Submission to the Standing Committee on Environment and Communications References Committee

Inquiry into electricity network companies

Bruce Mountain
18 December 2014
Melbourne

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1 Introduction

The document is my submission to the Standing Committee on Environment and Communications References Committee in regards to the Committee's inquiry into electricity companies. I have written this submission in response to the Committee's invitation. The submission sets out my view. It does not purport to represent others.

In developing this submission I considered how best to address the Committee's fourteen questions. I decided against answering them individually, since many are closely linked. The underlying theme in the Committee's questions is the failure of economic regulation. I address this theme as follows:

- first I consider the evidence of regulatory failure;
- then I comment on the extent to which recent changes to regulations have addressed these failures;
- then I describe the underlying reasons for these failures.

Finally I suggest the direction for reforms that the Committee might consider. In the interests of brevity, I limit my suggestions to two areas: Institutional arrangements and regulatory design.

2 Evidence of failure

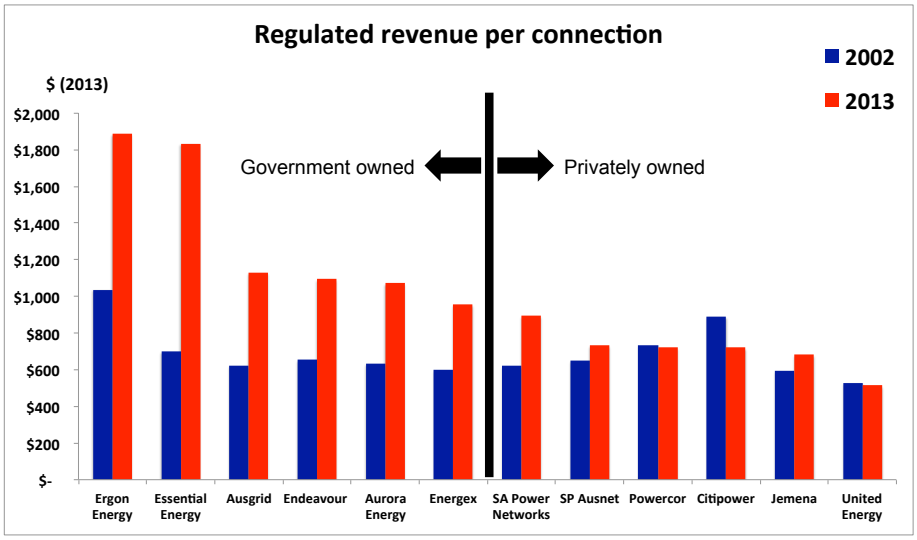
The regulation of energy networks in Australia, and by this I refer to the south and eastern jurisdictions that comprise the National Electricity Market (NEM) has failed badly.[1] The focus of my attention here is mainly electricity distribution network service providers ("distributors" hereafter). However I suggest that many of the concerns also apply to electricity transmission network service providers although I suggest the failures in that segment have been less severe. The regulation of gas distribution network service providers has been comparatively more successful, and I suggest their ownership (private) explains this in part. I refer to this later again, but do not examine the quantitative evidence in relation to gas network regulation.

The evidence for the failure in the regulation of distributors is the extraordinary increases in the prices they charge and in their regulated asset values and profits. The rest of this section briefly covers each in turn.

2.1 Prices

Figure 1 shows the regulated revenues per connection for twelve electricity distribution network service providers in the NEM between 2002 and 2013, based on the allowed revenues set by the Australian Energy Regulator (for 2013) and the state regulatory commissions (for 2002). It shows that state government-owned distributors (the first six from the left) systematically increased their allowed revenues per connection far more than privately owned service providers.

Figure 1. Regulated revenue of distributors per connection ($2013)



Source: Mountain (2014)

Figure 1 is based on regulatory decisions of total allowed revenue per connection. I have also compared outcomes based on the actual network tariffs. The results of this analysis are shown in Figure 2 (for state-wide averages) and in Figure 3 for individual

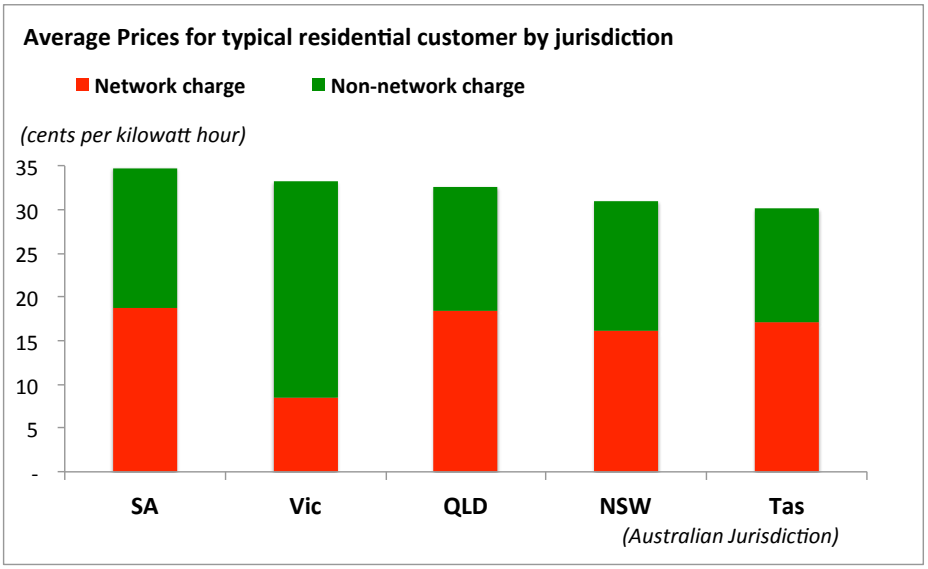
[1] We focus on the south and eastern jurisdictions that are covered by the National Electricity Market. We do not cover outcomes in Western Australia or the Northern Territory.

[2] To be clear, Figures 2 and 3 are the network services charges including transmission charges that distributors pass through in the calculation of their network tariffs. The prices for SAPN,

network service providers. Figure 2 show that average network charges in Victoria are less than half those of network service providers elsewhere in the National Electricity Market (NEM).

In Figure 3, SA Power Networks (SAPN) also stands out in this comparison as having comparable average network service charges for households as the distributors in NSW and QLD[2]. However Figure 1 shows while SAPN is, per connection, the most expensive privately owned distributor, it is still less expensive per connection than any of the government-owned distributors.

