Privatisation and the regulatory valuation of electricity distribution network service providers in New South Wales: Evidence and issues

A report for the Public Interest Advocacy Centre

October 2014

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Erratum

This report, when released publicly on 17 October 2014, commented that the value of the distribution regulatory asset base in California was, per capita, about one tenth that of New South Wales. The correct figure is about one fifth. This was corrected on 19 October 2014.

Executive Summary

The New South Wales (NSW) Government has committed to partially lease the distribution network service providers (DNSPs) Ausgrid and Endeavour, as well as the transmission network service provider TransGrid. Network costs (to cover the poles, wires and substations) now make up approximately half of NSW households' electricity bills.

In this context, the Public Interest Advocacy Centre (PIAC) commissioned Carbon and Energy Markets (CME) to analyse the value of Regulated Asset Base (RAB) of the NSW DNSPs and the consequences for NSW electricity consumers.

The objective of this report is to draw attention to relevant issues and advise on areas that would benefit from further investigation, particularly the potential benefits of devaluations of the RAB prior to privatisation. This summary outlines the key findings of this paper.

There has been massive investment in the NSW networks over the last 13 years which has significantly increased costs for NSW consumers

From 1 July 2000 to 30 June 2013, the RABs for the three NSW DNSPs increased from $11b to $22b (in constant currency) as a result of the massive capital expenditure program over the period:

- This $11bn increase was more than three times more than for the Victorian networks over the same period, and reflects NSW DNSPs adding more than twice as much capital per connection to their RABs.
- As a result, the three NSW DNSPs now charge amongst the highest prices in Australia having previously (in 2002) charged amongst the lowest.
- The average network services charge per household in NSW is now 16.1 cents per kWh, compared to 8.5 cents per kWh in Victoria.

The lifetime costs of solar are now lower than network costs in NSW

Mountain and Szuster (2014a) calculate that the life cycle average cost of electricity delivered by the 900,000 rooftop system installed in Australia between 2010 and 2013 is around 16 cents per kWh. This is less than the price of network services in NSW. In other words, households in NSW are now able to produce electricity for themselves more cheaply than what they pay for network services alone, leaving aside the cost of actually producing and retailing grid-supplied electricity.

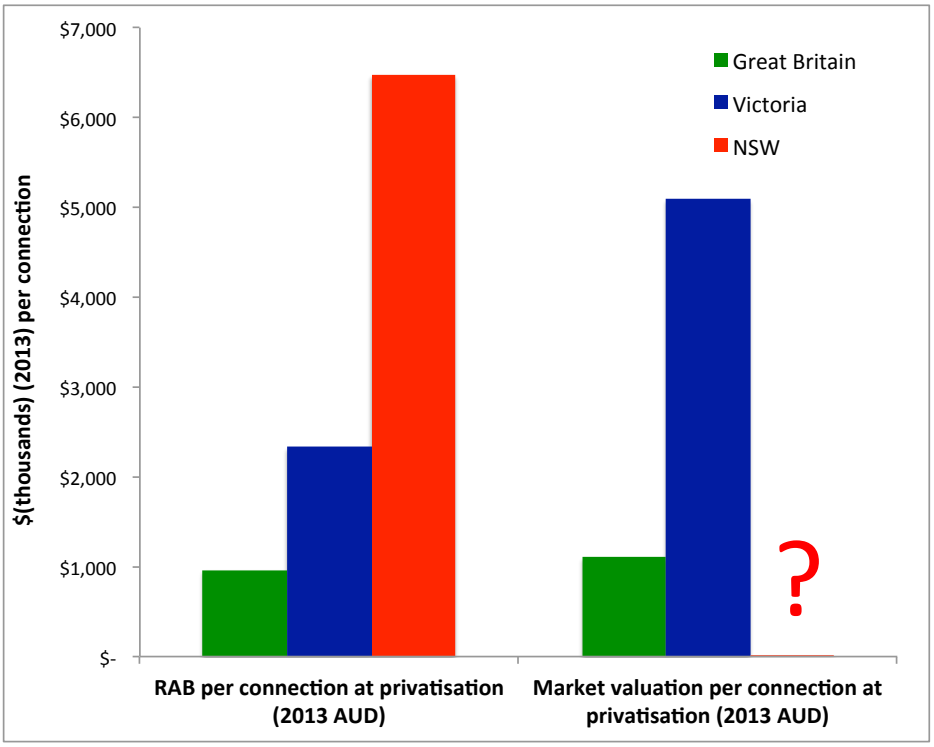
What is the size of the RAB in NSW?

In constant currency, the asset base per customer in NSW at 30 June 2013 ($6,800 per connection) is about three times as high as it was in VIC ($2,300 per connection) when the Victorian distributors were privatised. It is about seven times higher per connection than the British distributors when they were privatised. The three main investor-owned utilities (IOUs) in California currently have regulated asset values (of their distributor networks) that are, per capita, about one tenth those of the NSW distributors.

What does this mean for market valuation?

The regulatory valuation of DNSPs has a significant bearing on their market valuation. Figure 1E shows a stark difference between the regulatory and market valuations in Victoria and Great Britain at privatisation, compared with the regulatory asset value for NSW DNSPs at 30 June 2013. Even if they are valued at privatisation at their RAB (i.e. buyers do not pay a premium to RAB), the NSW DNSPs will still be around twice the price per connection of the Victorian businesses when they were privatised and seven times more expensive per connection than the British distributors when they were privatised.

Figure 1E. Regulatory and market valuations



How might the extent of stranded assets in NSW be estimated?

Analysis of the sharply declining ratio of transformer capacity to average demand suggests significantly more unused capacity across the NSW networks. On the basis of the combination of utilisation, price and demand data and considering the availability and cost of distributed generation and efficiency improvement, this report concludes that significant parts of the distribution network in NSW are already stranded, and this situation seems likely to deteriorate. However it is difficult to quantify the magnitude of stranded assets with certainty: many different factors need to be considered.

The approach taken to estimate stranding is to calculate what the RAB in NSW would be in 2013 if the per connection changes (additions less depreciation plus indexation) of the NSW DNSPs' RABs matched those in Victoria between 2000 and 2013. With this assumption, the NSW DNSPs' RAB would have been $13bn instead of $22bn in June 2013. For the average household, this lower RAB would mean permanent bill reductions of around $230/year.

What are the next steps?

This report concludes that devaluation of the RAB prior to privatisation should be considered as it has the potential to be a win for consumers, retailers, non-distributed grid-connected generators, buyers at privatisation but also for the NSW Government. This is because buyers may associate a lower RAB per connection with lower future asset revaluation risk. Future revenues will be regarded as less risky and hence more valuable. Following this logic, a lower regulatory valuation need not translate into lower privatisation proceeds: the higher price that investors are willing to pay may compensate for some, all or more of the RAB devaluation. Pre-privatisation RAB devaluations may therefore offer better outcomes for all parties. Given the significant reductions in electricity bills that are possible, it is recommended the NSW Government test the ideas in this report with potential privatisation participants.

1 Introduction

The New South Wales Government has committed to partially privatise the distribution network service providers (DNSPs) Ausgrid and Endeavour, as well as transmission network service provider TransGrid. In this context, the Public Interest Advocacy Centre has asked us to present initial evidence and analysis of the value of Regulated Asset Base (RAB) of the NSW DNSPs. The objective of this report is to draw attention to relevant issues and advise on those areas that would benefit from further investigation.

The DNSPs' RAB has a significant bearing on electricity prices – about 65% of regulated revenues depend on the RAB. The RAB also affects market valuation. This is partly because of the RAB's influence on regulated revenues but also because investment analysts and valuers use the regulatory valuation as a benchmark, often expressing market values as a percentage of the RAB.

The paper begins by defining the RAB, describing how it is currently determined and its history. The three sections that follow present evidence on:

- regulatory and market valuations of the DNSPs in NSW in comparison to those in Victoria and Britain;
- the price of electricity network services in NSW in comparison to the prices charged by other DNSPs in the National Electricity Market; and
- the extent to which distribution networks in NSW are economically stranded.

The final section discusses the evidence and suggests where further examination would be valuable.

