

# Submission to the Productivity Commission

## The Capital Efficiency of Australian Electricity Distributors

– Results of a Benchmarking Study

AMP Capital



NOVEMBER 2012

## Executive summary

### The results of our benchmarking study:

- > Australian private sector owned electricity distribution utilities at least match their United Kingdom private sector counterparts in terms of capital efficiency;
- > In comparison, the capital efficiency of most state owned electricity distribution utilities is far poorer with several exhibiting Regulated Asset Bases more than double what would be expected.
- > A significant component of electricity price rises have been driven by the over-investment by some of the major state owned electricity distribution utilities.
- > We propose that the difference in outcomes between the private and public sector owned distributors results from a failure of the regulatory system to account for the total returns to state governments. They receive significant windfalls including notional income tax payments and a significant arbitrage on debt service costs, in addition to their regulated returns. Effectively, the state ownership of utilities allows them to “triple dip” ie regulated returns + notional income tax payments+ debt arbitrage.

**State Government windfalls increase in proportion to the asset base of the utility and consequently provide a strong incentive for states to over-invest.**

### The regulatory system:

- > The current system is effective in controlling capital expenditure by private sector owned networks, who receive essentially the regulated return and are subject to normal capital market disciplines.
- > Increasing regulatory powers without addressing the fundamental issues of regulatory design will not address the differences in incentives to invest associated with the ownership structure.
- > An excessive regulatory backlash may, in fact, penalise investment by the efficient private component of the sector while doing little to control public over spending.
- > State governments have very little incentive under current regulation to privatise.

**Changes to the regulatory system design are necessary to put public and private ownership on a level playing field before effective control of state utility investment will be achieved or the states would realistically consider privatisation.**

**The equivalence in capital efficiency of private sector owned networks in Australia and the United Kingdom, suggests that the regulators current powers are adequate for effective regulation, once a level playing field for both public and privately owned networks is established.**

### Recommendations:

- > Suggested corrections to the current regulatory design include:
  - a. National Tax Equivalent Regime payments to be included in a state owned utility’s allowable return calculation, and;
  - b. removing the debt servicing arbitrage by using the state’s actual debt rating in the calculation of an appropriate WACC;
 or alternatively
  - c. encourage states to raise debt for their utilities from special purpose BBB- rated bonds serviced entirely from the cash flows of the utilities.

## 1 Background and introduction

Thank you for the opportunity to comment on your draft report.

Rises in transmission and distribution charges are a major contributor to rapid increases in Australian retail electricity tariffs<sup>1</sup>. Under the current system of regulation, transmission and distribution utilities are able to recover a return on their regulated asset base (RAB), or the capital assets which make up the structure of their network. The price increases have largely been driven by increased expenditure expanding the asset base. This is especially apparent among state owned utilities<sup>2</sup>.

This has led to claims that the networks are being “gold plated”; that is, utilities are deliberately over-investing to allow increased returns<sup>2</sup>. In its draft report on price rises<sup>3</sup>, the Productivity Commission addresses the issue as to whether the levels of investment are reasonable by reviewing a number of benchmarking studies<sup>2</sup> which compare the capital efficiency of Australian and United Kingdom distribution utilities. The Productivity Commission concluded, in their draft report, that the evidence was inconclusive.

AMP Capital identified a number of shortcomings in the referenced studies and has undertaken its own high level benchmarking exercise, which is set out in this report.

AMP Capital has been advising on, investing in and managing infrastructure on behalf of institutional and pension clients for more than 20 years, and is one of the longest standing participants in global infrastructure investing which is widely recognised as one of the core capabilities of AMP Capital. We invest across all infrastructure sectors in major economies. To date, AMP Capital has made over 100 infrastructure equity and debt investments throughout Europe, Asia, North America, Australia and New Zealand and manages client monies in excess of US\$6 billion (as at 30 September 2012). Furthermore, portfolios under our management have significant exposure to regulated utilities, including electricity distribution networks. Our duty to our investors is to protect the future value of these investments.

The following paper sets out our response to the recent release of the Productivity Commission’s Electricity Network Regulatory Frameworks Draft Report (Draft Report). While we support the general thrust of the recommendations in the Draft Report, we are concerned that the Draft Report does not adequately identify the major causes of the rapid growth in transmission and distribution charges in the Australian electricity sector. We attempt to cover these issues in our analysis and findings.

In particular, in Chapter 6 of the Draft Report, the question as to whether there has been over-investment in publicly owned networks was left open. This is clearly a very politically charged question but effective reform of the sector will not be possible unless it is answered. In our opinion, the benchmarking evidence regarding capital efficiency, provided in Chapter 6 of the Draft Report, is inadequate. In addition, we find that a number of the sources quoted in the benchmarking evidence have a particular bias.

Consequently, in our opinion, the draft recommendations of the report are inadequate and would have only limited effectiveness in driving efficient capital investment in the sector. Furthermore, unless reform policies are based on sound and impartial commercial analysis, changes in regulation may have unintended consequences that could materially impact the value of investors’ equity in the sector and appetite for future investment.

Our own research suggests that it is possible to effectively benchmark network investment in various countries and, consequently, to determine the relative efficiency of capital investment in publicly and privately owned electricity networks in Australia.

This submission provides you with an overview of our research and conclusions. We also offer a number of recommendations, which, we believe, would promote efficient capital investment in the sector if implemented.

