UNIVERSITY OF CAMBRIDGE | Electricity Policy Research Group

E·S·R·C 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

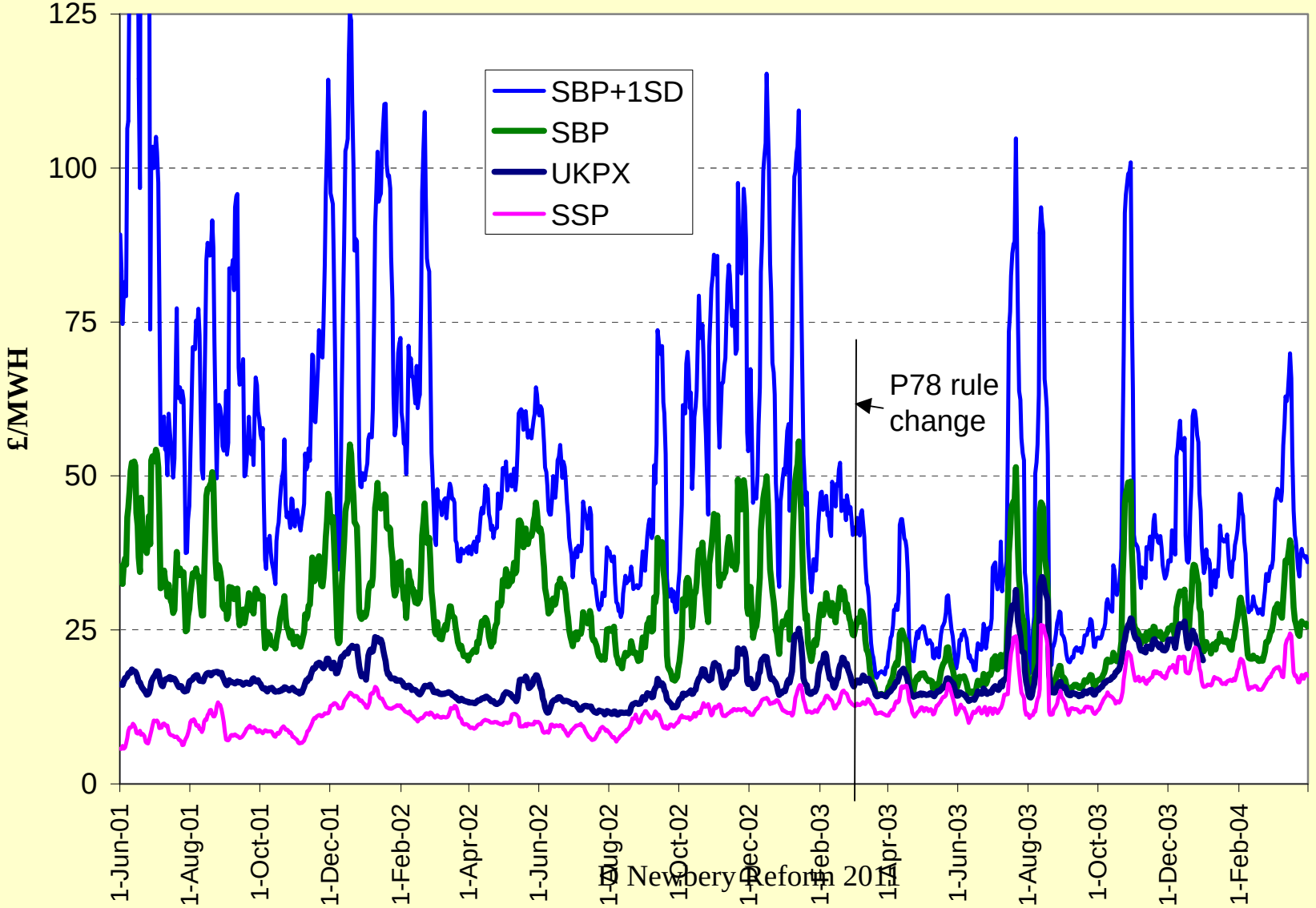
The view from Australia

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

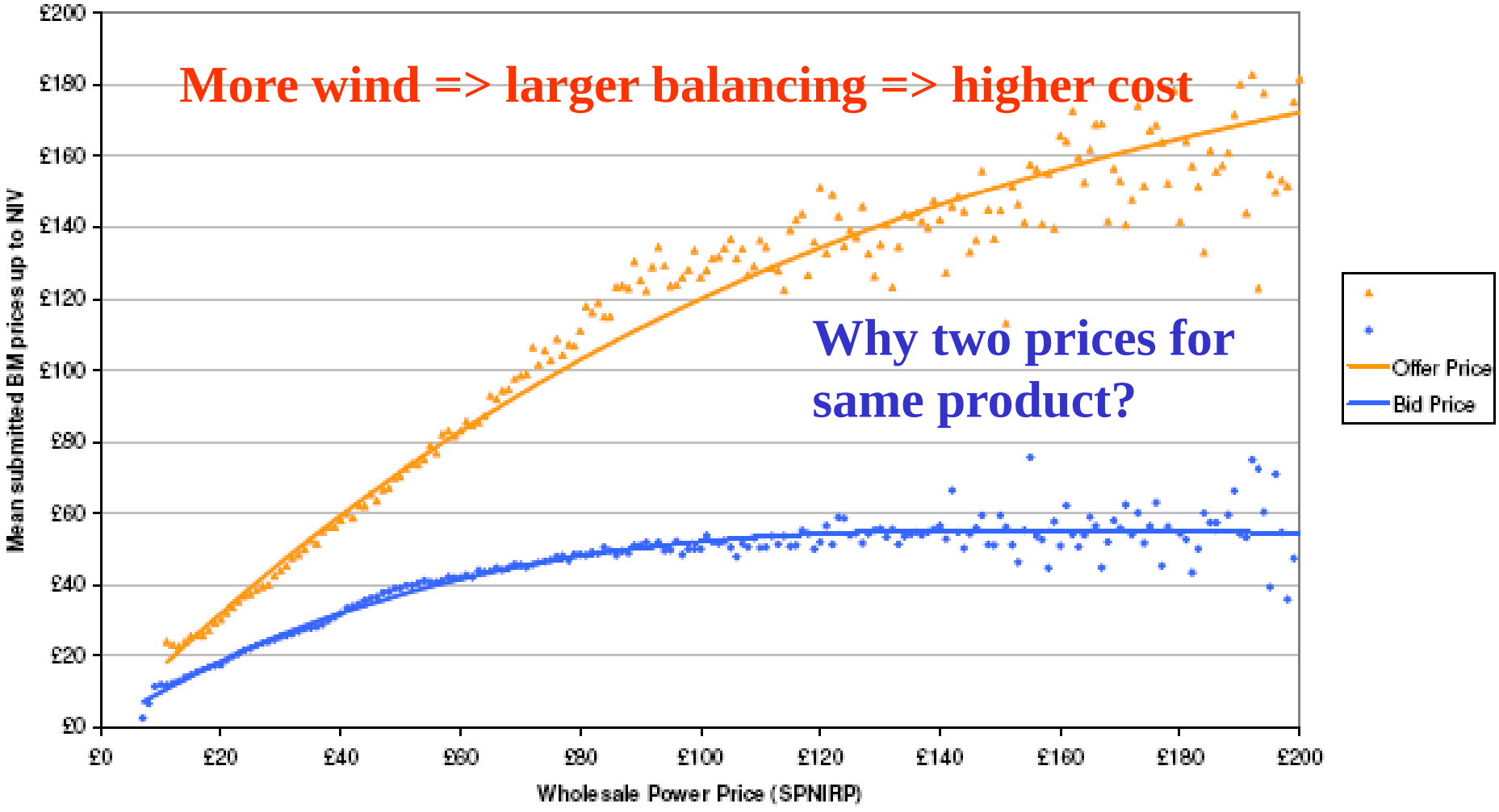
- examined Nordpool, PJM and NETA
- NETA's incentive to individual balancing "a significant inefficiency that adds cost to the system"

(CoAG, p103)

Spot and cash-out weekly moving averages June 01-Ap 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

