City of Greater Bendigo

National Electricity Equity (Business) Project

Summary Report

July 2007
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Contents

Disclaimer

Inherent Limitations

Section 1.1 to this report outlines its basis of preparation. The procedures outlined in Section 1.1 do not constitute an audit. The findings in this report reflect a perception of electricity network costs incurred by businesses, but only to the extent of the sample surveyed, being the representative sample approved by the City of Greater Bendigo. Any projection to the wider population of businesses as a whole is subject to the level of bias in the method of sample selection.

No warranty of completeness, accuracy or reliability is given in relation to the statements and representations made by, and the information and documentation provided by the stakeholders consulted as part of the process.

KPMG has indicated within this report the sources of the information provided. We have not sought to independently verify those sources unless otherwise noted within the report.

KPMG is under no obligation in any circumstance to update this report, in either oral or written form, for events occurring after the report has been issued in final form.

The findings in this report have been formed on the above basis.

Third Party Reliance

This report is solely for the purpose set out in the Introduction to this report and for City of Greater Bendigo's information. This report has been prepared at the request of City of Greater Bendigo in accordance with the terms of KPMG's contract dated 2 November 2006. Other than our responsibility to the City of Greater Bendigo, neither KPMG nor any member or employee of KPMG undertakes responsibility arising in any way from reliance placed by a third party on this report. Any reliance placed is that party's sole responsibility.

1 Introduction

1.1 Scope – terms of reference

The Bendigo Manufacturing Group and the City of Greater Bendigo have campaigned for equity in network charges for non-metropolitan distribution regions since 2001. Historically, this work originated from the concerns of businesses located in regional Victoria (for example see "Central Victorian Demand Tariff Energy Project"[1]).

The Bendigo Manufacturing Group and the City of Greater Bendigo believe that electricity network cost differentials are a national issue. Not only are regional businesses at risk, but many businesses that invest in regional Australia operate nationally, not separately in individual jurisdictions.

Also, recent changes in jurisdiction, such as the establishment of the Australian Energy Market Commission ("AEMC") and the Australian Energy Regulator ("AER"), and recent endorsements of the Australian Energy Market Agreement ("AEMA") by the Commonwealth and Jurisdictions and Territories, seek to provide a national framework for energy market regulation. Accordingly, the Bendigo Manufacturing Council and the City of Greater Bendigo:

- seek to pursue these issues on a national not a local basis; and
- have obtained funding from the National Consumer's Electricity Advocacy Panel to undertake a project with an objective of effecting change to reduce the differentials between regional and metropolitan electricity costs and their inhibiting effects on regional economic development.

To assist with these objectives, the City of Greater Bendigo has engaged KPMG to provide it with an independent report that, among other things:

- validates details of the impact of the cessation of network subsidies or rebates or related schemes, on regional large business customers;
- validates details of the current inequities in network costs (including loss factors) for large business electricity consumers based in regional areas, compared to metropolitan distribution areas;
- sets out reasons for and against the establishment of an ongoing network subsidy/rebate scheme within the NEM to address the differentials in network costs between regional and metropolitan electricity consumers; and
- develops a strategy and policy for the provision of an ongoing network subsidy/rebate scheme in the context of economic development for Australia's regional areas.

[1] Central Victorian Demand Tariff Energy Project City of Greater Bendigo, September 2005
http://www.bendigo.vic.gov.au/Page/Page.asp?Page_Id=1194

This discussion paper summarises the key features and findings of that report in relation to these matters.

2 Findings

2.1 Regional network customers bear higher prices

Since the early 1990s and the introduction of National Competition Policy, Australia's electricity supply industry has undergone significant reform. This has resulted in formerly vertically integrated, state-based electricity supply industries being disaggregated to allow competition in the retail and generation sectors and to provide economically efficient pricing and access to monopoly networks such as electricity transmission and distribution.

