



UNIVERSITY OF  
CAMBRIDGE

Electricity Policy  
Research Group

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ECONOMIC  
& SOCIAL  
RESEARCH  
COUNCIL

# Implications of current NETA design

David Newbery

**DECC Market Design workshop**

London 7 April 2011

<http://www.eprg.group.cam.ac.uk>

# Agenda

- NETA: the case for bilateral trading, energy only markets, penal balancing
  - From NETA to BETTA
- Liquidity
- Long-term contracting
- Vertical integration
- Implications for market reforms

***E”M”R needs to reform the Market(s)***

# *a priori* defence of NETA

- “The Pool is too transparent and discourages bilateral bargaining”
- “Making the 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”
  - Panic for British Energy – fails to vertically integrate, buys costly coal to balance, **demise**

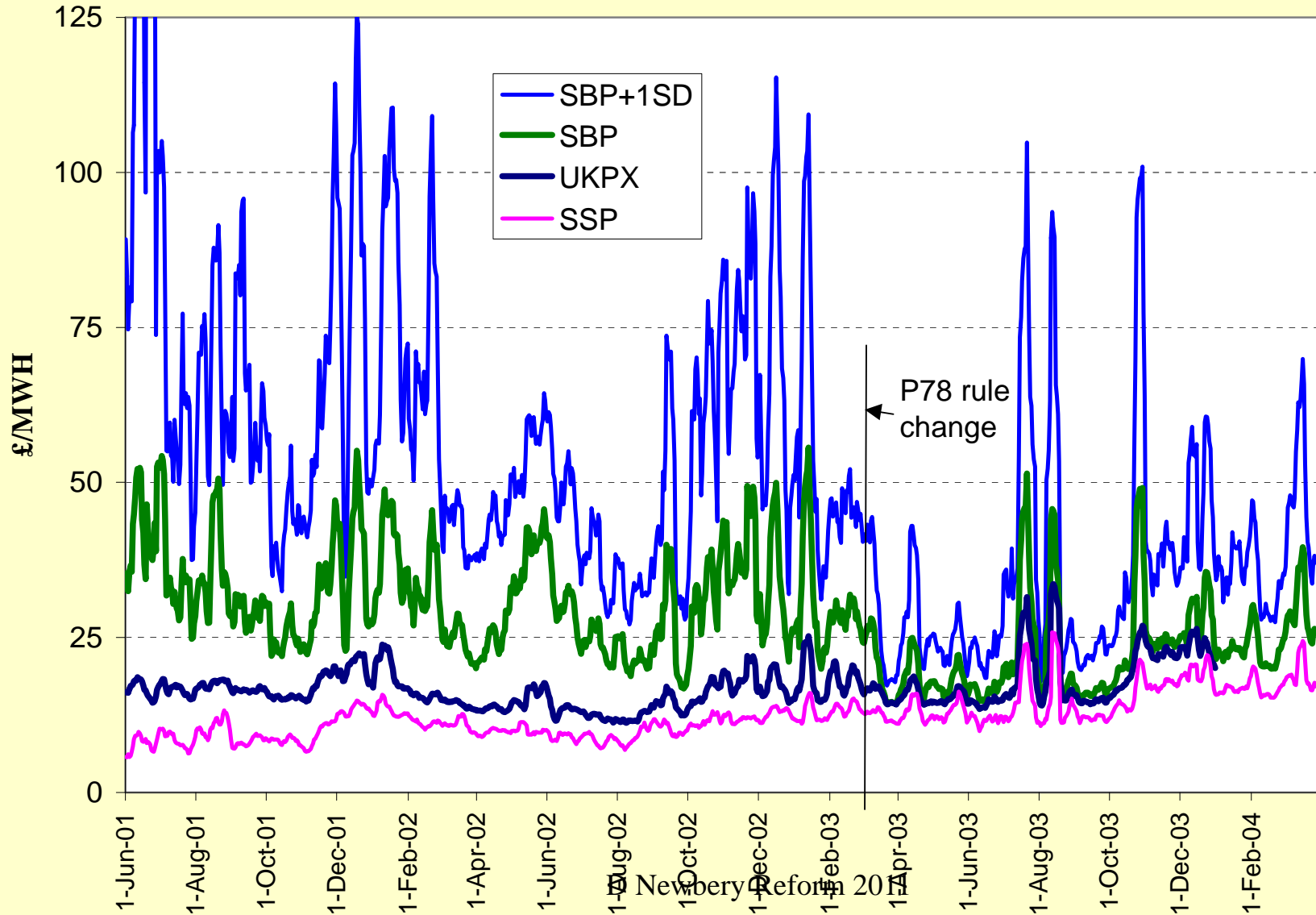
# The view from Australia

*CoAG Independent Review of Energy Market Directions* reported Dec 2002

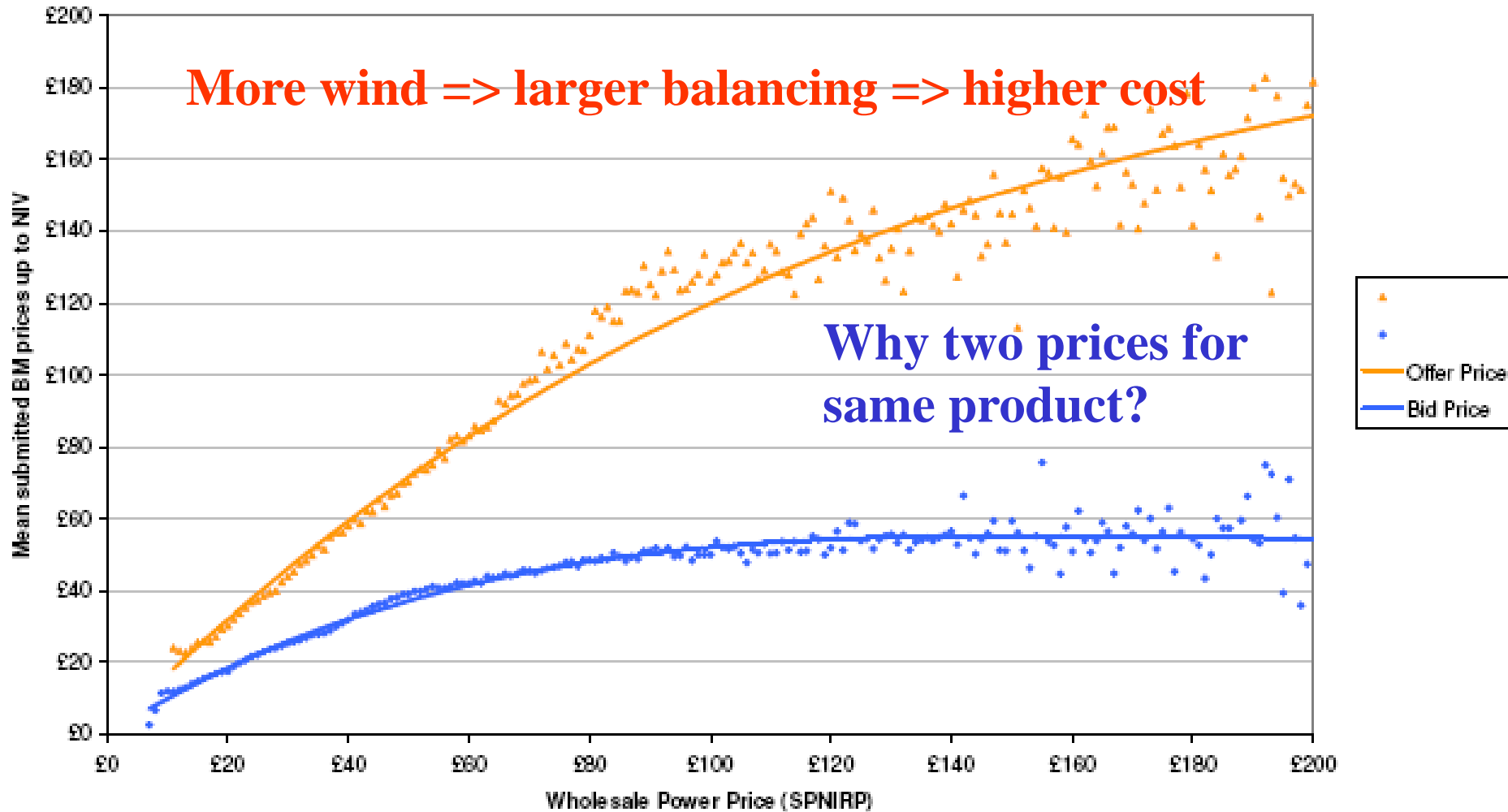
- examined Nordpool, PJM and NETA
- NETA's incentive to individual balancing  
“a significant inefficiency that adds cost to the system”

(CoAG, p103)

# Spot and cash-out weekly moving averages June 01-Apr 04



# Bid-offer spread in the balancing mechanism



# Reasons for NETA

- Dissatisfaction with manipulation of GOAL
  - cured by adequate competition
- must contract ahead => mitigates market power
  - but 80-90% financially contracted in Pool
  - => DA market illiquid, physical contracts encouraged
- Balancing to impose costs on causation
  - why not reward those who assist => single price
  - do we really want to penalise unpredictable wind?
- Encouraged vertical integration, deterred entry

# From NETA to BETTA

- Create fiction of a single energy price in GB
  - => increases congestion costs
  - => over-encourages distant costly wind
  - => discourages storage in Scotland
- “Connect and manage” to encourage more wind
- TransmiT to sort out the mess