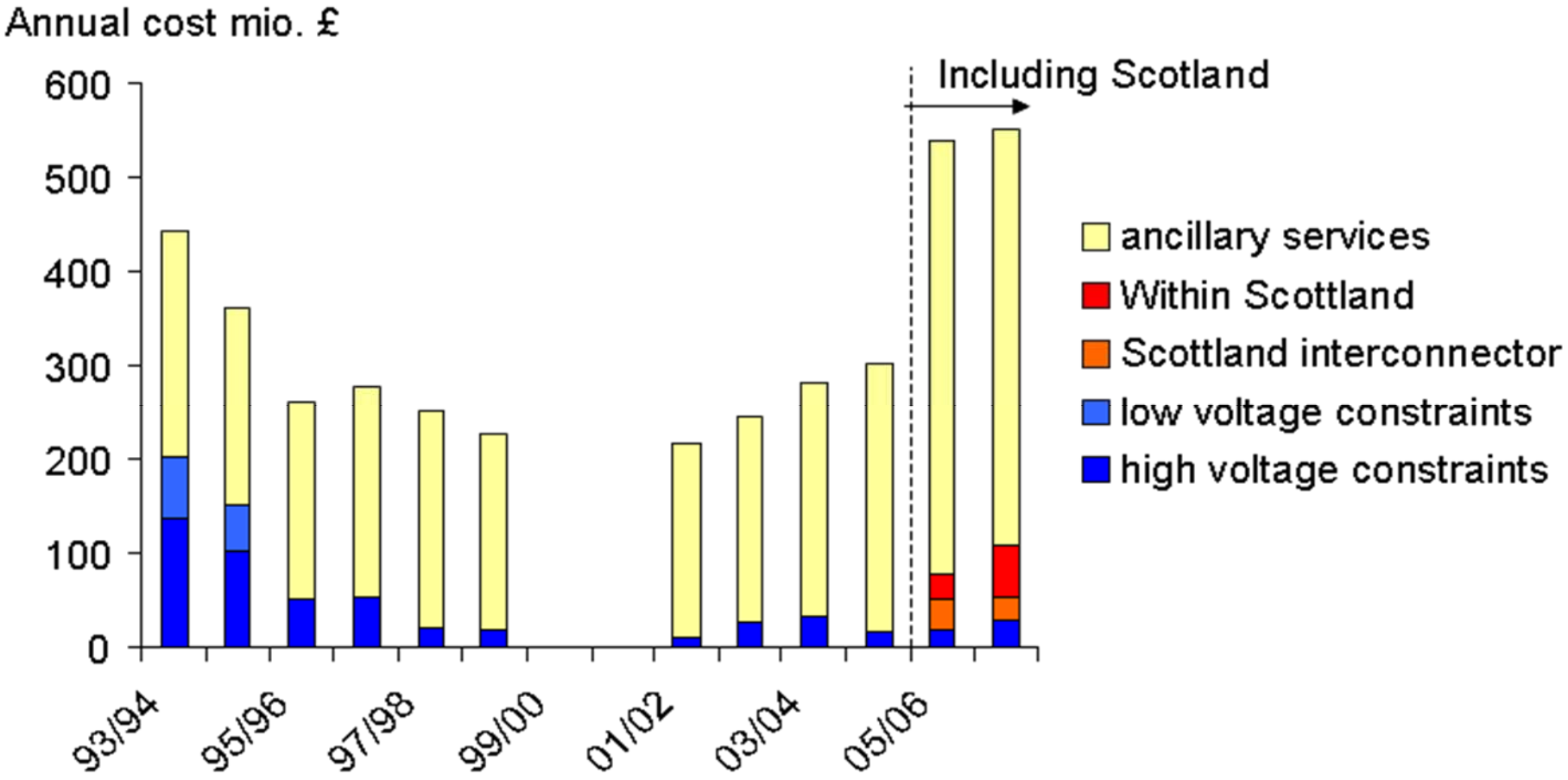
=> discourages storage in Scotland

- "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

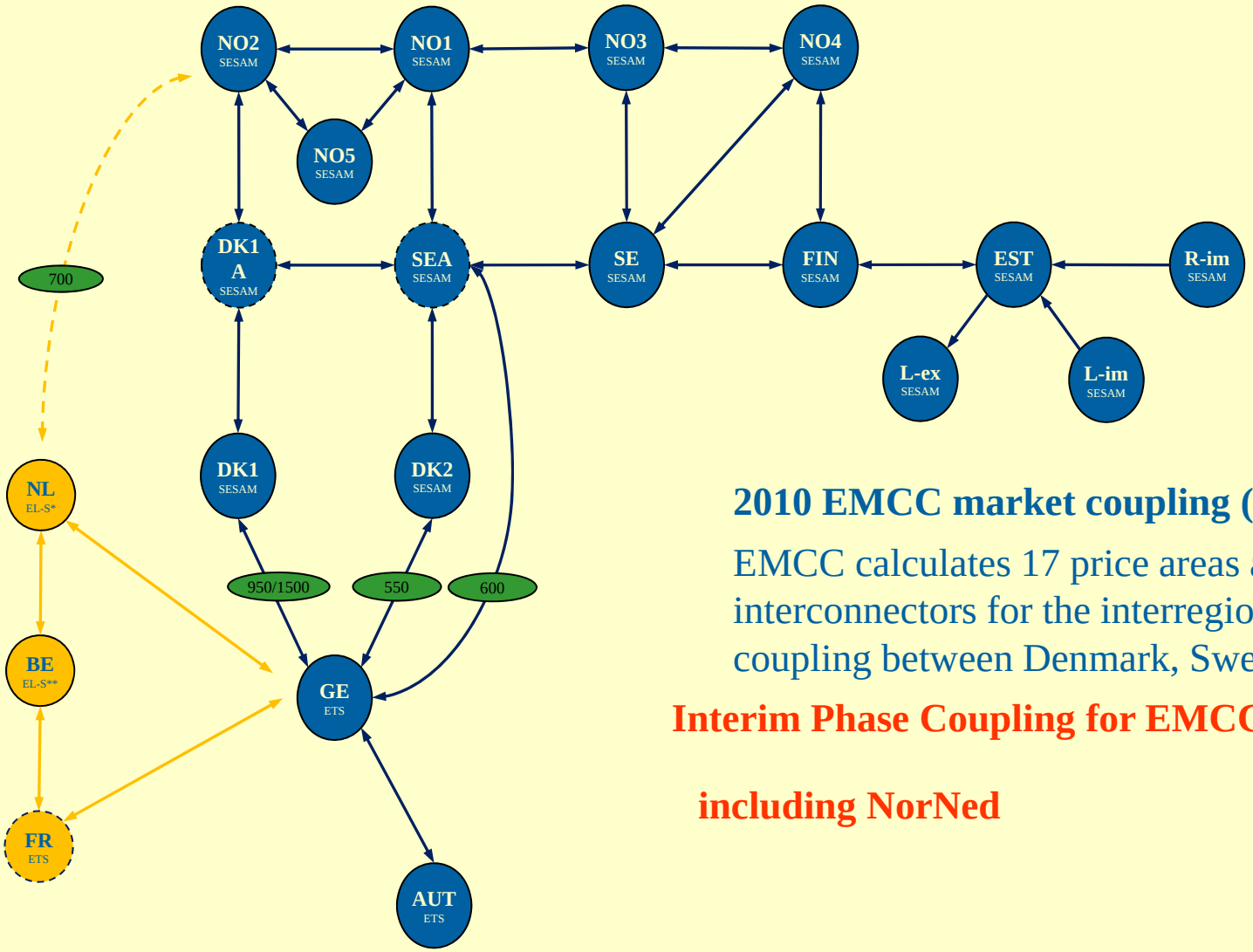


Target Electricity Model

