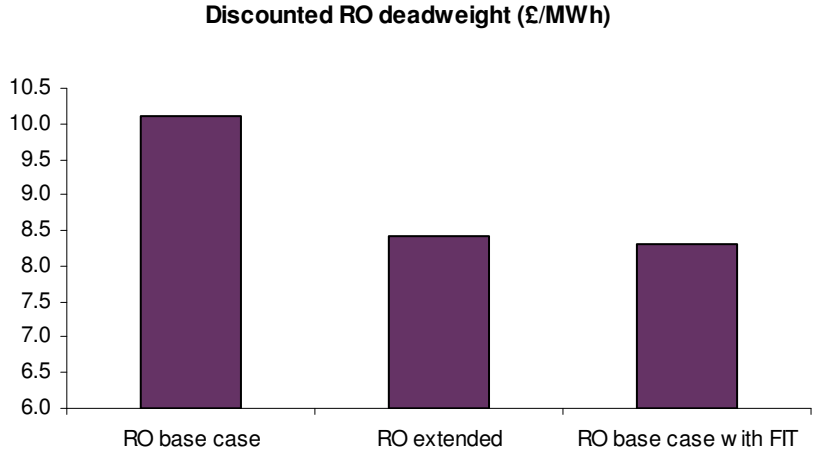
Extended RO

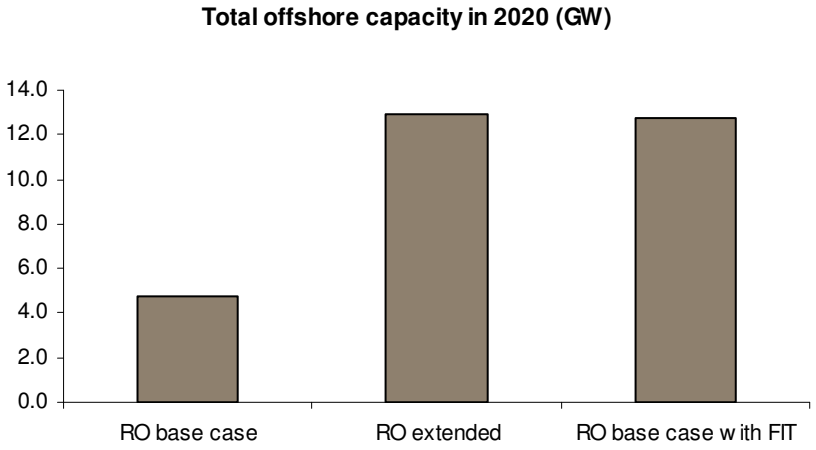


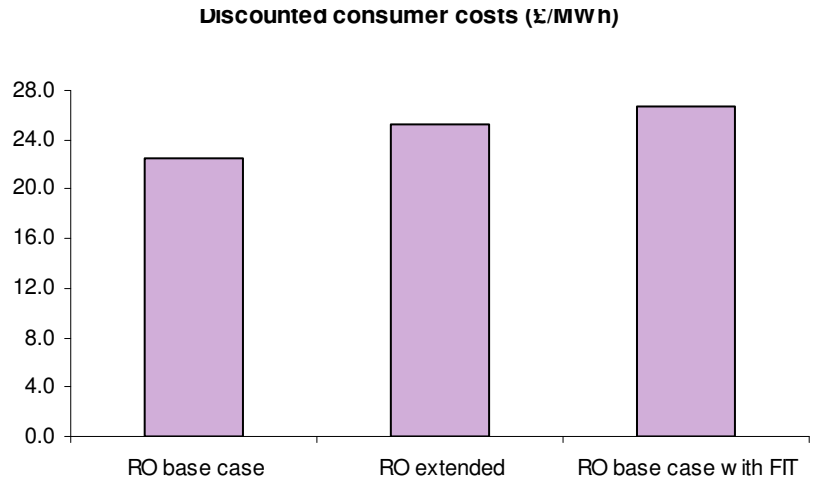
Source: Oxera analysis.

Hypothetical policy scenarios
Effectiveness, efficiency and distributional impacts









Notes: 'Deadweight' costs here refer to the opportunity cost of renewable generation subsidies not borne by consumers. Discounted costs are calculated using a public sector discount rate.
Source: Oxera analysis.