2 The RAB: description, specification and history

This section describes the RAB and some history of its determination for DNSPs in NSW, and then in comparison to those in Victoria.

2.1 What is the RAB?

The RAB is, conceptually, the regulatory valuation of the stock of (typically) physical assets that NSPs use to provide network services. It represents the cumulative depreciated valuation of the capitalised sunk expenditure.

The value of the RAB is recovered from electricity users through depreciation, at the annual rate of 2%-5% of the RAB, plus the regulated rate of return applied to the RAB. Around 65% of the NSW distributors' pre-tax revenue is accounted for by depreciation and return on assets, both of which are directly related the RAB.

2.2 How is the RAB established for NSW DNSPs?

The calculation of the RAB is conceptually straight forward. The asset value at the end of the regulatory control period is equal to:

- the asset base at the start of the regulatory control period;
- less the depreciation on that opening asset base over the control period;
- plus the depreciated value of the actual capitalised expenditure incurred in that period;
- plus an adjustment to ensure the asset base is not eroded by monetary inflation.

The determination of the RAB is specified in Chapter 6/6A of the National Electricity Rules. Precise descriptions of the arrangements that currently apply are as follows:

- **Opening RAB:** The opening RAB is determined pursuant to a Roll Forward Model that the AER is required, under the Rules, to develop and implement. The Australian Energy Regulator (AER) does not have discretion to change the opening RAB, although it can determine the rate at which the opening RAB changes with respect to capital expenditure during the regulatory period.

- **Depreciation:** Network service providers are able to propose the rate at which their assets are depreciated, and the AER has the right to refuse that proposal and decide its own rates.

- **Indexation:** The Rules require that the asset base is indexed to adjust for inflation using the same measure of inflation as is used in the determination of the revenue or price cap.

- **Actual capitalised expenditure:** The actual capitalised expenditure incurred in a regulatory control period is added to the RAB less an adjustment for the depreciation that the AER allowed when establishing the five year price/revenue control. The AER also has discretion, in limited circumstances, to decide that some part of actual expenditure that it considers has not been efficiently incurred should not be added to the RAB.

2.3 History of the RAB for NSW DNSPs

The Independent Pricing and Regulatory Tribunal (IPART) established the initial value of the regulated assets for the NSW DNSPs on 20 June 1998 at $7,246m.

From 2004 regulatory authority was transferred from IPART to the Australian Energy Regulator and the opening RAB for the NSW DNSPs was set out in a schedule to the National Electricity Rules, with a total value of $8,839m on 1 July 2004, subject to various adjustments specified in the Rules.

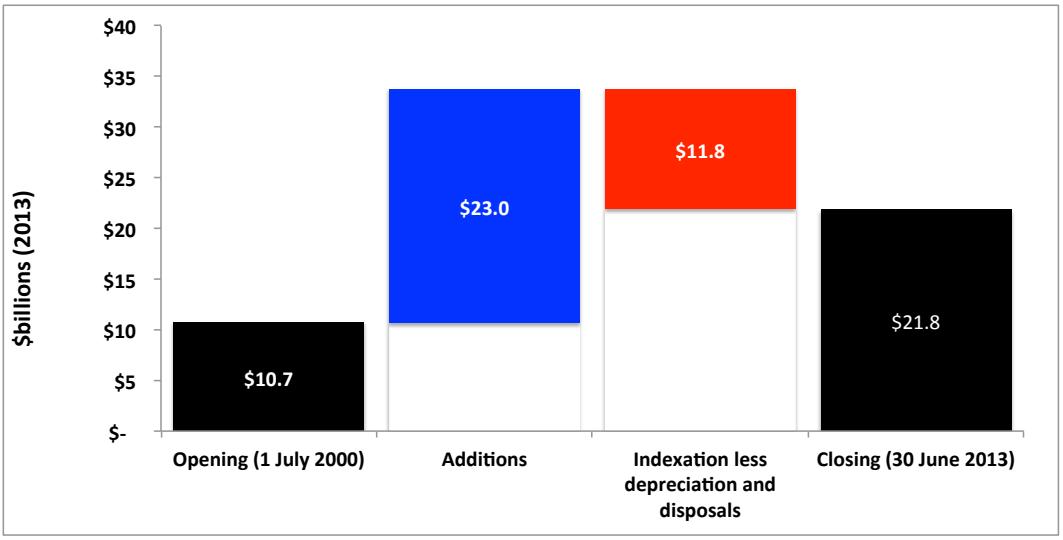
The AER established the opening RAB for the NSW DNSPs for the first price control that it set from 1 July 2009 (see (Australia Energy Regulator, 2009)). To do this it used the RAB set out in the Rules for the start of the period, made a few adjustments to it and then added the depreciated value of the actual capital expenditure, using depreciation based on that actual spend, rather than the (in most cases) lower depreciation that had been specified in regulated charges previous established by IPART[1].

Figure 1 shows the total change in the sum of the RABs for the three NSW DNSPs from 1 July 2000 to 30 June 2013. All amounts have been stated in 2013 dollars. The figure shows that over the 13 years the DNSPs more than doubled their regulated assets in

[1] The AER had discretion to use depreciation based on actual (generally higher) spend, or depreciation based on the capitalised expenditure that IPART had approved. It chose the higher measure of depreciation thus resulting in a lower RAB than if it had used regulatory depreciation.

constant currency. This is explained entirely by the massive capital expenditure program ($22.9bn, almost 2.5 times more than in Victoria) over the period.

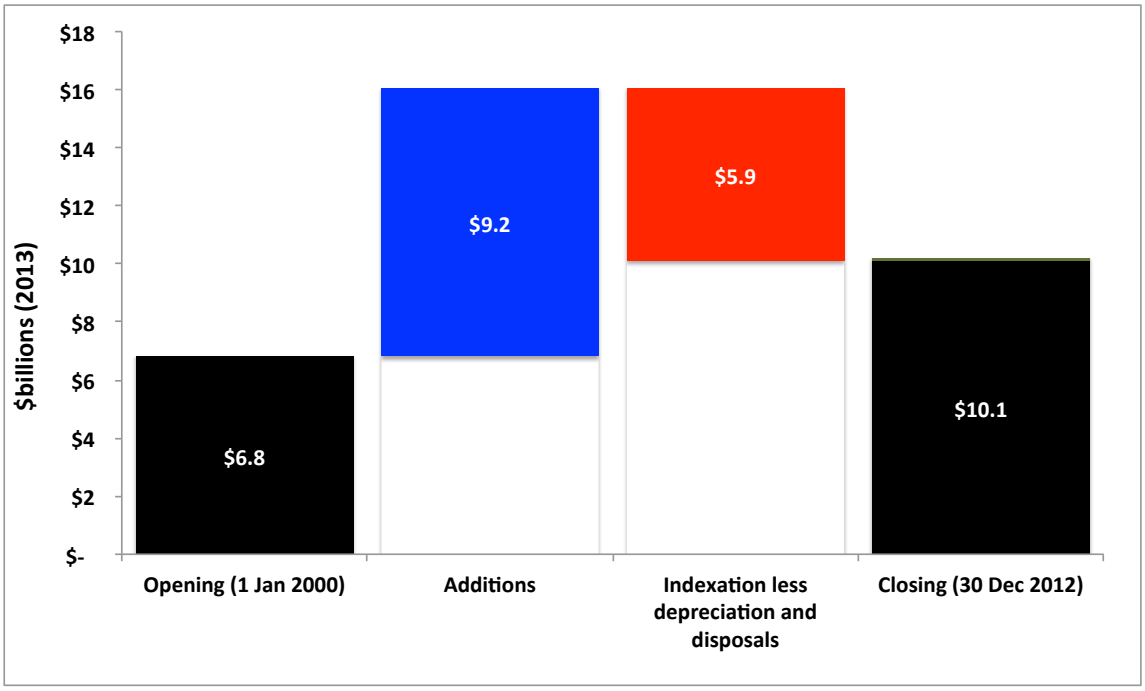
Figure 1. NSW regulated asset values since 1 July 2000 ($billions - 2013)



Source: IPART and AER regulatory decisions, CME analysis

The change in the RAB in NSW can be compared to that in Victoria over the same time period. Figure 2 shows that the closing (31 Dec 2002) RAB in Victoria (VIC) was about 50% higher than the opening (2000) RAB. In the next section we extend this comparison after normalising for the different number of connections in NSW and VIC.