- 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

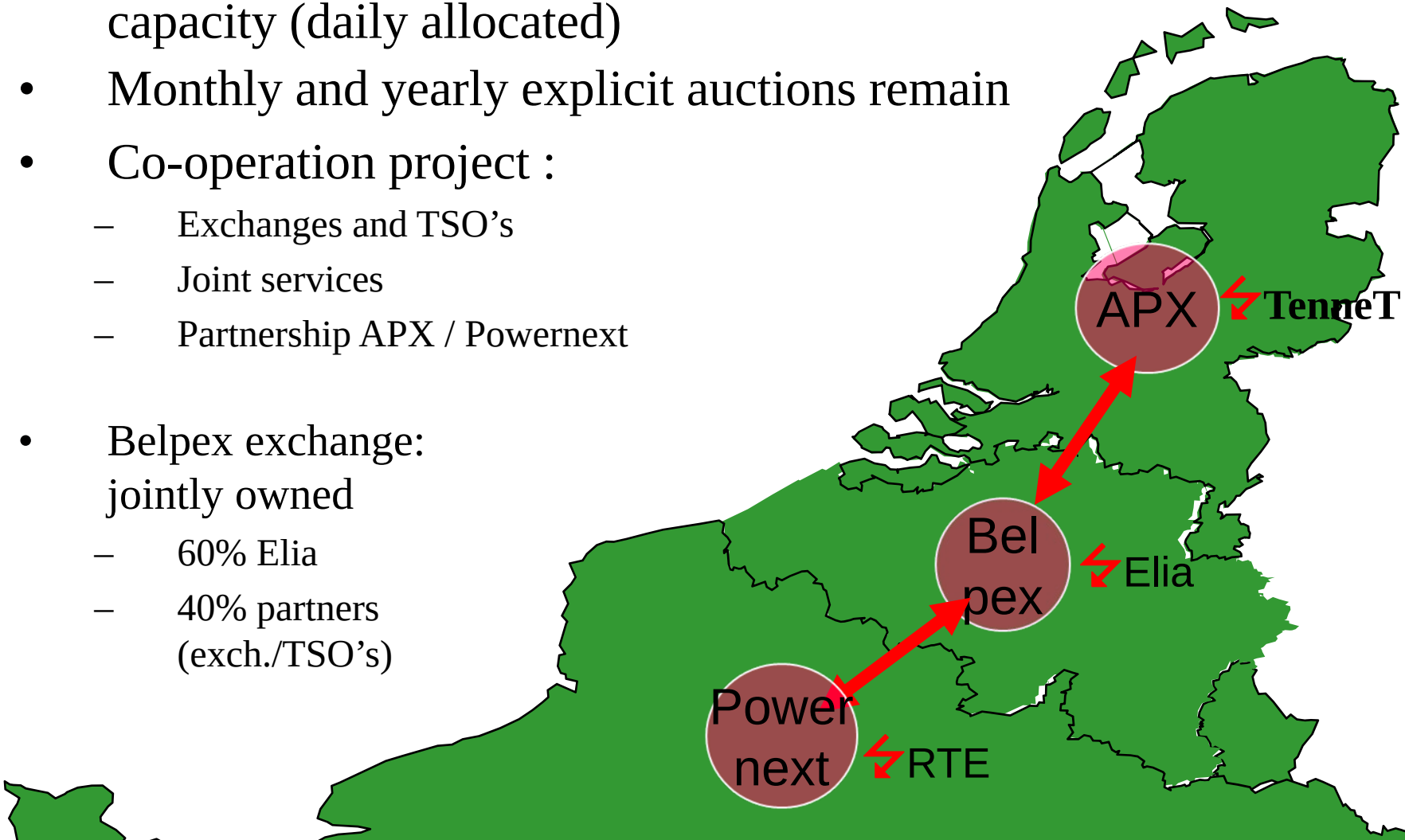
including NorNed

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

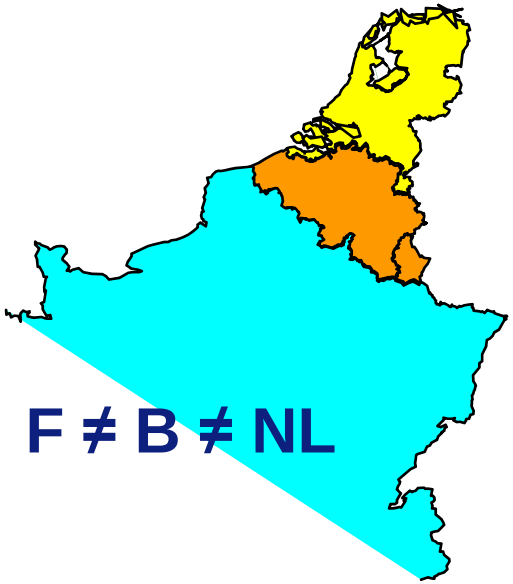
From APX

capacity (daily allocated)