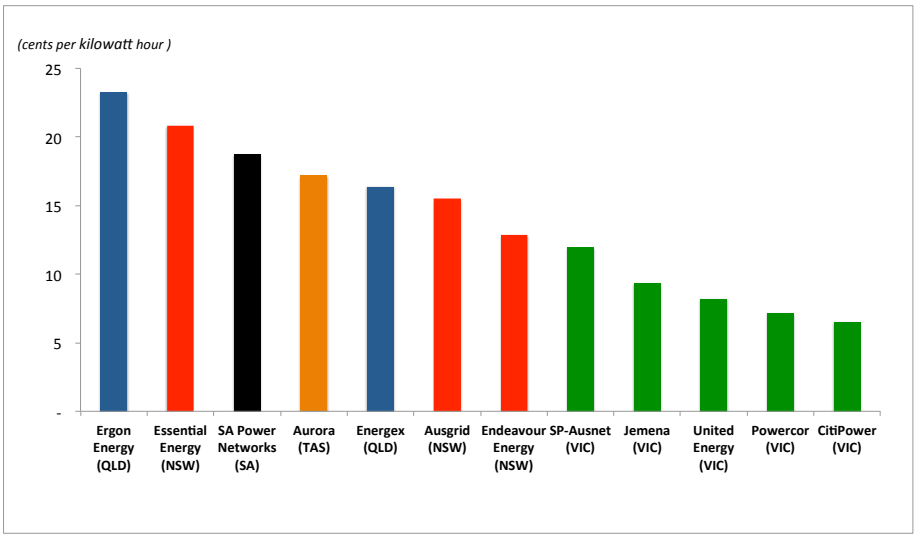
Figure 2. Average electricity network and non-network prices by jurisdiction in 2014



Source: Mountain (2014a)

[2] To be clear, Figures 2 and 3 are the network services charges including transmission charges that distributors pass through in the calculation of their network tariffs. The prices for SAPN, excluding recovery of the feed-in tariff would be a little under 2.5 cents per kWh lower than in Figure 3. The prices in other states (except NSW) would also be lower than shown in Figure if the recovery of PV feed-in tariffs was excluded. However we expect that the adjustment for SAPN would be higher than for other distributors.

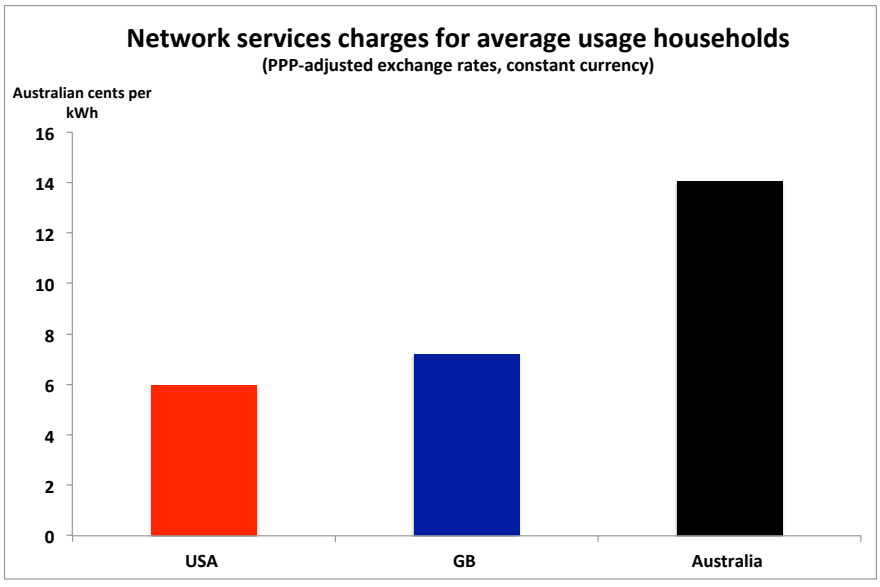
Figure 3. Average electricity network services prices per household for distribution network service provider in 2014



Source: (Mountain, 2014a)

Comparing Australia's network services charges for average usage households with those in other countries, there are stark differences. Figure 4 compares the average price paid by households in Australia in 2013 based on purchasing power parity rates of change. It shows that on average households in Australia are paying about twice as much as in Great Britain and about 2.5 times as much as in the U.S. Ofgem has recently set the regulated revenues for British distributors had average reductions of around 10% are expected. This will narrow the gap between GB and the USA relative the amount shown in Figure 4.

Figure 4. Network services charges for average usage households in 2013



Source:(Mountain, 2014b)

There is however a significant range amongst individual firms both in Britain and Australia. The highest price distributors in Australia are charging households about nine times as much as the lowest-priced distributors in Britain. On the other hand the

lowest-priced Australian distributors are charging households about 20% less than the highest in Britain (Mountain, 2014).

Comparing network prices for households in Australia with the 14 member countries in the EU that have the highest per capita GDP shows that in Australia the network charges are, at PPP rates of exchange, 29% higher than the EU-14 average (they are double at market rates). The average price charged by government-owned distributors is 49% higher than the EU-14 average at PPP rates.[3]

The large increase in network charges in Australia explains why electricity prices in Australia are amongst the highest globally (Mountain, 2012). Network charges now account for about 60% of the typical household electricity bill for customers served by government-owned networks, and 30% for those customers served by privately owned networks. By comparison in Britain, around 20% of the household electricity bill is accounted for by network charges (Ofgem, 2013).

Much higher prices in Australia have not been associated with meaningful changes in the quality of supply. Australia's metropolitan and most regional electricity users have long had a high quality of supply both before and after prices rose[4]. Remote rural customers served by single wire earth return or radial 11kV lines have long experienced relatively lower quality of supply than their metropolitan peers and this continues.

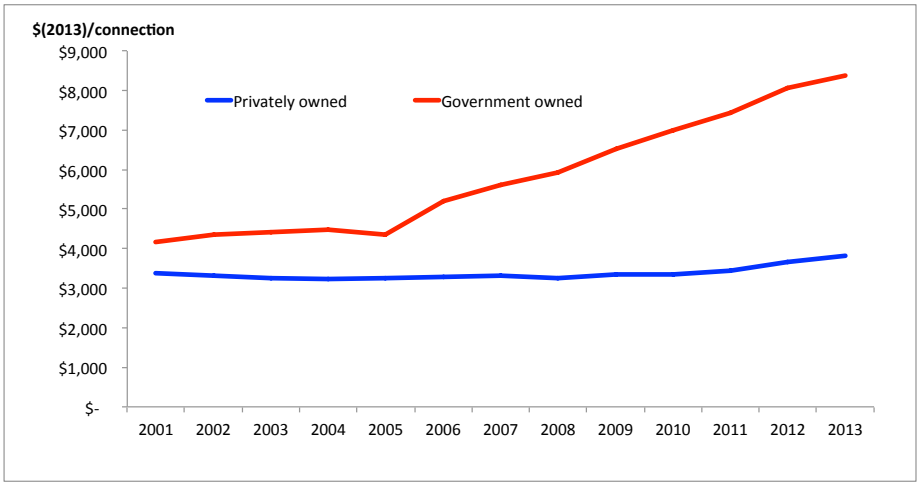
[3] This is based on EU data from Eurostat and presented in FLORIO, M. 2014. Energy Reforms and Consumer Prices in the EU over twenty years. *Economics of Energy & Environmental Policy,* 3. It should be noted however that the EU data is for 2011, while the Australian data is for 2013. While more up-to-date EU data would be preferable, electricity network charges in EU member countries have long been stable and we do not believe the results of this comparison would be meaningfully different if 2013 EU data had been used. Also, France has been excluded because network price data for France data is not available. PPP rates are from the OECD's online database for 2013.