Figure 2. VIC regulated asset value since privatisation ($billions - 2013)



Source: IPART and AER regulatory decisions, CME analysis

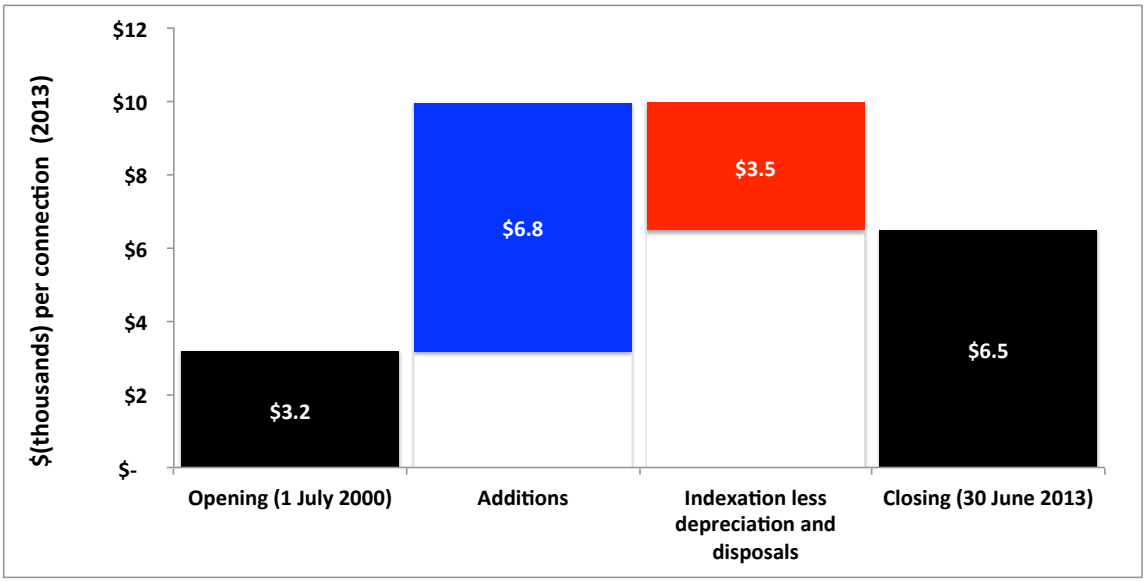
3 Regulatory and market asset valuations

The previous section examined the change in the RAB for the DNSPs in NSW and VIC. This section extends that analysis by normalising for the number of connections. The second part of the section then examines the RAB at privatisation in VIC completed by 1998 and in Great Britain (GB) in 1983, and in NSW currently. It also compares the market valuations of the DNSPs in VIC and GB at privatisation.

3.1 Regulatory valuations per connection since corporatisation in NSW / privatisation in VIC

Figure 3 below shows that the NSW DNSPs' RABs in 2013 has more than doubled, per connection, on their levels in 2000. Per connection depreciation net of indexations and disposals ($3,500 per connection) offset about half of the capex additions ($6,800 per connection) against an opening RAB of $3,200 per connection.

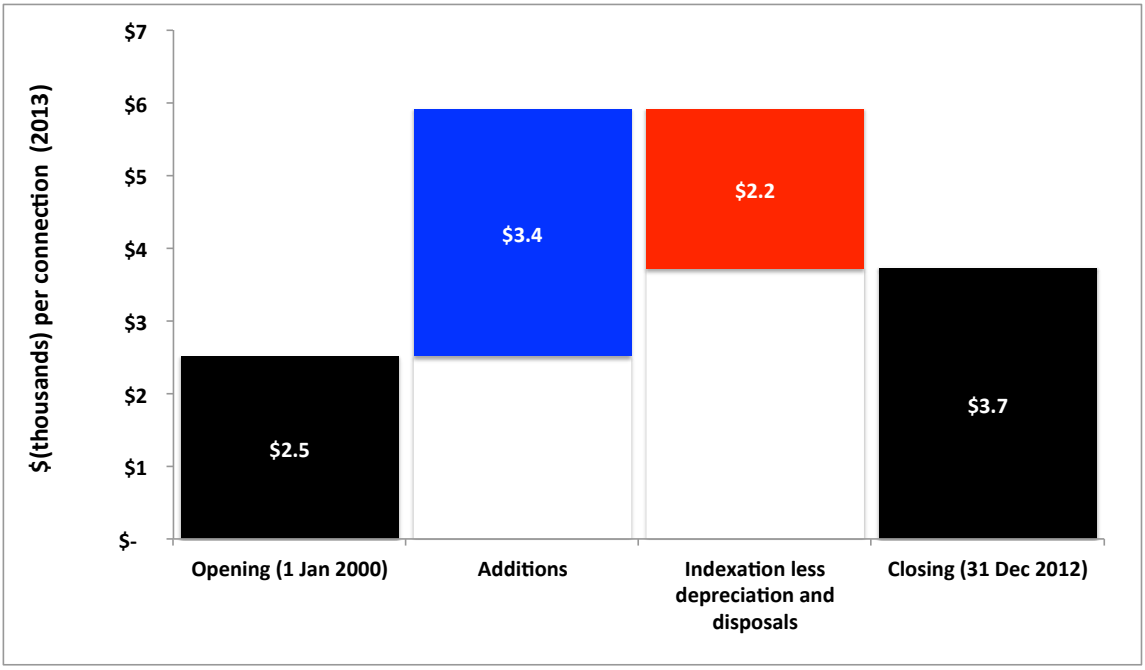
Figure 3. NSW regulatory asset value since 1 July 2000 per connection ($(2013) thousands per connection)



Source: IPART and AER regulatory decisions, CME analysis

The outcomes in NSW can be compared with the outcomes in VIC (shown in Figure 4).

Figure 4. VIC regulated asset value per connection since 1 Jan 2000 ($(2013) thousands per customer)



Source: IPART and AER regulatory decisions, CME analysis

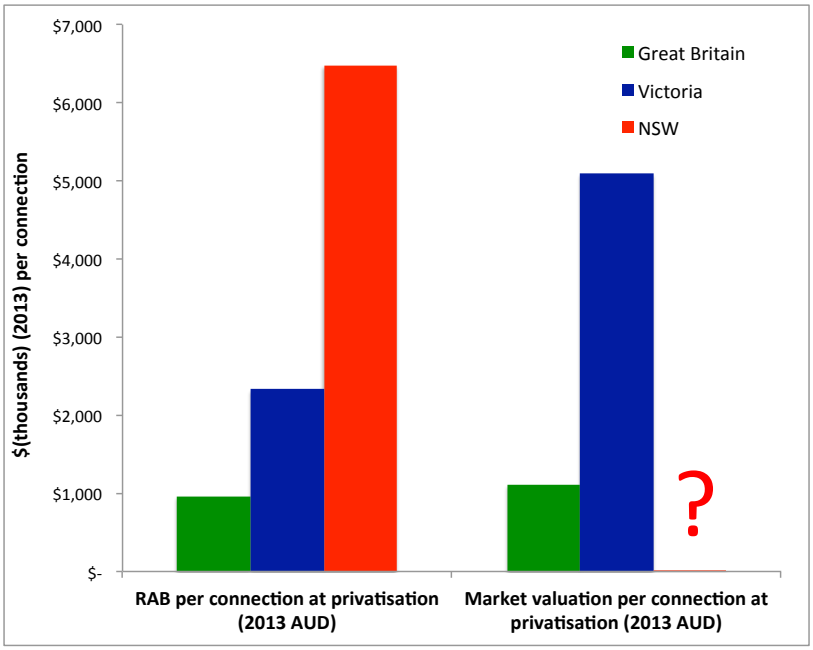
From Figures 3 and 4 we observe:

- The asset base per customer in NSW at 30 June 2013 ($6,500 per connection) was about twice as high as it was in VIC on 31 Dec 2012 ($3,700 per connection).
- Depreciation net of indexation and disposals has been a bigger proportion relative to new capex in VIC than NSW suggesting faster depreciation in VIC.
- The biggest difference between NSW and VIC is that the NSW DNSPs have spent twice as much capital per connection.

