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UK Electricity Market Reform

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Outline

- 1 Background: development of UK electricity markets
- 2 Why is the EMR needed?
- 3 What is in the EMR proposals?
- 4 Where do we go from here?



The CEGB (up to 1990)

- Merit order – cheapest marginal cost plant dispatched first.
- BST – fixed plus running cost charge

Problems:

- Engineering, not market, solution – costs passed through
- Few incentives to efficiency or innovation
- Divorced from investment decisions (agreed with government, theoretically on lrmc)
- Consumers bore all the risk



The Pool (1990)

- Mandatory for most generators (but with CfDs)
- Day ahead bids
- Highest accepted bid for any period determines SMP; grid dispatches
- Capacity payments – LOLP and VOLL
- A sort of market version of merit order



Problems with the Pool

- Dominance of big two generators
- Prices did not fall in line with costs
- Sufficient reward for flexibility?
- Dash to gas



Review of Energy Sources for Power Generation (1998)

- Moratorium on gas
- Break up big two
- Change market to more competitive structure
- Little mention of environment or nuclear



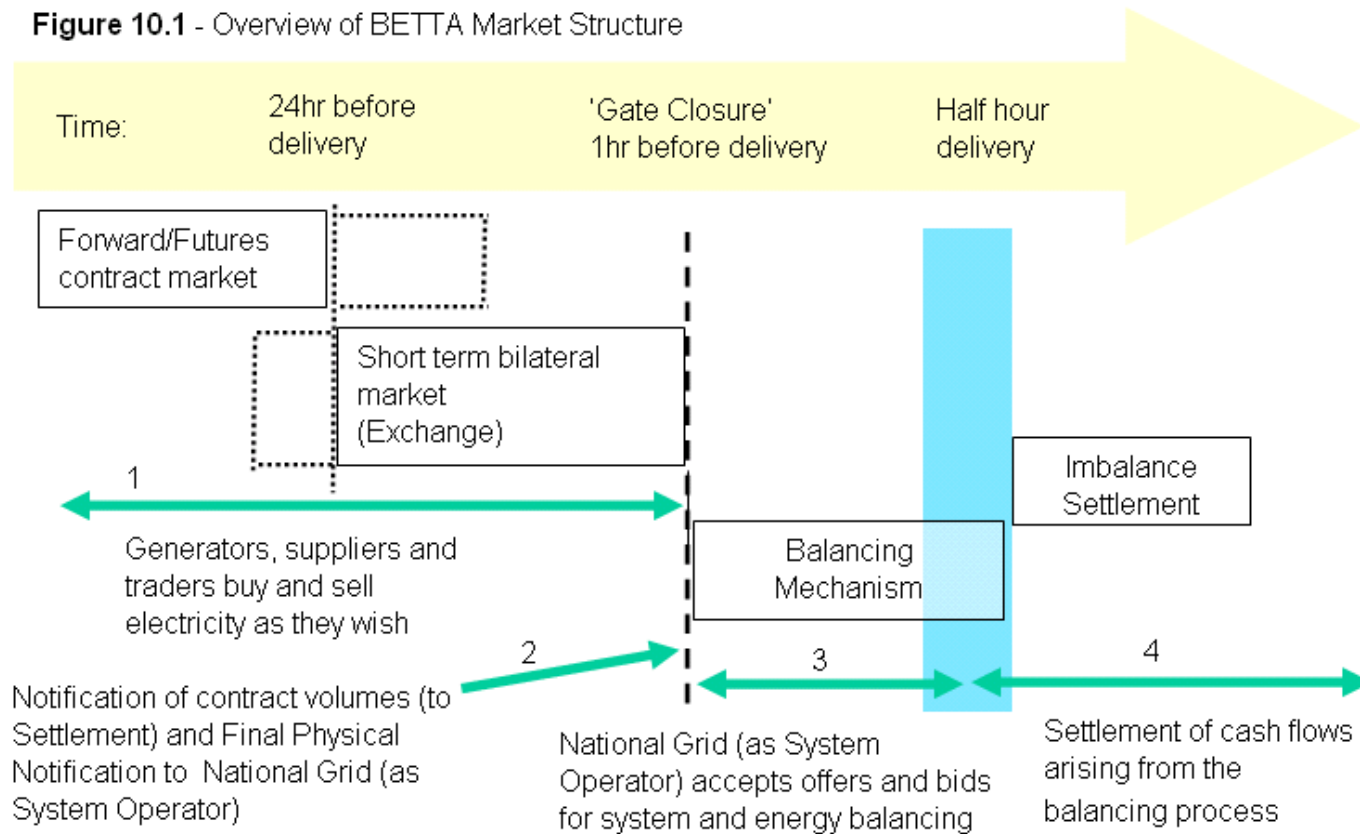
NETA and BETA

- NETA (then BETTA) – aim: to be like commodity markets
- Based on bilateral trading, spot markets, OTC market, self-dispatching
- “Fine tuning” via Balancing Mechanism



