

THE BRITISH GOVERNMENT'S ENERGY MARKET REFORM

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Economic Challenges for Energy
Madrid

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The Green Agenda/1

- As well as wanting to save the world Blair wanted to save the planet so we got
 - * series of White Papers
 - * Stern Report
- We had the most unwise and expensive subsidy mechanism – Renewable Obligation Certificates – which piled risk on risk on risk so increased the cost of capital and missed targets

The Green Agenda/2

- In May 2007 - without taking advice - Blair signed up to the 2020 Renewables Directive
 - * Britain to achieve 15% of total consumption renewable up from 1.3% - electric industry up from 4% to 30%
 - * did Blair think he was signing up to 15% for the electric industry?
 - * implies cost to Britain of 25% of all EU costs to meet 20/20 Renewables

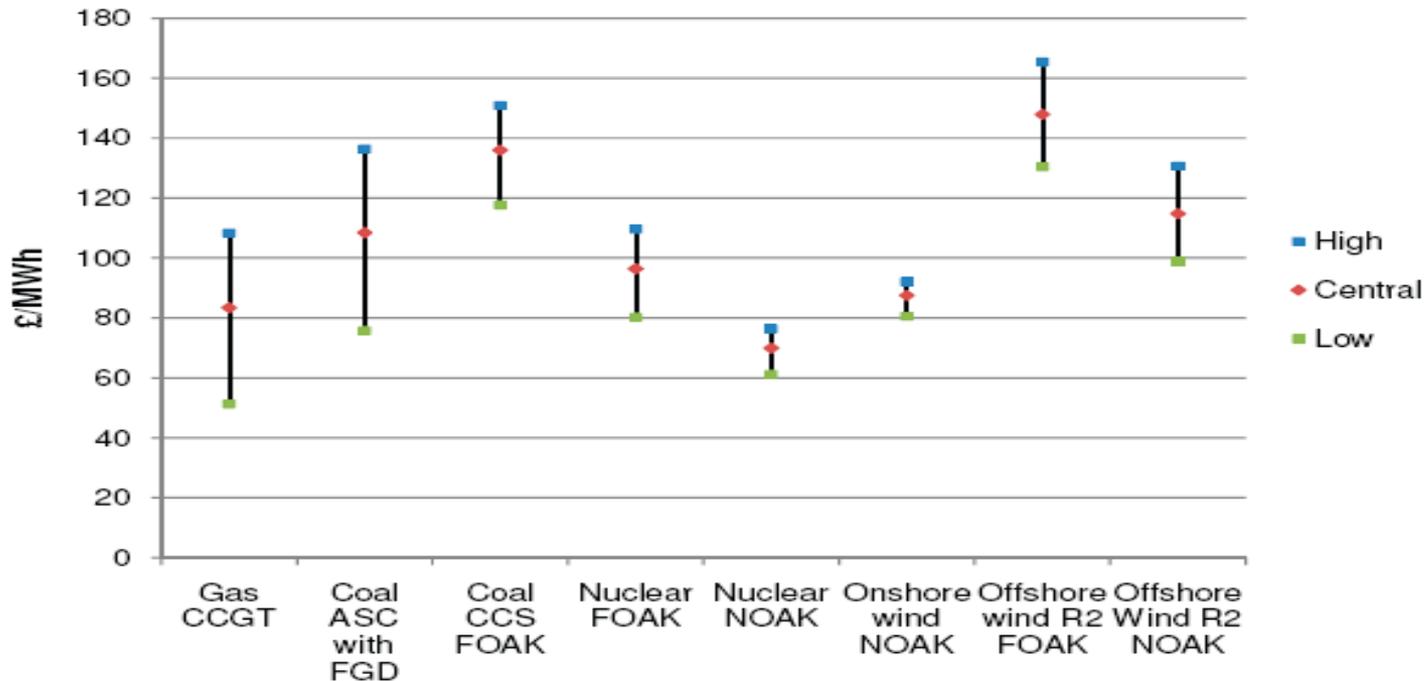
The Green Agenda/3

Implications for the electric industry

- ~10GW on-shore windmills
- ~20GW off-shore windmills
- Massive capex - £110bn this decade
- Higher prices
- Turn the electric industry upside down