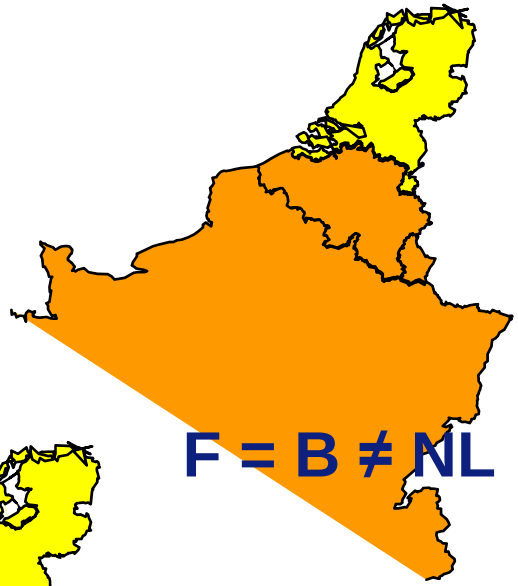
- Monthly and yearly explicit auctions remain
- Co-operation project :
  - Exchanges and TSO's
  - Joint services
  - Partnership APX / Powernext
- Belpex exchange: jointly owned
  - 60% Elia
  - 40% partners (exch./TSO's)



Prices depend on transmission constraints / availability



F ≠ B ≠ NL



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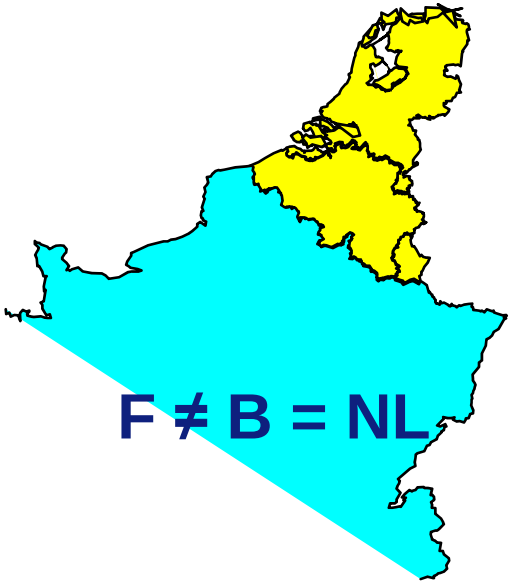

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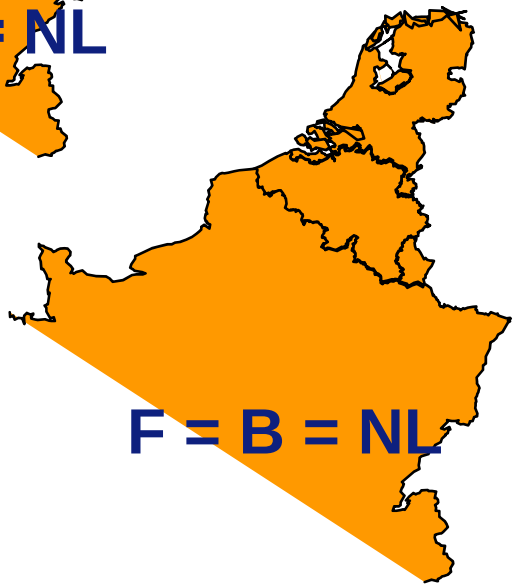

F = B = NL

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 providef 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

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Appendix: Pre-NETA experience

David Newbery

Market design workshop

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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-put of £6/MWh - to reflect SO_2 credit?

