System Operators: Lessons from US and EU Energy Experience and Implications for the England and Wales Water Industry

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Background

In 2010, Ofwat's "Valuing Water" paper proposed the potential introduction of a functionally separate System Operator (SO) within each water company to facilitate upstream trade.

System operators have been developed in both the electricity and natural gas industries in the US and the EU over the last 20 years.

There are 2 main types of SO:

- (i) "Thin" SOs that neither own nor have the responsibility for transmission/transport investment (ISOs); and
- (ii) "Thick" SOs that own and are responsible for transmission/transport investment (ITSOs)

SOs may be functionally separate, legally separate or ownership separate.

The Cave Review suggested functionally separated SOs for water. US and EU energy law now require ownership separation.

Objectives of SO Separation in Electricity and Gas

- The main direct objectives were to:
 - Increase the size and levels of trade in upstream markets; and
 - Reduce if not eliminate discrimination in favour of own generation/gas use relative to other suppliers

SOs were expected to reduce prices (wholesale and retail) and to increase network efficiency, static and dynamic, as well as network planning.

- Other objectives included:
 - Encouraging new upstream entry
 - Helping make a reality of retail competition (esp in EU)

US Electricity SOs: Main Developments

- In the 1990s, US electricity started with <u>functionally</u> separated ISOs in a small number of states. They were company based ISOs
 - These achieved very little particularly on reducing discrimination in favour of own generation
- Post-2000, reforming states were required to have <u>ownership</u> separated ISOs. These were primarily *regional* groupings e.g. PJM. New England RTOs
- US gas has an ownership separated ITSO for transport and Texas electricity is close to that with significant retail competition

Main Results of US Energy SO Experience I

The main results of US energy experience on SOs are:

- 1) Functionally separate SOs had virtually no impact on anything.
- 2) Ownership separate SOs/RTOs have improved short-run grid operational efficiency and increased upstream generation competition but have had little impact on retail prices
 - a) RTOs have serious problems especially on transmission maintenance and investment co-ordination
 - b) RTOs have not increased low levels of investment or significantly reduced congestion costs
 - c) There are unrequited co-ordination losses and ecs of scope
- Ownership separate ITSOs in US gas and in Texas electricity have done much better – on trade, upstream market openness and transmission investment and maintenance
 - a) ITSOs responsibility for transmission investment and its financing restores co-ordination and scope economies
 - b) A network with explicit transmission prices strongly fosters trade

Main Results of US Energy SO Experience II

Overall Regional ISOs have clearly performed worse than ITSOs on almost all measures (particularly investment) - and also arguably worse than vertical integrated companies.

US SO experience also shows quality of *accompanying* measures crucial:

- a) Quality of competition policy re upstream generation markets is crucial - and has by no means always been good (viz California)
- b) Wholesale competition stronger and easier to defend, monitor and regulate with significant retail competition – exists for Texas and natural gas but not much elsewhere in electricity
- c) Federal-State regulatory allocation of functions has caused serious problems over transmission investment levels e.g. over who finances where benefits arise in other States

Summary of Recent EU Electricity and Gas SO Experience

- 2nd Electricity and Gas Directives 2002 required functionally separated ITSOs as a minimum
 - Some countries only imposed the minimum (France, Germany, Belgium, Central Europeans, Ireland). Other countries required full ownership separate ITSOs (UK, Denmark, Netherlands, Sweden, Spain).
 - Regulated TPA required in minimum package plus introduction of full retail competition by 2007
- Results of 2nd Directive changes reviewed in DG Competition Inquiry 2005-6 – conclusions damning particularly as regards functional separation
- DG Competition Inquiry considered but explicitly rejected "thin" ISO model
 - The ISO approach "would require more detailed, prescriptive and costly regulation and would be less effective in addressing the disincentives to invest in networks"

Main Results of EU Gas Experience with SOs I

DG Competition Enquiry found that, with only functionally separated ITSOs:

- 1) Wholesale gas and electricity markets remained national with little new entry or incumbent entry into other areas. Concentration levels and market power remained high.
- 2) Functional separation of transmission and system operation had serious weaknesses over
 - (a) the functioning of wholesale markets; and
 - (b) network investment particularly network investment that would primarily benefit non-incumbent suppliers.
- 3) Cross-border sales did not impose any significant competitive constraint on incumbent behaviour.
- 4) There was a considerable absence of transparency, particularly on network availability and especially on interconnector lines/pipes.

Main Results of EU Gas Experience with SOs II

DG Competition Inquiry recommended remedies focused on:

- i. Ownership unbundling of networks
 - This was pushed for but not achieved in the 2009 3rd Energy Package
 - Has been reached sometimes in settlement of competition/merger disputes
- ii. Anti-concentration measures: divestitures of upstream electricity and gas holdings gas release – especially VPP auctions and gas release programmes
 - Achieved substantially in settlement of competition/merger disputes
- iii. Action to promote market integration via interconnector investment, etc.
- Note: DG Inquiry results supported by 2007 CEPA study of Belgian gas market which again emphasised power of incumbents to obstruct upstream – and effective retail – competition in absence of ITSOs with ownership separation

Main Lessons from Energy Experience for England & Wales Water Reform

The main general lessons are as follows:

- 1) The context and the surrounding institutions matter at least as much as the form of company institution chosen
- 2) Functionally separate single company ISOs and ITSOs do not seem to have any significant positive effect either in the US or in Europe.
- 3) Ownership separate "thin" ISOs covering large market areas have been more successful but are still highly problematic particularly for supporting investment.
- 4) Unbundling vertically integrated companies inevitably causes losses in economies of scope. Those losses are only worthwhile:
 - (a) if there are significant enough benefits (including environmental benefits) from more trade and competition; and
 - (b) new co-ordinating methods can replace the vertical integration (e.g. a regional ITSO).