## 2 AMP Capital’s benchmarking studies

To test whether there was a significant difference between the capital efficiency of state and privately owned electricity distributors, AMP Capital undertook its own benchmarking study. Rather than take the detailed bottom-up approach as

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<sup>1</sup> FINAL REPORT; Possible Future Retail Electricity Price Movements: 1 July 2011 to 30 June 2014. AEMC Dec 2011;

<sup>2</sup> Australia’s Rising Electricity Prices and Declining Productivity: the Contribution of its Electricity Distributors.; B Mountain 2011;

<sup>3</sup> Electricity Network Regulatory Frameworks Draft Report; Productivity Commission Oct 2012;

used by most studies reviewed in the Draft Report, we have developed a top-down holistic approach to modelling. Our benchmarking study, therefore:

1. Examined whether the capital utilisation of Australian private sector owned distribution utilities, could be measured by modelling their regulated asset base (RAB) against a limited number of key network descriptors (the Australian RAB Model);
2. Examined whether the capital utilisation of United Kingdom distribution utilities, could be measured by modelling their regulated asset value (RAV) against the same key network descriptors (the UK RAV Model). **Note** UK distributors are all privately owned;
3. Determined the relative efficiency of the capital utilisation of privately owned utilities in both countries, by using the Australian RAB Model to predict UK RAVs, using an appropriate purchasing power parity conversion factor.
4. Determined the relative efficiency of Australian state owned distribution utilities against the Australian RAB Model.

Our developed benchmark model forecasts an electricity distribution company's Regulated Asset Base (RAB) (the Australian RAB Model) and uses the following three key network descriptors:

- > customer number / number of connections;
- > network length, and;
- > peak network demand.

The model was calibrated against Australian private sector owned distributors using multi-regression analysis.

The model forecasts the RAB of Australian private sector owned networks with a high degree of reliability (ie a linear regression  $R^2 > 0.95$ ) and a standard error of A\$270 million, see chart 1 in the appendix. This demonstrates that the top down approach could generate a simple three variable model that was able to give excellent results in forecasting a distributor's asset base.

Using the same variables we further developed a similar model (UK RAV Model) for the United Kingdom's electricity distributors to forecast their Regulated Asset Value (RAV). RAV is an equivalent measure to the Australian RAB. The UK has a similar regulatory system to Australia and most of the necessary information for comparison is readily available.

The three variable UK RAV Model was found to predict the RAVs of UK distributors with essentially the same degree of reliability as the Australian RAB Model forecast the RABs of Australian privately owned distribution networks.

The Australian RAB Model was then used to forecast the RAVs of the UK distributors using purchasing power parity (PPP) values, as published by the Organisation for Economic Co-operation and Development (OECD). The Australian RAB Model was found to forecast the UK RAVs with accuracy equal to that of the UK RAV Model (see chart 3 in the appendix).

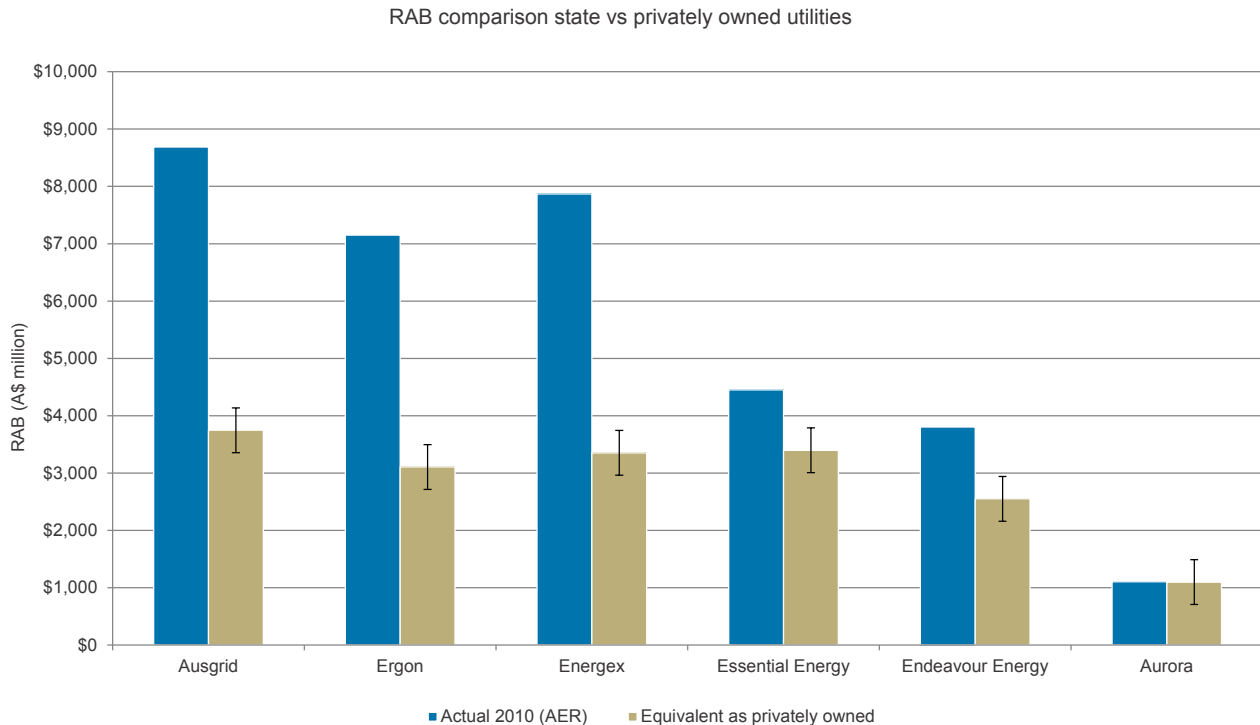
**This is a striking result which not only demonstrates that the top down approach to bench marking allows meaningful comparisons widely different networks, it also strongly suggests that the capital efficiency of network investment in private sector owned UK and Australian electricity distribution networks is effectively identical.**

