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Financing renewable energy investments

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Insight in Economics™

Overview

1. Renewable electricity investment – trends and needs
2. Investment and financing challenges
3. Targeting renewable energy – or carbon?

1 Renewable electricity investment – trends and needs

Investment in renewables has tripled globally since 2005, with 55% in developing countries

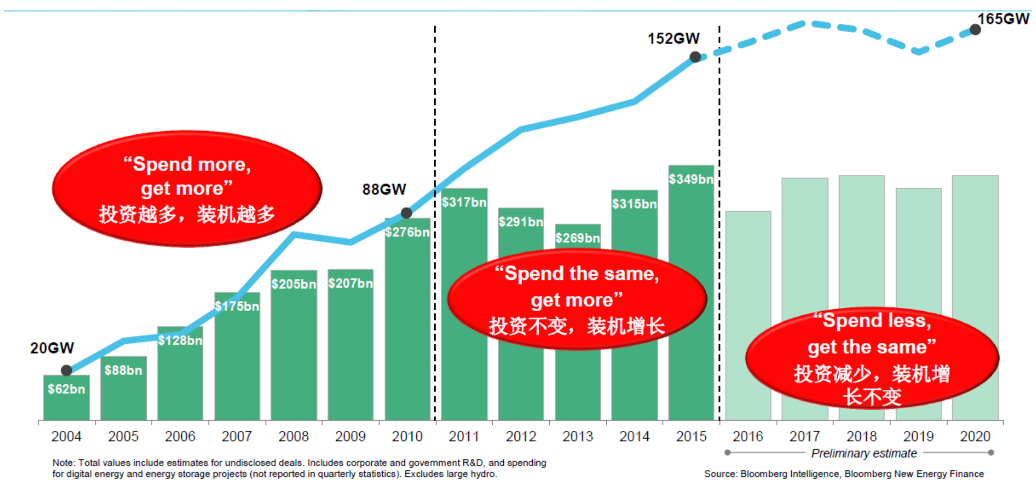
Financial markets are delivering significant cleantech investment

- Global investment was around $300-350bn in 2015, up from around $90bn in 2005
- Investment supported build of 152 GW in 2015
- Investment growth slowing – but continued strong capacity growth due to lower costs

But more needed for 2C trajectory…

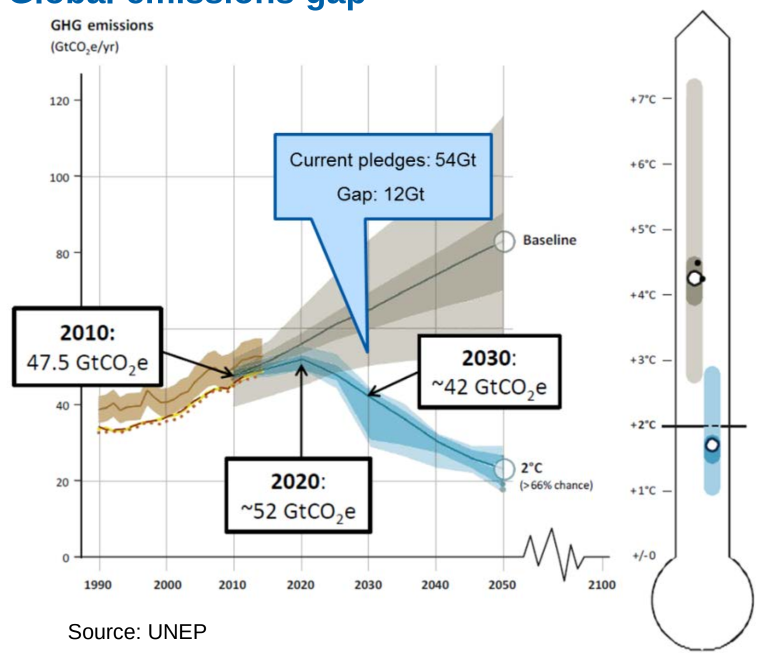
- IEA: Investment of over $450bn/year needed in nuclear and renewable energy 2015-2030 for 450ppm scenario.
- Total power (generation) investment 2015: $410bn
- UK Carbon Budgets to 2030
  - BEIS: on track for 35% renewable electricity by 2020
  - CCC: policy gap to the carbon budget of 100MtCO2e (20% of current emissions)