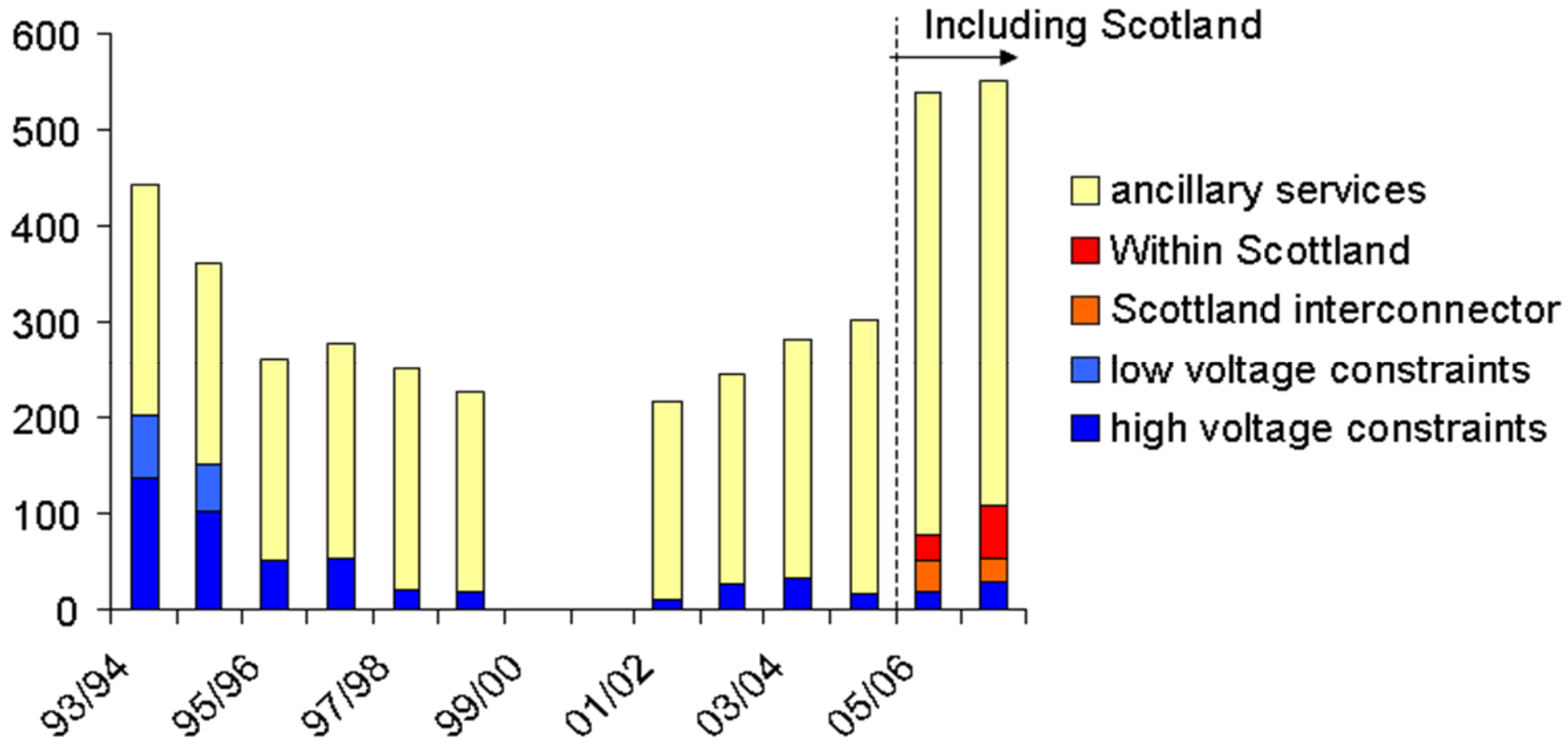
***comply with Target Electricity Model 2014***

***=> sort out balancing mechanism too?***



# Congestion costs in the UK system

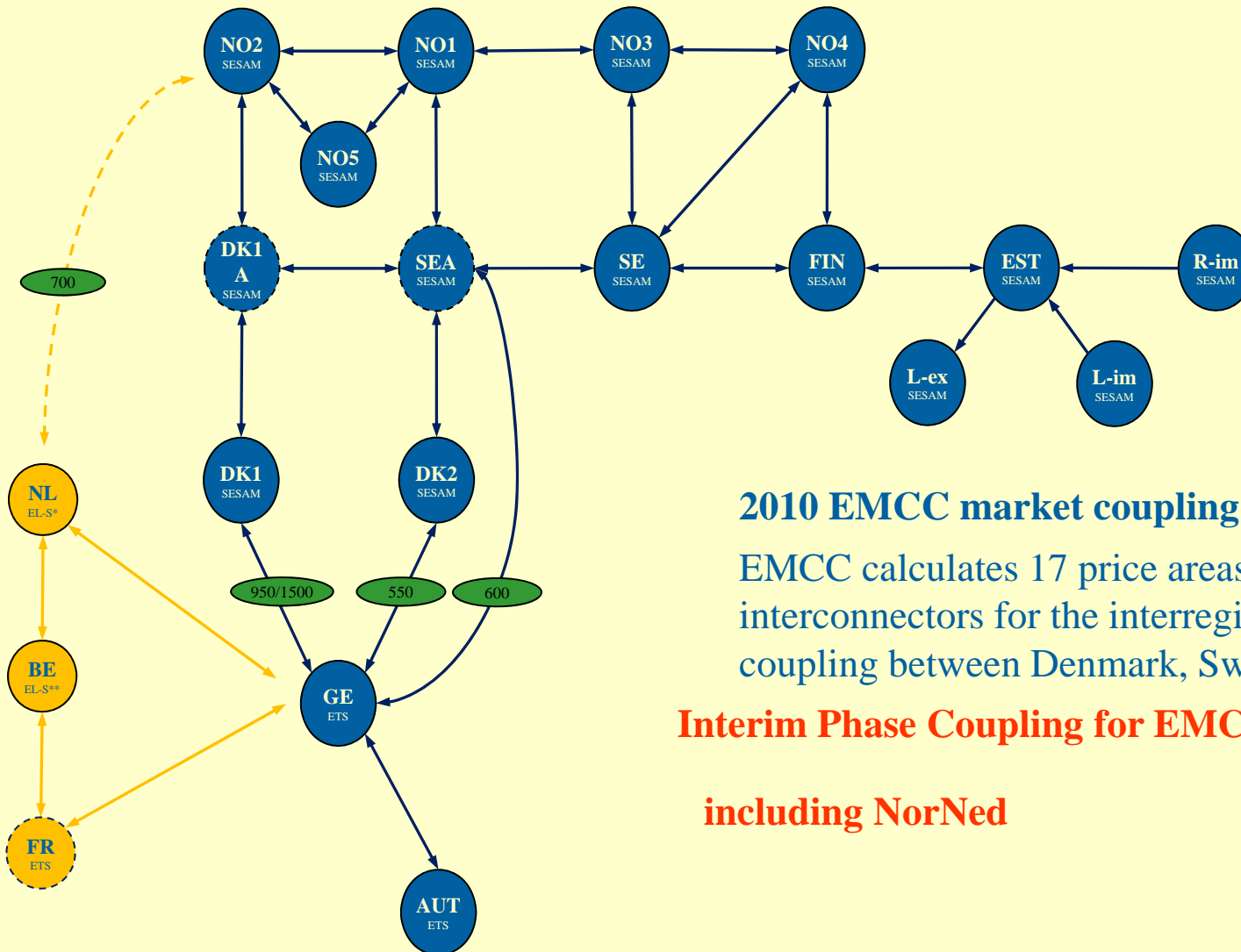
Annual cost mio. £



# Target Electricity Model

- ENTSO-E is developing the TEM
  - to agree Network Codes, Capacity determination, forms of forward contracting
- Model is CWE now coupled to Nordel
  - energy only markets, PTRs FTRs or CfDs?
  - Decouple/split into prize zones on **congestion boundaries - in future not national boundaries**
  - Bordering TSOs agree IC compensation
- working groups => ACER => comitology
  - Aim is single market by 2014***