This conclusion is at variance to the findings of Mountain<sup>4</sup>, referenced in the Productivity Commission Draft Report, who claims that both Australian publicly owned and privately owned distribution networks are relatively inefficient in comparison to the UK. However, we believe that Mountain did not adequately consider the impact of peak demand on network investment. Networks must be sized for maximum demand conditions and if all else is equal, a network with a higher peak demand will require additional network investment.

The models developed by AMP Capital, allow an estimate of the individual contribution to the asset base of each of the three network descriptors. The Australian RAB Model indicated that peak demand accounted for around 50% of a network's RAB (see chart 2 in the appendix), whilst the UK RAV Model indicated that peak demand in the UK accounts for only around 20% of RAV (see chart 4 in the appendix). Therefore, if the impact of differences in peak demand on network investment is ignored, a comparison between the two countries' networks would skew the results, implying that Australian networks had excessive investment.

<sup>4</sup> Australia's Rising Electricity Prices and Declining Productivity: the Contribution of its Electricity Distributors.; B Mountain 2011.

We then applied our Australian RAB Model to predict the a comparable RAB for Australian state-owned utilities. The results are illustrated in the following graph which shows the current actual RAB versus that forecast by the model for private sector owned utilities. The standard error associated with each estimate is also shown (black bars).



This comparison suggests that only one of the state-owned utilities, Aurora energy in Tasmania, has a comparable capital investment efficiency as the private sector owned utilities in Australia and hence, by inference, the UK.

The RABs of Essential Energy and Endeavour Energy lie between 2.5 and 3 standard errors higher than the model estimate. That is, there is less than a 5% probability that the difference between actual and forecast RABs happens by chance.

In the cases of Ausgrid in New South Wales and Energex and Ergon in Queensland, the actual RABs are more than double that forecast from the benchmarking studies. More significantly, the differences are more than 5 standard errors from the model forecast. This means the difference in investment levels is both large and real with a vanishingly small probability that it has happened by chance.

**This leads to the conclusion that these networks have been subject to systematic over-investment. Such large discrepancies could only arise if this behaviour was consistent over an extended period. This over investment has made significant contribution to recent retail electricity price rises.**

### 3 Regulatory design impacts on investment incentives

Our modelling raises the question as to why there are such vastly different investment outcomes between public and private sector owned distribution networks.

It should be remembered that the basic regulatory model, used in both Australia and the United Kingdom, was developed in the United Kingdom in response to the privatisation of a large number of public utilities. However, it has been applied, without differentiation, to an Australian utility sector in which public and private ownership co-exist. Implicitly, therefore, the regulatory design assumes that investment incentives are the same under both public and private ownership. However, as demonstrated in Section 2, the incentive for capital investment appears to be much stronger under public ownership.

An examination of the standard regulatory model, applicable to almost all Australian utilities, shows how differences in investment incentives may arise. The model tacitly assumes that business risks are “ring fenced” and remain within the business unit. The Capital Assets Pricing Model (CAPM) is used to price equity on this basis, while debt is added to

reduce the Weighted Average Cost of Capital (WACC) to a level consistent with the utility achieving a minimum BBB-, or investment grade status.

Private sector owned utilities raise capital from both debt and equity markets, in a manner consistent with the assumptions underlying the regulatory model. They are, therefore, subject to all the capital market disciplines that this implies. The benchmarking evidence, presented in Section 2, suggests that these disciplines have produced a markedly similar level of capital efficiency in privately owned distribution utilities both in the UK and Australia.

In contrast, Australian state owned utilities are not subject to the same capital disciplines as the private sector. For example, the state owned companies obtain an advantage from having access to cheaper debt. Capital for funding network expansion of state owned utilities is raised by retaining some of the business' cash flow and by the issuing of government-guaranteed bonds. Rather than being "ring fenced" in the business unit, both debt and equity risks are effectively socialised over the broad state-wide tax payer base.

The NSW state government, for example, has a AAA credit rating. This provides an immediate arbitrage opportunity between the BBB- debt margins, upon which the regulated returns are based and the AAA margins that the state pays on its general purpose bonds.

The main control on state borrowings is provided by ratings agencies, who may downgrade a state's credit rating in the face of excessive borrowing. However, unlike most government services, utilities produce strong and reliable cash flows which are independent of market cycles, unlike payroll taxes and stamp duties. We would expect that utility cash flows would be favourably considered by ratings agencies and may even allow increased borrowings for other activities.

In addition, state owned utilities do not pay federal income tax. Rather, they pay a notional income tax to the state under the National Tax Equivalent Regime (NTER). This payment is generally of the same order of magnitude as dividend payments generated by the regulation process. That is, this payment by itself effectively doubles the states' return from the utilities and represents a major windfall to the states.

State governments therefore receive not only the regulated return on assets, but the debt arbitrage plus and the tax equivalent payments. They effectively are able to "triple dip" from their ownership of the electricity poles and wires businesses.