Since the introduction of the National Electricity Code (now the National Electricity Rules) in 1998, electricity network pricing in the National Electricity Market (the NEM) has been governed by a single set of rules intended to provide prices that replicate the outcomes of efficient competitive markets. Consequently, electricity network pricing has become increasingly reflective of efficient cost. This is intended to both provide efficient prices for customers and meet the costs of and stimulate appropriate network investment by network owners. However, greater investment and costs are generally required to build and maintain extended rural and regional electricity networks, which serve a less dense population of customers than metropolitan networks. Accordingly, relatively high costs are allocated to relatively few, regional and rural customers. As a result, they generally bear higher network prices than their metropolitan counterparts.

However, regional business customers may not be in a practical position to manage these cost differentials where:

- they may be unable to pass through increased costs where their markets are also served by competitors located outside of regional Australia; and

- it may be impractical or damaging to the regional social structure for businesses to move to lower cost locations.

Both of these outcomes are likely to have adverse local economic impacts which may be exacerbated in regional economies that may be more sensitive to and less able to deal with, the effects of relatively small reductions in investment, than metropolitan areas.

The following examples illustrate the differentials in electricity network prices for business customers within a range of jurisdictions in the National Electricity Market[2]. These examples draw on data for actual regional customers selected at random from the sample of customers that contributed data to this report.

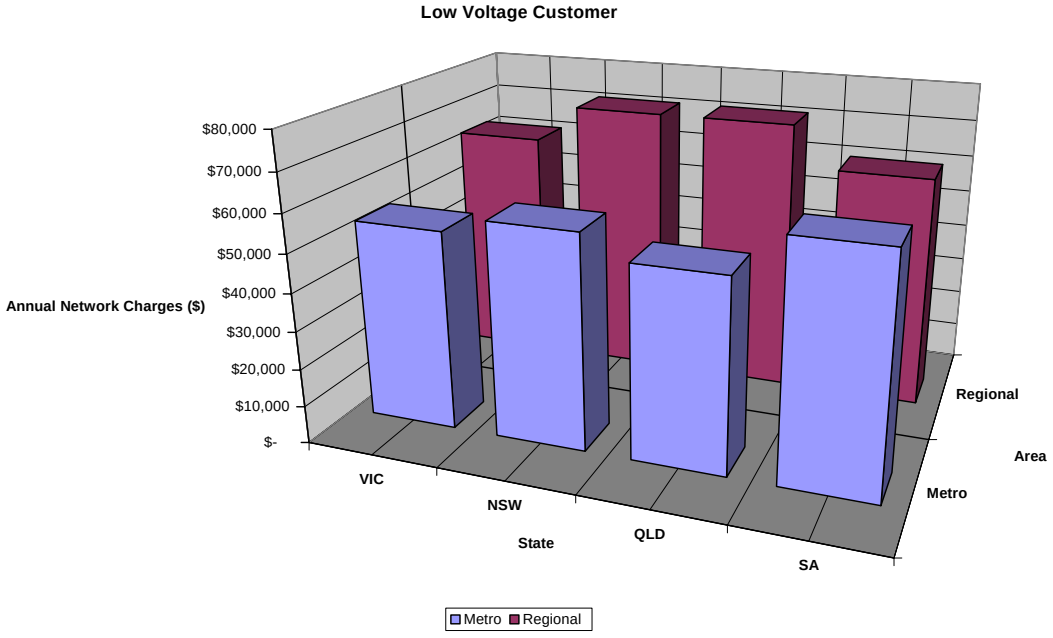
We also emphasise that benefits to customers comprise both price and service and that service standards for regional networks tend to be more difficult to maintain than for metropolitan networks. Therefore the differentials in net customer outcomes are likely to be greater than just the price differences illustrated below.

[2] The ACT and Tasmania are not included in these illustrations. South Australia, a single distribution network, operates throughout the jurisdiction, thus obviating locational differences in distribution network prices.

Example 1 – Low voltage business customer

A small manufacturing business with annual electricity consumption around 1,400,000 kWh (or 1.4GWh).