Policy Implications: Water SOs

For England and Wales, I would argue that:

- a) For E&W water, the major benefits of effective SOs are:
 - i. Competition and regulatory transparency;
 - ii. Major environmental benefits from greater water trade
- b) Requiring water companies to create functionally separate system operators and doing nothing else is highly unlikely to create any significant benefits.
- c) ITSOs, where system operation is combined with network operation <u>and</u> investment funding, have considerable advantages over ISOs that exclude networks.
 - For water, regional ITSOs are likely to provide far greater net benefits than company specific ITSOs
 - Regional ITSOs would create an effective investment planning and co-ordination function – greatly needed in water
 - Treatment works better <u>not</u> included in ITSO but handled separately as an "essential facility"

Policy Implications: Market Structure and Competition I

- Retail competition a major part of developing effective ITSOs
 - Effective retail competition requires choice of upstream supplier
 => need for adequate number (3-5 or more) of upstream
 suppliers selling across an ITSO
 - With retail competition, ITSOs can give well-functioning and coordinated upstream and downstream markets. Absent or very limited retail competition leads to government/regulator-driven sector and markets.
- Scarcity based abstraction (and discharge) pricing to underpin water resource markets crucial beyond shortrun
 - Also need for reforms of abstraction licensing regime to give greater flexibility of terms
 - A water based environmental tax could probably act as a reasonable abstraction pricing substitute

Policy Implications: Market Structure and Competition II

Effective upstream competition requires ensuring that new entrants have access to water resources as well as open access to networks. There are two main methods of obligating incumbent companies to do this:

- A. Mandatory divestment (and/or forced trade)
 - Was used for British Gas in 1990s and in US electricity advocated in Stern (2010)
 - Mandatory loss of ownership of upstream resources more likely to cause losses in economies of scope (US electricity)
- B. Mandatory water release schemes
 - Comparable to electricity generation and upstream gas virtual auctions
 - Company retains ownership of resource appears not to cause significant losses in economies of scope

Policy Implications: Regulatory Policy I

Some things already in progress or under discussion:

- (i) Separate accounting but development yet to be defined
 - Pipe networks crucial including potential distinction between interconnecting and non-interconnecting pipes
 - Questions as to whether/when to move to separate balance sheets
- (ii) Modular licences
 - Allows licences by main function
 - Best basis for licensing new entrants

Policy Implications: Regulatory Policy II

Also

- (iii) Network access rules and prices need for regulated and published rates and rules imposing mutual access rights
 - ➤ Advocated in Cave Review and Stern (2010)
 - Provides basis by which companies can decide whether they wish to continue owning, operating etc network assets.
- (iv) Separate price caps Ofwat has announced intention of >1 price cap for 2014 price caps
 - Key choice is whether separate (water supply) network price cap (excluding treatment works, etc) put in place for 2014 – and treatment of interconnector pipes
 - Highly desirable possibly essential to foster competition and corollary of moving towards ITSOs

Regulation to Encourage Vertical Unbundling I

Some of the previously discussed measures should help encourage movement towards unbundling and regional ITSOs but are unlikely to be sufficient.

Recommended further Ofwat actions to help support moves to regional ITSOs and development of upstream trade include:

- 1) The development of a more competition-oriented approach particularly in upstream water including attitudes towards
 - Profit increases from network unbundling efficiency generated and not
 - Network leasing and management long franchising
 - Mergers of vertically unbundled entities (network or supply entities)

Regulation to Encourage Vertical Unbundling II

Also:

- 2) Ofwat's future regulatory approach towards potentially and actually stranded assets including RCV implications
- 3) Regulation of large upstream investments the potential for a contract-based approach to replace price regulation (cf. electricity regulators and PPAs; also modern public procurement, PPP/PFI and similar approaches)
- 4) Signalling expected medium and long-term structural changes so that RCV consequences can be taken on-board and handled within a "no surprises" framework of mutual trust.

Final Comments

- 1) The 2011 White Paper and any subsequent Water Act present a major reform opportunity. This is both:
 - (a) to consolidate market arrangements; and
 - (b) to introduce a framework suitable for handling the challenge of future likely regional and seasonal water shortages.
- 2) The environmental challenges suggest major benefits from upstream trade and competition
 - This is in addition to benefits to consumers and companies from better functioning markets and more effective regulation
- 3) SOs particularly separate ITSOs can have a significant impact on fostering upstream water trade and competition but need to be accompanied by (among other things):
 - i. Scarcity based abstraction prices (or equivalent)
 - ii. Effective network access rules and prices
 - iii. Retail competition plus effective upstream competition via virtual capacity water auctions (or equivalent)

Demand and Supply of Water Resources in England : Environment Agency Map March 2008

Resource availability status for units of surface water and/ or surface water combined with groundwater in completed CAMS March 2008





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