The political economy of rent allocation

David Newbery

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?

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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

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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

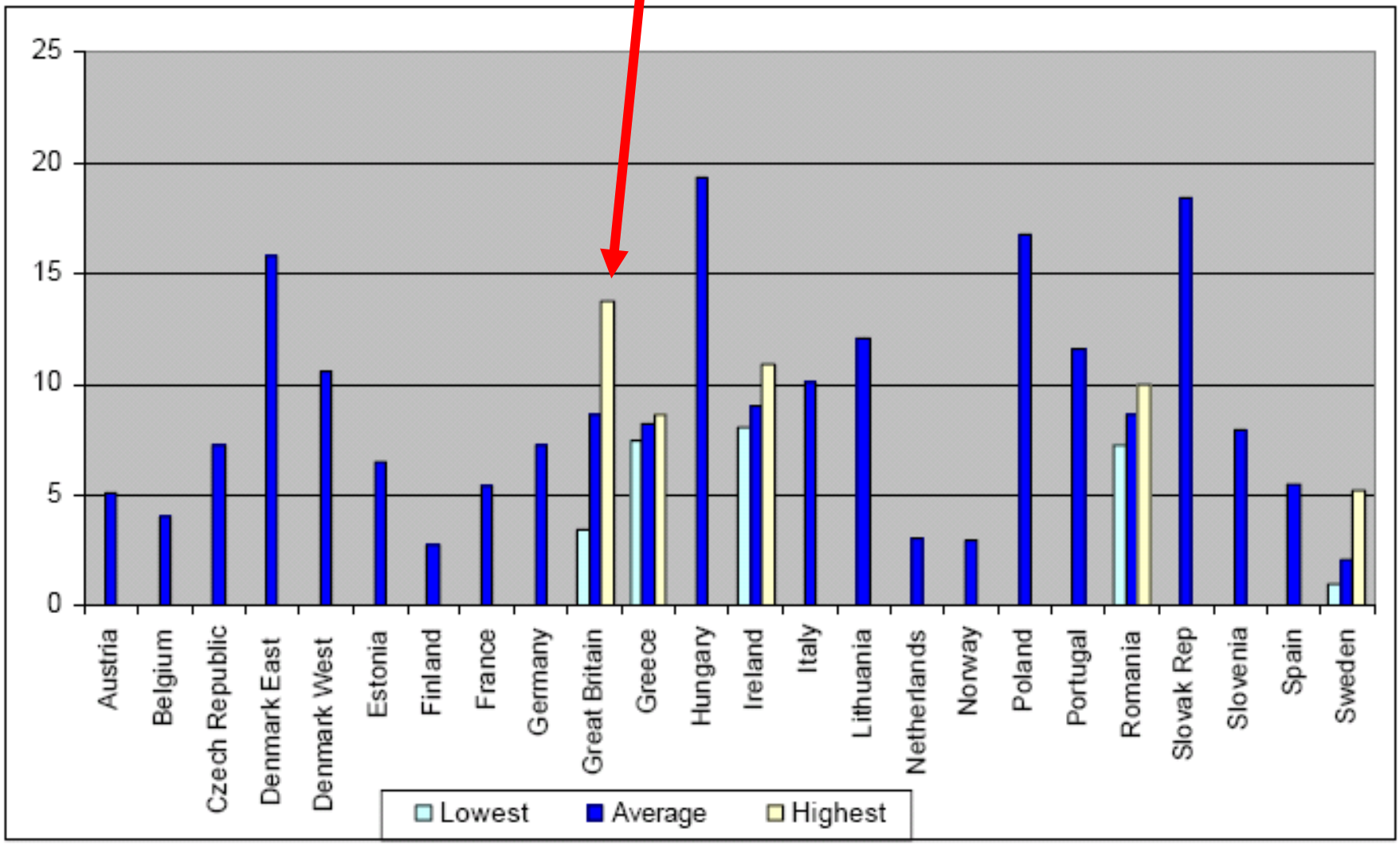
Summary of problems

- 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

Comparison of transmission tariffs G+ L: impact of location

Euro per MWh

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

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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 interconnetors

Challenging to devise necessary route map

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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