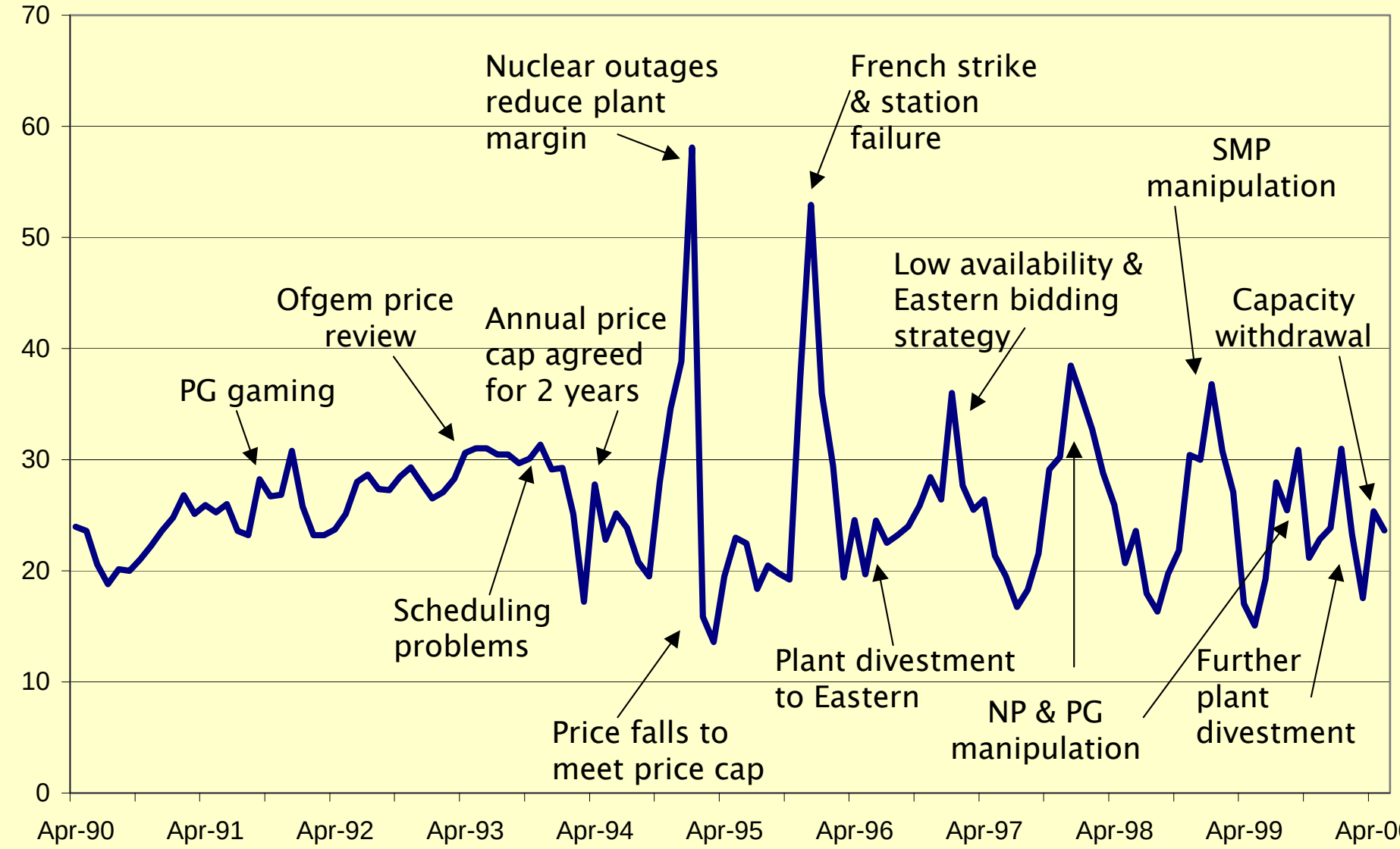
    => sustains high prices despite lower concentration
- Future looks oversupplied with cheap gas