Global investment in renewable energy 2004-2020



Source:BNEF

Global emissions gap



Source: UNEP

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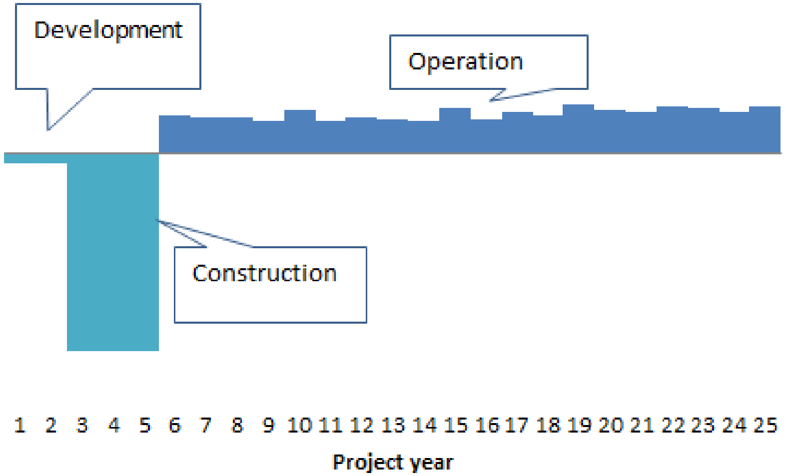
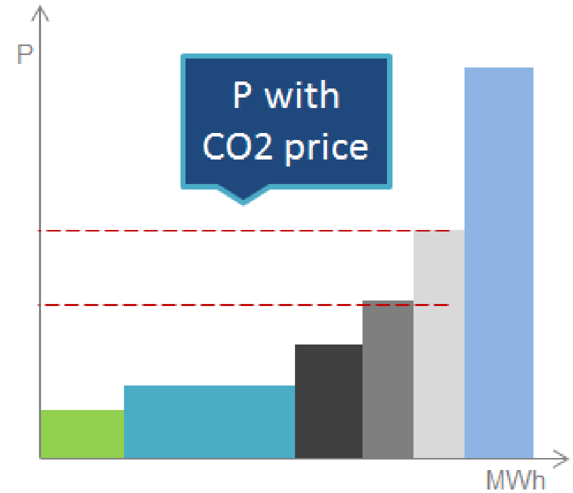
2 Investment and financing challenges

Financing investment in renewable electricity – challenges

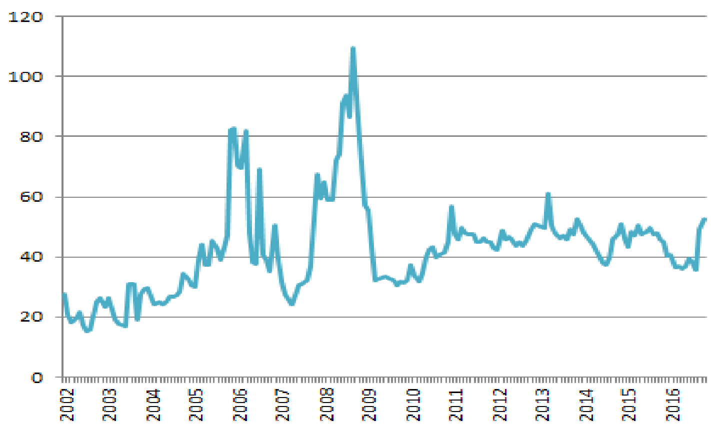
High upfront capex, financed against stream of electricity price revenues