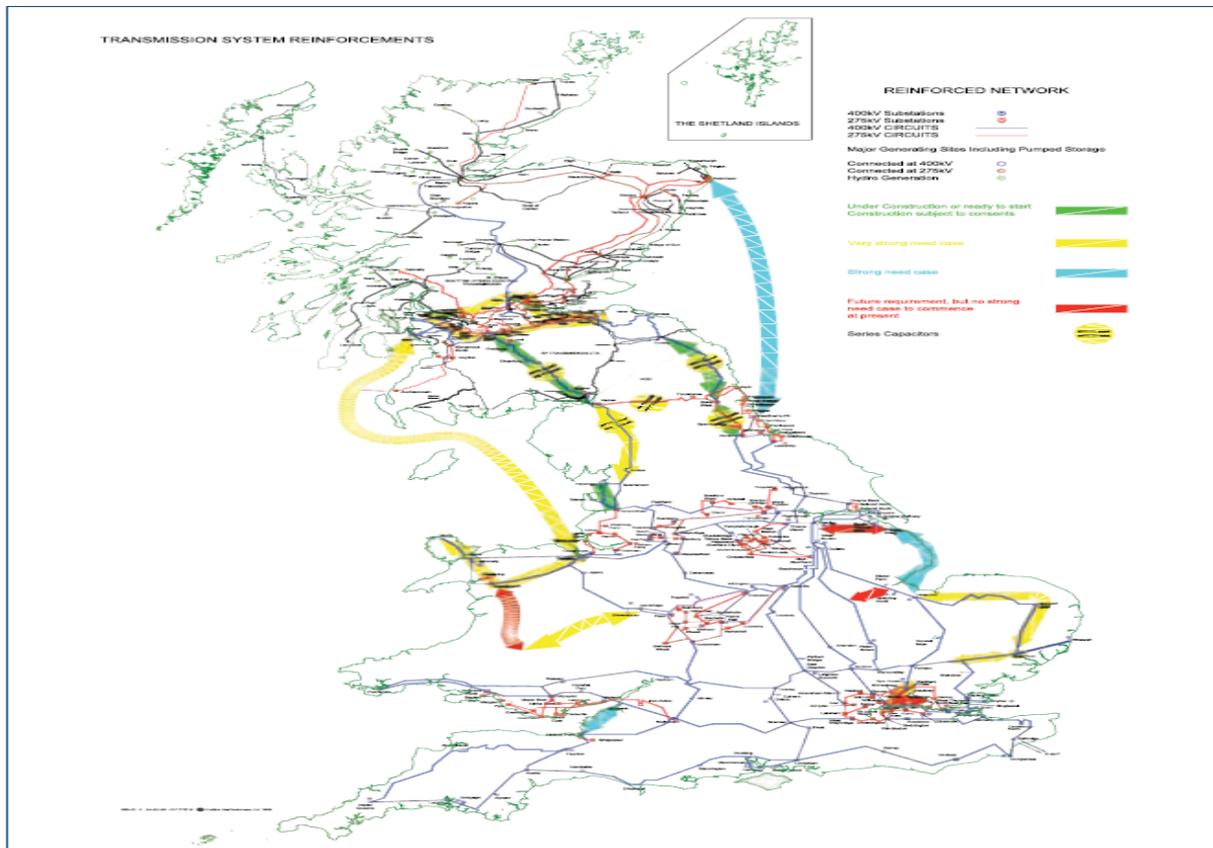
The Green Agenda/4

Levelised costs of generation technologies



The Green Agenda/5

Proposed expensive transmission reinforcements



The Green Agenda/6

- The government hopes for nuclear plants
 - * taken steps to streamline licensing and planning
- The government is in begging mode
 - * developers say jump
 - * government responds “how high”

The Green Agenda/7

- End of investment market
 - * de facto central planning
 - * economic competition to build plant replaced by competition for subsidy

