UNIVERSITY OF CAMBRIDGE | Electricity Policy Research Group

Sustainability and Competition in Network Services

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Outline

- Key issues in policy:

- Legitimacy of governance arrangements
- Cost effectiveness of new investment
  - *UK Offshore Transmission*
- Who decides on new investment
- Efficient use of existing assets
  - *Independent System Operators in US*

Offshore Transmission

Rising T&D costs

- Project Discovery *(Ofgem, 9/10/09, pp.94-5)*: E+G Distribution and Transmission investments in UK to 2025 are £47 to £53.4bn
- Electricity transmission and distribution charges rise £49-53 per customer (or 60%), more than proportionately.
- Offshore transmission alone could be £15+bn to 2020 (more than current onshore RAV).
- Cost of capital and competitive sourcing key.

Principles of Auction Design

(Klemperer, 2002)

- Key is to attract sufficient bidders and avoid collusion, as per standard industrial economics
- Even small bidding costs deter bidders
- Sealed bids better than ascending auction
- Structured negotiation can be used where too few bidders or large information costs
- Practical design 'local circumstances matter and the devil is in the details'
- Need to worry about legitimacy of alternatives

Risks with Auctions

- Tendering processes expensive
- May lead to duplication of assets
- Capital adequacy problems/non-delivery risks
- Still need a proposer of investments

UK Offshore Transmission

- 20 year contract, indexed to RPI, de-risked of actual energy flow and existence of wind park
- Round 1 and Round 2 tenders - transitional regime.
- Round 1, projects already built or being built. £1.1bn transfer value.
- Round 2, underway.
- Subsequent rounds - enduring regime originally intended (BFOO) or (FOO).

Lessons from Round 1

- Lots of interest (£4bn vs £1.1bn).
- 9 projects: 7 preferred bidders financial; 0 incumbent transmission companies.
- Low interest rates (cheap debt), savings of £350m est.
- Potential for greater savings with DBOO.

The Future – more complex networks?

- Offshore Auctions likely to work well for point-to-point transmission.
- Could have more complicated auctions (multi-criteria) auctions for radial links (Crampton et al., 2006).
- Subject all auctions to max willingness to pay test.
- No evidence of major benefit from meshed offshore networks (e.g. Morton et al. 06).
- Strong evidence that option value of waiting to see how transmission needs develop rules out building ahead of need (e.g. van der Weijde and Hobbs, 2011)
- Merchant links already being built offshore…