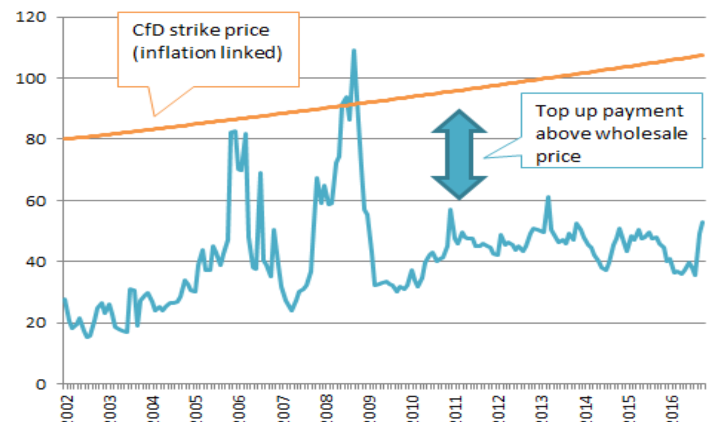
Carbon price? Results in economic rents for incumbent producers at high cost to consumers



Electricity price revenues are uncertain

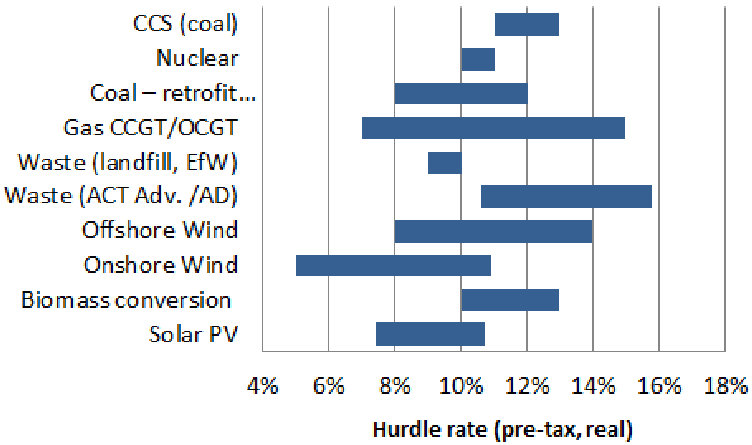


Renewable subsidies – on top of electricity price
FITs, RO, CfD

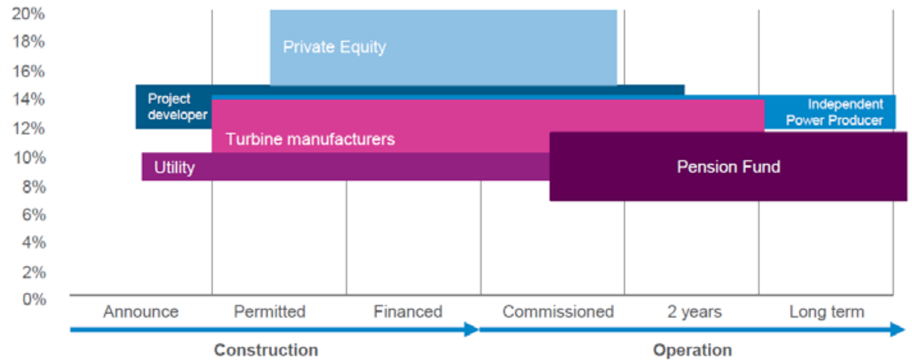


Finance is available – at a cost

Whole project rate of return: IRRs of 5-16%
NERA Survey of investors (2015), report for DECC

