British Electricity Restructuring: From the Pool to NETA

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MIT Energy and Environment Policy Workshop

www.econ.cam.ac.uk/dae/research/regulate.htm
NETA and the coal end-game

- coal privatised on franchise contracts
- franchise due to end “1998”
- coal faces gloomy future
- coal-friendly Labour party elected
- electricity prices, profits stubbornly high

⇒ Oct 1997 Minister requests RETA
⇒ to correct bias against flexible coal
-generation in England and Wales by fuel type

- TWh


- 0 50 100 150 200 250 300 350

- imports
- hydro+other
- CCGT
- other steam
- Coal
- Nuclear
The demise of UK coal

Coal production and use

- Net imports
- Deep mined
- Open cast
- Generation use

The graph shows the decline in coal production and use from 1990 to 2001, with a significant reduction in generation use and a decrease in net imports.
Generation in England and Wales

TWh

- PSB / Mission
- PG
- NP
- Mis'n
- AES
- Eastern
- IPP
- Import
- NE
- Magnox

89/90 90/91 91/92 92/93 93/94 94/95 95/96 96/97 97/98 98/99 99/00 00/01

Forecast
A tale of two cities

British Domestic electricity prices net of taxes

p/kWh 2000 prices

Edinburgh  London
Criticisms of the Pool

• generators have market power
• capacity payments are unnatural
• biased against coal
• generators get PPP regardless of bid
• constraint payments unsatisfactory
• no demand side
• unsatisfactory governance structure
Offer’s analysis

- Pool complexity amplifies market power
- Ending guaranteed PPP will encourage competition
- Commodity markets a suitable model
- End Pool $\Rightarrow$ end PSA $\Rightarrow$ change governance
Offer’s proposals

- Pool replaced by voluntary markets
- self-dispatch, physical contracts
- SO trades in balancing market to stabilise
- pay-bid in BM, different buy, sell prices
  ⇒ costly to be out of balance
Traded markets under NETA

Balancing Mechanism

Forward Markets
- Bulk OTC Trading
- Standardised Products
- PX Trades

Spot Market

Financial Markets
- Options/Swaps
- Other Financial Instruments

Time:
- Up to several years ahead
- T - 24 hours
- T - 3½ hours
- T=0
  - Gate Closure
  - Traded period
DN’s Critique to Pool (Sep 1998)

• Efficiency gains are small and easily lost
  – Newbery and Pollitt estimate restructuring
    CEGB lowered costs by 6%

• Transaction costs may be large
  – Electricity: like cocoa or financial services?
  – Financial services charge 25% of income
  – Offer estimated restructuring costs at £700+ = 1.5% of PPP
Will bilateral trading lower prices?

- “The Pool is too transparent and discourages bilateral bargaining”

- “Making balancing market a poor guide to SMP will encourage contracting”

- “If there is no market of last resort then must-run stations have to accept lower bids”
Sceptical comments

• 90% of electricity contracted - what was wrong with Pool contracting?
• A penal and opaque BM may encourage contracts but raise transaction costs
• advantages incumbents and deters entry
  ⇒ more likely to raise costs and prices
  because long-run prices set by entry cost
Possible adverse consequences

• destroying Pool will create new risks

⇒ more vertical integration

⇒ make entry more difficult

⇒ allow total capacity to be controlled

⇒ to tighten market and raise prices
Critique - 1998 conclusions

• The root problem is lack of competition
• If this is resolved the Pool may work better
• Pool replacement may then be unnecessary, costly and counterproductive
  – it will accelerate vertical integration
  – it will raise transaction costs and hence prices
  – it will deter entry and allow prices to rise
Events from RETA to NETA

• Competition intensified
  – Jul 99 Edison Mission buys 4GW $472/kW
  – raises load factor from 25% to 40+ %
  ⇒ SMP falls 20-30% year-on-year
  – Oct 01 Edison Mission sells at $190/kW

• Interconnector raises UK gas prices
  – CCGT now at margin
  – more dispersed ownership ⇒ more competition
Ofgem’s evidence on effect of NETA
Ofgem vs other explanations

- The outbreak of post divestiture competition by Edison Mission?
- Baseload supplied by inflexible nuclear
- Delays in ‘Go-live’ cause contract unwinding?