Independent System Operators

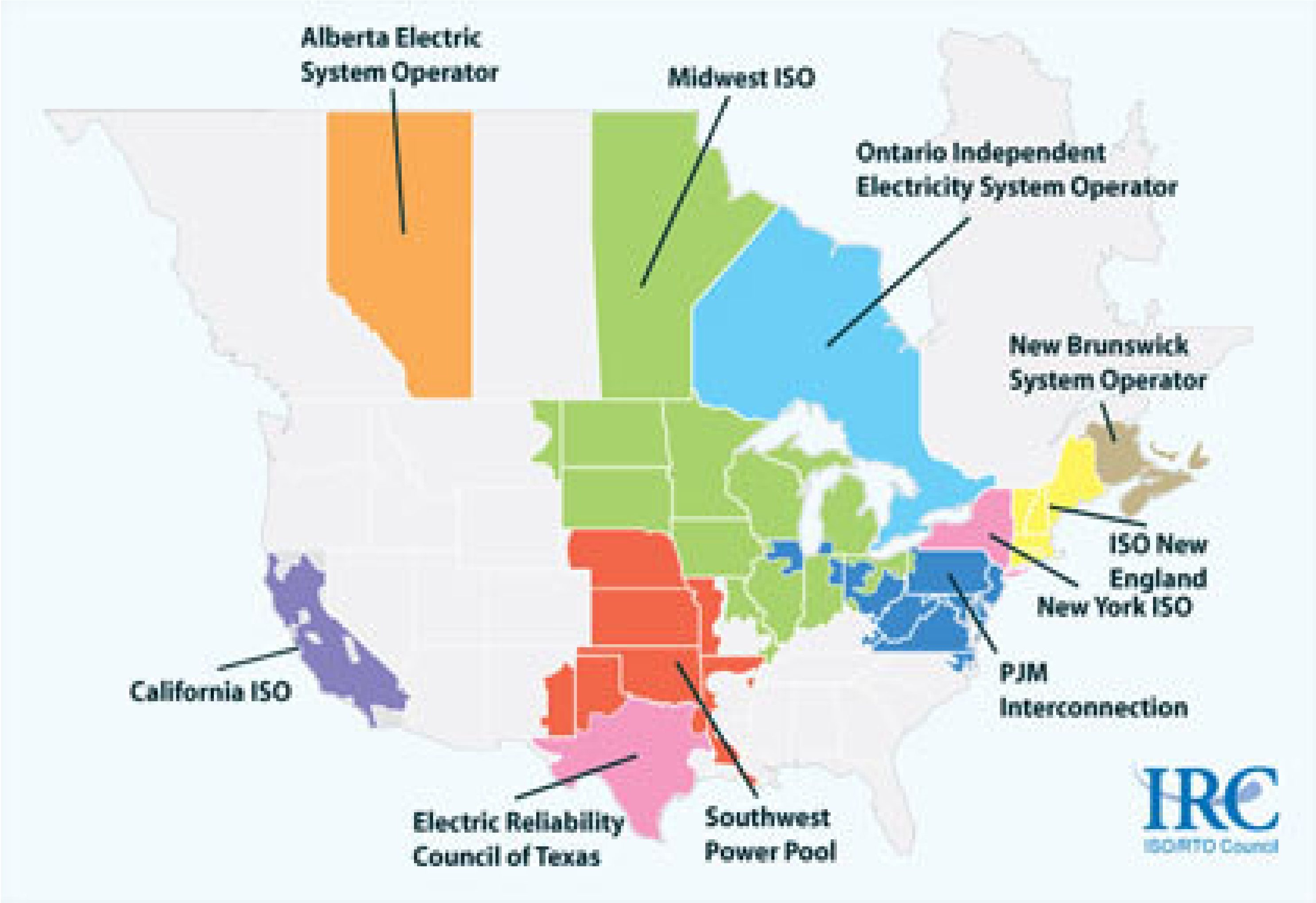
Developing System Operation

- ‘Competition’ in provision of networks leads to pressure to separate SO and TO(s), e.g. in offshore transmission and in water

- So do issues of regulator jurisdiction and competence.

- Evidence from US electricity ISOs informative.

US ISOs/RTOs



Source: http://www.isorto.org/atf/cf/%7B5B4E85C6-7EAC-40A0-8DC3-003829518EBD%7D/iso_rto_map_20090915.jpg

Example ISO Budgets and Activities

RTO/ ISO	Annual Budget and Debt Service ($ millions)	Staff	Historical Peak (MW)	Services Offered
NYISO (US)	119.5	452	33,000	• Energy market: two-settlement (day ahead and real-time) spot market with LMP • Regional and locational capacity market • Financial transmission rights market.
PJM (US)	252.0	725	167,000	• Energy market: two-settlement (day ahead and real-time) spot market with LMP (prices calculated at each bus every five minutes) • Capacity markets (RPM) • Ancillary services markets • Financial transmission rights (FTR) market

Governance Issues ***(cf.Joskow, 2007)***

- Independence from what?
- Incentives vs Not-for-profit
- Cost control for globally small internal costs
- Relationship with regulation = ?

Independence Issue

- ITSO experience in UK
  - SO around 7% of total ITSO revenue
  - c.+50%, -25%, SO revenue exposure

- Alberta for profit ISO: 1998-2003

- Alliance RTO proposal in Midwest: 1999-01

- Increasingly fully independent board, with advisory group of stakeholders

Missions	Ideal first best ISO	PJM (US)	ERCOT* (US)	NGC (GB)
Management of: ***Congestion***	**Nodal pricing**	Yes.	Yes.	None: re-dispatch.
Losses	**Fixed rate**	Yes.	Yes.	Yes.
Network development : ***Investments***	**Social cost minimisation, centralised by SO (congestion threshold criteria)**	No.	Responsible for System planning coordination.	Mainly engineering criteria; fuzzy economic criteria.
Tariffs	**Zonal tariffs + Accommodation capacities**	Partly, no accommodation capacity.	No.	Yes.
Coordination with TSOs	**By standardisation**	Yes, in progress.	Not interconnected.	No, but little need of coordination.

Source: Rious and Plumel, 2006; Rious, 2006

Problems of splitting SO/TO (Lieb-Doczy et al.08)

- Mismatched incentives.
- Efficient information transfer.
- Coordination of planning, maintenance and expansion of the network.
- Effectiveness of emergency procedures.
- Costly dispute resolution procedures.
- Financial liabilities and risk allocation issues.

- All of these can be solved…

Evidence on FTRs

- NYISO Transmission Congestion Contract (TCC, a form of FTR) market exhibits systematic underbidding for T rights (i.e. monopsony buying power) in auctions where less than two bidders on average. Zhang (2009)
- NY FTR market getting more efficient over time, except in the NY City – Long Island which can be explained by unforeseen shocks. Adamson et al. (2010)
- International merchant interconnectors offer FTRs and almost as efficiently as social optimum. Parail (2010)
- LMP based pricing with an FTR auction for access to merchant network assets (overseen by an ISO) might facilitate much more trade than is currently the case.

Conclusions

Summary

•*Competitive processes necessary to provide legitimacy*.

•More competition (albeit well designed) necessary in investment provision to keep costs down.

•*Integrated SO and TO arrangements cannot be defended where TO is increasingly competitive and in competition with production.*

•Need to make more use of price signals as network assets become more heavily relied on and more congested.

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