  => sell coal-stations while prices are high

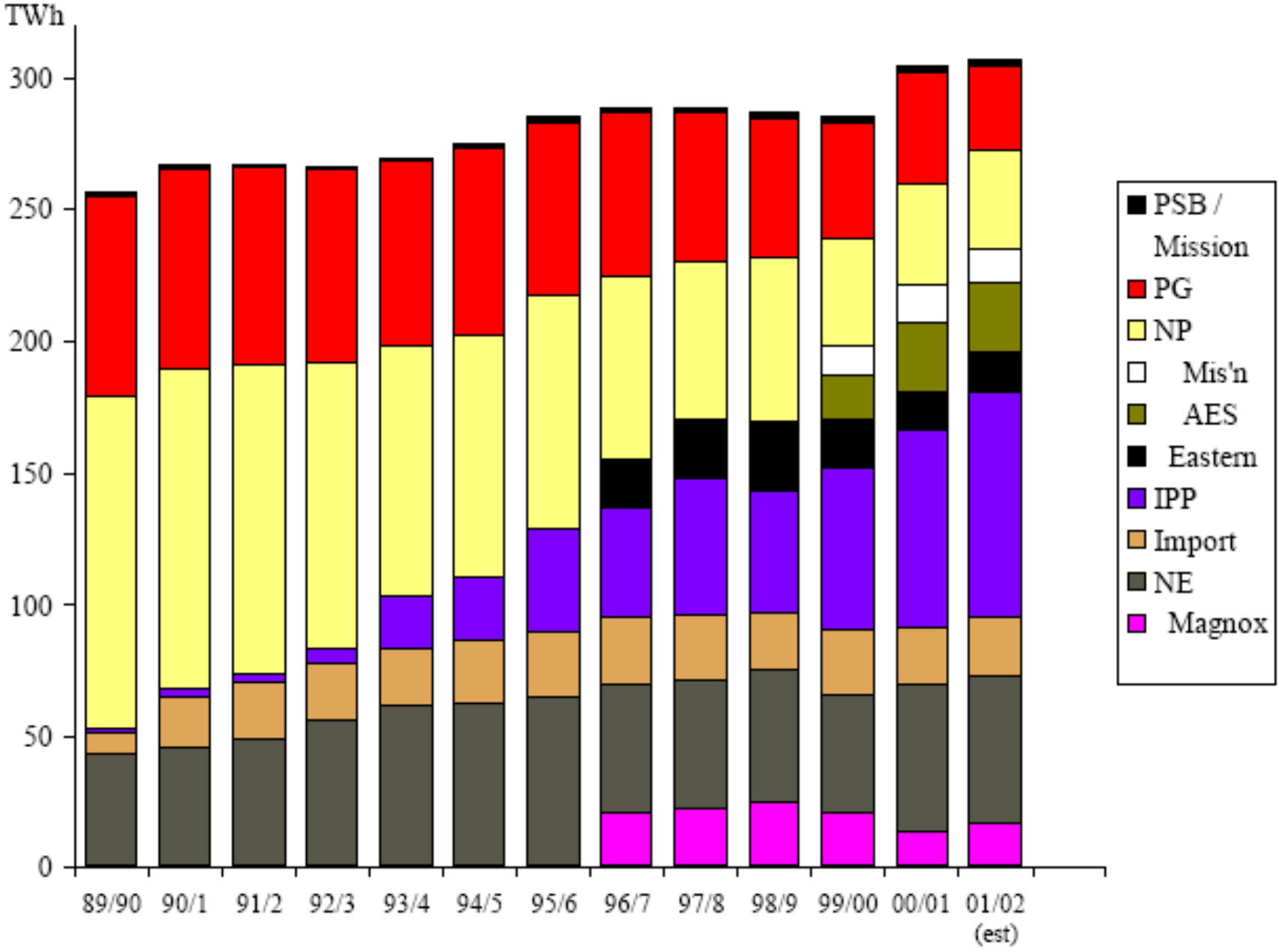
  => tacit collusion to keep prices up

  fall in concentration causes price collapse

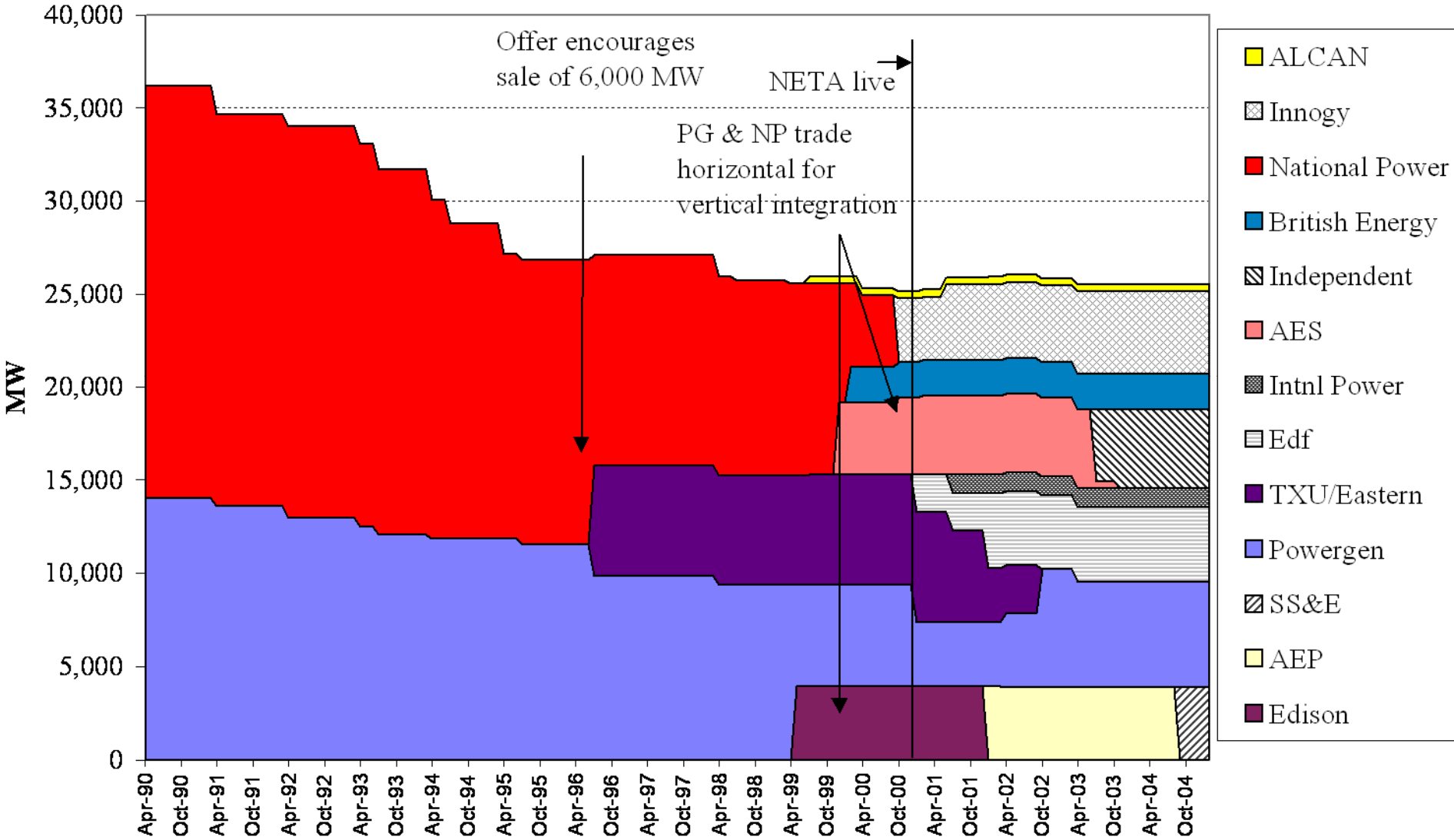
Pool prices 1990-2000