3.2 Regulatory and market valuations at privatisation

The relationship between the regulatory and market valuation is important: the latter shows the way that investors value the former. Figure 5 below shows the market and regulatory asset values in VIC and GB at the time of their privatisations. The chart also shows the regulatory asset value for NSW DNSPs at 30 June 2013.

Figure 5. Regulatory and market valuations



Sources: CME analysis with data from www.statisticsauthority.gov.uk (British RPI), www.rba.gov.au (Australian CPI), Grout et al. (2004), (Grout and Jenkins, 2001, Domah and Pollitt, 2000) (GB market values and customer numbers), www.aer.gov.au (Regulatory Information Notices for NSW regulatory asset values), Victorian market value and regulatory asset values (Quiggin, 2002), GB regulatory asset values (Office of the Electricity Regulator, 1999).

In Victoria, the market value of the DNSP was around twice their regulatory valuations. In Victoria, the regulatory values were established before the businesses were privatised. Quiggin (2002) suggests that the substantial premium reflected investors' perception that the regulatory arrangements would be favourable to investors. However, on the basis of subsequent re-sales not long after privatisation he suggested that investors had perhaps overestimated this and paid too much. Since that time, the market value of network service providers in Victoria has continued to be substantially higher (although not as high as twice the RAB as at privatisation).

Recently revised regulatory guidelines intended to deliver better outcomes for consumers do not seem to have affected investor sentiment. Indeed, following the finalisation of revised regulatory guidelines at the end of 2013, the share prices of listed NSPs (and their holding companies) have increased substantially particularly in comparison to the broader market.[2]

[2] For example for the period 1 January 2014 to 30 September 2014 relative to the ASX All Ordinaries the price of Spark Infrastructure, APA, Duet, and Envestra increased by 20%, 30%, 23%, 16% respectively.

In Britain, a regulatory asset value was not established at the time that the businesses were privatised. Rather the regulated asset value was based on the market value, taken to be the enterprise value based on the price of the shares at the end of the first day of trade after they had been listed on the London Stock Exchange, plus a small uplift in some cases (e.g. 15% for the electricity distributors)[3] determined by the UK Regulator.

This method of RAB valuation was used not just for the electricity network businesses, but also for the privatised water and rail companies in Great Britain. As a consequence of this methodology, and a much lower market valuation in Britain than in Victoria, the regulatory valuation was (and still is) much lower in Britain[4] than in Victoria[5].

Figure 5 shows a stark difference between the regulatory valuations in Victoria and Great Britain at privatisation, compared to NSW currently. The RAB at privatisation in Victoria was about a third of the RAB in NSW now. The market value of the NSW DNSPs is of course yet to be established. Even if they are valued just at their RAB, they will still be almost twice as expensive per connection as the Victorian businesses when they were privatised and more than seven times more expensive per connection than the British businesses.

Comparing the NSW DNSPs' asset valuations with the network regulated asset base for the distribution part of the three main investor-owned utilities (IOUs) in California (which is the U.S. state - excluding Hawaii - that has amongst the highest average electricity prices) reveals that the three IOUs distribute electricity to around 33 million customers (about four and half times as many people as served by the NSW distributors), but have a regulated asset value for their distribution networks (see (Barrager and Cazalet, 2014)) that is comparable to that in NSW. In other words, per

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[3] The RAB was first established by the Office of the Electricity Regulator in the first price control decision that it made in 1994. The uplift reflected various factors including capital expenditure since privatisation.

[4] In 1997 the British Government imposed a privatisation windfall tax, reflecting the then Government's view that the industry had been sold too cheaply. This raised $2.2bn from electricity network service providers (DOMAH, P. & POLLITT, M. G. 2001. The Restructuring and Privatisation of Electricity Distribution and Supply Businesses in England and Wales: A Social Cost-Benefit Analysis. *Fiscal Studies,* 22**,** 107-146.), but did not affect the regulatory asset valuation.

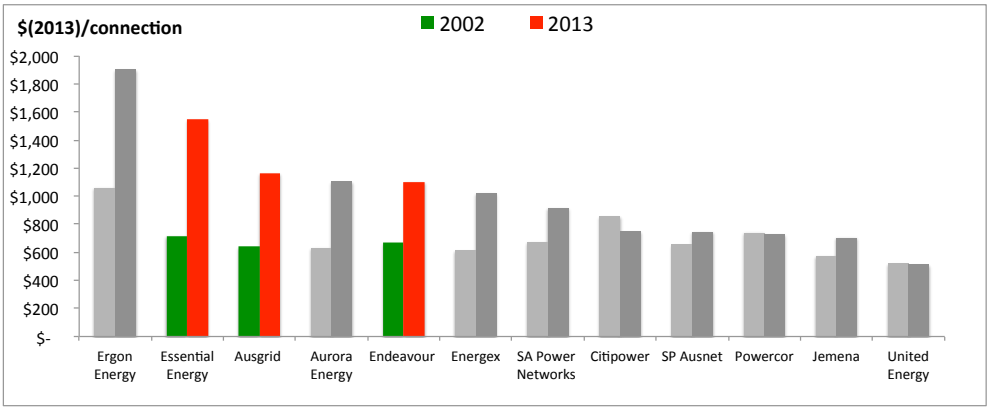
[5] A rigorous critique of the Depreciated Optimised Replacement Cost (DORC) used to value the RABs in NSW and VIC is set out in JOHNSTONE, D. J. 2003. Replacement cost asset valuation and regulation of energy infrastructure tariffs. *Abacus,* 39. It is largely for the reasons set out in his paper that the British did not use a DORC approach to set the RAB.

capita their regulated asset values are less than one quarter those of the NSW distributors.

4 NSW distributor network prices

The regulated and market values should be seen in the context of the prices that the DNSPs are charging. Figure 6 shows the average charge per connection for twelve DSNPs in the NEM in 2002 and in 2013. It shows that the revenue per connection for the three NSW DNSPs has roughly doubled in constant currency so that they now charge amongst the highest prices having previously (in 2002) charged amongst the lowest.

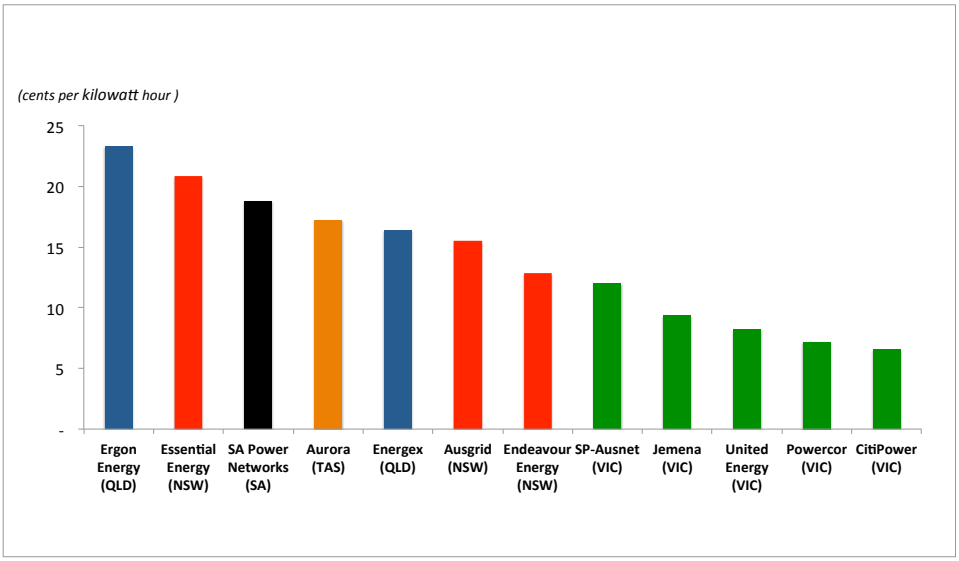
Figure 6. Regulated revenue per connection $(2013) per connection



Source: Regulatory decisions, CME analysis

Figure 7, based on an analysis of the actual network tariffs and assuming average residential consumption levels, shows that Essential Energy is the second most expensive DNSP while Ausgrid and Endeavour are near the middle in the NEM.

