

Benchmarking electricity networks monopolies: linking economic concepts on costs, pricing and efficiency.

Electricity network businesses are facing growing scrutiny by the Australian Energy Regulator (AER), the public and political institutions as increasing costs of transporting electricity flow through to consumer bills. The AER has suggested modifications to the current approach to regulating electricity network businesses, not least the use of benchmarking to encourage greater efficiency – hence lower costs. MHC has undertaken a desktop study of Australia's electricity network businesses' Long Run Marginal Costs (LRMC), and found:



- A range of LRMCs not readily explained by “common” reasons
- The differences require further review before any definitive conclusion can be reached, particularly, where the conclusion represents the foundation for changes to the current regulatory framework
- Electricity network businesses should explore and identify the reasons for difference
- It is arguable whether the AER's suggestions would improve the outcomes.

Background

In January 2008, the Australian Energy Regulator (AER) assumed responsibility for regulating the revenue of Australia's distribution network businesses (DBs), having already assumed the regulatory oversight of transmission network service providers (TNSPs) from July 2005. By 2011, the AER had finalised access arrangements and revenue determinations for all distribution and transmission businesses, approving substantial increases in capital investment leading to increases in allowed maximum revenues, and having flow on increases on final prices to consumers.

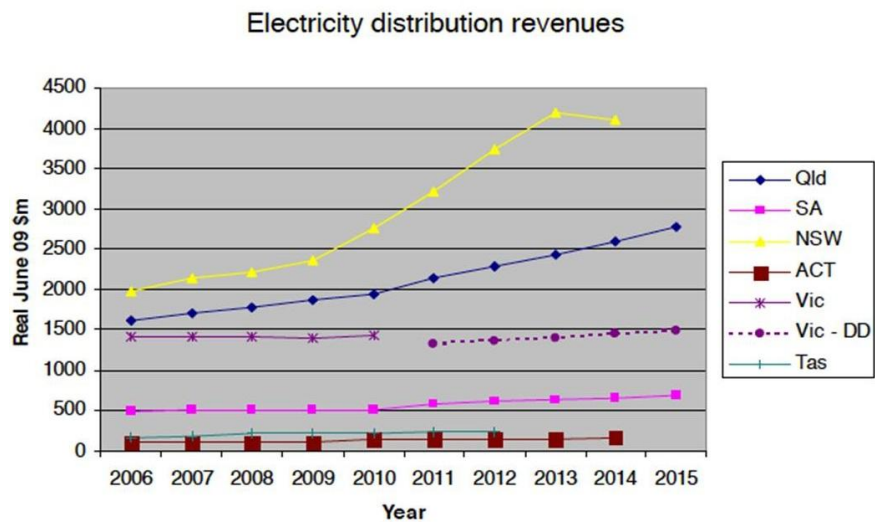
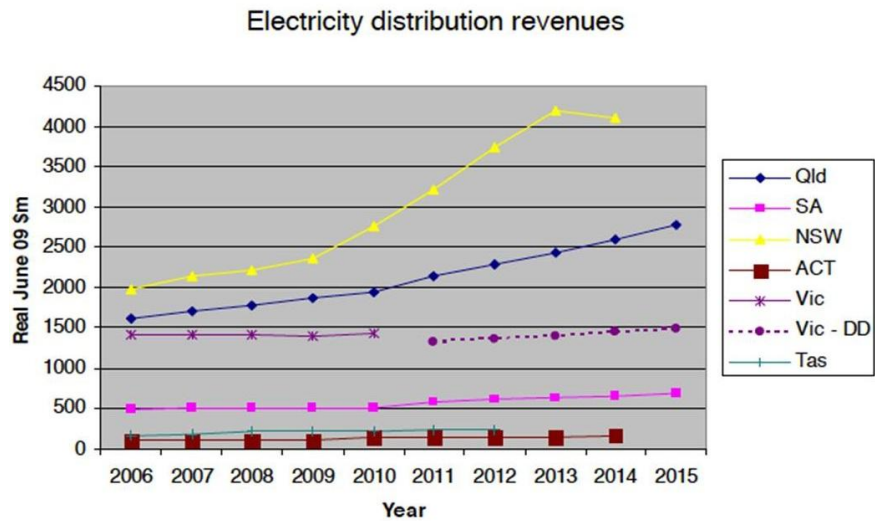


Figure 1: AER approved DBs capex allowance and maximum allowed revenues by state

Increasing regulatory network costs now make up close to 50 per cent of consumers' electricity bills, and this proportion is forecast to grow in line with network businesses' current plans for capital investment. In a recent policy speech, the AER's Chairman, Andrew Reeves, foreshadowed key changes to the current regulatory rules to give the AER the ability to:

- Substitute its own forecasts (relating to capital and operating expenditure proposals) for those of the network businesses
- Review over-spends within past regulatory periods – as part of the approval process for the next regulatory period
- Examine the arrangements around revenue cap re-openers, applications for cost pass-throughs, and capital expenditure contingency projects and off-ramps
- Utilise up-to-date financing practices when setting a business' return on capital, rather than being locked into a theoretical method.