Chart 2-1: Illustrative regional and metropolitan electricity network charge differentials



Regional / Metro	Annual Network Charge ($)			
	Vic	NSW	Qld	SA
Regional	63,000	73,000	73,000	62,000
Metro	53,000	57,000	51,000	62,000
Difference ($)	***10,000***	***16,000***	***22,000***	**-**
Difference (%)	***19%***	***28%***	***43%***	**-**

In this example the impact of being located in a network that serves predominantly regional rather than metropolitan, customers ranges up to $22,000 per annum or a 43 percent increase over metropolitan network tariffs.

Estimated annual network charges have been calculated by using a business' actual monthly peak consumption, off peak consumption and maximum demand data and applying applicable network tariffs assuming that the business is connected to the following networks

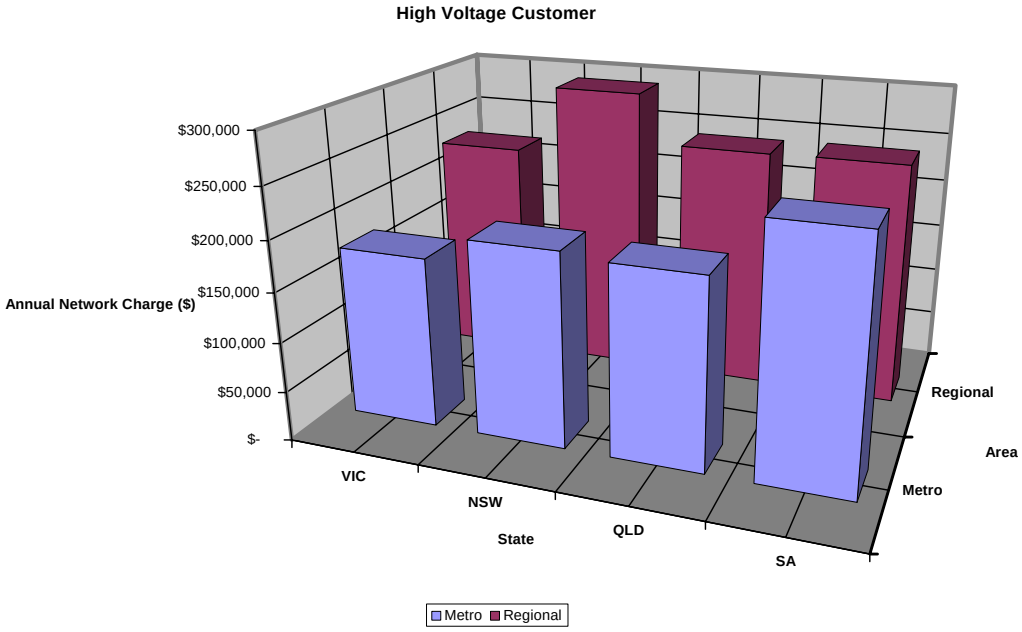
Assumed networks	Victoria	NSW	Queensland	SA
Regional network	Powercor	Country Energy	Ergon Energy	ETSA Utilities
Metropolitan network	CitiPower	Integral Energy	Energex	ETSA Utilities

Appendix A.3 provides more detail on the assumptions and calculations used to derive this example

Example 2 – High Voltage customer

A larger manufacturing business with an annual electricity consumption of around 9,000,000 kWh (or 9GWh).

Chart 2-2: Illustrative regional and metropolitan electricity network charge differentials



Regional / Metro	Annual Network Charge ($)			
	Vic	NSW	Qld	SA
Regional	226,000	296,000	246,000	247,000
Metro	172,000	196,000	191,000	247,000
Difference ($)	***54,000***	***100,000***	***55,000***	***-***
Difference (%)	***31%***	***51%***	***29%***	***0%***

In this example the impact of being located in a network that serves predominantly regional rather than metropolitan, customers ranges up to $100,000 per annum or a 51 percent increase over metropolitan network tariffs.