Figure 7. Average price of network services to households in NSW in 2014 (cents/kWh)



Source: (Mountain and Szuster, 2014b)

The average network services charge per household in NSW is now 16.1 cents per kWh, compared to 8.5 cents per kWh in Victoria. International comparisons are even more disconcerting: at market exchange rates, average household network charges for the least expensive NSW DNSP (Endeavour) are still 64% more expensive than the most expensive British DNSP, and around three times more expensive than the most expensive distribution network services charges in Texas[6]. In California, the total average household price of electricity is less than the average network services charges for households in New South Wales[7].

Mountain and Szuster (2014a) found that the life cycle average cost of electricity delivered by the 900,000 solar PV rooftop systems installed in Australia between 2010 and 2013 was 16 cents per kWh. Average costs of rooftop PV have declined further since that time. In other words, households in NSW are now able to produce solar electricity for themselves more cheaply than the price of network services alone, even before counting the cost of electricity production and retailing. This has potentially significant implications for network stranding, explored in the next section.

[6] The Texas comparison is based on data in BROWN, T. & FARUQUI, A. 2014. Structure of electricity distribution network tariffs: recovery of residual costs. Prepared for the Australian Energy Market Commission. The Brattle Group.

[7] This comparison is based on market exchange rates at the time of writing - 90 U.S. cents per Australian dollar. Californian household electricity price data from http://energyalmanac.ca.gov/electricity/

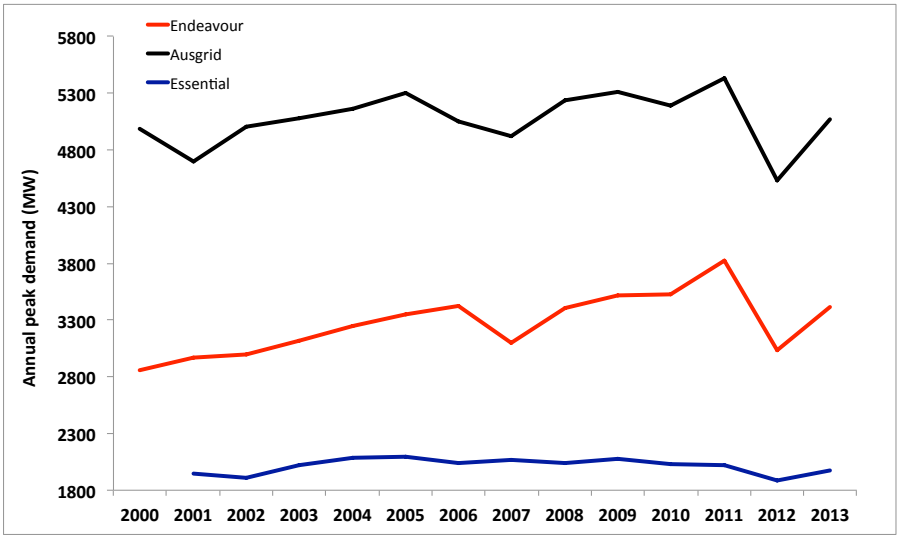
5 Stranded assets in NSW electricity distribution?

Peak electrical demand in NSW has stagnated since 2009 and there has been a reasonable reduction in average demand since that time. The privatisations in both GB and VIC that have been used as point of comparison in this paper, occurred in the context of rising peak and average demand. At the time of those privatisations, technologies that currently offer significant efficiency improvement (such as LED lighting and televisions, heat pump space conditioning, solar water heating and other efficient appliances) were not yet widely commercialised. Similarly, distributed generation (other than reciprocating engines for emergency back-up) was not common. Photovoltaics (PV) and technological advances in consumption efficiency have already delivered significant reductions in average demand in NSW and there is potential for considerably more. This section briefly examines the current situation and then future prospects.

5.1 Current situation

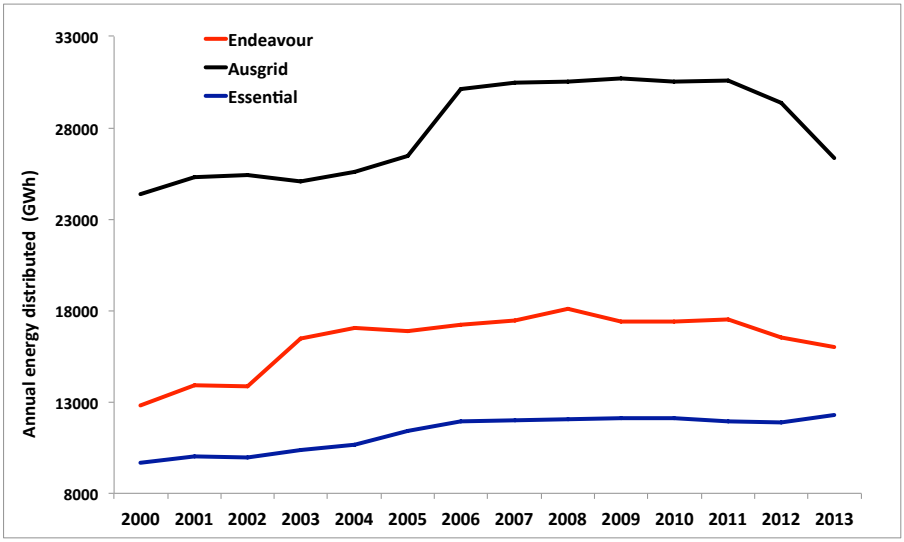
The record of NSW's peak demand and the annual distributed electricity for each of its three distributors from 2000 to 2013 is shown in Figure 8a and 8b respectively.

Figure 8 (a) Peak demand (MW)



Source: (AEMO, 2014b)

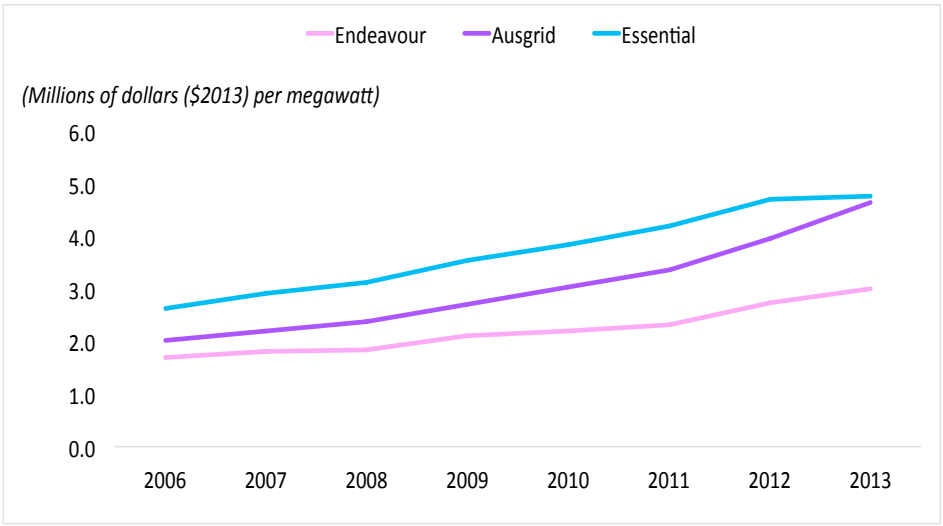
Figure 8 (b) Annual energy distributed (GWh)



Source: (AEMO, 2014b)

The previous section showed that the RAB for the three NSW DNSPs more than doubled between 2000 and 2013. Figure 9 below shows the ratio of the RAB to the average demand over this period. It shows that for all three DNSPs, the RAB per MW of average demand roughly doubled.[8]

Figure 9. RAB per MW of average demand



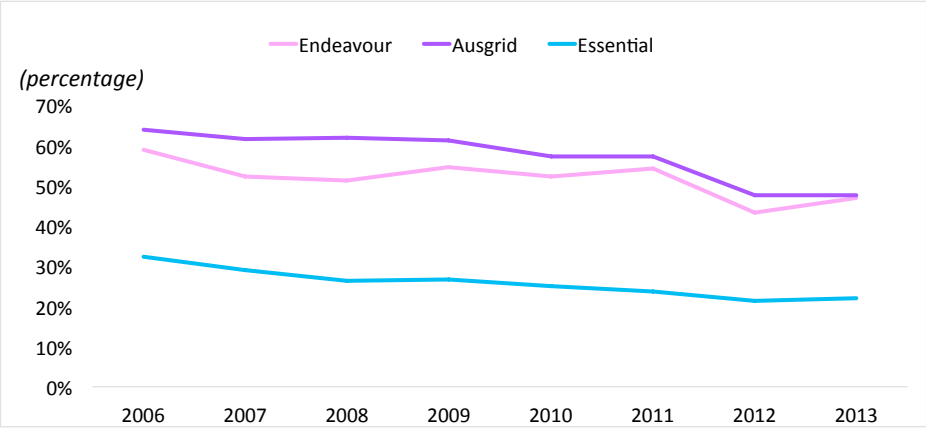
Source: Regulatory decision documents, (AEMO, 2014b) CME analysis.

