The challenges of reforming electricity markets in line with the low carbon agenda

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Outline

- Context of UK Energy Policy
- Principles and Problems
- Technologies
- Current policies
- Proposed changes
- Conclusions

The objectives of UK energy policy

- The impossible trinity:
  - Competitiveness
  - Energy Security
  - Decarbonisation

- The other ones:
  - Elimination of (energy) poverty
  - Renewables??
  - Green jobs/economy/technology???

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European Energy Policy Context

- 20-20-20 Targets for 2020:
- 20% reduction in CO2e   (hard target)
- 20% renewable energy   (indicative target)
- 20% reduction in energy intensity   (aspirational target)

- Completion of Electricity and Gas markets (3rd Energy Package)

- Energy Security Directive, Energy Services Directive etc…

- Reality of patchy implementation

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UK Decarbonisation targets

- UK in 2009 GHGs: -25.7% relative to 1990
- Kyoto Target: -12.5% by 2020

- 2008 Climate Change Act
  - 80% reduction by 2050 (-34% by 2020)
  - Climate Change Committee
  - Five Year Carbon budgeting
  - First report: complete decarbonisation of electricity by 2030

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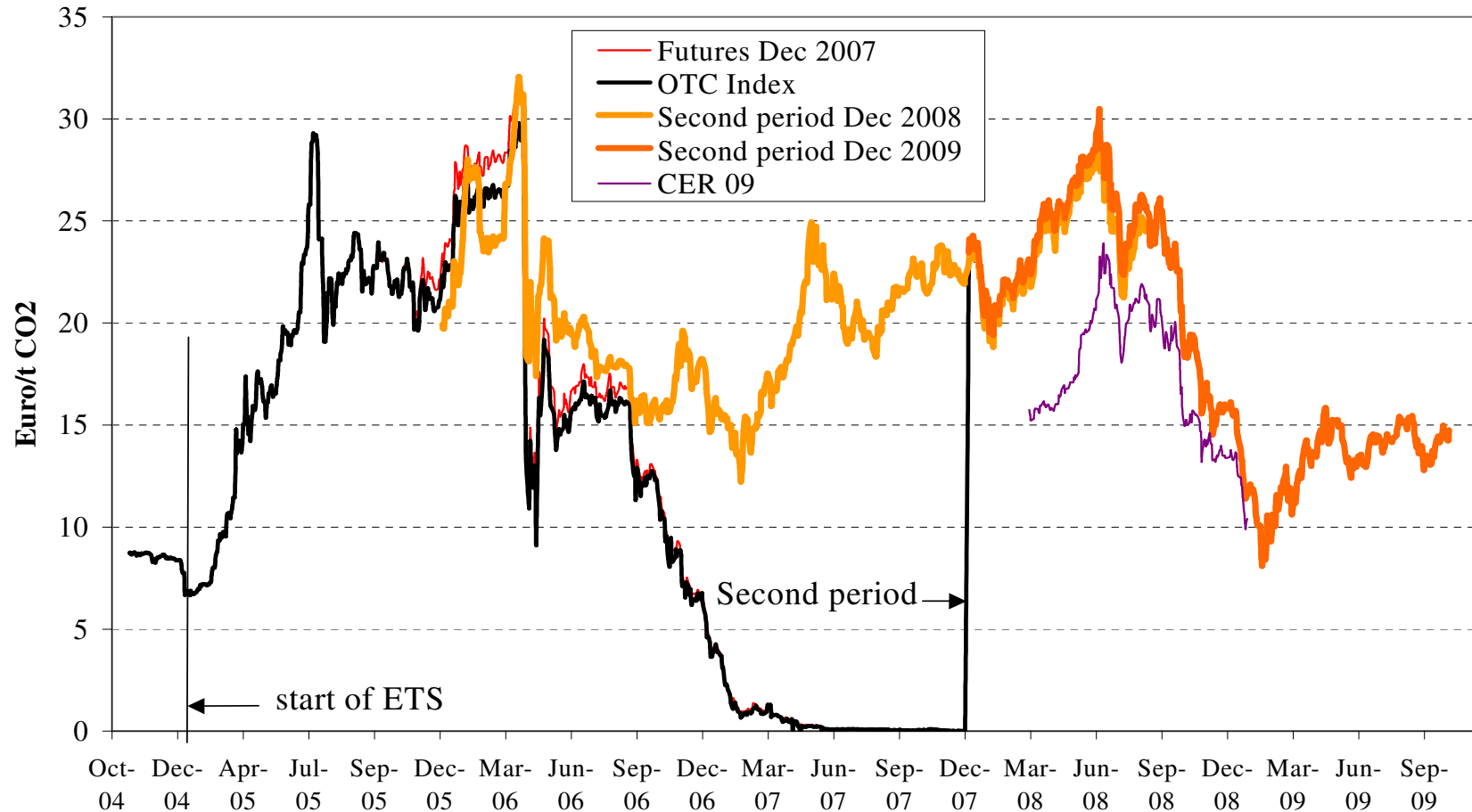
UK Renewables Targets