Estimated annual network charges have been calculated using the same approach and location assumptions as Example 1.

Several factors influence differentials in electricity network prices for specific businesses. For example load, load profile and demand, as well as location[3].

To provide broader illustrations of the differentials, this study collected network cost data from a sample of 10 metropolitan and 17 regional business locations in Victoria, New South Wales, Queensland and South Australia.

The results which are summarised in Appendix A show that rural and regional network prices in the sample are generally higher than metropolitan[4] network prices by the order of 10 percent to 40 percent, according to jurisdiction.

The sample is not of sufficient size to allow a statistical rather than an illustrative correlation of network price with location. Also, businesses generally had different load and demand characteristics, which meant that the sample does not normalise out these influences. For these reasons, we suggest that it is more meaningful to use the data to draw conclusions based on ranges rather than point estimates, of price differentials.

2.2 Locational cross subsidies are embedded in within each distribution network but they are limited

Electricity network costs are not allocated to customers on a precise geographic basis. Rather most customers of a distribution network share in costs spread over the entire network regardless of customer location ("postage stamp pricing"). While most distribution networks do not precisely match regional and metropolitan boundaries in Victoria, Queensland and NSW, they usually *broadly* align with regional and metropolitan areas, where 'metropolitan' is defined as the area within the bounds of State and Territory capital cities and their immediate surroundings. Hence while intra-network cross subsidies exist, they provide limited locational cross subsidisation in these jurisdictions.

In Victoria and Queensland in particular, other inter-network cross subsidies exist but they are unwinding.

2.3 Many regional NEM customers face greater price differentials as other cross subsidies unwind

Inter-network cross subsidies do exist in the NEM. They principally comprise:

- **Victoria's Transmission Equalisation Adjustment (TEA)** – which pre-dated the National Electricity Rules and its predecessor the National Electricity Code. Its purpose was to allow a gradual transition to more cost reflective pricing, not to permanently insulate regional and

[3] Refer to Appendix B for definitions of load, load profile and demand.
[4] By "Metropolitan", we mean within the bounds of the capital city in each State. By "Regional" we mean all other locations.

rural customers from cost reflective pricing. The TEA is being phased out over the period to 2020. Section 2.4 outlines the effect of this on regional customers in Victoria.

- **Victoria's vesting asset revaluation adjustment** – This was a one-off adjustment made at the time of reform in 1994 to mitigate price differentials between distribution areas. Its intent was for regional distribution customers to pay less than efficient economic costs indicated by the original network asset valuations at the time of reform and for metropolitan customers to pay more. The effects of this adjustment will continue to unwind as the original vesting assets are fully written down and/or replaced.

- **Queensland Community Service Obligation ("CSO") arrangements.**- Due to its exceptional length and sparse customer density, if Ergon Energy's customers face significantly higher network costs than their counterparts located in Energex's distribution area. To alleviate this, Queensland's CSO has the effect of providing an inter-network cross subsidy but does so by a CSO administered in the retail tariffs, *outside* of the regulatory framework. It has to date operated to provide a uniform retail tariff throughout Queensland that over recovers costs from Energex's customers and under recovers cost from Ergon's customers. With the impending introduction of Full Retail Competition ("FRC") to Queensland and the partial sale of the government's energy retail interests, this arrangement is likely to be revised. But how it may be structured and funded in the future is unknown to us at the time of writing.

In addition, **Victoria's Network Tariff Rebate Scheme** operates until 2008 to subsidise retail prices for small businesses and domestic customers of Powercor and SP AusNet's distribution networks. This rebate is in the form of government payment intended to alleviate the impact of small customers being exposed to cost reflective pricing following the introduction of full retail contestability.