The Green Agenda/8

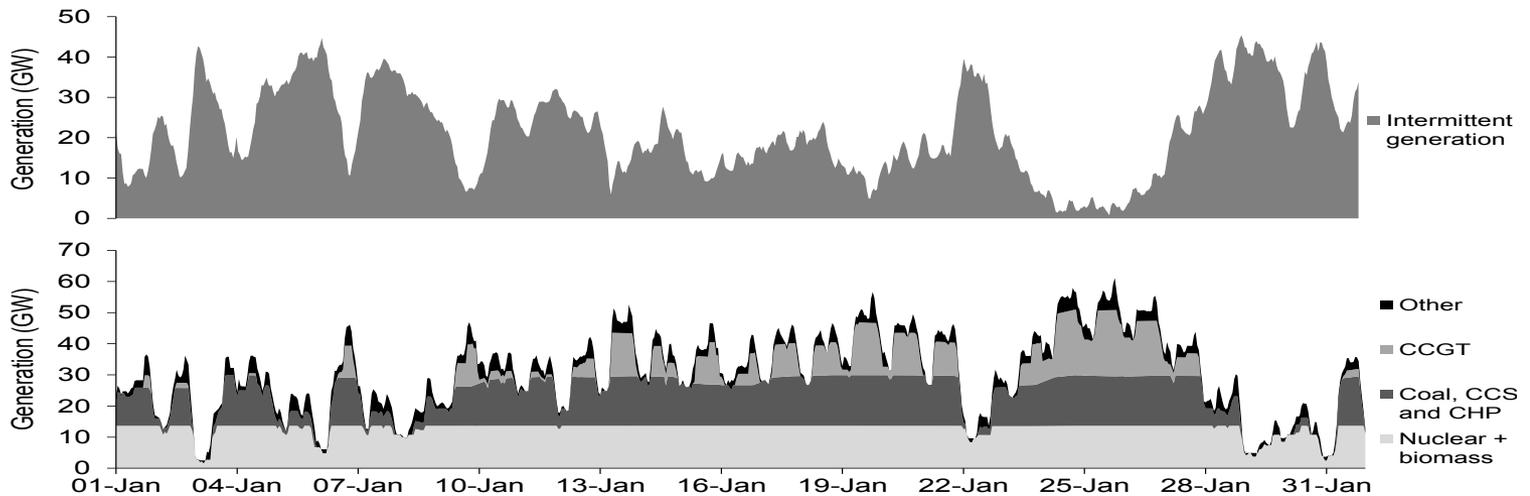
A market has 2 main roles

- Long-term signal need for investment and (hopefully) remunerate it
- Short-term signal to incentivise merit order and response to scarcity

The Green Agenda/9

British market in January 2030 with 2000 weather

Source: Pöyry



The Green Agenda/10

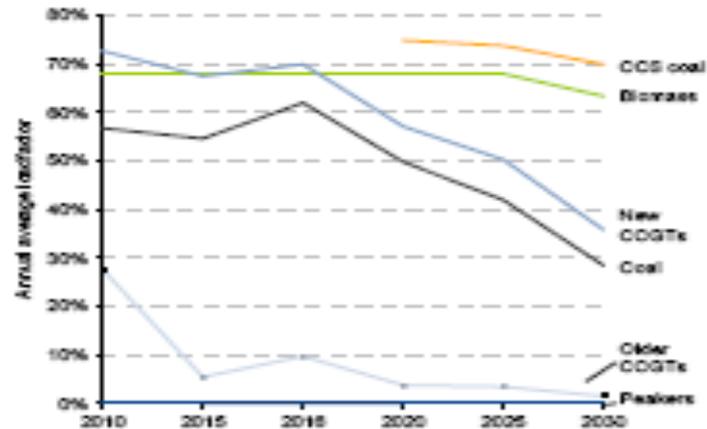
Extensive wind has two price effects

- Reduces average
- Makes prices very volatile

And undermines investment role of market

The Green Agenda/11

Extensive wind also reduces thermal plant load factors



Source: Pöyry

The Green Agenda/12

And increases plant starts p.a.



Source: Pöyry

The Green Agenda/13

In energy-only market price volatility makes investment in back-up gas plant problematic

- This comes on top of 15GW to be closed by 2015 under LCPD

The Electric Market Reform (EMR)/1

- EMR started 2 years ago
- Has proceeded very slowly
- And up some blind alleys due to inexperience of the civil servants
- Still much in the air

The Electric Market Reform/2

- Accepted going to negotiate nuclear plants
- Proposes auctions for windmills
- Need capacity market to support CCGTs to back windmills
- Just agreed single buyer – National Grid

The Electric Market Reform/3

- Re nuclear plants:-
 - * only says they will have negotiated contracts for differences
 - * nothing said about the level and risk sharing of the contracts
 - * nothing said about who will negotiate the contracts