[4] On average about 300 minutes of outage per customer per year and two outages per customer per year.

2.2 Regulated assets

Figure 5 shows the change in the value of the regulated asset values again normalised by number of connections. It shows a large difference in the outcomes for government and privately owned distributors.

Figure 5. Regulated asset base per connection (actuals to 2011, regulatory determinations since then for regulatory control period currently underway) ($2013)

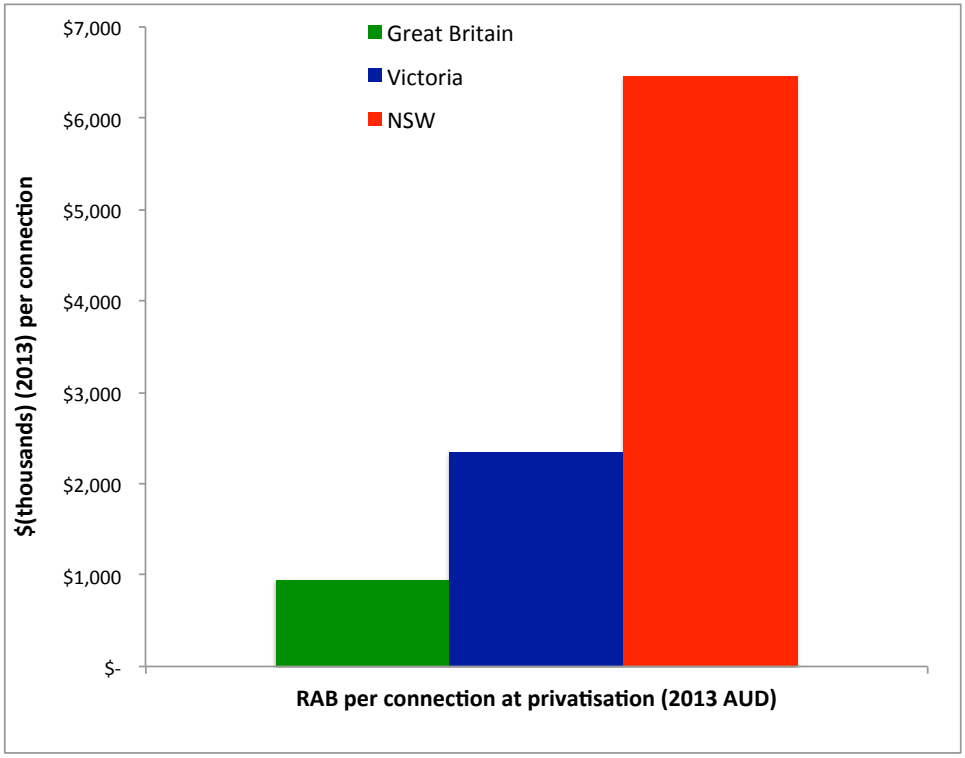


Source: (Mountain, 2014)

The main reason for this difference is much higher capital expenditure of government-owned distributors. Specifically between 2000 and 2013 for distributors in NSW and VIC and from 2002 to 2013 for distributors in QLD capital expenditures of $8,500, $6,800 and $3,500 per connection were incurred (in constant 2013 dollars).

The big difference in the government and private asset valuations is shown in Figure 7. This shows (in the left hand cluster of bars) the regulated asset value per connection in 2013 dollars of distribution network assets in NSW, Victoria and Great Britain at the time of their privatisation. Since privatisation the regulated value of the Victorian assets has since risen to $3,800 per connection, still less than half those in NSW. The picture in Queensland is even less flattering, with state-wide regulated asset values of the distribution businesses of $9,400 per connection in mid 2013.

Figure 7. Regulatory and market asset values per connection

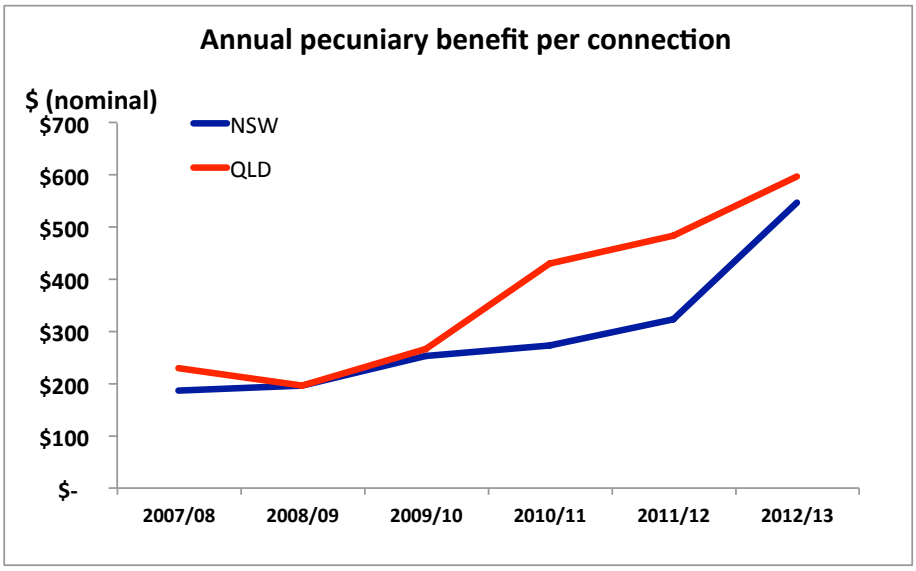


Source:(Mountain, 2014c)

2.3 Profits

The profits of the network service providers have risen to extraordinary levels. Figure 6 below shows the "pecuniary" benefit per connection for the distributors in NSW and QLD. Pecuniary benefit is defined as the sum of after tax profits plus income tax plus debt guarantee fees. This measure describes the financial rewards attributable to the state government owners of these businesses. All data is obtained from annual financial statements, with the exception of the debt guarantee fees data for NSW which is confidential and which I have therefore had to estimate based on data in the annual financial statements. The profits and income taxes in 2013/14 were lower than in 2012/13 but it is no longer possible to estimate debt guarantee fees because the data needed to do this no longer published in financial statements, and the distributors and NSW Government has refused to publish this information (it is available in Queensland however).

Figure 6. Annual pecuniary benefit per connection



Source: (Mountain, 2014)

Figure 6 shows that pecuniary benefits per connection have grown to $547 (NSW) and $599 (QLD). These are derived on average regulated revenues per connection of $1,289 (NSW) and $1,265 (QLD), to give margins of 42% and 47% respectively. By any measure these are outstanding margins.