Generating companies in England and Wales

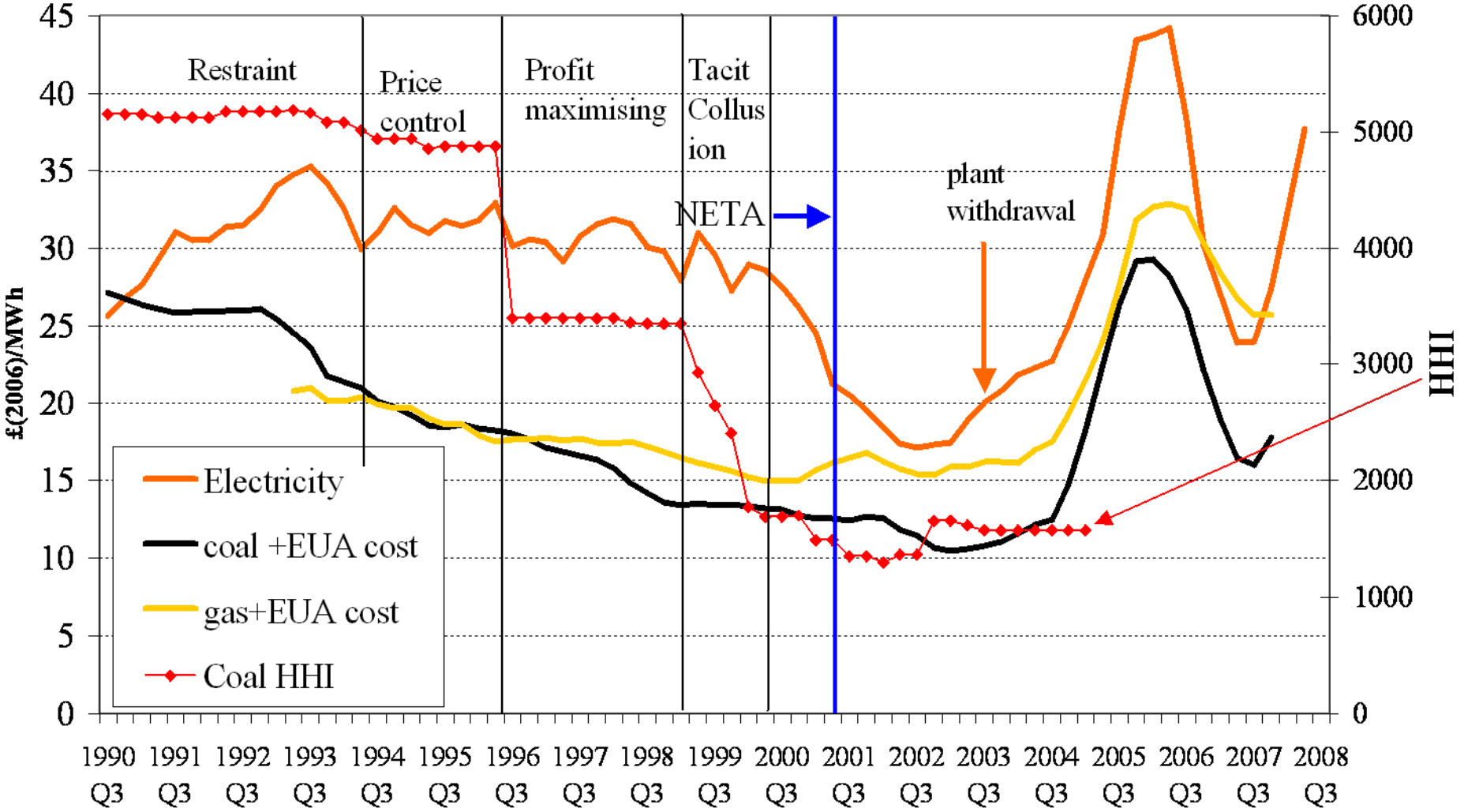


Capacity Ownership of Coal Generation 1990-2004



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

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