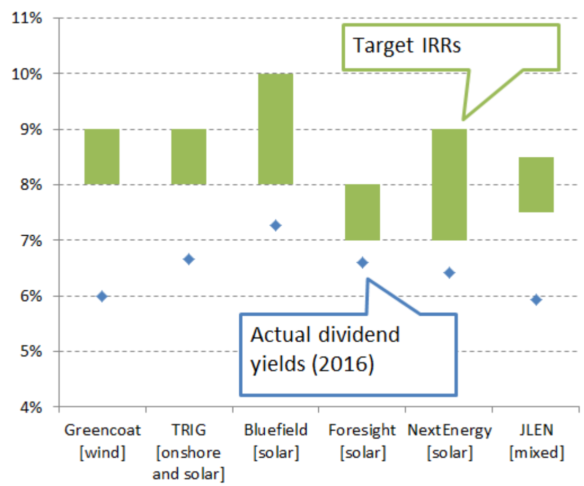


Different investors have different preferences
Return expectations and entry stage



Source: UKTI et al (2015) Offshore wind investor pitchbook

Investors post-construction/operation: 6-7%
Yieldcos for portfolio of technologies and sites



Source: NERA analysis based on share prices and dividend payments

CMA assessment of power generation WACC (2015)

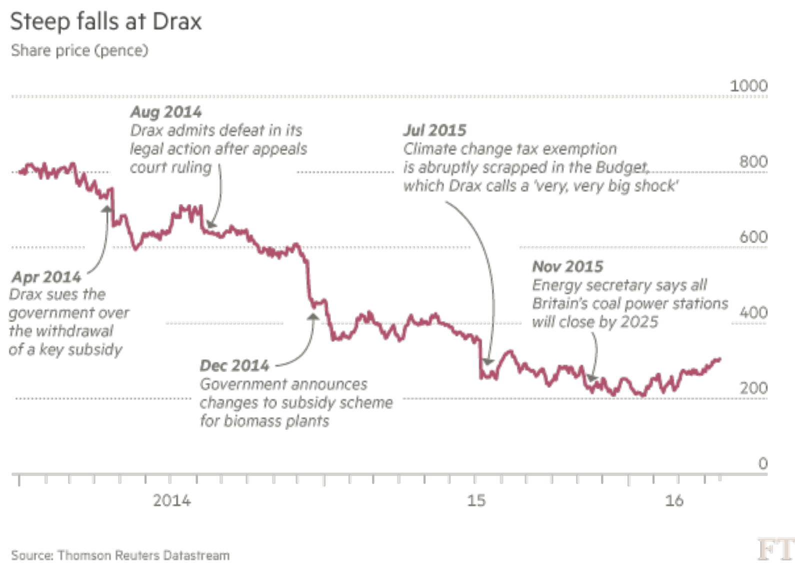
- Benchmark WACC for power generation 7.9-9.7% pre-tax, nominal (based on existing operational fleet 2007-14)

Policy risk is difficult to hedge

Government changes to renewable subsidies and taxes (2015)

- Early closure of RO for solar and onshore wind, and the scheme closes to new accreditation from 1 April 2017 (with grace periods)
- End of tax exemption for renewables (CCL levy exemption) had a significant on renewable energy developers
- Possible changes to the Carbon Price Support (CPS) at every budget and autumn statement

Impacts on share prices, Beta and cost of capital



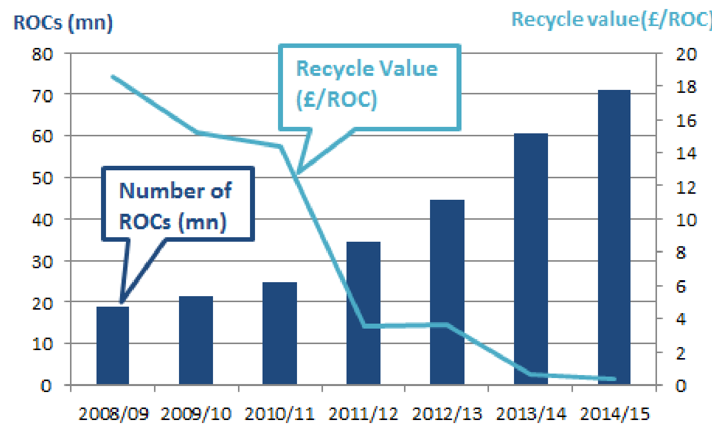
Source: FT/ Thomson Reuters Datastream

ROCs and CfDs

- ROCs provide revenue per MWh on top of the electricity price. ROC price is determined by supply and demand. Demand is set by the Government (BEIS).
- ROC price risk is significant – see chart.
- CfD contract provides additional investor protection. But before contract is allocated there is significant allocation risk.