The Electric Market Reform/4

- Sensible approach for nuclear plants is to copy Georgia Power development of Vogtle 3 & 4
 - * against regulated asset base with low cost of capital
 - * capex based on engineering procurement contracts
 - * bonus/penalty award
 - * open book contracts to authority

The Electric Market Reform/5

- The company's capital structure is approximately 45% debt; 10% preferred; and 45% equity; its cost of debt is about 5.8%; its cost of preferred stock is about 6.1%; its post-tax nominal WACC is about 7.8%
- From a customers' perspective this is a significant improvement on the 11.2% the government's consultant suggests
- Using Citi Investment Research cost assumptions this return results in a cost of £80/MWh while the Georgia Power return results in a cost of £56/MWh

The Electric Market Reform/6

- Re windmills will move to auctioning FIT contracts-for-differences

	<i>Intermittent</i>	<i>Baseload</i>
<i>Contract Form</i>	<ul style="list-style-type: none"> • Two-way FIT CfD 	<ul style="list-style-type: none"> • Two-way FIT CfD
<i>Strike price</i>	<ul style="list-style-type: none"> • Annual inflation indexation 	<ul style="list-style-type: none"> • Annual inflation indexation • Minded not to include fuel indexation for biomass. To be confirmed for CCS commercial deployment.
<i>Market Reference Price</i>	<ul style="list-style-type: none"> • Day-ahead price • (choice of baseload vs. hourly prices) • Not averaged over a longer period 	<ul style="list-style-type: none"> • Year-ahead price • Averaged over 12 months prior to delivery year
<i>Contract Volume</i>	<ul style="list-style-type: none"> • Metered output 	<ul style="list-style-type: none"> • To be confirmed: metered output or firm volume

Source: Table 14 IA

- White Paper of July contains lengthy analysis of terms

The Electric Market Reform/7

- Re capacity contracts for gas plant the government has made some serious mistakes
 - * first favoured a “strategic reserve” as per Sweden – not relevant for the problem to be addressed
 - * at first – in ignorance – rejected reliability options as devised by IIT for Columbia and Miles Bidwell for ISO-New England because they were “academic” and “not tested in practice”
 - * took a year to work out that capacity market should be centralised
- Then got the product wrong, saying it was a financial instrument when in fact it is an option on electricity
- Now over to National Grid

The Electric Market Reform/8

- National Grid appointed
 - * to devise and run the capacity market
 - * to settle the capacity market contracts
 - * to settle nuclear and wind CfDs
- The subsidies will be guaranteed by legislation

The Electric Market Reform/9

- Various problems due to the idiosyncratic design of the “New Electricity Trading Arrangements” market
 - * lack of contact liquidity and good reference price
 - * increases in pseudo risks
 - * extension to Scotland results in excessive congestion cost between Scotland and England