In addition, if externalities are ignored, the apparent financing cost of capital investment by state utilities is relatively low. Capital market disciplines effectively cap gearing in private sector-owned utilities to around 60% to 65%, broadly in line with regulatory expectations<sup>5</sup>. Any significant capital programme may well require an equity injection from shareholders. In contrast, benefiting from the state government debt guarantee, Ausgrid is geared to about 80%<sup>6</sup>. This means that the equity contribution for new capital expenditure is only half that assumed by the regulator and can usually be provided from the utility cash flows, before dividends. Coupled with the favourable tax treatment and the lower cost of debt, this means that the effective WACC for new capital programmes is about two thirds of the cost to the private sector<sup>7</sup>.

Although a state government does not have day-to-day control of its utilities, it exerts shareholder control and can effectively influence behaviour by demanding higher levels of dividends. In the absence of effective capital rationing, management can meet these demands most easily by maximising the capital spend, rather than implementing the degree of operational reform that would be necessary in an private sector-owned utility. A strategy of maximising the RAB also has the advantage of "locking in" future returns, while an operator can only keep operational efficiency gains for five years under the regulatory arrangements.

These factors strongly incentivise a state-owned utility to over-invest in their networks, as:

- > Dividends increase in proportion to the asset base;
- > The value of the borrowing cost arbitrage also increases as more capital is invested;
- > The apparent cost of expansion is relatively low due to the benefit from the state government debt guarantee;
- > Income tax payments to state governments generally will increase in proportion to the regulated return on equity dividend payments; and
- > The very strong resulting cash flows may materially assist the state's credit rating.

<sup>5</sup> DUET Annual Report 2011.

<sup>6</sup> Ausgrid Annual Report 2011

<sup>7</sup> AMP Capital Calculations



While over-investment generates valuable long term cash flows for state governments, its consequences are damaging to the wider economy<sup>8</sup> as discussed in the Productivity Commission's own paper Public Infrastructure Financing: An International Perspective, 2009. By definition, the marginal benefit to cost ratio of excess investment will be low. Given the scale of the potential over-investment revealed above, large amounts of capital have been diverted from areas where the money could be better spent, and the cost of production unnecessarily inflated, in turn reducing economic growth.

This analysis also explains one of the main reasons why state governments have been slow to privatise their utilities. These businesses provide large and reliable revenues for cash strapped state governments. Only now, when the consumer backlash from price increases has reached a level that has required investigation by the Productivity Commission, are any changes in the rules being contemplated by the Australian Energy Market Commission (AEMC) – and yet the demands for greater powers for the AER do not appear to address the fundamental issue of the inappropriate incentives for over investment by state owned electricity distributors.

Given the nature of these incentives, we would expect that this issue is not just limited to electricity distribution companies but would be a common issue across all state utilities.

**In hindsight, over-investment by state-owned utilities seems to be an inevitable consequence of the failure to recognise how the difference in ownership structure impinges on corporate behaviour when setting up the original regulatory framework.**

## 4 The way forward

The Draft Report recognises “the conflicting mix of state government influences on their corporations” and recommends that all state owned network businesses be privatised as a consequence.

We believe that, unless there is a fundamental change in the basis of regulation, state governments will be very reluctant to privatise their utilities. Under the current regulatory design, the private sector could only value the utilities on the basis of their regulated returns. The additional windfall gains associated with state ownership mean that the value to the states of retaining ownership is likely to be much greater than they could realise from a sale process.

If state governments do not agree to privatisation, the Draft Report offers some recommendations for improved governance. While worthy in themselves, we believe that these initiatives would be insufficient to prevent the worst excesses of state ownership.

We suggest that a necessary pre-condition for any privatisation would be to place state and private sector ownership on a truly level playing field. If this condition is met, the political risk of retaining state ownership may well convince state governments to privatise these utilities.

To achieve a level playing field, regulation should recognise how the differences in ownership structure influence behaviour.

For a start, rather than ensuring competitive neutrality, the NTER arrangements effectively tilt the playing field strongly towards state ownership. This incentive would be removed if the current tax payment to the state counted as part of the regulated return-on-equity. This could be achieved by setting the WACC for state-owned utilities on a tax-free rather than post-tax basis.

Similarly, if state governments are to continue funding state utilities by issuing general purpose bonds, the cost of debt used in the WACC calculation should reflect government bond rates. This would remove the current arbitrage and reduce, but not eliminate, the incentives for over-investment. Government underwriting of the business risk would remain, permitting excessive levels of gearing. This, in turn, would reduce the WACC associated with new investment relative to the private sector.

A possible alternative would be for the state governments to raise BBB- rated special purpose bonds for the capital requirements of their utilities, with coupon payments entirely limited to the utility cash flows. This would impose a highly desirable degree of capital market discipline on the utilities. This would also discourage over-gearing of publicly-owned utilities.

Collectively, we believe these changes would remove most of the misaligned investment incentives which currently exist between the public and privately owned utilities.

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<sup>8</sup> Public Infrastructure Financing: An International Perspective, 2009. Productivity Commission

In contrast, the success of current regulatory rules, when applied to private sector owned utilities, shows that unilateral changes to these rules are unnecessary. The changes proposed by the AER (and outlined in the Draft Report) may actually have unintended consequences and the unwanted outcome of reducing private sector confidence in the sector – as they could adversely impact privately owned networks while being relatively ineffective in controlling publicly owned networks.