Between a ROC and a hard place

ROC recycle values have been falling



Source: NERA Analysis

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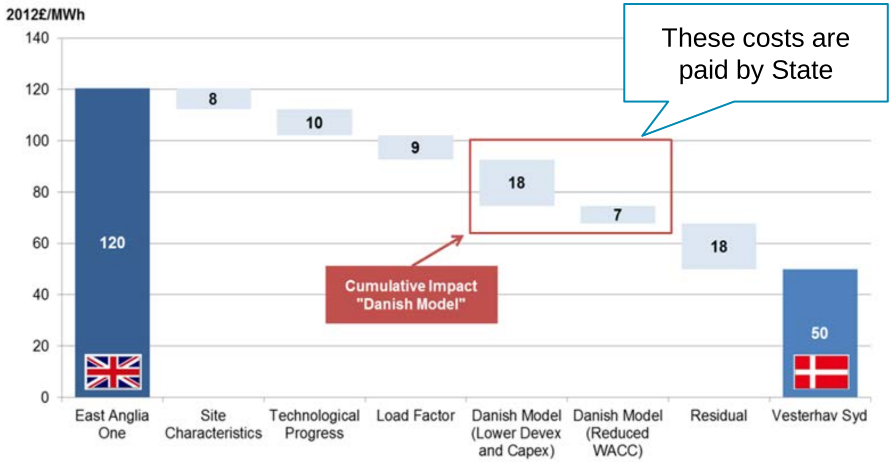
3 Targeting renewable energy – or carbon?

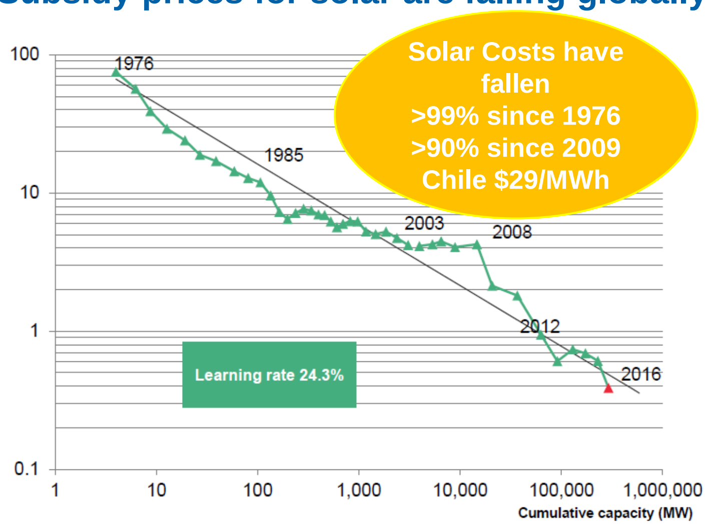
Falling costs presents an opportunity

Subsidy prices for offshore wind are falling in North West Europe



Source: NERA Analysis

Subsidy prices for solar are falling globally



Source: BNEF

How should policy evolve?

- More technology neutral auctions (CMA)?
- Start contemplating subsidy-exit (“Subexit”)?
- Clear, long term policy decisions to avoid unnecessary risk premia
- How to integrate variable/intermittent renewables in the most cost-effective way?
- How to avoid renewables undermining energy markets and price signals for other plant?
- Move back towards pricing the CO2 externality instead of subsidising specific technologies?

Pricing the carbon externality instead of subsidising renewables?

