

Transmission in a world with batteries: should we rethink arrangements ?

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Bruce Mountain
Director

Outline

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- Arguments for and against independent transmission planning
- Arguments for and against contestable contracts for transmission development
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Context

- Closure of stored fuel generation (Northern and Playford) and rise of wind and solar gives rise to concerns about:
 - generation adequacy when wind and sun not available
 - power system stability and resilience to supply-side and demand-side shocks (even when wind and sun available).
- Competing solutions include some or all of:
 - more transmission and interconnection to diversify supply
 - more “stored fuel” generation (invariably fossil-based)
 - better demand-side response to wholesale prices
 - distributed and grid-scale batteries
 - other storage (thermal, hydro, pumped-hydro, compressed gas, flywheel etc.)

Lots of options on the table already

- SA Government procured ~250 MW diesel generation capacity
- Hornsdale 100 MW battery about to enter service
- Jamestown 30 MW battery under development
- SA Government contemplating gas generation?
- SA Government funding interconnection expansion studies
- Sea-water pumped hydro in SA (maybe along lines of decommissioned Okinawa plant) being examined;

A refresher on vertical integration literature

- Joskow (1996) (building on Coase (1937) and Williamson (1975)):
 - Economies of co-ordination arising from: public goods and externality; technological dependency and complex co-ordination of supply and demand in real time.
 - But vertical integration results in monopoly with consequential dead-weight loss
 - Unbundling generation from transmission reflects belief that benefits from competition in generation will exceed loss of economies of scope
- Meyer (2012) – Transaction Cost Economics describes economies of scope between generation and transmission: generation and transmission assets are specific, long lived and not easily reversible.
- Brunekreeft (2015) – costs of flawed coordination among different decentralized agents in a fragmented system may not be felt by the individual agents, but are incurred by the system overall

Transaction Cost Economics (TCE) explains historic dominance of regulation, rather than contestable contracts in transmission development

- TCE says regulation is more efficient than contracts if:
 - future demand is uncertain and
 - large future capital outlays are needed and
 - assets are specific or relationship-dependent.
- TCE says, equivalently, where sufficiently complete once-off contracts are not possible, what starts out as a once-off contract turns into a contractual negotiation process that is akin to regulation.

Transmission and batteries can be excellent substitutes and complements

- Transmission line/substation, generator, pumped hydro, battery and price-responsive demand are substitutes and often complements. Of these batteries can be the best substitute and complement to transmission
- Markets can resolve competition between battery, pumped hydro, gas peaking generation, price responsive demand.
- But resolving choice between transmission (regulated) and batteries (market) requires policy decision. The vertical integration arguments need to be reconsidered.

And so, the main questions

- 1. Should transmission asset owners be prevented from owning batteries for the same reason that they are prevented from owning generation?***
- 2. If so, will separation of transmission planning from ownership facilitate co-ordination between transmission asset owners and batteries?***

Strong logic for separating transmission planning from transmission asset ownership in a world with batteries

1. Batteries can be excellent substitute and complement to transmission.
2. Transmission monopolies have incentives to expand regulated assets and so may be less likely to choose batteries before more expensive transmission alternatives
3. Therefore transmission asset owner that has exclusive right to plan transmission network has incentive to undermine less capital intensive solutions.
4. Not a new problem. Evidence suggests regulators in Australia are not effective in preventing this.
5. Separating transmission planning from ownership presents a possible solution that allows benefits from from co-ordination of battery and transmission to be realised.

Counter-arguments seem hard to sustain

1. **Integration of ownership and planning provides information not available to an independent planner ?** Maybe, but if integrated owner & planner prioritises own interests, informational advantage will not produce outcomes in customers' interests.
2. **Joint ownership and operation improves performance accountability?** Maybe, but performance also affected by exogenous factors. Performance incentives can be applied even if planning separated from ownership.
3. **Integration of ownership and operation allows regulatory incentives to reduce the cost of operation and development?** Maybe, but Australian experience not supportive – better outcomes seen in Victoria where transmission ownership and planning is separated, compared to the outcomes elsewhere in Australia where ownership is integrated with planning.

On Question 2, evidence increasingly undermines case for regulation - contestable contracting offers a solution

- Transferring whole-of-life risk under long term contracts provides strong incentives for innovation and minimisation of development & operating costs.
- Consumers pay prices that reflect successful tenderers' revenue requirements rather than regulator's determination.
- TCE arguments less relevant in contracts for relatively unmeshed infrastructure such as interconnectors. In Britain, Ofgem's transmission tenders are proceeding along these lines.
- Concern about market power through asset-specificity and future relationship-dependent investment in one-off contracts, must be weighed against imperfect regulation.
- Transmission has been effectively procured through contract in the UK, Brazil, Chile, India, Peru, the United States and Canada. Setting availability targets - the main performance measure – has been uncontroversial.
- In Australia, evidence of contestable transmission is encouraging.

Summary

South Australia is at the leading edge of decarbonisation in Australia. The combination of renewables, rapid development of batteries & regulatory failure motivates the search for transmission arrangements that deliver benefit of co-ordination and preserve competition in production. We suggest:

1. Separation of transmission planning from transmission asset ownership has a compelling logic. Counter-arguments seem unconvincing
2. Transaction Cost Economics explains regulation rather than contestable contracts in transmission. But evidence of regulatory failure in Australia; successful transmission tenders internationally (and in Australia), and opportunities presented by batteries suggests rethink needed.