From the AER's perspective, these changes, along with changing the basis for network businesses making merit review claims, will aim to provide greater discretion around inputs and, potentially, better regulatory outcomes. From MHC's perspective, the recent round of regulatory outcomes needs to be analysed further, and considered in terms of the incentives that regulated businesses face.

Natural monopoly, networks, costs and pricing

Electricity network businesses are natural monopolies as the infrastructure is unable to be economically duplicated, which is arithmetically demonstrated by average costs falling over the relevant demand range. The minimum efficient scale (MES) of investment is substantial resulting in a single set of network of assets being able to meet demand. Additionally, the cost curves reflect significant large fixed costs associated with building high/low voltage networks and sub-stations, which translates into a marginal cost of supply being low and close to 'zero' once new network capacity is added.

However, a network business that priced at its marginal cost alone would lose money and be unable to make reasonable returns which, in the long run, would increase the costs to end users as supply brown outs occurred, and when 'catch-up' investments were made to meet the deficit. Accordingly, for a regulated natural monopoly, the most appropriate and efficient approach to pricing is to set prices at the long-run marginal costs (LRMCs) of supply.

For non-regulated services and products, prices reveal the most amount of information to consumers about the business: showing its ability to combine labour and capital in the most efficient way compared to available substitutes. Considering the above, and where it is accepted that a regulated natural monopoly should set prices on the network business' LRMC, then it also follows that comparing Australia's network businesses' LRMCs represents an alternative benchmarking approach to providing additional information on current costs and prices of network businesses.

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LRMCs should be based on forward estimates of the next increment of capital investment technically required to extend network assets to supply the next increment of demand. In MHC's LRMC study, we have estimated each business' LRMC by:

- Accepting, as given, their information advantage in terms of the:
 - next (forecast) increment in demand
 - technical requirement to meet this demand
 - forecast capital costs to meet this demand

- Ignoring sunk costs, previous decisions, and legacy issues.

Importantly, an LRMC benchmark provides a relative comparison of each network's estimated price of delivering the next forecast increment in capacity, which should be an important component in the current debate on rising network costs and prices.

Results from benchmarking network businesses

Taking data from the AER's recent revenue determinations, and other publicly available information, we can calculate each network business' LRMC. For this purpose, we have assumed:

- Their planning horizon is the next five years (i.e. consistent with the AER's revenue determination period)
- Their total capital investment forecast coincides with the revenue determination period
- Their forecast growth in peak demand is met by the network by the end of the revenue determination period
- Not normalised financial numbers to the same base (this precision does not alter the outcome).

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Transmission businesses

Figure 2 sets out MHC's LRMC estimates for TNSPs*.

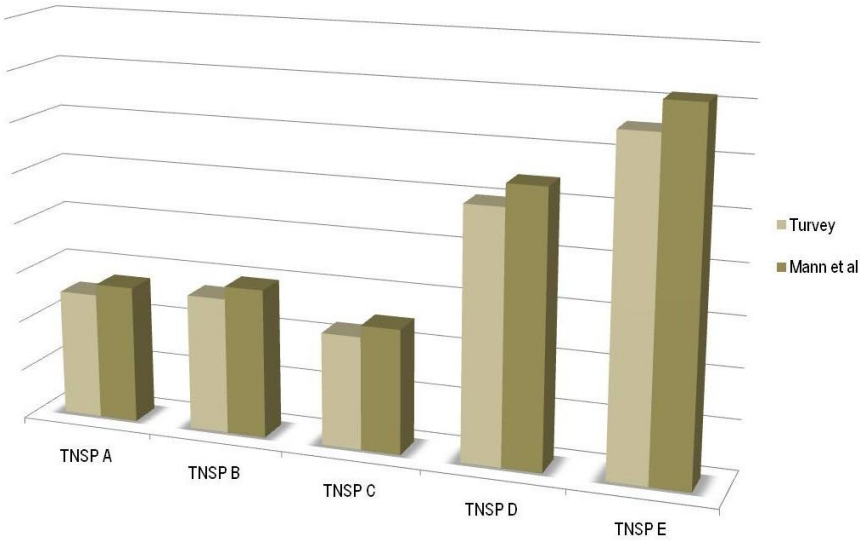


Figure 2: TNSPs' LRMC to end of current revenue determination period

Apart from the outlying TNSPs D and E, the TNSPs' LRMCs largely cluster at around \$1 million to around \$2.5 million per increment of forecast MW peak energy carried.

Distribution businesses

Figure 3 sets out MHC's LRMC results for Australia's DBs for the current regulatory revenue periods.