BETTA

Figure 10.1 - Overview of BETTA Market Structure



2 Why is EMR needed? The UK has very demanding environmental targets

- 80% reduction in ghg emissions by 2050
- 34% reductions on 1990 levels by 2020
- EU renewables target – implies at least 30% of electricity from renewables (c 7% today)
- Targets are legally binding and may be enforceable



UK Strategy: decarbonise electricity first

“Any feasible path to an 80% reduction by 2050 will require the almost total decarbonisation [$<50\text{g/kWh}$] of electricity generation by 2030” (Climate

Change Committee *Building a Low Carbon Economy* 2008)

- Government wants 100g/kWh by 2030 (cf 450g today)
- Massive investment in low carbon capacity needed (£110 bn by 2020; £70-80bn generation)



Investment in liberalised markets is risky, particularly low carbon generation

In the UK risk has been managed by:

- Vertical integration
- Low capital/low emissions options (CCGT)
- Staying with the herd (CCGT again)

Low carbon investment is highly capital intensive and inflexible, increasing risk.

- Under existing support system (tradable **ROCs** – source X% from renewables) both ROC and market price unpredictable.



Looking forward

- Significant closures of plant from mid decade under LCPD/IED and nuclear retirement, leading to low capacity margin
- Demand trends uncertain
- Planned growth of low carbon sources (wind, nuclear) would change cost structure of power system; markets ill adapted
- Uncertainties increase risk



Market change needed

- **Consultant:** In a 30% renewables market, prices would vary between -£50 and £8,400/MWh leading to: “huge increase in risk for investors”; “concern about the economic shape of the market” (Poyry 2009)
- **Regulator:** questions “are current market arrangements adequate” (Ofgem: Project Discovery 2010)
- **Government:** “[market] reforms are needed to deliver investment[in] low carbon electricity” (White Paper July 2011; update December 2011)



3 EMR proposals

- **FITs** - “long term contracts for low-carbon generation”, via CfDs
- **Carbon price support**
- **Capacity payments**
- Minimum **emissions standards** – “back stop” to rule out coal without CCS; plus
- **Levy Control Framework** sets overall limit on costs recovered via consumers’ bills



FITs: Why and how?

- Existing system tradable **ROCs** – source X% from renewables or pay the penalty (proceeds recycled). Both ROC and market price unpredictable.
- **FiT CfDs** – strike price based on (average) market price plus variable top-up.
- Government determines main features of FiTs; **System Operator** (Grid) will administer.
- Main aim: to reduce risk and cost of capital, while leaving some market signals.



FIT Prices are High

(cf £92.50 for nuclear and c £45/Mwh current wholesale price)

Hydro ¹⁰	95	95	95	95	95
Landfill Gas	65	65	65	65	65
Offshore Wind	155	155	150	140	135
Onshore Wind	100	100	100	95	95
Sewage Gas	85	85	85	85	85
Large Solar Photo-Voltaic	125	125	120	115	110
Tidal Stream ¹¹	305	305	305	305	305
Wave ¹²	305	305	305	305	305



Carbon price support: Why and how?

- ETS prices volatile and too low – not enough to drive investment
- Implemented from April 2013 via CCL and fuel duty on fossil fuels for power generation; will “complement” ETS
- Combination leads to significantly higher price – around £30 by 2020



Carbon price trajectory

Table 2.6 Carbon Prices assumed (£/tonne CO₂)²⁶

£/tCO ₂ , 2012 Prices	2011	2012	2013	2014	2015	2016	2020	2025	2030
Industry & Commerce (EU ETS price - no carbon price floor)	12.3	5.8	6.0	6.2	6.4	6.7	8.6	10.3	12.3
Electricity Supply Sector (with carbon price floor support)	12.3	5.8	9.6	14.2	19.9	23.6	32.4	54.0	75.6



Emissions Performance Standard

Why and How?

- A backstop way of restricting new plant choice
- Regulatory limit on CO₂ emissions from new plant on an annual basis
- Limit of 450g/kWh designed to allow only gas and coal with CCS



Capacity payments: Why and How?

- Aims to ensure enough reliable capacity is available for meeting peak demand
- Government determines total volume needed based on reliability standard
- System operator (grid) runs auction process to set price (2014 for 2018)
- Transitional arrangements for demand response proposals under development
- Short term measures (balancing reserve) to fill gap until market fully operational



4 Where do we go from here: political uncertainties

- EMR proposals were part of the Coalition Agreement
- Some Conservatives now appear to be back-tracking, but Liberals remain keen.
- Labour policies create new uncertainties (price freeze, but commitment to 2030 targets)
- Little further progress likely before 2015 Election



Conclusions

- EMR shows lack of faith in the effectiveness of markets
- Proposals derisk low carbon investment without creating a low carbon friendly market
- Political uncertainties make long term planning difficult
- Short and long term uncertainties mean proposals are unlikely to be sustainable