AMP Capital would suggest that correcting the regulatory model along the lines suggested in this paper would be far more effective in controlling over-investment than in increasing the regulator’s powers. With these suggested changes, the regulator’s existing powers, as demonstrated by the discipline exhibited by private sector owned utilities, are more than adequate to provide effective regulation.

We would welcome the opportunity to discuss our proposals in more depth and provide any further support should a review of the regulator’s existing powers take place.

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## Appendix: Benchmarking utility capital efficiency - electricity distributors

### A1: Capital utilisation of Australian private sector owned utilities

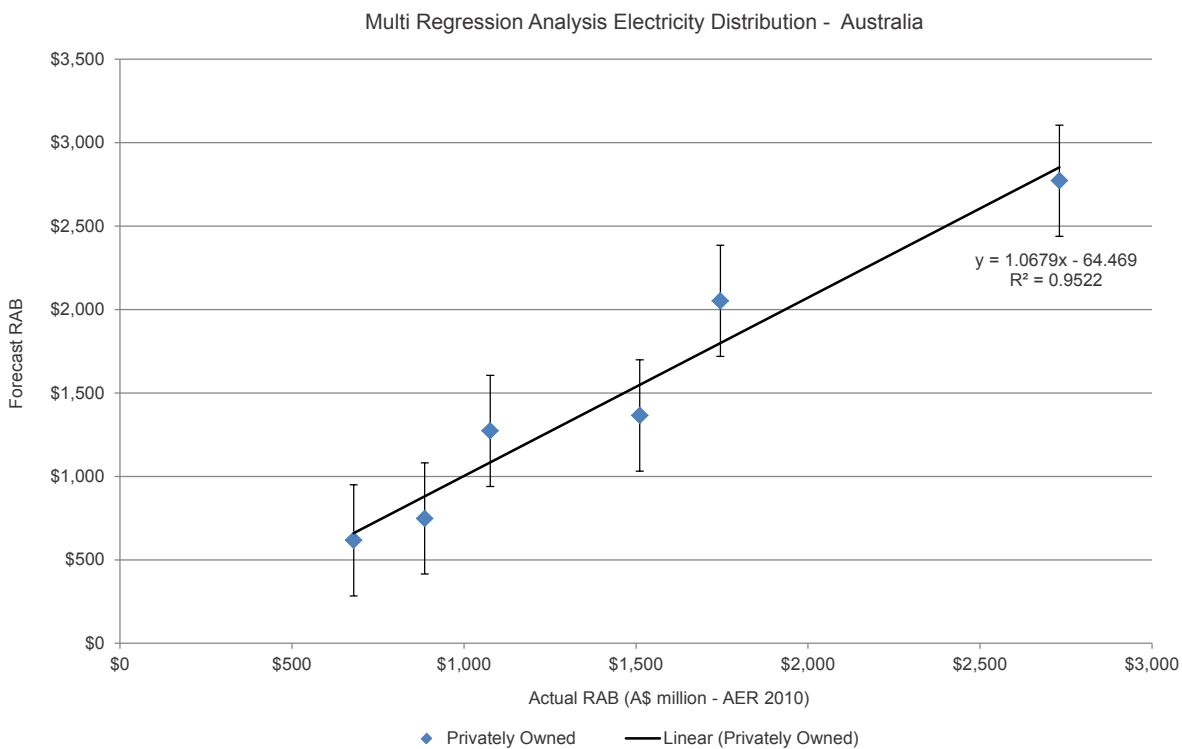
Our developed benchmark model forecasts an electricity distribution company's Regulated Asset Base (RAB) (the Australian RAB Model) and uses the following three key network descriptors:

- > customer number / number of connections;
- > network length, and;
- > peak network demand.

The model was calibrated using Australian private sector owned distributors using multi-regression analysis. Data was obtained from the AER Website.

The model forecasts the RAB of Australian private sector owned networks with a high degree of reliability (ie a linear regression  $R^2 > 0.95$ ) and a standard error of A\$270 million, see chart 1. The following chart plots the actual RABs against forecast RABs from our Australian RAB Model, together with the calculated standard error.