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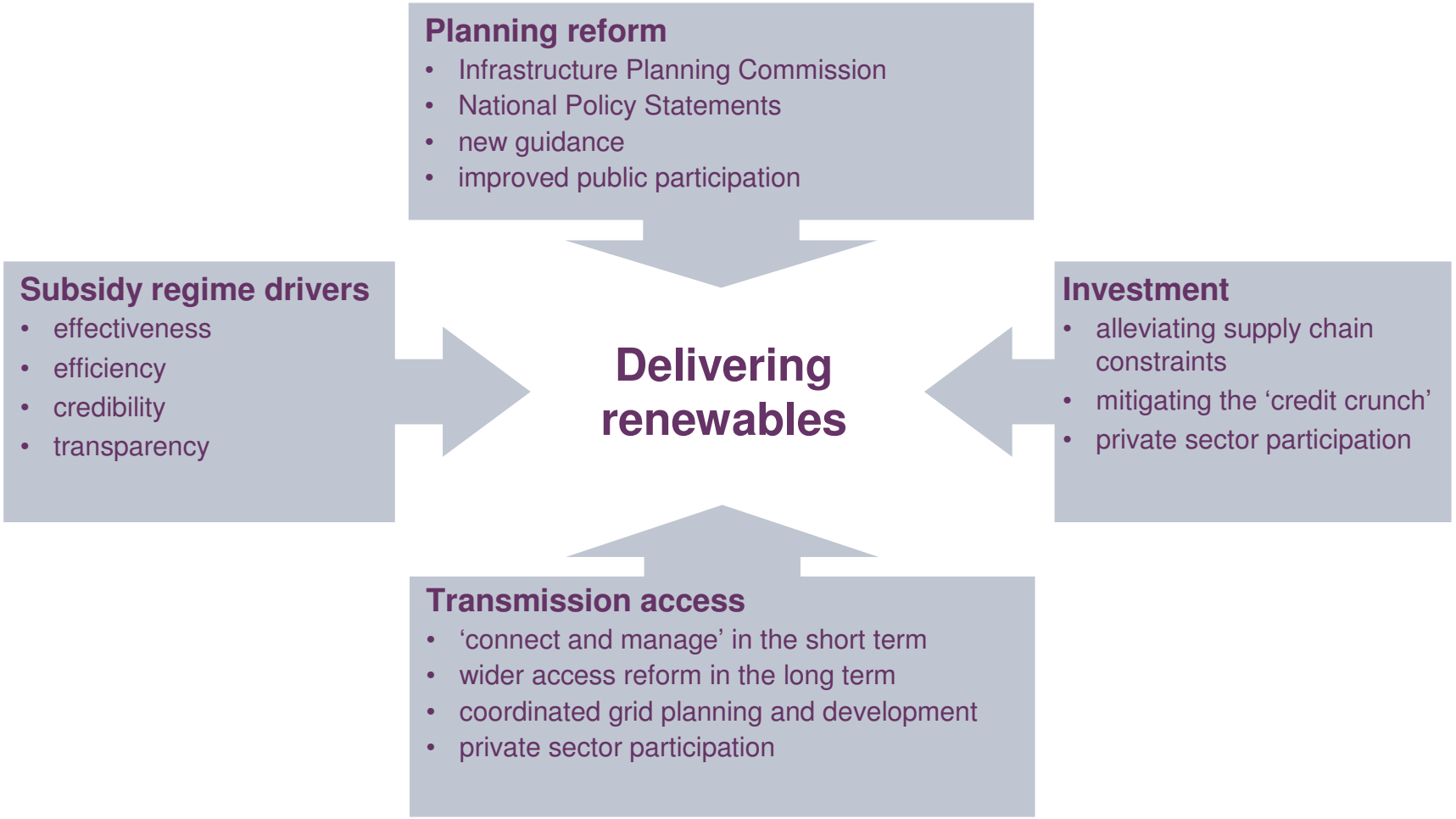
Delivering renewables

What is already being done?



Deployment under uncertainty

Mechanism type	FIT (fixed price)	RO (hybrid price/quantity)	Auction (fixed quantity)
Cost uncertainty	-	++	+
Learning effects	-	+	++
'Non-price' drivers	+	-	--
Power price risk	+	-	+

Given the diversity of renewable generation technologies and their state of development, this may imply that different policies could be optimally employed for different technologies.

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