2.4 The impact of unwinding Victoria's TEA

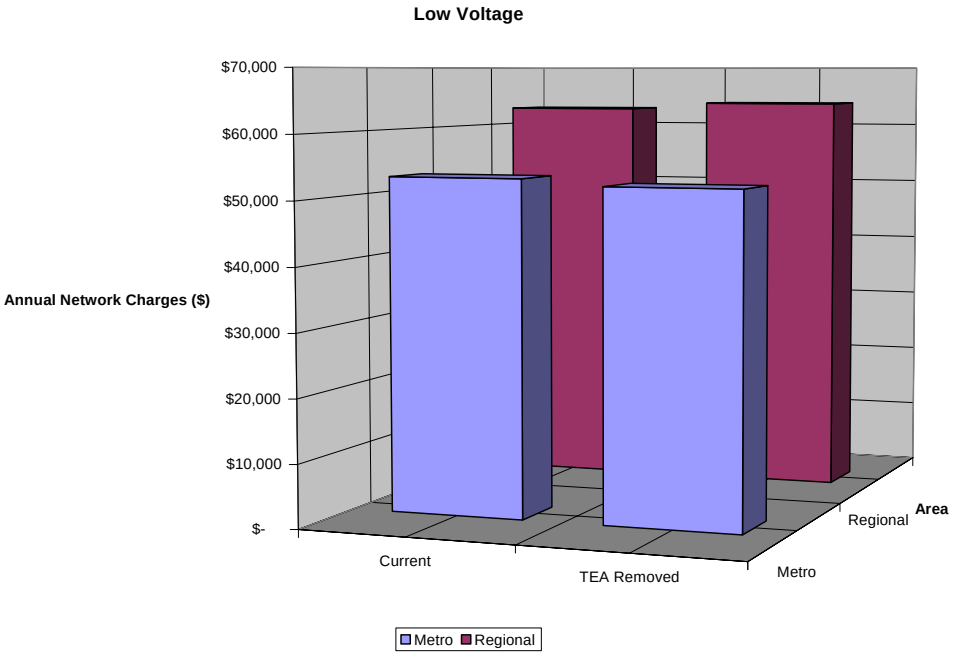
Victoria's TEA is reducing with time and expires in 2020. The following examples illustrate the dollar impact for the two illustrative customers and provided in the examples above.

We emphasise that these are illustrative examples. The specific impacts will differ for individual customers according to a range of factors, including the network they may be located in and how the distribution businesses allocate the benefits or costs of the TEA to different customer groups, in their tariff structures. Appendix A.3 summarises the other assumptions we have used and explains why the costs and benefits in the examples below are not necessarily equal.

Example 3 – Low voltage business customer

A small manufacturing business with annual electricity consumption around 1,400,000 kWh

Chart 2-3: Removal of TEA – illustrative impact on annual network charge



Regional / Metro	Annual Network Charge ($)		
	Current	Without TEA	Difference
Regional	63,000	64,000	*1,000*
Metro	53,000	52,000	*(1000)*
Difference ($)	***10,000***	***12,000***	***2,000***
Difference (%)	***19%***	***23%***	***4%***

For example, regional Victorian business located within Powercor's distribution area:

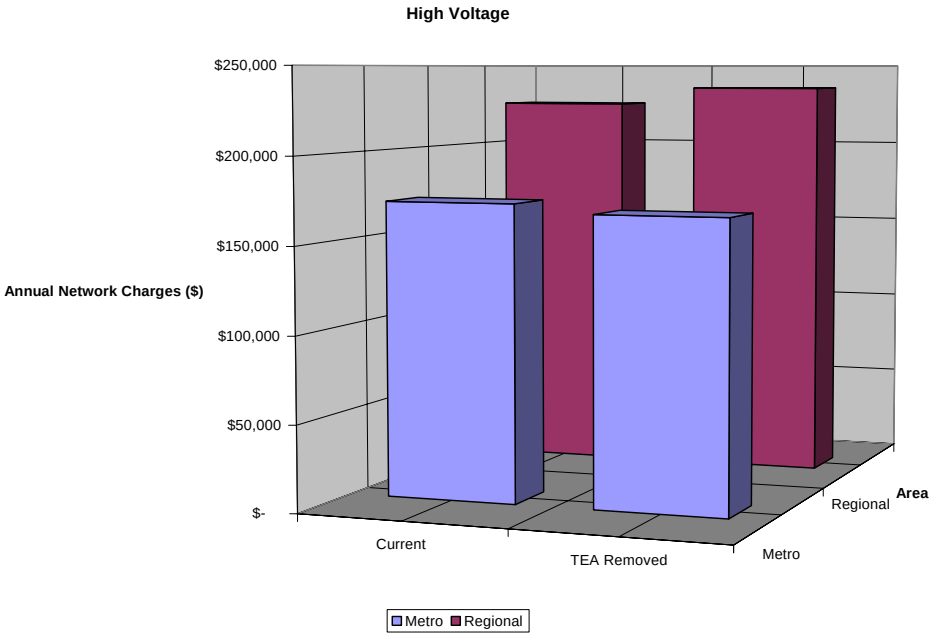
- the removal of the TEA is estimated to increase the annual network charge by $1,000 or 1.6 percent; and
- if that business were located in metropolitan Melbourne within Citipower's distribution area, we estimate a 1.9 percent decrease in its annual network charge of $1,000.

The differential between regional and metropolitan locations in this example is estimated to increase by a further 4 percent with the removal of the TEA.

Example 4 – High voltage business customer

A small manufacturing business with annual electricity consumption around 9,000,000 kWh

Chart 2-4: Removal of TEA – illustrative impact on annual network charge



Regional / Metro	Annual Network Charge ($)		
	Current	Without TEA	Difference
Regional	226,000	236,000	*10,000*
Metro	172,000	167,000	*(5000)*
Difference ($)	***54,000***	***69,000***	***15,000***
Difference (%)	***31%***	***41%***	***10%***

For example, regional Victorian business located within Powercor's distribution area:

- the removal of the TEA is estimated to increase the annual network charge by $10,000 or 4.4 percent; and
- if that business were located in metropolitan Melbourne within Citipower's distribution area, we estimate a 2.9 percent decrease in its annual network charge of $5,000.

The differential between regional and metropolitan locations in this example is estimated to increase by a further 10 percent with the removal of the TEA.

2.5 Line losses and emerging regional pricing issues

The different physical characteristics of regional and metropolitan networks lead to customers served by extended regional networks generally incurring greater costs of "line losses" than their metropolitan counterparts. These costs arise because a proportion of the power fed into a network is generally dissipated by resistance losses. More extended networks necessary to serve regional areas, tend to have greater line losses. While the costs of line losses are passed through to customers in their energy charges, theses costs are nonetheless closely related to network geography.

For example, differentials in distribution loss factors can lead to retail energy costs being up to about 5.4% more for regional businesses in Victoria (who are low voltage customers consuming less than 40GWh pa or with a peak demand of less than 10MW) than for comparable businesses within metropolitan-based distribution regions[5]. Customers also bear transmission loss factors which can lead to further geographic differences in retail energy costs. These differentials are additional to the differentials in network charges described above and the effect of unwinding cross subsidy schemes, such as the TEA in Victoria.

A consequence is that any general increases in energy charges may be magnified for regional customers and further increase the differentials between regional and metropolitan customers.

For example, wholesale energy prices in the NEM recently increased. This is generally considered to be attributable to the effects of the drought and the capacity of generators to access cooling water. Also, the introduction of any carbon trading system that increases energy prices by introducing a cost or carbon could increase differentials.

An illustrative example of the potential additional costs borne by regional businesses is provided below. Assume:

- that a metropolitan located business faces a general increase in energy prices of say $10 per MWh; and
- another business that is identical in all regards except that it is located in a regional area that is subject to a loss factor of say 5% greater than its metropolitan counterpart.