As a measure of the physical capacity utilisation, Figure 10 shows the installed transformer capacity per MW of average demand, based on data in the Regulation

[8] Average demand has been used rather than peak demand because peak demand volatility since 2010 complicates the trend.

Information Notices provided by the DNSPs to the Australian Energy Regulator (AER). Transformer capacity measures the amount of infrastructure that has been provided to reduce capacity from higher voltages to the voltages used by customers. A sharply declining ratio of transformer capacity to average demand as shown in Figure 10 shows rising amounts of unused capacity on the networks.

Figure 10. Installed transformer capacity divided by average demand



Source: RINS, CME analysis

5.2 Future prospects

The previous sub-section showed much higher fixed assets per MW of average or peak demand together with a significant decline in utilisation attributable to the combination of several years of very high capital expenditure in the context of slow demand growth, and over the last four years, generally declining average demand.

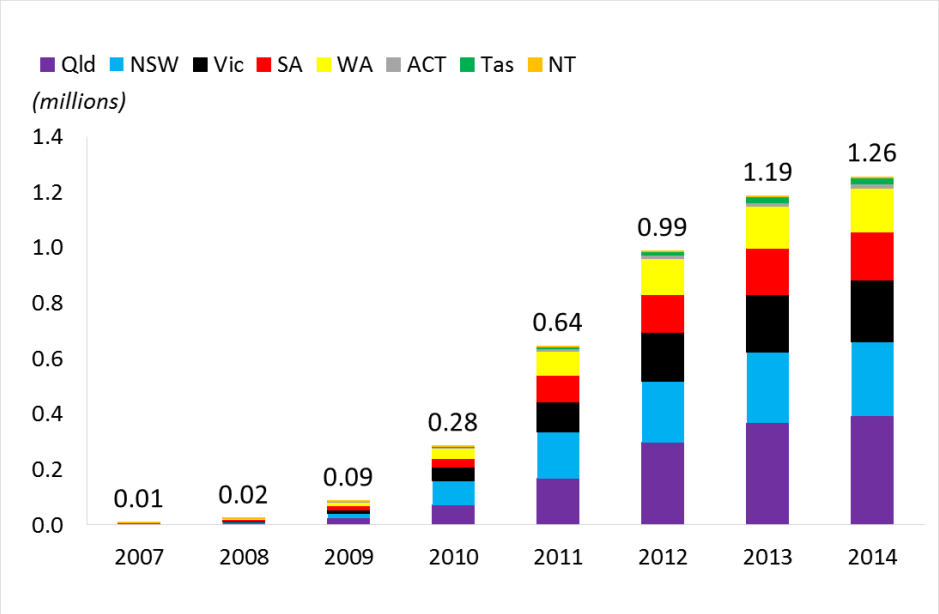
The resulting price increases have had an effect on demand, partly because many consumers can be expected to consume less as prices rise, but also because higher prices have helped to stimulate investment in distributed generation (especially household PV) and more efficient appliances. While it is impossible to be certain of the extent of this price effect – demand elasticity in the short and longer term is uncertain - higher prices have clearly had a role, particularly in the reduction of average demand.

Saddler (2013) presents an Australia-wide electricity demand analysis. He concludes that government policies (such as energy efficiency programs), declining industrial demand, the impact of higher prices and higher distributed generation are the four biggest explanatory factors for the level of electricity demand in 2013.

It is not unreasonable to expect that significantly more demand reduction is possible in NSW. The long term price elasticity of demand is always higher than short term elasticity (see for example Fan and Hyndman (2011)) and while price rises have moderated, the full impact of the previous increases e has perhaps yet to be fully reflected in demand reductions.

In respect of distributed generation, Figure 10 shows the cumulative installed capacity of rooftop PV in each state and territory of Australia to July 2014.

Figure 10: Australian solar PV installations to July 2014

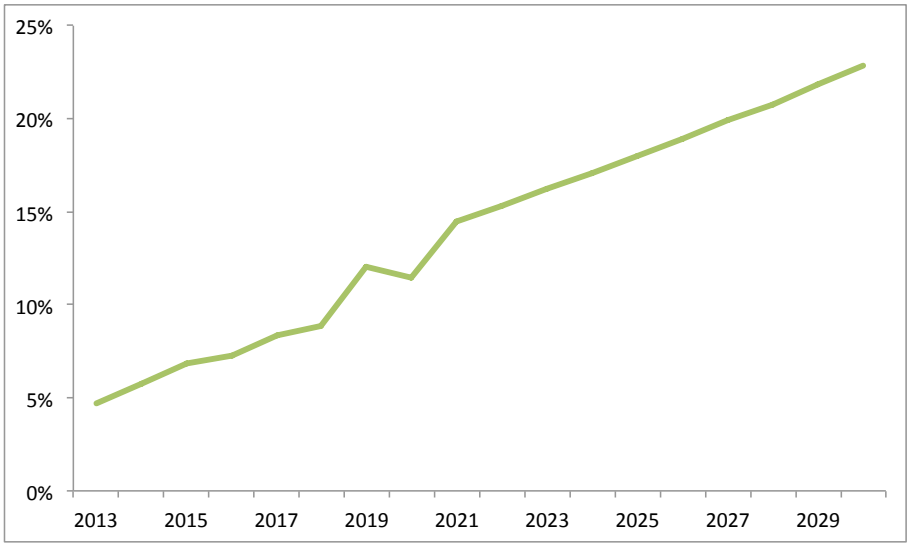


Source: (Clean Energy Regulator, 2014) CME analysis

While NSW has been the second largest market in absolute terms, as a percentage of households, a little over 1 in 10 NSW households has now installed rooftop PV, with a state-wide cumulative total installed capacity of 625 MW at the end of 2013. Per household this is one of the lowest market penetration rates in Australia. By comparison more than one in five households in Queensland and South Australia have installed rooftop PV.

Figure 11 shows AEMO's projections of rooftop PV capacity in NSW to 2030, expressed as a ratio of their medium scenario projection of NSW peak demand. It shows installed capacity rising from 5% of peak demand in 2013 to around 23% by 2030.

Figure 11: Projected NSW rooftop PV capacity divided by projected NSW peak demand

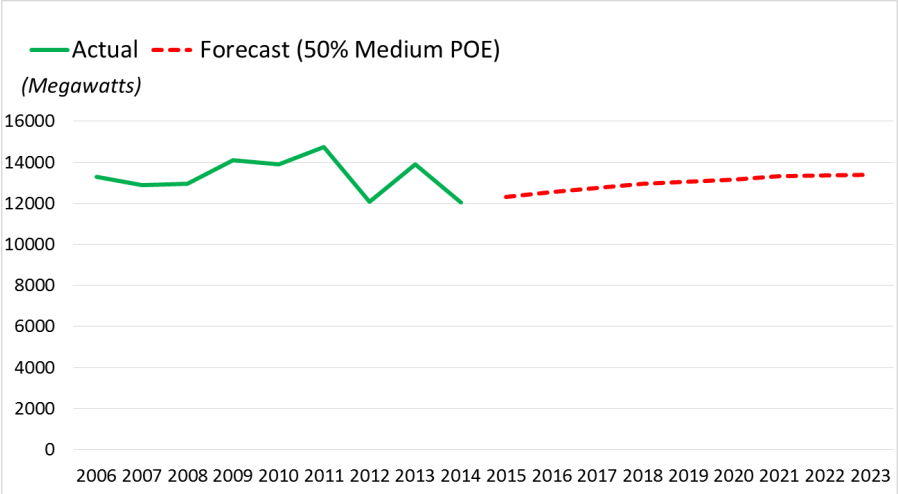


Source: (AEMO, 2014a), CME analysis

Rooftop PV is therefore likely to significantly affect peak demand in NSW.