Profitability can also be examined as a function of return on equity and return on assets. This is less useful since it reflects the asset valuations which were established by the governments and subsequently the regulators, rather than by the market. Nevertheless I report it here for interest.

Analysis provided by the NSW Auditor General shows that for the year ended 30 June 2013, the combined profit after tax for NSW distributors was $1,363 million ($771 million in 2012), a 76.8 per cent increase.

The Auditor General calculates that for AusGrid in particular, this resulted in a Return on Equity of 23.2% (see (New South Wales Auditor General, 2013)). This excludes income tax equivalents that the Government collects and is also net of debt guarantee fees. In addition, this is a current cost return on equity: in Australian regulation, the regulated asset base is indexed by the CPI. In the case of AusGrid, this has created a revaluation reserve of $2989.2m. Subtracting the revaluation reserve from total equity ($4190.5m) gives $1203m, the value of equity that represents subscribed capital and retained profits. Against this calculation of equity, AusGrid's rate of return on retained equity becomes 80%.

Profitability can also be described in terms of return on assets. On this measure, according to the NSW Auditor General, in 2012/13 AusGrid achieved a post-tax return on assets of 11.2%. This is about a 60% higher return on assets than the AER had expected in its determination of AusGrid's prices. Furthermore, as I alluded to earlier, this measure of return on assets must been seen in the context of AusGrid's asset valuation. In 2012/13, AusGrid's regulatory asset value was $8,546 per connection. This is twice has much as the highest valued Victorian distributor (AusNet Services) and almost three times as much as the lowest valued Victorian distributor (United Energy).

Some of the privately-owned NSPs also seem to have become extraordinarily profitable. SA Power Network's (SAPN) regulatory information notice shows pre-tax profits (after interest payments) of $319m for 2012/13 for their regulated business. This is equivalent to $381 per connection. By comparison, UK Power Networks which in Cheung Kong Infrastructure shares a common dominant shareholder with SA Power Networks – achieved pre-tax profits of $102/connection.[5] Much higher regulated assets per customer ($4,096 per customer for SAPN versus $1,131 per customer for UK Power Networks) and much higher cost of capital determined by the AER for SAPN (7% real, vanilla[6]) than determined by Ofgem for UKPN (4.7% real, vanilla) would seem to explain much of the difference in SAPN and UKPN's profits.[7]

I noted earlier that SAPN had increased revenues between 2002 and 2013 more quickly than other privately owned NSPs. This was largely a result of much higher capital expenditure that the AER determined for the current five year price control. SAPN has however consistently underspent its capital expenditure allowances, and the remaining service life of its assets is now lower than that of other NSPs. This suggests that part of SAPN's extraordinary profitability is also attributable in part to underspend against the capex used to calculate its regulated prices and consequently at least relative to its peers, ageing assets.

I would also like to make clear that SAPN has disputed my comparison of their profits with those of UK Power Networks. In particular they commissioned advice from consultants HoustonKemp. I have seen claims that SAPN has made on the basis of this advice, although I have not seen their advice. I have asked SAPN to put this advice and the claims they have made based on this advice in the public domain.

Analysis of the profitability of the privately owned Victorian distributors is more difficult because most are not listed on the stock exchange and so comprehensive financial data is not available. The single listed NSP (AusNet Services) also owns other regulated businesses and does not provide disaggregated accounts. Most Victorian distributors have very complex corporate and financial structures that further complicates analysis.

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[5] Profit data for the regulated network business is sourced from the Regulatory Information Notices available from the AER's website. This calculation uses market exchange rates at time of writing of 0.55 British pence to the Australian dollar. SA Power Networks' statutory accounts shows significantly lower profits per connection despite $97m in customer contributions. This means that SAPN's regulated business is far more profitable than its unregulated business.

[6] Vanilla WACC uses the post-tax return on equity and pre-tax cost of debt.

[7] It might be suggested that lower customer density and higher assets per customer explains higher SAPN profits relative to UKPN profits. But it is not clear why the regulated asset base per connection for SAPN should be so much higher than for UKPN. Information in Regulatory Information Notices available on the AER's website shows that SAPN has customer density of 10 connections per circuit kilometer of network. UKPN has customer density that averages 45 connections per kilometer amongst its three networks. But 81% of SAPN's network is over-head, of which 65% is inexpensive single wire earth return and 11kV circuit. By comparison 67% of UKPN's network is underground, a far more expensive approach, and UKPN's networks are also far more highly meshed with much greater redundancy and so provide more reliable supply.

Victorian distributors are also currently in dispute with the Australian Tax Office over related-party and shareholder loans which seem to have affected their taxable profits. For example, AusNet Services recently settled "Division 974" taxation issues by surrendering tax losses of $506m and making an additional cash tax payment of $25m. Such significant adjustments need to be considered in properly understanding the profits of the Victorian NSPs.

However most of the Victorian NSPs have not had revenue increases comparable to the government-owned distributors or SAPN, and all have much lower regulated assets per connection. For these reasons we suggest that it is unlikely that they are as profitable as their government owned peers or SAPN.

2.4 Exogenous factors do not explain these outcomes

Mountain (2014) explored various factors that the industry and to some extent the regulators have suggested explain outcomes, including higher reliability standards, demand growth, ageing assets and historic under-investment, customer density, and the global financial crisis. None of these factors with the exception of higher reliability standards are adequate explanations.

With respect to higher reliability standards, why were (apparently) higher standards ever adopted? The data on the frequency and duration of outages provided no support for higher standards. Other than for exogenous reasons – particularly tropical storms in Queensland - average reliability performance for all distributors in the NEM has been comparable to that in other developed economies. For Queensland in particular, it is notable that despite massive increases in their regulated asset base, their worst reliability performance (as measured by the index of average outage duration) on record occurred in 2011, according to data reported in the AER's State of Energy Market 2013 report. This is not to criticise the Queensland distributors: tropical storms can have severe impacts. It has always been this way. The Queensland distributors argue that after adjusting for storm events there has been an improvement in the quality of supply. But after adjusting for storm events there never was a problem in the quality of supply in Queensland, and so pointing to improvement on what was perfectly acceptable performance seems to miss the point.

The Queensland and NSW Governments have since wisely reverted to the earlier standards.

Finally in this section I would like to draw particular attention to the issue of customer density. NSPs suggest that comparing outcomes in Australia to those in other countries, such as Britain is wrong because of differences in customer density. There is much to say on this:

- Firstly distributors sometimes state customer density per square kilometre of surface area. This makes little sense as a basis for comparison, since a large part of the surface area of each state is not inhabited, and neither does electricity infrastructure cover it.