# Price areas considered with CWE-Nordic



## 2010 EMCC market coupling (+ Baltic Cable):

EMCC calculates 17 price areas and flows on 22 interconnectors for the interregional tight volume coupling between Denmark, Sweden and Germany

## Interim Phase Coupling for EMCC and CWE

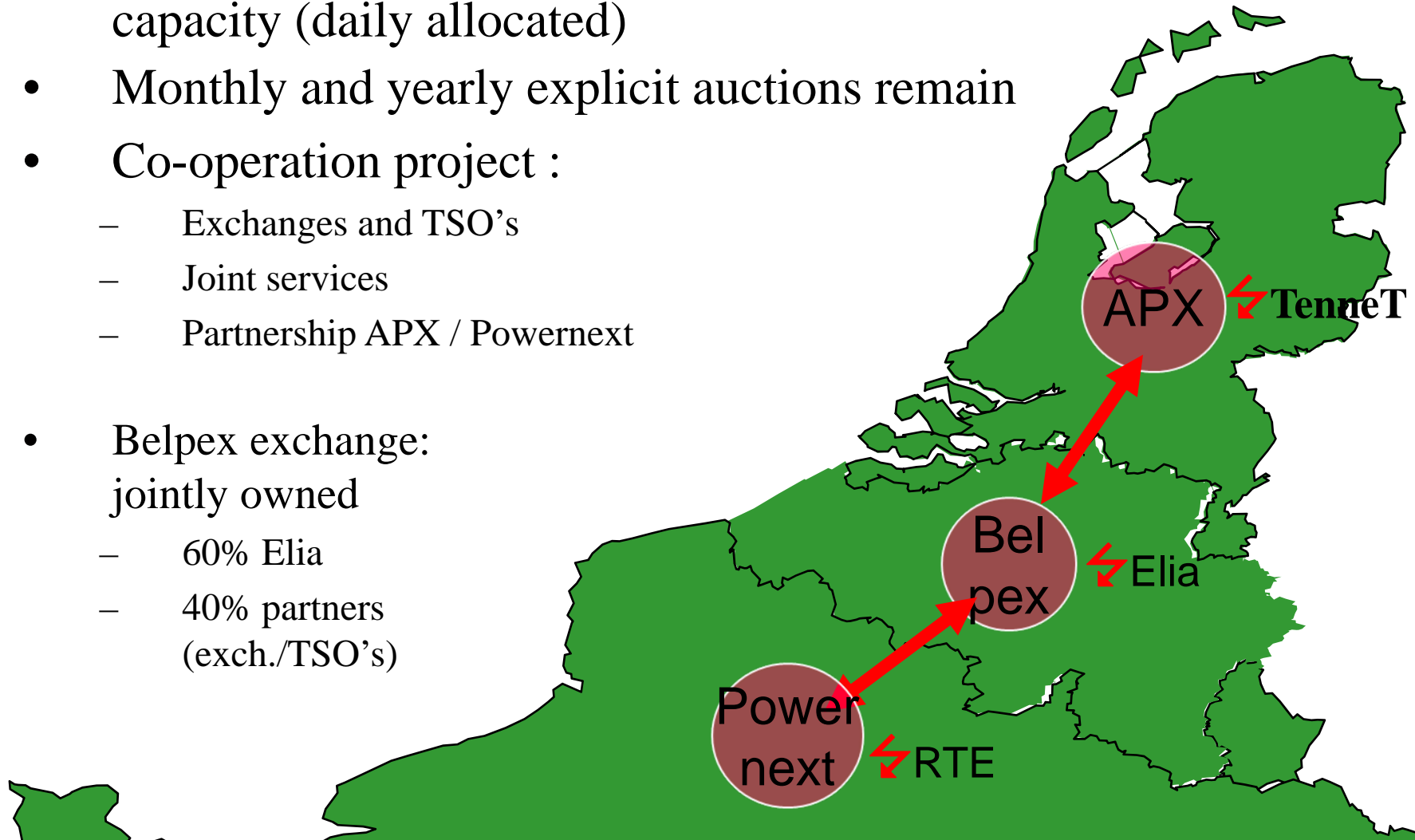
including NorNed

- ↔ established interface
- ↔ development started

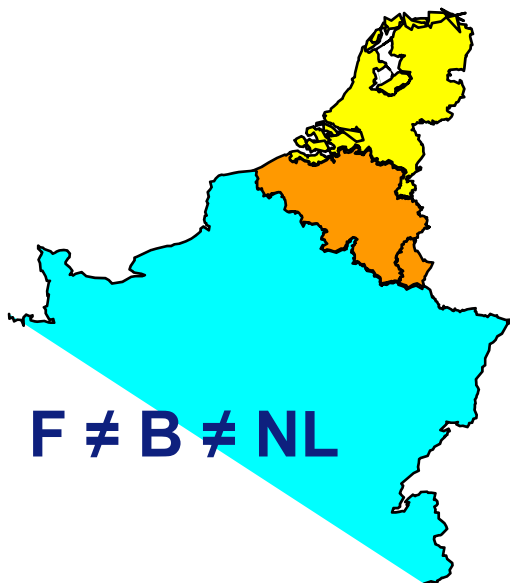
# Example 1: Belpex + coupling of Netherlands-Belgium-France