AEMO's projection of NSW peak demand is shown in Figure 12. This shows no further reduction in peak demand, so that the peak demand in 2023 will be approximately comparable to the level in 2006.

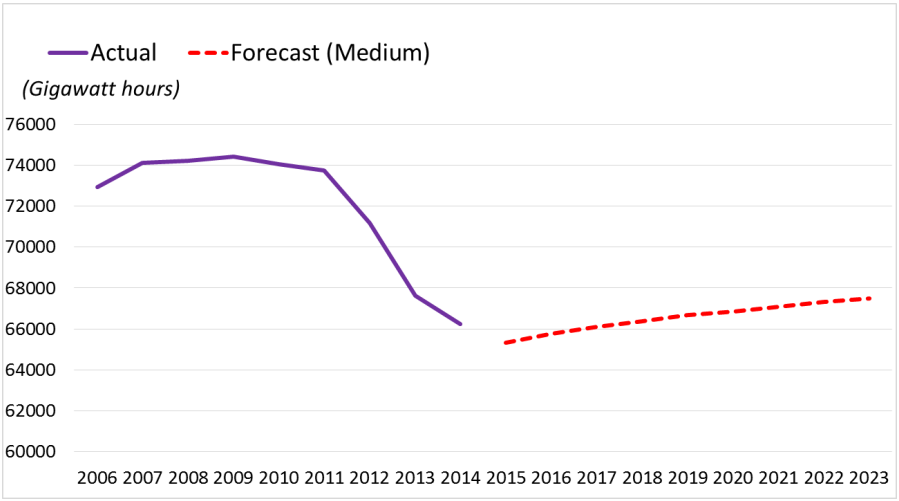
Figure 12: AEMO projections of NSW peak demand



Source: (AEMO, 2014b), CME analysis.

Similarly in regard to distributed energy, AEMO project that the rapid will be arrested so that by 2023 the electricity distributed through the networks will be about 10% below the level in 2006.

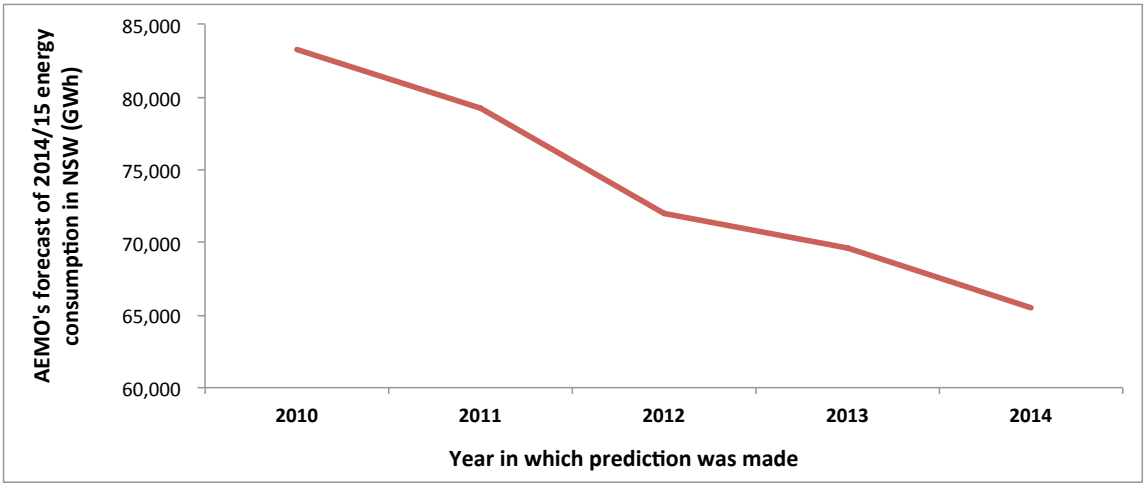
Figure 13: AEMO projections of NSW annual energy



Source: (AEMO, 2014b), CME analysis

AEMO's forecasts for NSW energy and demand are relatively benign: they show that the declines of the last few years will be arrested and moderate growth restored. Perhaps this is right but it is notable that AEMO has consistently reduced its NSW demand forecasts for each year over the last five years as show in Figure 14.

Figure 14: AEMO's changing forecast of total electricity consumption in NSW in 2014/15



Sources: AEMO's Electricity Statement of Opportunity for 2010 and 2011, and National Electricity Forecasting Report for 2012 to 2014.

As Figure 14 shows, in their Electricity Statement of Opportunities, AEMO forecast that NSW annual energy consumption in the 2014/15 financial year would be more than 83 TWh. By June 2014, it forecast it would be just a little over 65 TWh.

Of course the future is uncertain. Rising PV installation, ever-higher energy consumption efficiency and industrial decline will reduce demand for grid-supplied

electricity. On the other hand, possible electricity-for-gas substitution in response to rising gas prices and the possible widespread electrification of private transport might increase demand for grid-supplied electricity.

However, as we noted in the previous section, since it is now possible for households to produce their own electricity for less than their network service charges (and less than half their total grid-supplied electricity charges) it would be surprising if increased production from rooftop PV did not account for a large part of any future increases in household consumption. Advances (and cost reductions) in battery storage would be likely to significantly increase the uptake of distributed generation and eventually disconnection from the grid in some cases, starting with 'fringe of grid' areas.

5.3 Quantification of stranded assets

Since a large amount capital network expenditure has been incurred over the last 10 years assuming exactly the opposite outcome in peak and average demand from that which has occurred, a possibly large proportion of the asset base has already been economically stranded.

It is of course very difficult to quantify the magnitude of stranded assets: many different factors need to be considered. However, a plausible starting point would be to assume that the per-connection outcomes in Victoria over the period 2000 to 2013 could also have been achieved in NSW. In this period, the weighted average service life remaining of the NSW DNSPs' assets has typically been higher than VIC DNSPs', customer number and demand growth in VIC has typically been greater in VIC than NSW. The quality of supply (duration and frequency of outages) has been better in VIC than NSW, although the differences are not large. As such, we find it difficult to see why DNSP expenditure outcomes per connection in NSW should not be comparable to those in VIC.

If, over the period from 2000 to 2013, the per connection rate of change of capital spending, depreciation and indexation of the regulated assets of the NSW DNSPs had matched outcomes in Victoria, the NSW DNSPs' RAB at 30 June 2013 would be $13bn instead of $22bn. For the average household a $9 billion write-down would translate into permanent annual bill reductions of $195 for Endeavour customers, $249 for

Ausgrid customers (in the greater Sydney region) and $325 for Essential Energy customers (in country NSW).

6 Discussion

This section summarises the evidence, discusses issues arising and concludes with suggested next steps.

Summary of the evidence

The main observations from the previous three sections are as follows:

1. The NSW DNSPs' RAB per connection has more than doubled in constant currency between 2000 and 2013. It is now around twice the level in Victoria. Almost all of this is due to much higher capital expenditure in NSW over this period.
2. The NSW DNSPs' RAB per connection is a little under three times higher than it was in Victoria when the Victorian DNSPs were privatised and around seven times higher than it was in Great Britain when its distributors were privatised.
3. Average revenue per connection of the NSW DNSPs is amongst the highest in the NEM. Household network charges are however relatively lower so that two of NSW's three DNSPs' average network charge for households are near the average in the NEM. By comparison they fair less well internationally. At market exchange rates, average household network charges for the least expensive NSW DNSP (Endeavour) is still 64% more expensive than the most expensive British DNSP, and around three times more expensive than the most expensive DNSP in Texas.
4. It is currently possible for households in NSW to produce electricity on their rooftops for less than it costs to distribute it on the grid.
5. AEMO projects that the decline in average and peak demand will be arrested so that by 2023 peak demand will be around the level it was in 2006. It does not however project average demand recovering to the level it reached in 2012. AEMO has however reduced its forecasts of average demand significantly each year for the last five years.
6. On the basis of the utilisation, price and demand data and considering the availability and cost of distributed generation and efficiency improvement, it is concluded that significant parts of the distribution network in NSW are now already stranded, and it seems that this situation will deteriorate.