- Second, Australia is one of the most urbanised countries in the world, and customer density in our metropolitan areas is often comparable to that in other countries with the exception of very dense international capitals such as London, Tokyo or New York.
- Third much of the additional length of the network of some service providers such as Ergon, Powercor or Essential Energy is in inexpensive single wire earth return or 11 kV overhead distribution lines. This adds to the length of the network, but adds much less per kilometre than an underground high voltage urban or metropolitan network.
- Fourth much of the rural network has been funded fully or partially from customers' capital contributions, and yet is counted as part of the NSP's network (in Queensland it is counted as part of the RAB) and features in the measurement of the NSPs' network density.
- Fifth, measures of network density are, taken in isolation, of limited use. Network type and specifically underground versus overhead can be a far more significant factor since underground networks can typically cost many times more than overhead networks.
- Finally, network density does not explain the changes in prices or assets. These changes have occurred for metropolitan and country distributors alike and in all cases, networks have become more dense at the same time that expenditure has risen.

3 Is the Committee examining yesterday's problems?

It might be suggested that the Committee is examining yesterday's problems. For example it might be suggested that changes resulting from the AER's Rule change application and the outcome from the Yarrow inquiry into the arrangements for merits review have dealt with the problems and all that is now needed is for these changes to be left to work.

I do not agree with this. I think the changes that have been made are not proportionate to the problem, and will not be successful in achieving the improvements that are needed. This subsection explains my view.

In my research in 2010 with Professor Littlechild (see (Mountain and Littlechild, 2010) we drew attention to factors that we suggested explained the outcomes that are now widely recognised in Australia. In particular we suggested that government ownership means government is more receptive to a regulatory framework that limits regulatory authority[8]. We also suggested that failing to account for ownership in the determination of price controls would overcompensate government-owned service providers[9]. We suggested that the regulatory arrangements had unduly restricted the AER, but we felt that that there was more that the AER could do even within the then current arrangements. We also drew attention to what we considered to be short-comings in the conduct of regulation – including failure to use benchmarks to set expenditure allowances.

Since then the AER has proposed and the AEMC accepted, changes to the Rules. This, and the subsequent consultation on Guidelines became the centre-piece of the regulatory debate for the last two years. These guidelines, finalised at the end of 2013, changed regulatory processes a little; have encouraged NSPs to consult with consumers in the development of their proposals (with no meaningful penalty if they fail to); suggest the AER will make greater use of benchmarks (the AER has always had a mandatory requirement in the rules to take account of benchmarks anyway); and has made some changes to the design of efficiency incentives (specifically some changes to the rewards/penalties for underspending/overspending regulatory capex allowances).

While the AER has made significant progress in the development of regulatory tools (including data sets and benchmarking), in our view the most substantive change to the

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[8] We said "*In designing a regulatory framework, a government has to balance (among many other things) the interests of customers and investors. A government that is also an investor, as the owner of a regulated company, and as the recipient of its tax revenues, has an additional financial interest in the profitability of that company. It is more receptive to a regulatory framework that continues to provide such revenue streams. It has a financial interest in limiting the extent of regulatory power and discretion and how this is exercised, especially with respect to the severity of the price control. This might be expected to manifest itself in the design of the regulatory framework*".

[9] We said "*In assessing capital expenditure, companies need to consider the alternative use of their funds. Private companies typically have alternative profitable uses, their opportunity cost of capital is relatively high, and this gives them the incentive to minimise the extent of capital investment in electricity distribution (subject to maintaining adequate quality of service). In contrast, government-owned companies may have fewer alternative uses — indeed, if a government-owned distribution company does not reinvest its funds in its distribution system it may have them taken away*."

Rules has been that the AER is no longer required to set the return on debt based on the average value of the risk free rate and debt risk premium in a short trading period close to the start of the regulatory control period. While not an insignificant change, it would be wrong to overstate its importance.

Compared to the arrangements that had previously applied to the regulation of gas networks, the new Rules are slightly more restrictive, while compared to the arrangements that previously applied to electricity distribution and transmission, they may be slightly less restrictive. However, it is difficult to see that these changes *per se* will make much difference to prices, expenditure, asset values or will address the extraordinary profitability of NSPs. The NSPs' owners seem to share this assessment.[10]

To be clear, the current framework, like the framework that applied before the rule change, leaves the following issues beyond the AER's grasp:

- The fundamental design of the regulatory framework – such as whether to establish multi-year revenue or price caps or some other approach (such as annual controls, profit controls, ex-post controls, index-based controls and so and on)
- The valuation of the regulated asset base;
- The methodology for the indexation of the asset base to account for inflation (indeed, if this should be done at all);
- The reliability standards that network service providers are required to plan their networks to;
- The methodology for the establishment of the Risk Free Rate;
- The ability to distinguish between government and privately-owned network service providers in the design of economic regulations including the determination of the cost of capital (the next section focuses on this).

I do however expect that the regulatory decisions currently underway (covering transmission and distribution in NSW, distribution in QLD and SA, and transmission in Tasmania) will be more benign to consumers than the AER and NSW and QLD state regulators' previous decisions. This is partly because some of the businesses have made less extravagant claims (if not in opex then in capex) than in the previous regulatory control period. It is also clear that the "political" zeitgeist is far more supportive of tougher controls by the AER than has been the case previously.

While it would be inappropriate to speculate on where the AER will ultimately land in respect of decisions currently under review, I would imagine that they will set allowances substantially below those that the businesses have sought. Part of this will be the usual adjustment for ambit claim, but we also expect some meaningful progress in respect of opex allowances, particularly in view of the AER's benchmarking report which has demonstrated what analysts, including ourselves, have long suggested (the

[10] For example for the period 1 January 2014 to 30 September 2014 [8 December 2014] relative to the ASX All Ordinaries the price of Spark Infrastructure, APA, Duet, and Envestra increased by 20% [27%], 30% [35%], 23% [35%], 16% respectively. Similarly in major off-market transactions for the purchase of gas distributor Envestra by CKI and the purchase of a substantial stake in electricity network service provider AusNet Services, transactions occurred at a premium of about 50% to regulatory asset value.

government owned distributors are much less efficient than the privately owned distributors).

The AER's Draft Decision for the NSW distributors has reduced opex allowances per connection substantially below what the distributors had sought (which was to increase them substantially on the existing, inflated, levels). Following the AER's Draft Decision, opex allowances for the NSW distributors are now approximately in line with the amounts allowed in the last decision by IPART, the NSW state regulator. Per connection, their opex allowances after the Draft Decision are however still higher than all of the Victorian distributors, on a pair-wise comparable basis.

However we expect that the main reason for lower revenue allowances in future will be reductions in the Risk Free Rate of finance, a regulatory parameter prescribed in the Rules, that the AER does not determine. After adjusting for the change in the Risk Free Rate we find that the AER's Draft Decision for the NSW distributors sets a cost of capital only a little changed from the AER's last decision and still substantially above the levels decided by IPART in its two decisions. The biggest problem appears to be the allowance for debt costs. Despite the evidence of excessive allowances in its previous decisions, the AER has set the premium to the risk free rate at a level that is comparable to the level it has set in its previous decisions, and far higher than the level set by IPART.