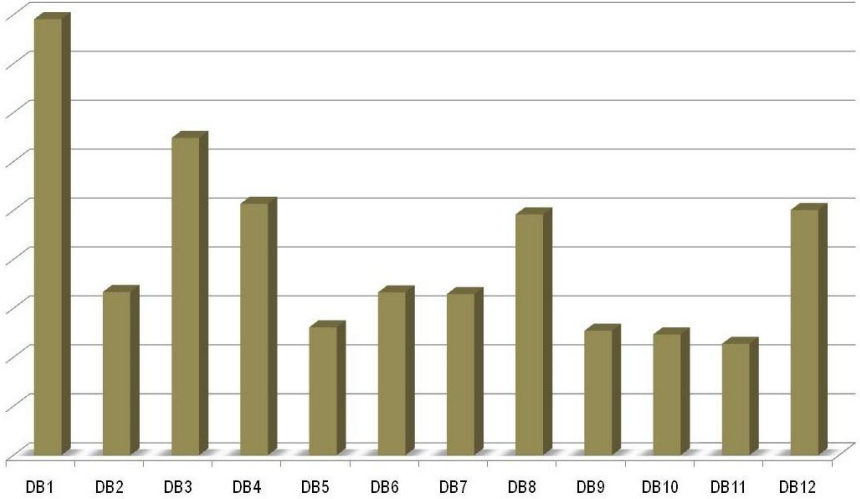


Figure 3: DBs' LRMC to end of current revenue determination period

Unsurprisingly, this shows:

- DBs with a service area dominated by rural regions have higher LRMCs
- DBs with compact service areas have lower LRMCs (although, there still remains a material difference between DBs in this compact category)
- In terms of prior expectations, differences in planning standards and reliability targets do not appear to affect DBs' LRMCs.

Implications

For regulators

The disparity in LRMCs, particularly even when DBs and TNSPs are categorised by common physical and technical requirements, identifies pricing differences, which potentially implies differential efficiency outcomes across Australia's electricity network businesses for their next five-year investment periods. In the interests of achieving the lowest cost of electricity supply to end-users over the long term, regulators and policy makers should thoroughly analyse network businesses' LRMCs to ensure these differences are driven solely by disparate topography, network size, and legal obligations – and not by reasons that may potentially lie within the control of the electricity network businesses.

Will the AER's review address our noted divergence in LRMCs? Not likely. The AER is at an information disadvantage to electricity network businesses – as demonstrated by its ongoing concern with levels of network spend despite ever increasing disclosure requirements being placed on network businesses. Therefore, instead of continuing to demand more information or draw itself into a de facto manager role for these businesses, the AER should reconsider the nature of incentive regulation, and its real purpose to have electricity networks reveal their true costs of supply.

Given network businesses have been through several cost-to-serve building block approaches to regulation, exploring alternate forms of regulation may provide businesses with real incentives to reveal their true costs.

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For businesses

For electricity network businesses, MHC's analysis illustrates that, despite recent gains, LRM pricing suggests room for improvement, or at least a greater understanding of what is happening within each network business' total cost function. MHC's analysis poses some further areas for inquiry:

- Are current capital investment programs reflecting that the next addition to network capacity is now utilising more expensive 'styles' of asset configuration (having exhausted less-costly asset configurations in previous planning/investment periods)? Importantly, discovering the best way to demonstrate this.
- Is the business correctly 'timing' the incremental capacity expansion in light of available information? Divergence between LRMCs may be driven by

- losses in the 'prudency' of capital investment programs.
- Are global trends in essential inputs to electricity network assets (such as copper, steel and concrete) making Australian electricity network businesses price takers to such an extent, natural monopoly regulation of Australian networks is simply translating to annuity-style income for international suppliers with pricing power?
 - Are there any regulatory barriers which preclude the ready consideration of so-called 'alternative' solutions to network capacity issues, such as energy storage solutions? Should a case be made to address these and, if so, how?
 - Are current capital asset planning and workforce delivery practices striving to achieve the lowest modern equivalent asset (unitisation) to support the forecast minimum efficient scale required for the electricity network to meet forecast peak demand?
 - Are recent obligations relating to network planning standards and minimum service standards providing network businesses with less flexibility to control network costs to meet peak demand while achieving these standards?

Some electricity network businesses may have already undertaken this study, and identified the reasons for the differences. Those which have not may consider preparing for such an explanation. MHC maintains that as electricity network businesses act as the custodians of the natural monopoly technology, it is incumbent on them to at least answer these questions to ensure the costs of supplying electricity are minimised now, and into the future.

For consumers

For electricity consumers – particularly large energy users – it is clear which network businesses are providing the lowest cost supply for network reliability and quality of service. If minimising network costs are a factor when considering where to locate business operations, then there is merit in monitoring movements in network businesses LRMCs.

Conclusions

The price of a product or service reveals how well the business sets strategy, operates and performs. For regulated electricity network businesses, this is no different. When we apply the economic standard for pricing regulated natural monopoly services, we have found a divergence between Australian network businesses, which at least requires further examination to explain the reasons for these differences. This will assist in ensuring that electricity consumers are paying the least cost of supply for the transportation of the electricity that they consume.

* We used the Turvey and Mann et al methods to estimate LRMC, for further information, see <http://www.qca.org.au/files/PricingPrinciples.pdf>

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