

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

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# Outline

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

# The objectives of UK energy policy

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- The impossible trinity:
  - Competitiveness
  - Energy Security
  - Decarbonisation
- The other ones:
  - Elimination of (energy) poverty
  - Renewables??
  - Green jobs/economy/technology???

# European Energy Policy Context

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- 20-20-20 Targets for 2020:
  - 20% reduction in CO<sub>2</sub>e (hard target)
  - 20% renewable energy (indicative target)
  - 20% reduction in energy intensity (aspirational target)
- Completion of Electricity and Gas markets (3<sup>rd</sup> Energy Package)
- Energy Security Directive, Energy Services Directive etc...
- Reality of patchy implementation

# UK Decarbonisation targets

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- 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

# UK Renewables Targets

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- UK committed (in draft) to 15% target for renewables contribution to total final energy consumption 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.

# Three economic principles

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- Carbon externality needs to be priced
- Subsidies where exists learning effect
- Net *and* gross cost effects significant

# Current carbon prices are volatile...

EUA price 25 October 2004-27 September 2009





# Renewables expensive and difficult...

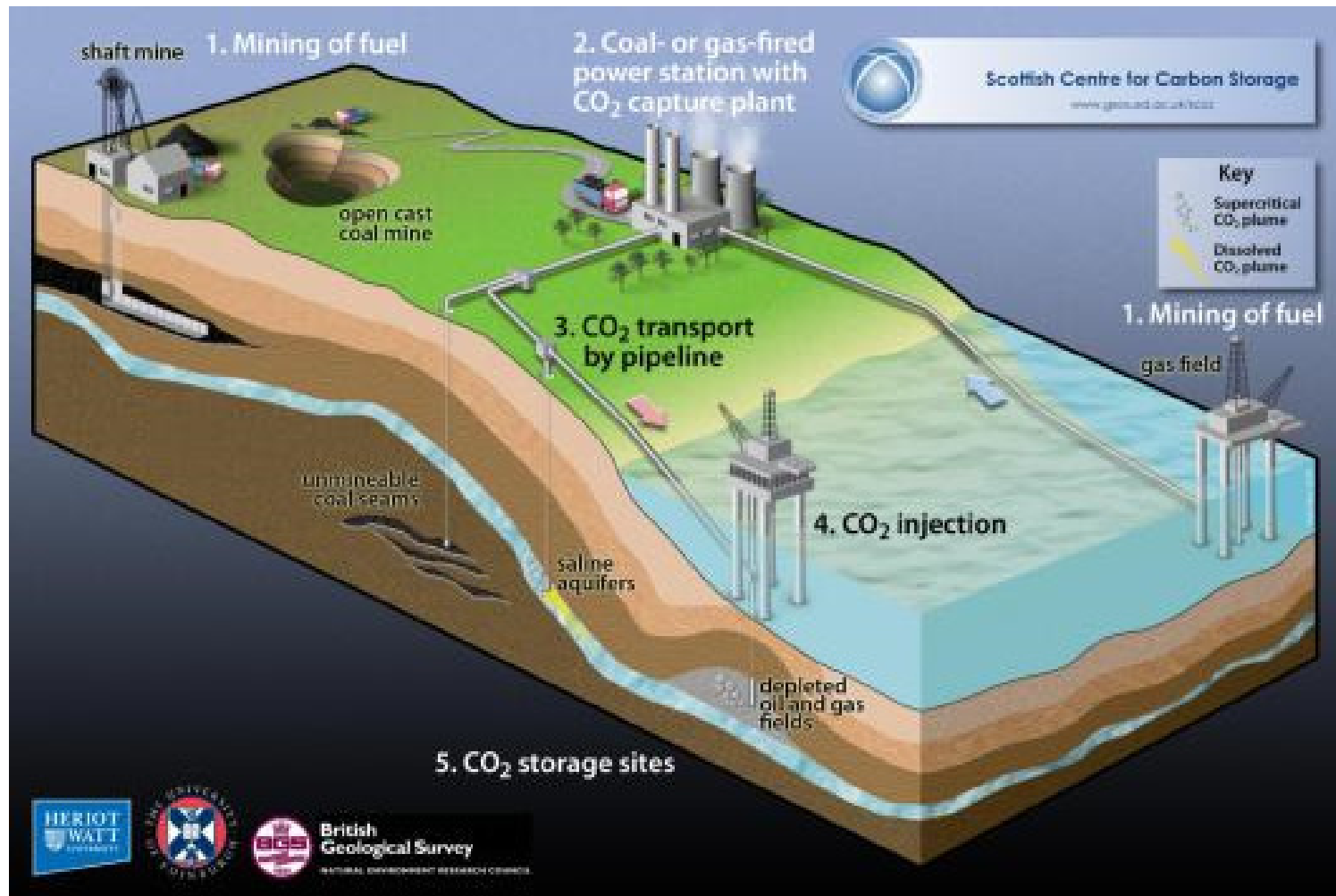
	<b>Target renewable share in GB</b>	<b>% Delivery in UK</b>	<b>Nominal Buyout Price £/MWh</b>	<b>Total Cost £m</b>
2002-03	3.0	59%	30.00	282.0
2003-04	4.3	56%	30.51	415.8
2004-05	4.9	69%	31.59	497.9
2005-06	5.5	76%	32.33	583.0
2006-07	6.7	68%	33.24	719.0
2007-08	7.9	64%	34.30	876.4
2008-09	9.1	65%	35.36	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

# Nuclear?

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# Carbon Capture and Storage?



# Renewables?

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# Demand Reduction?

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# Are policies working?

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- 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 CO<sub>2</sub>).
  - 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’.

# Proposed Electricity Market Reform

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- **(i) Low Carbon Generation**

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

# Proposed Electricity Market Reform

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- **(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 effectively increase the price of carbon emissions from the electricity sector in the UK above that in the rest of the EU.



# Proposed Electricity Market Reform

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- **(iii) Emissions Performance Standard**

Coal fired generation has average CO<sub>2</sub> 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, designed to rule out the building of new coal-fired power plants without carbon capture and storage (CCS) technology fitted.

# Proposed Electricity Market Reform

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- **(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 the introduction of payments to generators for maintaining availability, 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)

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- 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

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(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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