The consequence would be that the regional business would face a price rise of $10.50 per MWh. Accordingly if both businesses had an annual consumption of say 2,000MWh then the regional business would face an increase of $1,000 pa more than that faced by its metropolitan counterpart.

[5] Essential Services Commission of Victoria, Final Decision – Approval of Distribution Loss Factors for the 2007-08 Financial Year, April 2007.

2.6 Options for dealing with the differentials

We suggest that there are three options for regional business customers to address these differentials:

- seek change within the network pricing framework;
- change the network pricing framework; or
- seek economic support outside of the regulatory framework.

We summarise these options below.

2.6.1 Seek change within the network pricing framework

The National Electricity Rules do not accommodate inter-network cross subsidies, such as the TEA, which would run contrary to the pricing and policy principles on which they are founded. For the TEA to be prolonged or extended would appear to require a further derogation to or change in, the National Electricity Rules. These would be a challenging task requiring arguments based on principles of regulatory economics. However, it is difficult see how such an argument could be sustained and be compatible with principles of efficient cost reflective pricing.

There may be other opportunities for reducing differentials within existing networks. For example, where businesses may make greater use of local or embedded generation, they may avoid network costs. For this to be a viable option, reductions in network prices would need to be sufficiently reflective of avoided costs to provide a practical incentive for customers to invest in generation to provide cheaper overall costs of supply. But this would imply further reducing, not maintaining cross subsidies and the benefits for regional customers could be highly selective. More cost reflective prices could increase rather than reduce network differentials for regional customers who may be sited further away from sources of generation embedded or otherwise. The associated pricing issues and debate that may influence these outcomes are complex and likely to require technical support and knowledge.

2.6.2 Change the network pricing framework

The inclusion of inter network cross subsidies in the national network pricing mechanisms would require a departure from its principles of efficient cost reflectivity. This would be a fundamental change and would require significant policy reversals by COAG and reversals of approach by the Ministerial Council on Energy and the Australian Energy Markets Commission (AEMC). For these reasons, we suggest that this option is unlikely to meet the City of Greater Bendigo's objectives in the foreseeable future.

2.6.3 Seek economic support outside of the regulatory framework

The electricity network pricing mechanism and its associated regulatory framework is concerned with establishing network prices according to economic principles. Its remit does not extend to intervening in market responses to those prices.

Rather, we suggest that in practice policy and market responses to prices lie with market participants and those sectors of government responsible for those markets. For these reasons, we suggest that where arguments exist for support for specific customer groups (such as regional business customers) bodies such as the MCE and AEMC are less likely to view this as being within their remit, unless there is evidence that the economic principles that guide the price setting rules are inappropriate. This consideration and the analysis set out in this report suggest that:

- the arguments for financial support rest on financial and economic impacts on regional businesses and economies; and

- there are not strong economic arguments to suggest that setting prices that broadly based on efficient costs is an inappropriate approach, to pricing.

Accordingly, support to assist regional business customers to respond to cost and pricing differentials is more likely to be successfully sought from outside, than within, the regulatory price setting mechanism.

Further support for this conclusion is promoted by our analysis of the precedents for inter network cross subsidies summarised at Section 2.3:

- we have explained above that the TEA predates and is only accommodated by the National Electricity Rules, by a derogation. An extension of the TEA does not appear to be an option under the current pricing framework;

- the vesting asset adjustment was made by the Victorian government at the time of industry reform. Because the Victorian networks are no longer owned by government, its maintenance or reinstatement is no longer a relevant option in Victoria; and

- the distribution networks in NSW are still owned by government, which could in principle write down asset values to reduce costs and prices to customers of regional networks. However, this would require government as the shareholder, to permanently forego significant revenues, from tariffs or if networks were to be subsequently sold, from sale proceeds.