- UK committed (in draft) to 15% target for renewables contribution to <u>total final energy consumption</u> in 2020 (3.0% in 2009).

- Currently support regime only envisages 15.4% renewables in electricity by 2015-16.

- 2010 target of 10% for electricity from renewables.

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Three economic principles

- <u>Carbon externality</u> needs to be priced

- Subsidies where exists <u>learning effect</u>

- Net *and* gross <u>cost effects significant</u>

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Current carbon prices are volatile...

EUA price 25 October 2004-27 September 2009

Renewables expensive and difficult…

	Target renewable share in GB	% Delivery in UK	Nominal Buyout Price £/MWh	Total Cost £m
2002-03	3.0	59%	30.00	282.0
2003-04	4.3	56%	30.51	415.8
2004-05	4.9	69%	31.59	497.9
2005-06	5.5	76%	32.33	583.0
2006-07	6.7	68%	33.24	719.0
2007-08	7.9	64%	34.30	876.4
2008-09	9.1	65%	35.36	1036.2
2009-10	9.7	71%	37.19	1108.6
2010-11	10.4		+ inflation thereafter	
2011-12	11.4			
2012-13	12.4			
2013-14	13.4			
2014-15	14.4			
2015-16	15.4			Estimated: ~1753m (2008-09 prices) assuming no demand growth

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Nuclear?

Carbon Capture and Storage?
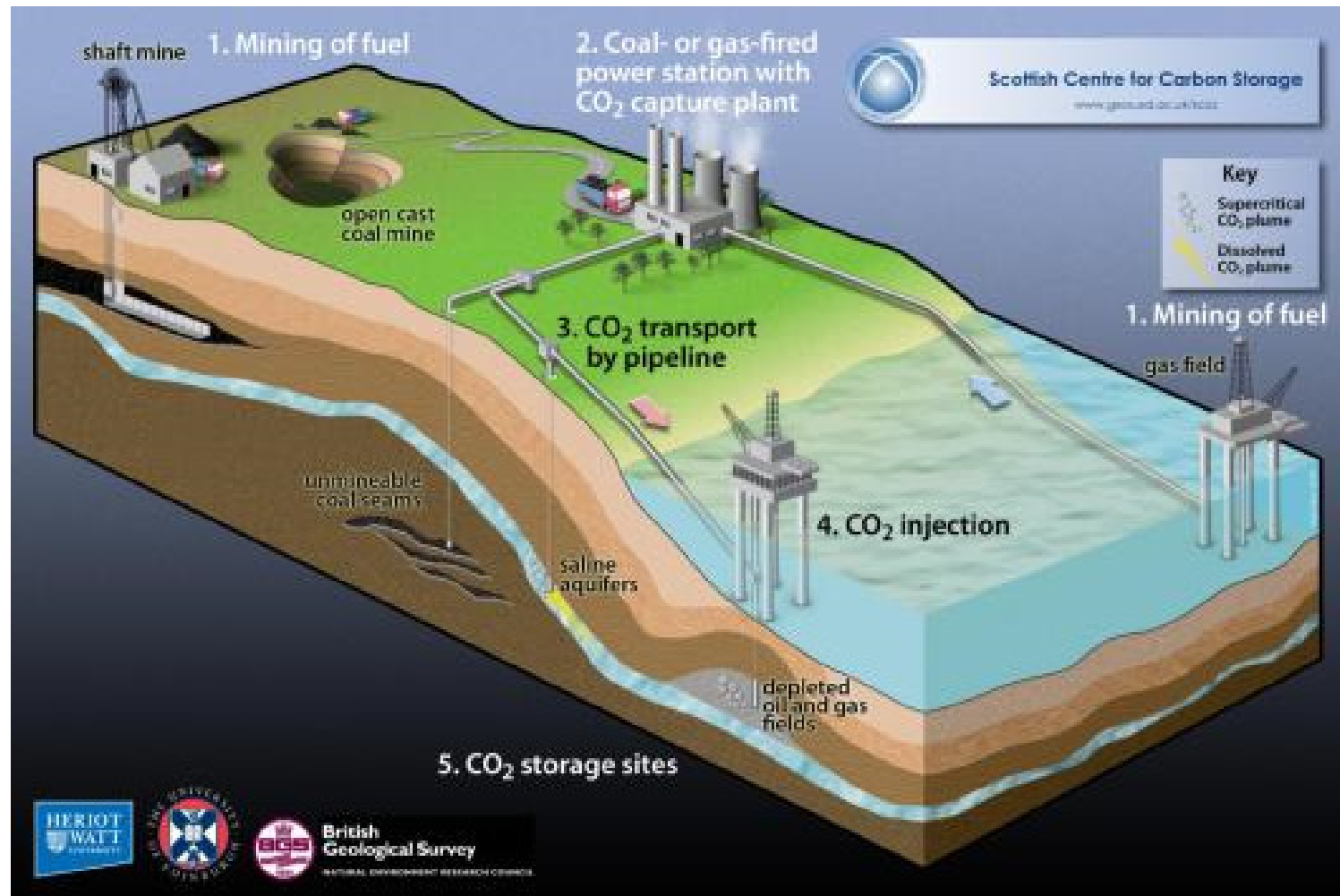
Renewables?