From APX

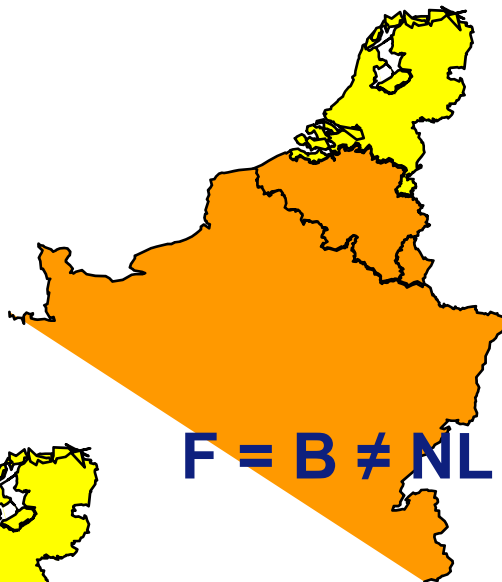
- capacity (daily allocated)
- Monthly and yearly explicit auctions remain
- Co-operation project :
  - Exchanges and TSO's
  - Joint services
  - Partnership APX / Powernext
- Belpex exchange:
  - jointly owned
  - 60% Elia
  - 40% partners (exch./TSO's)



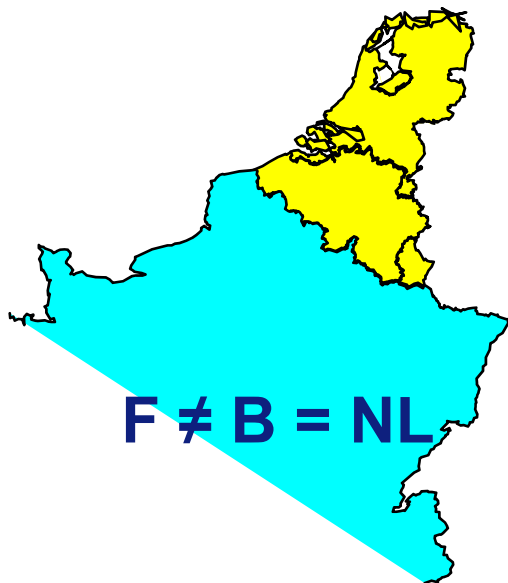
# Prices depend on transmission constraints / availability



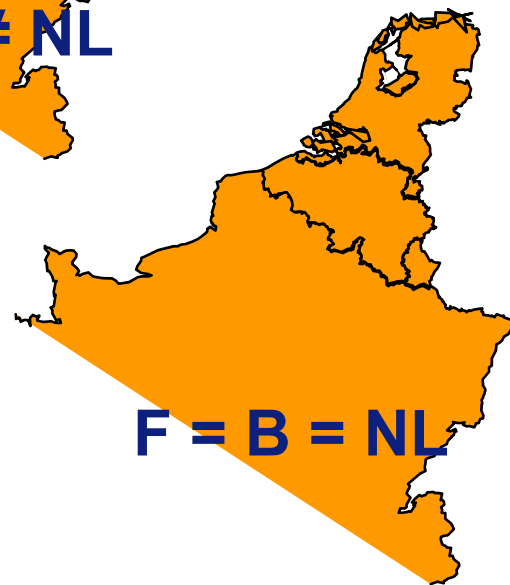
$F \neq B \neq NL$



$F = B \neq NL$



$F \neq B = NL$



$F = B = NL$

From APX

# Issues: balancing market

- Most balancing markets have single price
  - which varies by price zone or node (LMP)
  - and which may be very volatile
- day-ahead market will try to arbitrage BM
  - if shortages expected, keep plant to offer in BM
  - if excess supply switch BM plant to DA
- Contract ahead to reduce volatility risk
  - intra-day market to adjust before SO opens BM

***Easier for SO/Ofgem to reform BM?***

# Issues: Liquidity

- Pool traded all >50MW plant spot - 100% liquid
  - but 80-90% contracted ahead, contracts less liquid
  - contracts for difference on the PPP (or PSP)
- Pool removed all entry barriers
  - do not need to find a buyer of electricity
  - all demand met by SO dispatching plant
- Physical contracts: tailored but are illiquid
- Financial contracts: simple but more liquid
  - are base and peak months and longer adequate?
  - Is residual risk of sculpting in DA market low?

# Long-term contracting

- Vertical integration = v. long-term contract
- unbundling shortens contract duration
- CCGTs signed 15 year contracts with RECs
  - 15 yr gas and maintenance contracts,
  - finance with 15 yr bonds as low risk
- driven by RECs with equity interest?
  - and regulatory approval+ captive franchise
- Few other LT contracts - other than as virtual VI (e.g. gas co. enters elec market)



# Vertical integration

- Generators gain if wholesale price high
    - but suppliers then lose if they have sold on contract
  - Suppliers gain if wholesale price low
    - but generators lose if they have contracted for fuel
  - Up and downstream market risks cancel
- ⇒ contract or vertically integrate?
- Contracts only for 1-3 years ahead, VI for ever!
  - Would British Energy has survived with a REC?

