The political economy of rent allocation

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Power market design and the Renewables Directive

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http://www.electricitypolicy.org.uk
Outline

• **Renewables Directive** ⇒ massive wind
• Requires fundamental changes
  – more interconnection and pumped storage
  – Congestion management, plant operation
  – Location/type of generation and **nodal pricing**
  – Treatment of existing assets
• Changes risk rent redistribution
  – which will be opposed by losers

*Design transition arrangements carefully*
Implications of massive wind

• **Much greater price volatility**
  – mitigated by nodal pricing in import zones
  – requires CfDs and nodal reference spot price

• **Balancing needs better wind forecasting**
  – helped by central dispatch

• **Reserves (much larger) require remuneration**
  – contracted ahead by SO?
Criteria for market design

• Foster competition and entry => efficiency
• Incentives for timely, efficient (location and type) and adequate investment in G and T
  – reflecting comparative advantage
• Reflects social cost of carbon
• allow RD&D support without distortion
• deliver efficient dispatch
• at acceptable cost to consumers

without effective company opposition
Implications for Europe

• European market operates as integrated whole
  – efficient Europe-wide dispatch
  – efficient SO/balancing across borders
• Renewables built where cheapest
  – but costs share equitably
• Cost-effective interconnection as needed
  – to reduce cost of intermittency
• With careful transition arrangements

None of these currently guaranteed
Summary of problems

• Losses not reflected in dispatch
• Intermittency requires better scheduling
• Constraints only reflected via balancing
  – BM often illiquid and hard to hedge
• T access often firm - all or nothing
• Locational signals weak or absent
Locational access pricing rare
The argument for change

• A flawed system can be improved
  => potentially everyone can be made better off

• The challenge:
  – identify the efficient long-run solution
  – that can co-exist with an evolving regime for incumbents
  – apply new regime to all new generation
  – which compensates incumbents for any change
  – while encouraging them to migrate
Spatial and temporal optimisation

=> nodal pricing + central dispatch

• Nodal price reflects congestion & marginal losses
  – lower prices in export-constrained region
  – efficient investment location, guides grid expansion

• Central dispatch for efficient scheduling, balancing

• Market power monitoring – benchmark possible

• PJM demonstrates that it can work
  – Repeated in NY, New England, California (planned)
Market solutions to RES

• Nodal pricing plus central dispatch
  – Leave nodal spot prices to determine dispatch
  – but ensure that RES subsidies are for availability not generation
  – Avoids negative wind bidding
• SO incentivised to balance over 4 years
• RES support avoids negative bids
  – subsidy for availability, not generation?
GB objections to nodal pricing

• Disadvantages Scottish generators
  – but would benefit voting Scots consumers!

=> Large revenue shifts for small gains

• All earlier attempts thwarted by courts

=> need to compensate losers

Need to make change *before* large investments made (wind + transmission)
Transition for existing plant

• Existing G receives long-term transmission contracts for grid TEC charges
  – fixed volume based on past output?
  – pays reference node price less local node /MWh
• for output above this, sell at LMP
⇒ G significantly better off than at present
⇒ intermittent generation receives nodal price

Challenge: devise contracts without excess rents that facilitate efficient wind entry
Politics and design choices

• Liberalised markets vs Centralised solutions?
• But SEM requires market approach
  – or revert back to more costly individual solutions
• Will need to sort our Cross-Border Tariffication
  – but only needed for new transmission investment
• Central dispatch or US-style OASIS reporting
  – to ensure efficient use of RES and interconnectors

Challenging to devise necessary route map
Conclusions

- Renewable electricity poses major challenges
  - requires *and currently lacks*
    - efficient transmission access regime
    - efficient market design for dispatch and balancing
    - efficient information sharing for efficient interconnector use

- Wind puts stresses on current market design => nodal pricing, central dispatch and enhanced SO

- Requires transition arrangements/contracts
  - for new/old generation

*Reforming markets requires transition contracts*
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Acronyms

BM: balancing market
CfD: Contract for Difference
G: generation
LMP: Locational Marginal Pricing or nodal pricing
OASIS: Open Access Same-Time Information System and Standards of Conduct,
   See FERC Stats and Regs ¶ 31,093 (2000).
RES: Renewable electricity supply
SO: System Operator
T: Transmission
TEC: Transmission entry capacity