*Key question: what caused price decline?*
Defences of NETA

- discriminatory auctions discourage collusion
- penal imbalances encourage OTC contracts
  ⇒ fiercer competition, chiselling
- BM charges those who cause imbalance
  ⇒ better cost allocation and control
Response to arguments

• revenue equivalence theorem
  ⇒ with risk of inefficient dispatch
    – supported by lab experiments
• BM discourages efficient financial contracts
• BM charges are not cost-reflective
• BM charges company not system imbalance
  ⇒ excessive self-balancing
Ofgem’s expectations

- more competitive trading
- more scope for demand side
- forward curves facilitate efficient entry
- sharper cost incentives to manage risk

⇒ lower prices for all customers
Ofgem’s findings after 3 months

- OTC forward baseload prices fall 6% y-o-y
- forward peak prices fall 21% y-o-y
- markets evolving nicely
- Balancing Market 1.5% oversupplied
- BM volatile but only 3% of trade
- BM price spread narrowing

“Real and substantial benefits for consumers”
OTC winter baseload pre and post NETA

Winter Baseload year on year 2000/01
Gross and net BM balances

Settlement Date

Net Average Daily Imbalance
Average Daily Negative Imbalance
Average Daily Positive Imbalance
Average daily system buy and sell prices

Average Daily SSP and SBP since NETA

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<th>Date</th>
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Daily costs of NGC’s balancing actions

Indicative Daily Cost of Balancing Actions

- St Fergus Gas Terminal Struck by Lightning
Spread in average BM prices

Balancing prices weekday Sep-Oct 2001

£/MWh

half-hour starting

SBP  SSP
Daily maximum BM SBP

Balancing Market weekday daily Maximum SBP
Weekday HH average spot price

UKPX and APX weekday average prices

£/MWh

UKPX av  APX av  weekly UKPX moving average

02/04/01  09/04/01  16/04/01  23/04/01  30/04/01  07/05/01  14/05/01  21/05/01  28/05/01  04/06/01  11/06/01  18/06/01  25/06/01  02/07/01  09/07/01  16/07/01  23/07/01  30/07/01  06/08/01  13/08/01  20/08/01  27/08/01  03/09/01  10/09/01  17/09/01  24/09/01  01/10/01  08/10/01  15/10/01  22/10/01  29/10/01  05/11/01  12/11/01  19/11/01  26/11/01  03/12/01
What do traders think?

- Market fundamentals drive prices down
- Oct 01 contract round 2% up y-o-y
- BM volatility/spread $\Rightarrow$ PX prices $\Rightarrow$ OTC prices
- BM SBP unpredictable, can be very high
- mistakes very costly
- incentive not to balance but go long
- fear $\Rightarrow$ minimise risks
What do large users think?

- Hard to get quotes for contracts <2GWh/yr
- Tariff includes BM premium ~ 5%
- Penalty if profile differs from historical
- Hard for demand side to bid, lost DSB 15%
- Higher management costs

⇒ Higher delivered electricity prices
Too soon to tell?

Very large user electricity prices

p/kWh 2001 prices


electricity  coal cost  gas cost  elec-coal-FFL
Other reactions

• power exports from CHP down 61%
• small genco costs up 16%
• wind power can be charged for selling
  – BM imbalance exceeds energy value
• self-insure with own spinning reserve
  – loss of system multiplexing
• Demand forecasting decentralised
  – system accuracy ~5%, individual > 15%
Assessment - the good news

• BM over-rewards flexibility
  ⇒ keep old plant available (oil, coal)
  ⇒ excess capacity keeps prices low?
• Rules can be changed, still learning
• but rule changes costly
• prices are lower - but why?
Assessment - the bad news

- costly to implement: $1+ billion and rising
- trading personnel up 400%
- all supply businesses vertically integrated
- penal imbalance encourages self-insurance
  - more spinning reserve
  - more plant output variation
  $\Rightarrow$ higher operation and maintenance costs
Conclusions

“RETA rests on unsubstantiated claims, inappropriate analogies, and unquestioned criticisms” (DN Oct 1998)

• NETA benefits large vertically-integrated (G+S) companies with smart traders
• overproduction and excess reserves costly
• self-dispatch - feasible under Pool, now obligatory
• Not clear that NETA countervails market power
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