**Chart 1:**

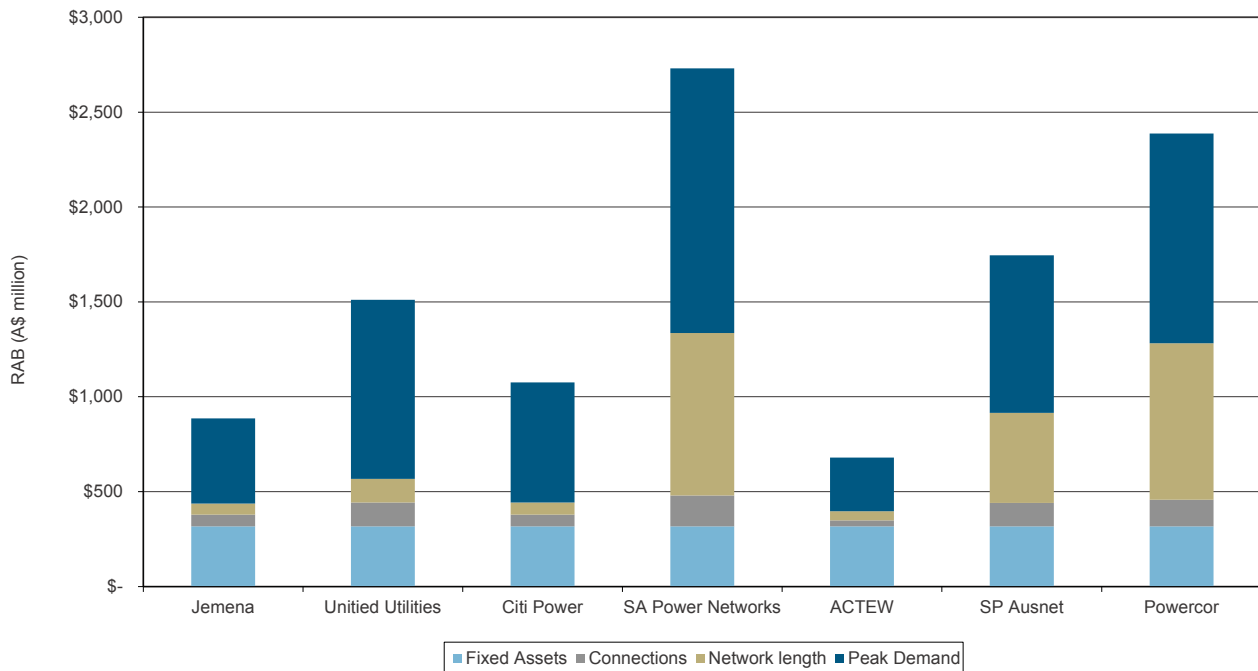


The results indicate that the three variable model could explain 95% of the actual RAB of Australian private sector owned utilities. This is considered to be very satisfactory.

The analysis was also used to forecast the contribution to RAB from each of the three variables plus a constant term, which is treated as fixed assets. This is illustrated in the graph below.

Chart 2:

Contributions to RAB - Australian Privately Owned Networks



The largest single driver of investment can be seen to be peak demand which, ranged from about 30% of the RAB in the case of ACTEW to more than 60% for United Utilities. The large leverage of peak demand to RAB is consistent with claims by network operators. The second largest component of RAB relates to network length, ranging from <10% for Citi Power and ACTEW to almost 40% for Powercor, with country networks having a higher exposure.

This demonstrates that the simple three variable model could accurately forecast the RAB of networks with widely divergent characteristics.

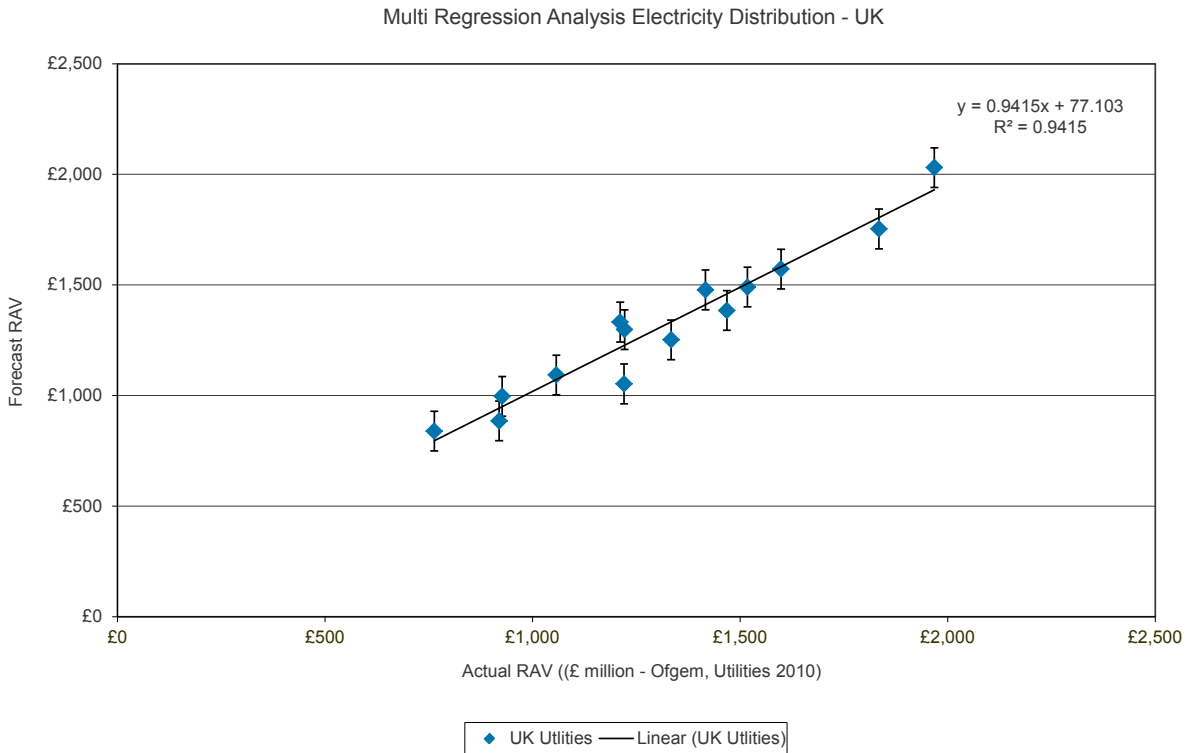
## A2: Capital utilisation of United Kingdom private sector owned utilities

The picture is a bit more complicated in the UK. Consolidation has meant that the original 14 networks privatised are now operated by only six parties. These consolidated networks are typically much larger in terms of their asset base than Australian networks.

However, the UK regulator (Ofgem) still requires reporting on the basis of the original 14 networks, so it is still possible to separately assess their individual capital utilisation.