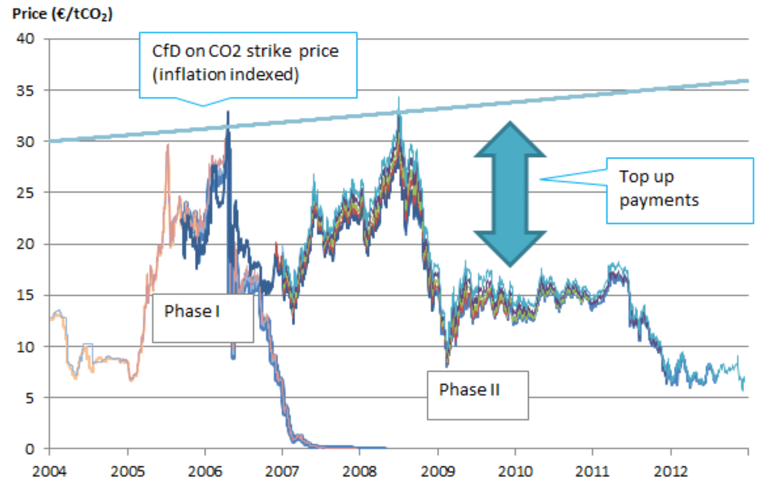
A CfD on the carbon price (EU ETS)?

- Idea proposed by Grubb and Newbery (2008)
- Key policy design issues would need to be worked out, but for example:
  - *Long term contract* (15 years like renewable electricity CfDs),
  - *Pays top up against the EU ETS price (or UK Carbon Price Floor)*
  - *Price set through auction*
  - *Payment based on carbon saved per MWh.* How much CO2 is a MWh of renewable/nuclear/CCS displacing? What is the counterfactual? CCGT? OCGT? Average grid intensity?

Benefits

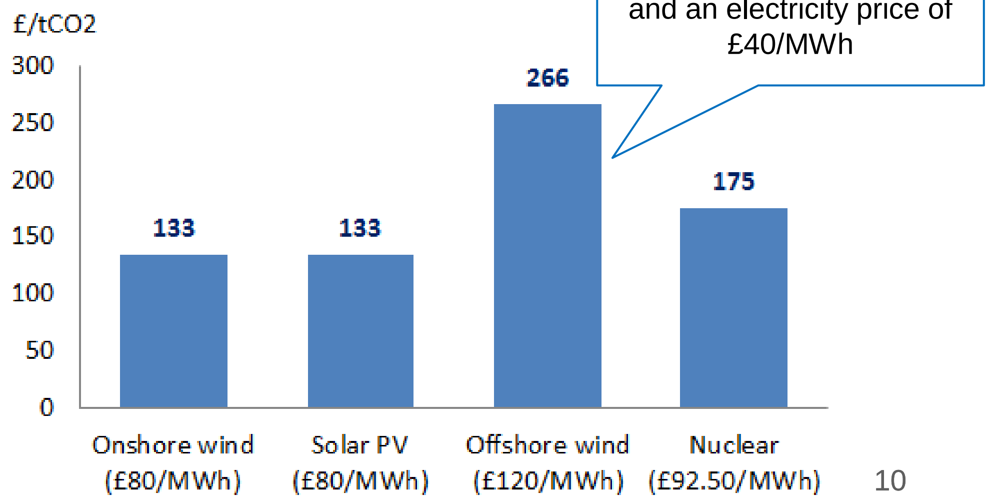
- More investable than "pure" CO2 price (EU ETS) – and avoids paying rents to existing capacity
- Exposes generators to the market (makes them responsive to demand) – like premium FIT/ROC
- But better than Premium FIT in that it dynamically adjusts to the carbon price. Protects investors from carbon policy risk, but not electricity market risk

A CfD on the carbon price – illustrated



Source: Point Carbon, NERA analysis

Price levels required (£/tCO2)



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