Demand Reduction?

Are policies working?

- Lack of high and stable enough carbon price:
  - Inhibits demand response.
  - Has delayed nuclear investment (if truly efficient).
  - Has led to more coal and less gas being burnt (and more CO2).
  - Has slowed development of bio-fuels (land fill gas and co-firing) and prolonged their subsidy.
- As a result:
  - Mature low carbon technologies have not emerged strongly.
  - Large reliance has been placed on subsidies to less developed technologies.
  - General policy uncertainty has delayed investment and unnecessarily raised issues of 'will the lights go out'.

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Proposed Electricity Market Reform

- **(i) Low Carbon Generation**

The reform proposes the setting up of a system of contracts for differences (CFDs) whereby <u>the government would contract with low-carbon generators to supply electricity at fixed prices for a prolonged period.</u> These contracts would pay the generators the difference between the average wholesale price of electricity and the contract price.

Proposed Electricity Market Reform

- **(ii) Carbon Pricing**

The reform proposes the introduction of a carbon price support (CPS) based on the existing climate change levy (CCL). This would involve increasing the rate and coverage of the climate change levy to <u>effectively increase the price of carbon emissions from the electricity sector in the UK above that in the rest of the EU.</u>

Proposed Electricity Market Reform

- **(iii) Emissions Performance Standard**

  Coal fired generation has average CO2 emissions of around 915g/kWh; a modern gas-fired power plant about 405g/kWh. The reform proposes an emissions performance standard (EPS) for all new power plants of either 600g/kWh or 450g/kWh, <u>designed to rule out the building of new coal-fired power plants without carbon capture and storage (CCS) technology fitted</u>.

Proposed Electricity Market Reform

- **(iv) Capacity Payments**

The reform proposes the introduction of a capacity mechanism (CM) to contract for the necessary amount of capacity to maintain security of supply. This would involve <u>the introduction of payments to generators for maintaining availability</u>, supplementing the market for units of electrical energy that exists at the moment. This deals with predicted low capacity margins by 2018.

Proposed Reforms (Pollitt, 2011)

- Capacity Markets ?
- Emissions Performance Standard ???
- Carbon Price Support YYY
- Low Carbon CFDs Y??

- Bill impacts:
  – Households: +33% by 2030
  – Businesses: +62% by 2030
  – Wholesale prices: +80% by 2024

Conclusions on sensible policy

(Noel and Pollitt, 2010)

- High & stable (or credibly rising) carbon prices

- A learning benefit-based renewables policy

- A fact-based electricity security policy

- Better public engagement on costs of policy

- More reliance on market mechanisms

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