A similar multi-regression analysis (UK RAV Model) was run on these 14 networks against connections, network length and peak demand with the results shown in the following graph. Data was sourced from Ofgem and individual company websites. There were some discrepancies between sources but these are not considered to greatly influence the results.

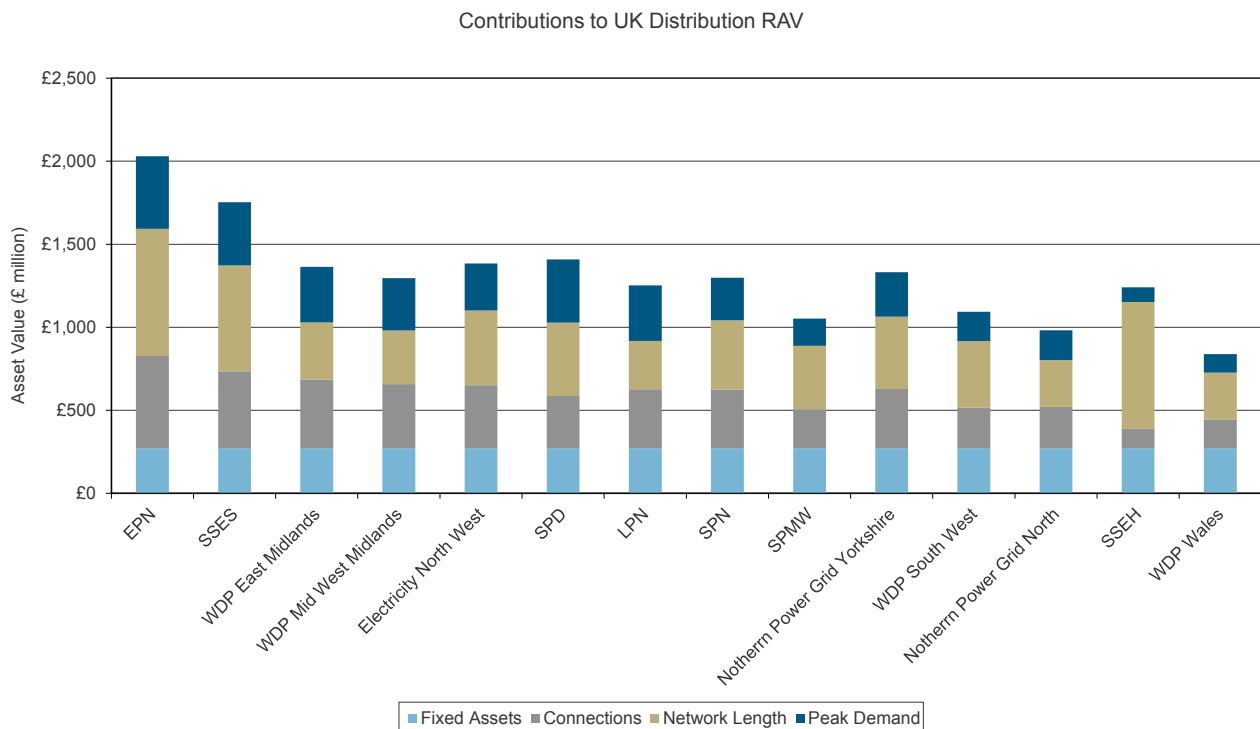
Chart 3:



The model was shown to be capable of accounting for 94% of the UK utility RAV, with a standard error of £95 million, ie essentially the same degree of reliability as found in Australia.

Additionally, the individual contributions of the three variables to network RAV were also assessed as is shown in the following graph.

Chart 4:



In all cases, the contribution of peak demand to RAV is less than 30%. The low contribution of peak demand to RAV is in marked contrast to the Australian utilities studied. This is consistent with the mild UK summer weather patterns and a high reliance on gas for space heating during winter<sup>1</sup>

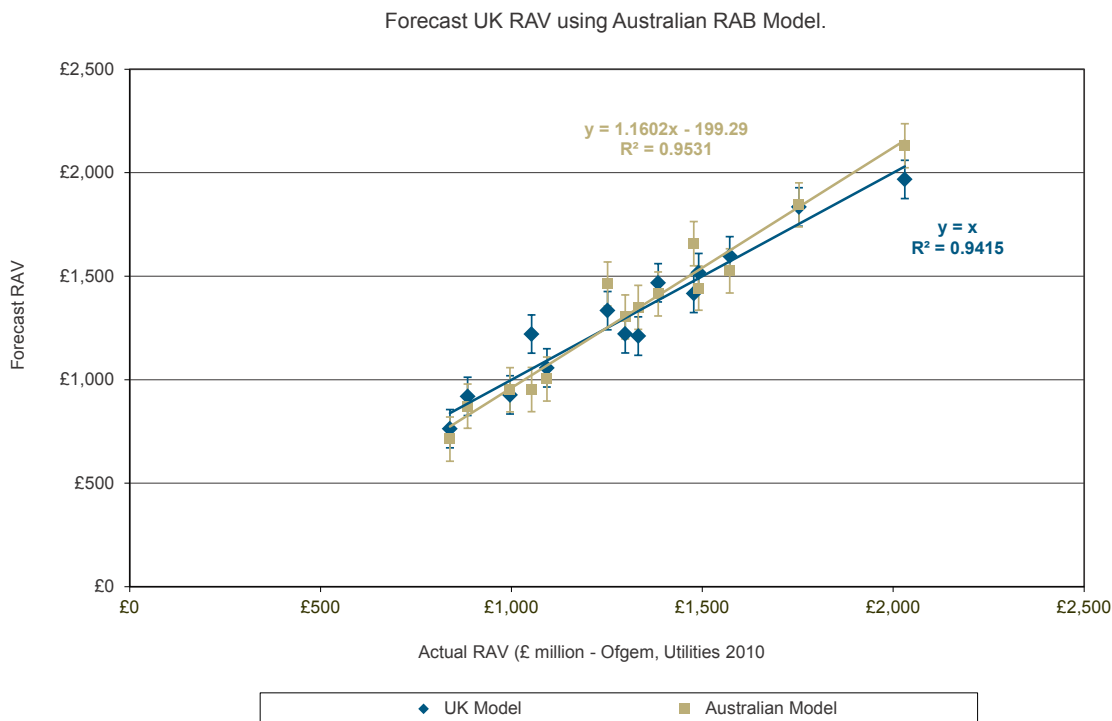
This means that if only the number of connections, or network length were considered, the UK networks would appear to have a lower level of investment than Australian privately owned networks. This appears to be a shortcoming with previous benchmarking studies submitted to the Productivity Commission.