Issues to be considered

The NSW DNSPs are being put up for sale at a time that their RAB per customer is three times higher than those in VIC and seven times those in GB, when they were privatised. In the context of, at best, stagnant future demand and a weakening monopoly, this may be problematic.

Prospective buyers in the privatisation may be concerned that the RAB will need to be written at some point in future, whether by regulation or choice. There is a substantial academic literature (sometimes known as the "precommitment and regulatory takings" literature) focussed on the determination of the RAB, and specifically its protection from expropriation through political opportunism (see for example (Grout et al., 2004, Stern, 2013, Grout and Jenkins, 2001)). A proposition in this literature is that protecting investors in regulated monopolies from expropriation through RAB write-downs reduces investment risk and hence borrowing and equity costs.[9]

The Energy Networks Association has recently cautioned against asset write-downs on the basis that electricity prices will rise in future as a result of the higher perceived investment risk. While current owners will be averse to write-downs, potential future buyers of the NSW DNSPs would prefer not to be exposed to stranding risk. Assurances by politicians at privatisation that assets will not be written-down in future may provide some protection. But counting on long term political will to protect what seems to be a fading monopoly from stranding risk is not a particularly desirable option. Lower regulatory asset valuations before privatisation are likely to be counted more highly by investors in ameliorating stranding risk: a bird in the hand is worth two in the bush.

Since the RAB is a major determinant of the prices that consumers pay, consumers would obviously prefer a lower RAB. Likewise grid-connected generators and retailers that rely on the distribution networks will prefer lower RABs to improve their own

[9] These propositions seem sound, but a question is the extent to which consumers also benefit from the reduction in borrowing and equity costs. In the Australian arrangements, in practice the cost of capital in respect of both equity and debt does not reflect the actual cost of capital of the regulated providers. Specifically the Beta factor used in the calculation of the return on equity does not reflect the Beta for Australian NSPs. Similarly, debt costs are in practice based on the costs of "broad BBB" debt, not the cost of debt of the Australian DNSPs.

competitive position relative to demand-side efficiency improvement and distributed generation.

A pre-privatisation RAB devaluation may by characterised as a win for consumers, retailers, non-distributed grid-connected generators and future network investors, at the expense of lower privatisation proceeds for the NSW Government. But it is not necessarily this straightforward. That is because potential buyers are likely to associate a lower RAB per connection with lower future asset revaluation risk. As a result, future revenues will be less risky. This is likely to be expressed in more vigorous competition by future buyers of those revenues. This greater competition will be expressed in higher market valuations. Following this logic, a lower regulatory valuation need not translate into lower privatisation proceeds: the higher market valuation may compensate for all or more of the RAB devaluation. Pre-privatisation RAB devaluations therefore may offer the potential for better outcomes for all parties.

Next steps

This paper has covered a wide territory. It suggests that, prima facie, the regulatory asset values of the NSW DNSPs present risks to potential investors that may be allayed through write-downs and that this need not necessarily reduce privatisation proceeds.

It would be valuable to test this idea with potential future buyers. Do they perceive significant regulatory risk in the current RAB valuations? Would those risks be allayed through RAB reductions, and if so how would this be expressed in their valuations? Would consumers, retailers and non-distributed generators benefit from such RAB reductions and what might be the impact on broader perceptions of regulatory risk?

It would also be valuable to consider how RAB write-downs might be best effected. There are many possibilities including one-off or progressive adjustments, differential valuation methods for sunk assets and capitalised value of future expenditure (as for example occurred in the privatisation of British Telecom), differential valuations for equity and debt funded assets – historic cost for debt-funded and current cost for equity-funded (as for example occurred in energy privatisations in Germany).

Provision could be made for stranded assets to be held in an escrow account and then added back to the RAB in future if that stranded capacity becomes useful again (as for

example occurs in parts of the United States)[10]. This approach may offer investors upside in the privatisation (and hence higher sales proceeds), but will still ensure consumers pay only for assets that they are using.

There are many possibilities to consider and a substantial literature to draw on to develop and evaluate alternatives. Unfortunately more sophisticated approaches are also more complex. But time and effort spent identifying and evaluating options will be well spent.

Finally, consideration of changes to the administrative arrangements – the Rules and regulations – will be necessary. Due process will need to be followed in changing these, but it is difficult to imagine that administrative processes should represent a serious obstacle to revaluation. The valuations of the NSW DNSPs RABs were specified in the Rules when the AER took over RAB regulation from IPART. There is no reason that valuations at privatisation could not once again be specified in a schedule to the Rules.

[10] See for example BALDWIN, V. M. & MALKO, J. R. 2012. Used and Useful Principle: Still Relevant in Utah. *Utah Bar Journal*.

References

AEMO 2014a. Information Methodology Paper NEFR 2014 - Rooftop PV.

AEMO 2014b. NEFR 2014 NSW forecast.

AUSTRALIA ENERGY REGULATOR 2009. New South Wales distribution determination, 2009-10 to 2013-14.

BALDWIN, V. M. & MALKO, J. R. 2012. Used and Useful Principle: Still Relevant in Utah. *Utah Bar Journal*.

BARRAGER, S. & CAZALET, E. 2014. *Transactive Energy: A sustainable business and regulatory model for electricity* Apple iBooks.

BROWN, T. & FARUQUI, A. 2014. Structure of electricity distribution network tariffs: recovery of residual costs. Prepared for the Australian Energy Market Commission. The Brattle Group.

CLEAN ENERGY REGULATOR. 2014. *Small-scale installations by postcode* [Online]. Available: http://ret.cleanenergyregulator.gov.au/REC-Registry/Data-reports [Accessed 24 Sep 2014].

DOMAH, P. & POLLITT, M. 2000. The Restructuring and Privatisation of Electricity Distribution and Supply Businesses in England and Wales: A Social Cost Benefit Analysis.1. Cambridge: University of Cambridge.

DOMAH, P. & POLLITT, M. G. 2001. The Restructuring and Privatisation of Electricity Distribution and Supply Businesses in England and Wales: A Social Cost-Benefit Analysis. *Fiscal Studies,* 22**,** 107-146.

FAN, S. & HYNDMAN, J. 2011. The price elasticity of electricity demand in South Australia. *Energy Policy,* 39**,** 3709-3719.

GROUT, P. A. & JENKINS, A. 2001. Regulatory oppportunism and asset valuation: evidence from the US Supreme Court and UK Regulation. *CMPO Working Paper Series,* 1.

GROUT, P. A., JENKINS, A. & ZALEWSKA, A. 2004. Privatisation of utilities and the asset value problem. *European Economic Review,* 48**,** 927-941.

JOHNSTONE, D. J. 2003. Replacement cost asset valuation and regulation of energy infrastructure tariffs. *Abacus,* 39.

MOUNTAIN, B. & SZUSTER, P. 2014a. Chapter 4 - Australia's Million Solar Roofs: Disruption on the Fringes or the Beginning of a New Order? *In:* SIOSHANSI, F. P. (ed.) *Distributed Generation and its Implications for the Utility Industry.* Boston: Academic Press.

MOUNTAIN, B. R. & SZUSTER, P. 2014b. Network tariffs applicable to households in Australia: empirical evidence. Prepared for Uniting Care Communities Australia.

.

OFFICE OF THE ELECTRICITY REGULATOR 1999. Review of Public Electricity Suppliers 1998 - 2000. Distribution Price Control Review. Consultation Paper. Birmingham.

QUIGGIN, J. 2002. The fiscal impact of the privatisation of the Victorian electricity industry. *Economic and Labour Relations Review* 13, 326-339.

SADDLER, H. 2013. Power down: why is electricity consumption decreasing? : Australia Institute.

STERN, J. 2013. THE ROLE OF THE REGULATORY ASSET BASE AS AN INSTRUMENT OF REGULATORY COMMITMENT. *Centre for Competition and Regulatory Policy Working Paper No. 22.* City University London.