The evidence in the previous section suggests that substantial and sustained reductions in expenditure, rates of return and asset valuation are needed, particularly for the government-owned network service providers. For the reasons set out in this and previous sections I do not think that the current arrangements are capable of delivering this, and that far more fundamental changes are needed to institutions and approaches.

Finally on the changes to the arrangements for merits review: The Standing Council on Energy and Resources set up a three-person panel (Professor George Yarrow (chair), Dr John Tamblyn and Mr Michael Egan) to examine the arrangements for the review of the merits of AER decisions. The Yarrow Panel recommended far reaching changes including that if NSPs wish to seek a review of the merits of an AER regulatory decision, the entire revenue/price control decision, not just parts of the AER's decision should be reviewed (to prevent cherry picking of an single element of the regulatory decision), and that the merits review should be undertaken by an economic institution, not a quasi-judicial commission such as the Australian Competition Tribunal. SCER substantially rejected the Yarrow Panel's recommendations and instead suggested much more limited changes. It is not clear why SCER rejected the Yarrow Panel's unequivocal advice. It is difficult to see how the changes that SCER has decided will address the problems that the Yarrow Panel identified.

4 What is the problem?

When major failures occur, ex-post analyses usually find many inter-related causes. However in respect of the reasons for the failures in the regulation of networks in Australia, I suggest that there is one, major, underlying factor that is more important than others. Specifically, I contended that ownership matters and the design and implementation of the regulatory arrangements have failed to account for this. This section sets out this argument.

Comparing the outcomes of private and government owned electricity network service providers has led many to conclude that ownership is the problem. This perception might be reinforced when comparing the relatively better outcomes delivered by gas distributors, which are privately owned, compared to the government-owned electricity distributors.

However, ownership and regulatory form are inextricably inter-twined, and therefore conclusions on the impact of ownership must also take into consideration the regulatory arrangements.

Electricity distribution has been undertaken by government-owned electricity entities – whether statutory corporations or municipal entities - for most of the history of the electricity industry in Australia. There have been concerns over productivity under government ownership. For example Pierce et al. (1995) examined the evidence in industry and government studies, and concluded that this evidence showed that there were significant productivity, and particularly capital productivity, concerns associated with electricity distribution by then (and still now) government-owned network monopolies. It was evidence such as this that contributed to the justification for the industry restructuring that led to vertically disaggregated, corporatised distributors and the application of a price cap form of regulation by ostensibly independent regulators.

However, since the restructuring, the capital productivity of government-owned distributors has declined significantly. This has been reflected in the price outcomes now well known: in the period from 1980 to 2007, the index of household electricity prices tracked the index of household prices quite closely. It only since then that the index of household electricity prices has roughly doubled relative to the index of consumer prices.

In other countries there seems to be little evidence that the efficiency of, or prices charged by, network monopolies is strongly affected by ownership in the absence of other factors. There is a rich empirical literature on this, particularly in the United States where investor owned, municipal and co-operative electricity utilities have co-existed for many decades. Our reading of this literature is that private ownership is generally associated with higher efficiency, but the gap in the efficiency of investor-owned and non-investor owned utilities (and the prices they charge) is not large.

Why therefore, have the prices of network services provided by government-owned distributors increased so much, but only since 2007? And why has the gap between public and private energy networks in Australia grown so wide?

I suggest that a large part of the answer to these questions lies in the application of the Competition Principles Agreement to monopoly network services businesses. The Competition Principles Agreement, which was executed at the Council of Australian Governments' meeting in April 1995, established competitive neutrality arrangements "*to remove resource allocation distortions arising out of public ownership of significant business activities and to improve competitive processes*". The agreement reflects widely accepted policy directed at preventing government-owned businesses that operate in competitive markets, from crowding out private sector competitors. Such crowding out might occur through preferential access to markets or to capital.

The Commonwealth[11] applies this agreement to a businesses that meets several criteria including that "*there must be an actual or potential competitor (either in the private or public sector) i.e. users are not restricted by law or policy from choosing alternative sources of supply*".
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The ACCC in its regulation of transmission network service providers (before transfer to the AER), the state regulatory commissions in respect of their regulation of distributors (before transfer to the AER), and the AER subsequently in its regulation of both transmission and distribution set prices on the basis that the Competition Principles Agreement applied to network monopolies. Specifically, this means the economic regulation of government-owned network monopolies is undertaken as if they are privately owned. This means ignoring that the government owned monopolies are funded entirely by state government-provided debt and retained earnings. They are also allowed to charge consumers hundreds of millions of dollars in respect of debt and equity raising costs which, being government-owned, they do not incur. The arrangement even extends to the calculation of taxation allowances despite the fact that the distributors are in effect exempt from income taxes[12]. As far as I know, Australia is unique in applying this approach to the regulation of government-owned network monopolies.

Energy users challenged the approach that government-owned utilities are assumed to be privately financed. In particular, in 2011, the Energy Users Rule Change Committee (a committee representing seven large Australian energy users) applied to the AEMC to change the Rules in respect of the calculation of the cost debt charged to users. The Committee argued that the cost of debt should reflect the government's cost of borrowing, which was 300 to 400 basis points lower than the cost the distributors were allowed to charge users (reflecting the regulatory assumption that they were privately financed).

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[11] COMMONWEALTH COMPETITIVE NEUTRALITY POLICY STATEMENT, June 1996

[12] Or, to be more precise, they are taxed but the tax flows directly to the shareholder. In effect therefore their profits are untaxed. In 2011 the two Queensland distributors successfully appealed against the AER's decision on dividend imputation in the calculation of income tax allowances. Their argument was based on the imputation of dividends paid by privately owned companies and ignored the fact that these distributors' profits are effectively untaxed (because the Queensland Government collects the income tax). The result of this successful appeal means that these distributors were entitled to recover additional revenues of around $400m in respect of taxation. After having won the appeal, the Queensland Government nevertheless instructed its distributors not to raise their revenues by the additional amount.

The government-owned network service providers, state governments and the AEMC vigorously opposed this Rule change. The AEMC disallowed the proposed change for two main reasons: firstly that it would not be "competitively neutral" and secondly that it would result in a misallocation of resources.

On the first of these, the AEMC referred to the Competition Principles Agreement (CPA). But the CPA makes no provision for the principles to apply to monopolies. Indeed, applying "competitive neutrality" principles to a monopoly is an oxymoron. Nevertheless the states have determined to apply the policy to its monopoly utilities. The AEMC has instructed the AER to recognise this, and the AER has supported it.

On the second argument (misallocation of resources), the AEMC said that establishing the regulated return on debt based on the cost of debt would result in inefficient over-investment. But how can this be right? The incentive for a utility to expand its regulated asset base rises in proportion to the difference between the return on debt and the cost of debt. This is the well known Averch-Johnson "gold-plating" effect (Averch and Johnson, 1962). Setting the allowed return on debt closer to the cost of debt weakens, not strengthens, the incentive to gold plate.