### A3: Relative investment efficiency - UK versus Australia

To test the relative efficiency of privately owned Australian networks, the Australian RAB Model was used to forecast the RAV levels of UK utilities using an average purchasing power parity ratio, calculated from historic data dating back to 2003 provided by OECD<sup>2</sup>.

The results, including the standard error, are shown in the following graph.

**Chart 5:**



The results indicate that the model calibrated from Australian utilities proved equally reliable in forecasting UK utility RAVs to a model calibrated from UK utilities.

Essentially, this both confirms the generally applicableness of the Australian RAB Model and means that there is no significant difference between the capital efficiency of investment in UK and Australian private sector owned electricity distribution networks.

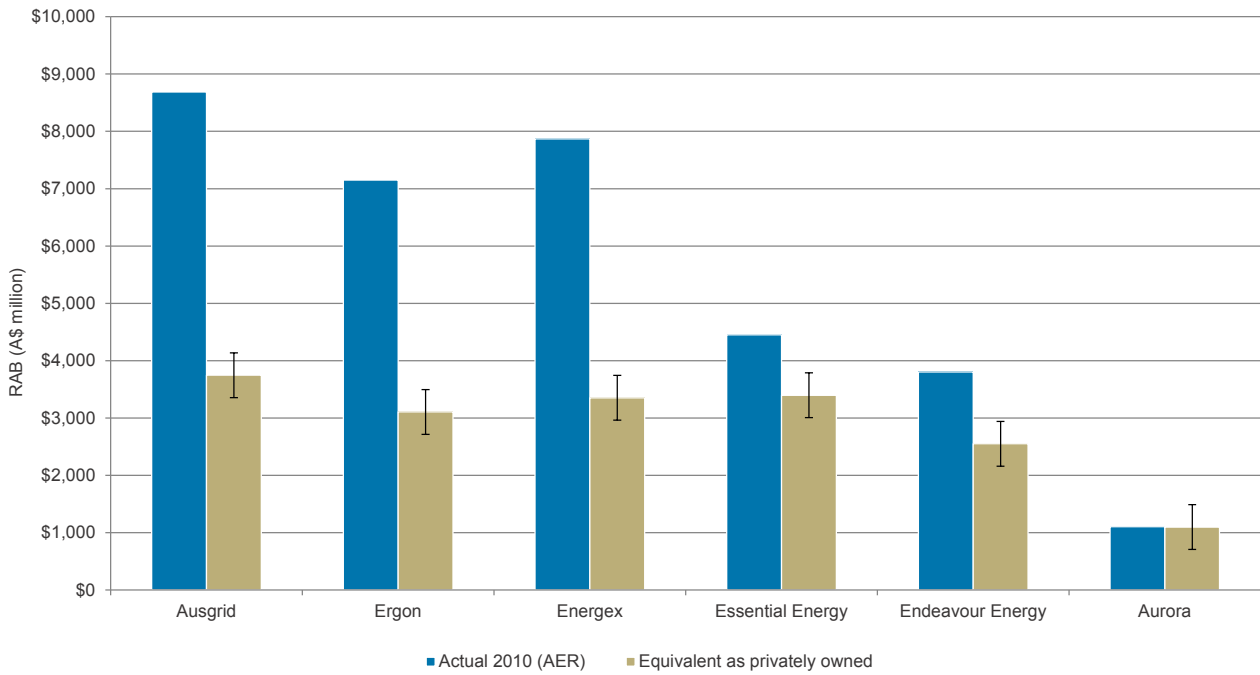
### A4: Relative investment efficiency – Australian State Versus Privately Owned Networks

We then applied our Australian RAB Model to predict the a comparable RAB for Australian state-owned utilities. The results are illustrated in the following graph which shows the current actual RAB versus that forecast by the model for private sector owned utilities. The standard error associated with each estimate is also shown (black bars).

<sup>1</sup> Estimates of heat use in the United Kingdom; Department of Energy and Climate Change; July 2011

<sup>2</sup> Dataset: 4. PPPs and exchange rates; OECD

RAB comparison state vs privately owned utilities



This comparison suggests that only one of the state-owned utilities, Aurora energy in Tasmania, has a comparable capital investment efficiency as the private sector owned utilities in Australia and hence, by inference, the UK.

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