***But VI removes liquidity from contract market***

# Conclusions

- Pool provides liquidity for contracts, entry, and deep balancing services to accept wind
  - works well with adequate competition
  - or mandated MC bidding (Ireland) + cap pay
- NETA is intentionally illiquid to force contracts and enhance competition
  - was unnecessary, costly, and damaging

***Aim should now be for SO to transform balancing market into a voluntary pool***



# Appendix: Pre-NETA experience

David Newbery

**Market design workshop**

DECC 7 April 2011

<http://www.eprg.group.cam.ac.uk>

# The Electricity Pool

- Pool sets wholesale *and balancing* price
  - all available plant offers supply schedule + dispatch details (start-up costs etc, min up time etc)
  - GOAL finds least cost **unconstrained** dispatch
    - ignoring location and transmission losses
  - SMP = cost of last accepted MWh
  - Capacity payment = (VOLL-SMP) x LOLP
  - PPP = SMP + cap pay, PSP = PPP+ancillary costs
- Constrained plant paid lost profit or cost
  - Gens have firm access rights, single wholesale price

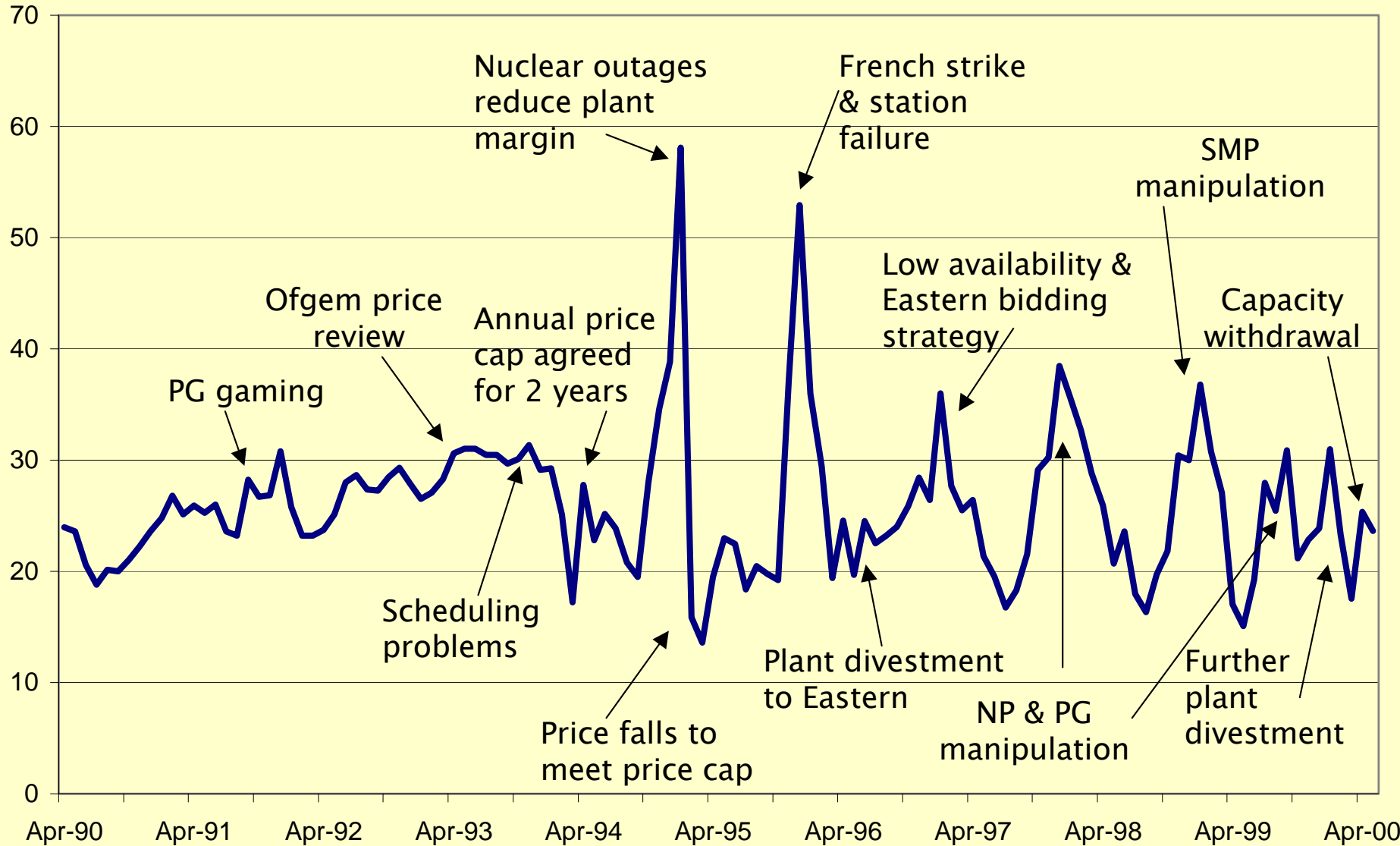
# Pool 1990-2000

- Coal plant set the Pool price
  - 1990-94 National Power and PowerGen restrained
  - 1994-6 “voluntary” price control hit precisely
  - 1996 divest 6,000 MW to Eastern/TXU
    - with earn-out of £6/MWh - to reflect SO<sub>2</sub> credit?
    - => sustains high prices despite lower concentration
- Future looks oversupplied with cheap gas
  - => sell coal-stations while prices are high
  - => tacit collusion to keep prices up