For these reasons I suggest it is too generous to say that the application of "competitive neutrality" principles to regulated monopolies is built on shaky foundations.

Some have suggested that although the calculation of prices on the basis that government-owned NSPs are privately financed is a tax by another name, such a tax is at least relatively efficient (using Ramsey's argument) since electricity demand is inelastic[13]. While the price elasticity of demand is difficult to determine with certainty, estimates of the long run elasticity of demand range from -0.2 to -0.7 (Fan and Hyndman, 2011). This is not what would be called inelastic demand. In addition:

1. Taxing consumers through network services charges is highly regressive (low income households typically pay the highest prices for network access).

2. Electricity is an important input in industry, commerce and agriculture. It is preferable to tax outputs not inputs in order to minimise allocative inefficiencies.

3. In the context of increasingly competitive distributed generation resources, using network services to raise tax has the potential to result in serious misallocation of resources between grid-supplied and distributed generation.

4. The method by which the income is raised – through a premium on the regulated asset base – provides strong incentives to over-invest in order to increase the asset base and hence returns.

[13] A recent "critique" of the proposed privatisation of networks in NSW, written by Stephen Koukoulas and Thomas Devlin and promoted by the McKell Institute felt no need bother about the inefficiency or inequity of the effective taxation of electricity consumers. For them it was enough just to point out the failures of the funding of our federation to justify the current arrangements.

From an efficiency and fairness perspective, the current arrangement seems to be the worst of all words: a regressive input tax that misallocates resources and results in stranded assets.

I suggest that the assumption that government-owned networks are privately owned has had a significant impact on incentives to invest. For example in respect of borrowing costs, over the last five years state government borrowing costs were typically in the range from 3% to 5%. Under the current revenue/price controls however they have been allowed to charge consumers a rate of around 8.8%. A conservative estimate of the excess above reasonable costs would be around 300 basis points. The regulated asset base of government-owned distributors (in the NEM) in 2013 was $42.8bn. A 300 basis point excess translates into a revenue premium of $0.8bn per year (only 60 % of the asset base is assumed to financed through debt).

It is also instructive to compare the approach to the regulation of government-owned network monopolies in Australia with the approach to the regulation of such monopolies in other countries. Provincial / state owned electricity network service providers is not a typical model in other countries. Government or co-operative ownership of network services providers (which are typically also integrated with retail activities) is more common. Typically ownership is local (municipal government or some form of co-operative or consumer trust). Examples of this exist in New Zealand, Austria, France, Germany, Ontario, South Africa, the Scandinavian countries and in the United States.

The determination of regulated prices for these "non-private" distributors does not follow the Australian practice. In most cases, typically for the smaller distributors, there is no explicit regulation of the cost of capital by third party regulatory agencies: regulation is undertaken directly by the owner. Where some form of explicit economic regulation is undertaken by third party authorities, such as in Norway, Sweden, Denmark and Ontario for the larger distributors, the determination of the return on debt is typically based on actual borrowing rates or a small margin on government borrowing rates (where funded by the governments).

It parts of Germany and in South Africa municipal electricity distribution has been a source of income for local government and has subsidised the provision of other services. This is akin to Australia at a state level, although neither in Germany nor in South Africa has this stimulated gold plating because revenue has not been linked directly to the size of the regulated asset base as it is in Australia.

The objection to the ideological assumption that ownership does not matter, is not just in relation to the determination of the cost of capital. The form of regulation applied in Australia – periodic price/revenue caps – is a form of regulation proposed by Professor Stephen Littlechild in the early 1980s in response to the question of the best way to regulate the soon to be privatised British Telecom[14]. Professor Littlechild's analysis (see Littlechild (1983)) was prepared specifically in the context of that privatisation[15].

[14] It analysed various regulatory designs – an Output Based Profits Levy, a Maximum Rate of Return scheme, a Profit Ceiling and Local Tariff Reduction scheme

[15] Its evaluation criteria included Protection against Monopoly, Efficiency and Innovation, Burden of Regulation, Promotion of Competition, Proceeds (of floatation) and Prospects (for BT).

His recommended approach was subsequently applied to privatised utilities in Britain, and then in Victoria and South Australia to its privatized distributors and then also by the state regulators in Queensland, Tasmania and New South Wales to the newly corporatised government-owned distributors in those states. Underlying Littlechild's analysis is the assumption that the newly privatized British Telecom would value profits in a way that the Government-owned BT had not. The Australian approach assumes that government and private firms value profits in the same way and so the regulatory design could be applied to both in the same way. For the reasons in this section I do not believe that this is a valid assumption.

Finally, it might be argued that even if the concerns in this section are valid, the proposed privatisations in Queensland and New South Wales renders the concerns irrelevant since change in ownership will eliminate the problem.

I do not necessarily agree with this. The current "privatisation" proposal in New South Wales, as I understand it, is for the sale of 49% of the Government's ownership in two of its three distributors and its one transmission company. This may mean a full privatisation of one business and minority private investor stakes in the others or minority equity stake in all three. An arrangements that has majority ownership and control with the Government is akin to models of private sector participation common in Europe, for example the passive investor participation in Electricite de France, or Dong Energy in Denmark, and in some of the municipal distributors in Ontario. This contrasts with the conventional privatisations such as have occurred in Britain, Victoria and South Australia, which has entailed full divestment. If the government continues to control the business as the majority shareholder, and finances its participation through state retained earnings and Treasury-provided debt, the concerns described in the previous section remain largely valid.

5 Suggested directions for reform

The previous sections have established the evidence that, I submit, substantiates the conclusion that economic regulation of electricity networks in Australia has failed badly and that the changes that have been made are not proportionate to the problem. I have suggested that the underlying problem is a misplaced ideology that government-owned network service providers should be assumed to be privately owned and regulated accordingly. This section suggests the direction for reform in institutional arrangements and regulatory design.

However, before discussing these directions, I would like to draw attention to an additional contemporary issue that merits careful consideration in an evaluation of changes to the design of Australia's regulatory arrangements. In this regard, the very rapid rise of decentralised generation in Australia: more than 1 in 10 Australian households have installed rooftop photovoltaics (PV) and around 180,000 additional rooftops are being electrified each year. This is already having significant impacts on electrical demand, particularly at the time of regional peaks. Our analysis of the economics of rooftop PV (Mountain and Szuster, 2014) suggests that it is now considerably cheaper for households to produce their own electricity rather than purchase from the grid.

I expect that the uptake of PV for households and also in commercial and industrial applications will continue to expand rapidly. Household consumers are also becoming producers (in the jargon, "prosumers"). As a result they are seeking a different service from the grid: back-up when the sun is not shining, and a route to market for production that surplus to their needs on the sunny days.