	£m
2005/06	70
2008/09	232
2009/10	102

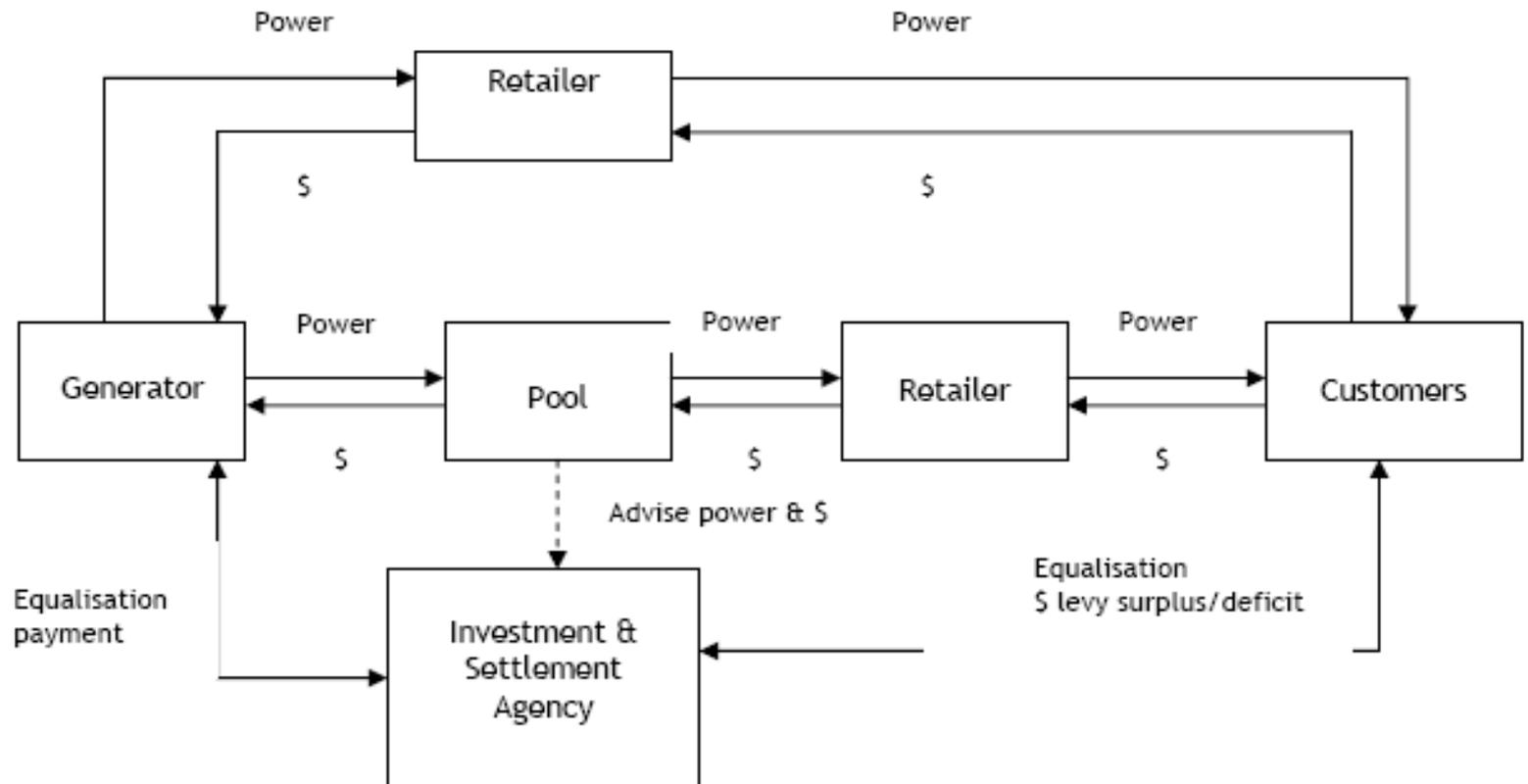
The Electric Market Reform/10

Reforming trading arrangements sensibly involves

- Investment contracts
- A short term pool to provide
 - * mechanism for merit order
 - * indicator of scarcity/abundance

The Electric Market Reform/11

Commercial relationships



But will it happen?/1

In a presentation to National Grid's investors CitiGroup asked:

“Where will the famous £110bn come from?
It won't.”

But will it happen?/2

And concluded:

In our view.....

- Even if – the Utility companies had the appetite to spend [total for Europe] they don't have the organisational capacity to do so;
- Even if – they had the organisational capacity to spend the money the supply chain couldn't provide the equipment;
- Even if – the supply chain could provide the equipment the Utility companies don't have the balance sheet to finance the investment;
- Even if - the Utility companies could raise the equity they wouldn't be able to afford the cost; and
- Even if – the Utilities could finance the investment, the consumer wouldn't be able to afford their bills.

But will it happen?/3

- Leaked briefing paper from Cameron's energy adviser
 - * “Our policies would increase household electricity prices by 30% in 2020 compared to what they would have been in the absence of policies”
 - * comments on the costs of windmills
 - * “we find the scale of household energy consumption savings calculated by DECC to be unconvincing”

But will it happen?/4

- The Queen's husband and son are against windmills
- The Telegraph, the leading Conservative newspaper, is against windmills
 - * unsightly
 - * expensive – particularly off-shore
- An all party group of MPs has been set up to oppose windmills

But will it happen?/5

- A paper by Fred Udo, retired CERN physicist, studied CO2 emissions in the Irish system which calculates them every 15 minutes
- Due to the inefficiency of ramping thermal plant up and down “The data shows that the reduction of CO2 emissions is at most a few percent if gas fired generation is used for balancing a 30% share of wind”
- * Wind energy in the Irish power system
www.clepair.net/IerlandUdo.html

But will it happen?/6

Last sentence of my book

“In a decade or so will someone write a ‘History of the British electric industry – 2011 to 2020: the rise and demise of greenery’ ?”

Book available from www.alexhenney.com