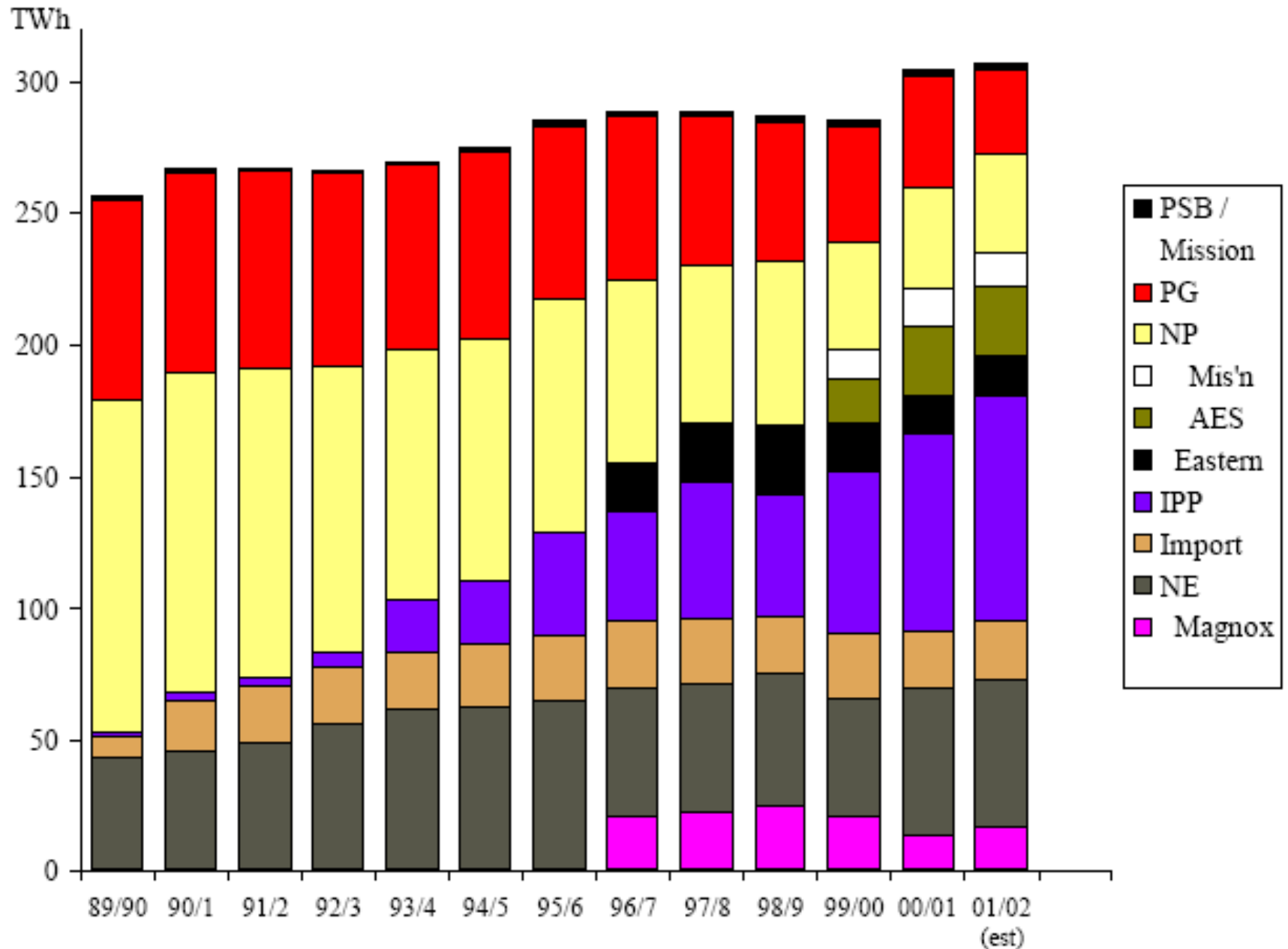
***fall in concentration causes price collapse***

# Pool prices 1990-2000

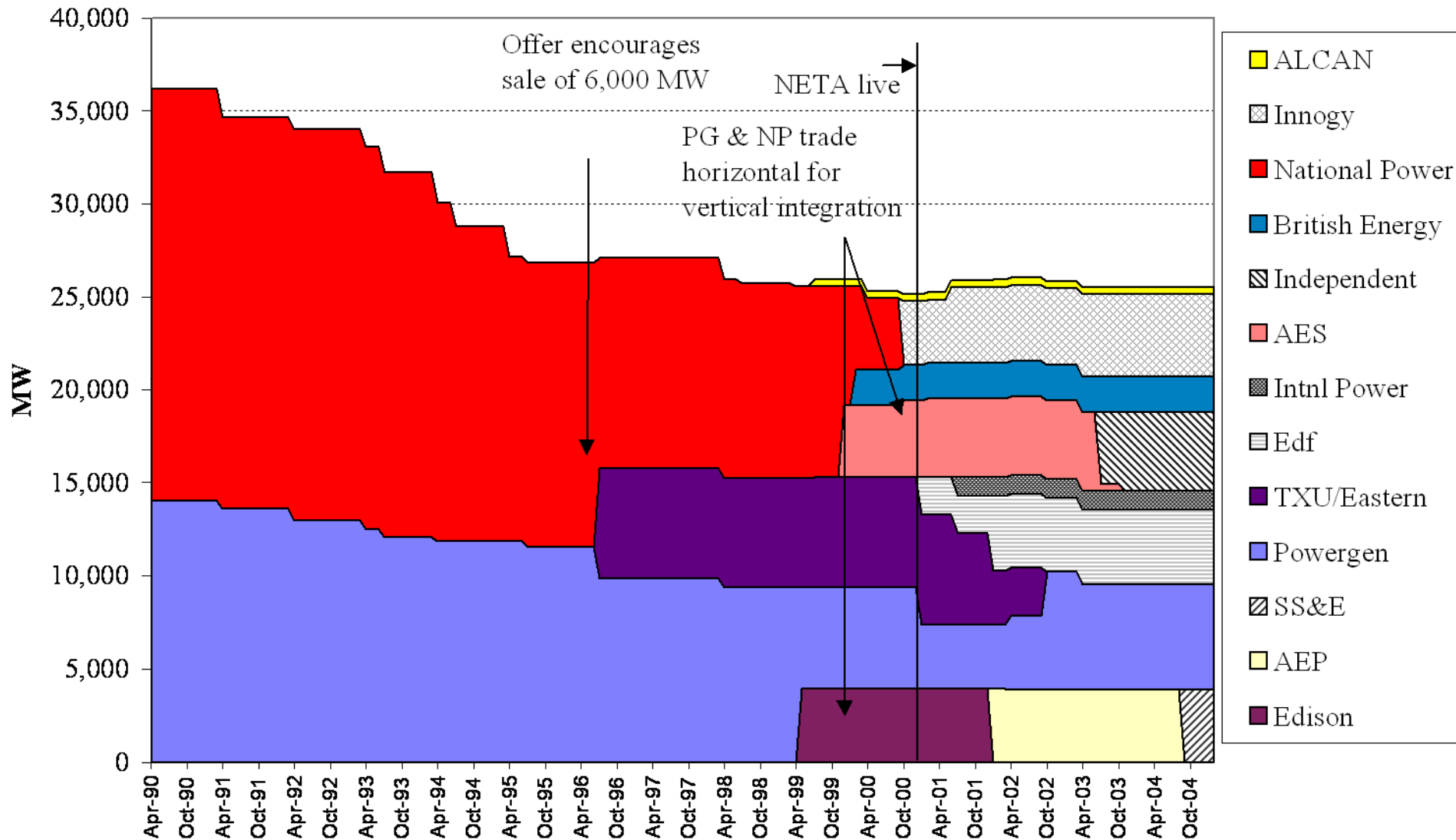
£/MWh  
(Jan 2000 prices)