Perhaps the development of decentralised storage will eliminate even this residual need for access to shared networks. Communities may agitate to acquire parts of the network in their localities to create their own isolated markets (sometimes known in the jargon as "micro-grids") as is happening in Germany and the United States. Other possibilities exist: utility-scale batteries may significantly affect the need for network augmentation and by acting as stores of energy, batteries if operated by the networks, makes these networks energy market participations, a role not encompassed under the existing regulatory arrangements.

All this raises significant regulatory issues: what is the role of networks, how should stranded assets be dealt with, what should be included in the rate base, should five year controls continue in an environment of such uncertainty? I envisage that proposed changes to institutional arrangements (next subsection) will facilitate consideration of these issues in a better way than is possible under the current arrangements. Likewise in considering changes to regulatory design (last subsection) I envisage that the issues raised above, would feature centrally in that regulatory design debate.

5.1 Institutional arrangements

I think a strong case exists for a fundamental re-think of the institutional arrangements for the economic regulation of monopoly network service providers. I see two related issues here that need to be addressed:

- the bifurcation of economic regulation between a rule-making and rule-implementing institution; and
- politically independent regulation.

Australia is, as far as I know, unique internationally in having separate institutions responsible for the design and implementation of regulation. This institutional bifurcation reflects part of the Commonwealth-state bargain[16] that resulted in the transfer of the implementation of economic regulation from state commissions to the AER. The institutional separation of design and implementation and as part of this, the codification of regulation in the Rules, has constrained the AER as intended.

However, it is quite reasonable that state governments would be concerned about the federal regulation of their electricity businesses: as the McKell report points out clearly these businesses are very important sources of income to the state governments. And so, would it not be better for the state governments to regulate their own network services providers as they have for much of the history of the industry in Australia? Despite concerns about the productivity and efficiency of network services under this original arrangement, it has nonetheless proven to be more successful than the ostensibly independent federal (and before that, state) regulation has proven to be.

There are many in the Australian polity that will baulk at these suggestions: the pursuit of a "truly national" energy market, extending also to truly national economic regulation of regional distributors has been a cherished ambition for many politicians and bureaucrats both federally and in the jurisdictions. The evidence that ownership matters and consequently that the federalisation of regulation of government-owned distribution monopolies has been problematic, is at odds with these cherished ambitions and may therefore be difficult to accept.

For privatised distribution networks, the institutional questions seem to be much more straight-forward. Politically independent regulation is desired by investors and consumers, and the track record of success of this model in North America, Britain, Victoria and elsewhere speaks for itself. Bifurcation between design and execution makes no more sense in this case than it does in the regulation of government-owned distributors.

The implementation of these suggestions would see the AER combining its existing functions with the existing network rule making functions of the AEMC (in fact there would be no need for the elaborate and bureaucratic rules-based arrangements), and empowered to regulate the privately owned (or privately controlled) network service providers. Government-owned distributors, including those that might choose non-

[16] I understand that state governments' concerned about the regulation of their network service providers by the AER (which is a quasi-federal authority), sought comfort through oversight and rule making by the AEMC, a body more directly answerable to the state governments.

controlling minority private participation, should continue to be regulated directly by their state government owners, perhaps advised by state-based regulatory commissions if necessary. This is the standard model for ownership-differentiated regulation prevalent in the United States and much of Europe. I can see no reason why Australia should differ.

5.2 Regulatory design

The "CPI-X" approach developed by Professor Littlechild responded to the political desire for a system of regulation that would provide a "light rein", as opposed to what was seen at the time as the heavy-handed "rate of return" approach to utility regulation in North America.

The Littlechild approach reflects the reality that neither the regulator nor the service provider can know what the efficient level of expenditure will be in future. But, by providing the opportunity to increase profit if expenditures are reduced below regulatory allowances, the service provider has an incentive to discover the efficient level of expenditure. In due course, the regulator can observe this level of expenditure and take account of this when it sets the subsequent regulatory allowance. In this way service providers have an incentive to reduce costs and this benefit is passed on to consumers in the subsequent regulatory control. This is meant to replicate, through regulatory processes, the efficiency and innovation disciplines provided by competitive markets.

The implementation of price cap regulation by state-based commissions started out along these lines. However, over time it has changed significantly. Regulatory proposals have become ever longer as the distributors submit ever more detail to substantiate their claims that they are proposing efficient expenditure. For example, the current regulatory proposals by the three NSW distributors total around 44,000 pages including around 30 consultant reports. The proposals by the distributors in Queensland and South Australia are no smaller (the Queensland proposals contained 560 separate documents and reports).

Numerous factors have conspired in getting to this point:

- The National Electricity Rules require NSPs to propose and the AER to respond to, expenditure allowances that are "efficient", as if by setting this as a regulatory obligation the impossible will be achieved. Consumers have often supported this obligation often not sufficiently mindful of the implications of demanding the impossible;
- Network businesses, while outwardly groan at the bureaucracy, at least recover the resulting costs from consumers and ever more "evidence" provides them with an opportunity to take advantage of the information and resource asymmetry relative to the regulator and even more so consumers;
- The AER, mindful of criticism from industry, consumers and merits reviews of its decisions have sought to avoid risks through ever more forensic analysis.

The resulting pursuit of the perfect mouse trap has failed badly as can be seen in the profit, price and expenditure outcomes. Further evidence of the failure can be seen in big differences between actual and forecast demand growth and the cost of capital. The

reason for pursuing the Littlechild price cap approach (establishing incentives for monopolies to reveal their efficient cost) has been lost and in its place is a system of regulation that follows its form rather than its function. The wood has been lost for the trees.

However, while the situation in Australia may be extreme, in Britain and elsewhere the implementation of CPI-X has become much more onerous and detailed than initially hoped. And, it should be noted, this is not an ownership-specific problem, though different regulatory designs may be preferable for government and privately owned distributors.

There would be advantage in looking at the approaches adopted in other countries, and how they have evolved. In the United States, in most cases in Germany and in Denmark, co-operative or municipal distributors are usually not explicitly regulated but are restricted from using profits from electricity distribution to cross-subsidise other services. In the United States investor-owned utilities are not subject to federal or state regulatory reviews unless they wish to raise prices. In some cases, prices have not risen for decades and so there has been no regulatory review. In some states of the U.S., prices are set through negotiated settlements with consumers. In several Scandinavian countries, price caps for municipal distributors are established through high-level productivity-based formulae rather than decisions on the detail of various inputs as in Australia. The system of regulation in Britain has also evolved, and much can be learned from this.

I suggest that fresh eyes need to be brought to this. There would be great advantage in exploring the possibilities unconstrained by the limitations of whether such and such approach is consistent with whatever clause of the Rules, or whether it is or is not ultra vires for the AER or AEMC. There are many possibilities. The size of the industry and its economic importance means that effort at improvement will be well rewarded.

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