# Generating companies in England and Wales



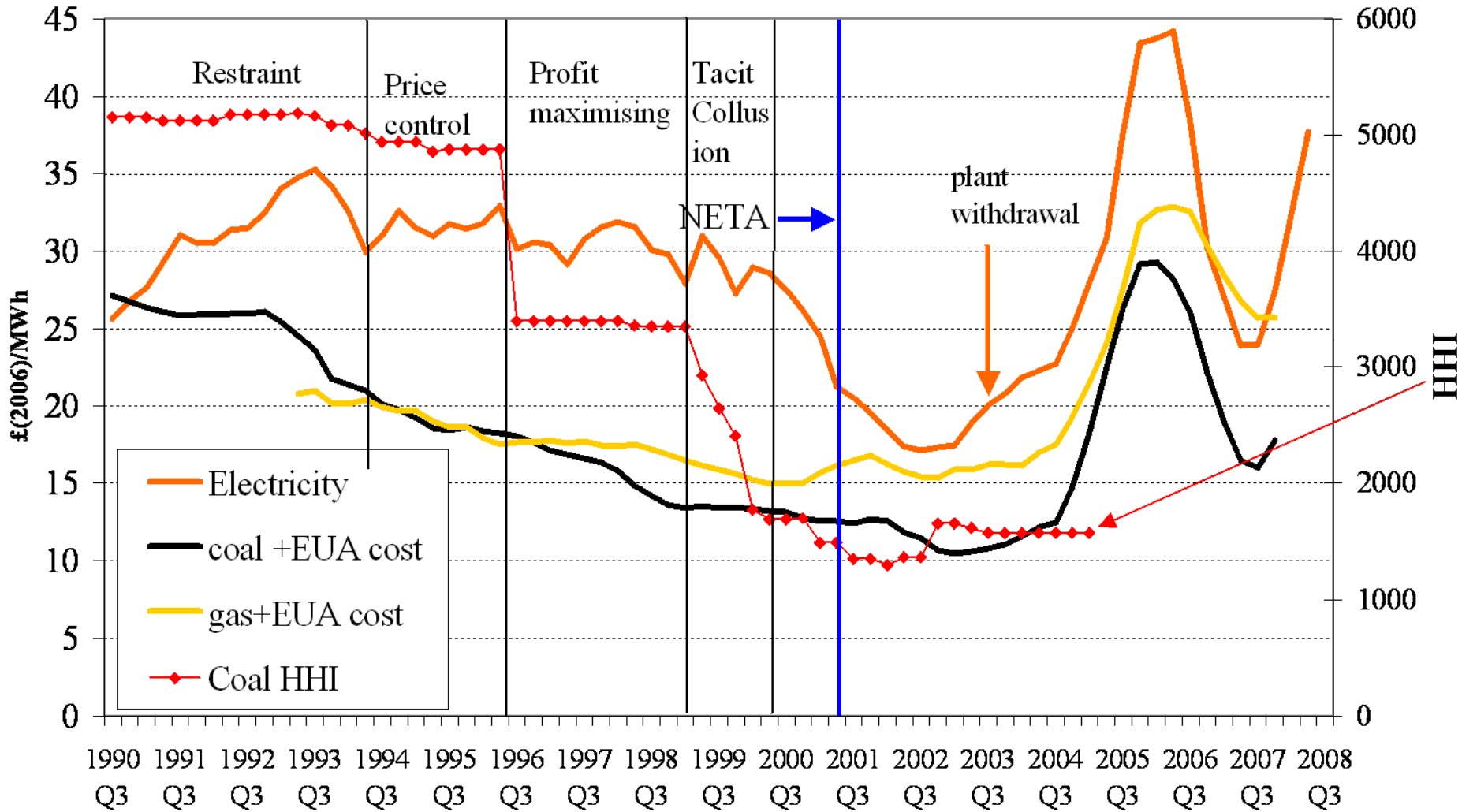
# Capacity Ownership of Coal Generation 1990-2004



Source: NGC Seven Year Statements, various years, and data from J Bower and C Humphries, slide from D Newbery Reform 2011



## Real GB electricity and fuel costs 1990-2007 centred annual moving averages



# A possible defence of NETA

- amplified pressure for vertical integration
- ⇒ NP+PG trade horizontal for vertical integration
  - but they would probably have sold plant anyway
- these sales greatly increased competition
- then only changing governance required
- and could have saved £1 billion
- and avoided the barriers to entry of the Big 6