  This would have the same effect as government providing a CSO except that it would not be focused on specific customer groups within a network. However, if an asset write down was significant, it would put at risk the network's capability to generate sufficient revenue to meet the costs of asset replacement and ongoing network investment. This could lead to a long-term decline of the network and its service standards. Furthermore, it is unlikely that under the National Electricity Rules a regulator would allow government to cross subsidise such an adjustment by writing up asset values in other government owned networks to recover amounts greater than efficient cost, from the customers of those networks.

This leaves the Queensland CSO and Victoria's Network Tariff Rebate schemes as relevant precedents.

Both of these mechanisms are CSOs that operate outside of, and are not dependent on, the regulatory network pricing framework. While the Queensland CSOs' historic implementation has been criticised because of its distortionary effects on efficient retail pricing, there is a wide variety of mechanisms by which a CSO could be implemented, which do not necessarily distort competitive prices.

On the basis of these considerations, our main report outlines a Regional Network Fund ("RNF") which could allocate regional development assistance from government to offset the adverse regional effects of network pricing disparities. Potentially, the RNF could provide payment in two forms:

- one-off contributions to network expenditure that improve regional customer outcomes; and

- tariff support payments to offset the differential in regional and metropolitan network supply costs.

We suggest that government support would be justified in terms of the positive regional economic impacts, avoided costs, or social and environmental benefits. The case for tariff support may be best made in the context that this may be part of a wider parcel of higher costs that regionally located businesses may face.

This would provide a business case and justification for support that would be in the public interest and provide a net sum gain to the economy, but without directly imposing additional costs on other customer groups.

We also observe that a key economic development strategy for many regional municipalities is to focus on business retention and attraction. In addition, State Governments have a range of strategies to grow regional areas and their economies. However, it is not a role of the current model of economic regulation of electricity networks to address such development and attraction strategies or to address broader regional economy wide impacts and social costs. Indeed the emphasis economic regulation places on network cost reflective pricing may create imperatives for additional regional economic development support where these costs may have broader impacts that could be adverse to regional economic development policy.

This suggests that:

- Governments may need to be cognisant of the network price differentials between regional and metropolitan areas in developing regional economic and social development policies or programs; and

- the regulatory framework needs to focus on developing network prices that provide incentives for appropriate investment in localised, embedded generation and demand side management technologies. This could assist regional customers to manage current cost differentials which may be further accentuated by the impact of carbon pricing on energy costs.

2.7 How to move forward

The actions to progress the options outlined above by the City of Greater Bendigo or other stakeholder might include:

- starting a process of canvassing whether there may be in principle support for a Regional Network Fund from jurisdictional energy and regional development agencies in Victoria, New South Wales and Queensland. This would include establishing the information and decision criteria that governments may require to move forward;

- starting a process to canvass network businesses with regional customers in Victoria, New South Wales and Queensland, for the likely degree of support for such a scheme. Combined approaches on issues from both customers and businesses can carry significantly greater weight and influence with governments and regulators;

- undertaking further work possibly in conjunction with other local governments or stakeholders to establish the economic effects or impacts of higher regional network prices. This study and its predecessors commissioned by the City of Greater Bendigo, have established that pricing differentials exist. However, the case for support may be more robust if the economic and financial *impacts* that might justify financial or economic support can be evidenced;

- evidence of broader economic detriment from higher network prices would be especially important for any proposal for tariff support, where the financial support required may be very significant but net sum gains from specific payments more difficult to demonstrate. The benefits of network expenditure support could be evidenced by a range of case studies that might clearly demonstrate where investment in local economies has been avoided because of higher regional network infrastructure costs. We also suggest that any body of evidence of regional disadvantage should consider service standards as well as cost differentials. Reviewing prices and costs without regard to service standards holds risks of longer term service standard decline or network under investment. In the limited sample we interviewed, 30 percent of respondents indicated that a marginal increase in service standards would be more valuable than marginal reductions in price. This proportion could increase in the future if businesses continue to become more dependent on technology to be competitive and efficient; and

- developing a more detailed practical implementation outline or 'business plan' for the scheme once the body of evidence that would satisfy governments' decision criteria and the in principle support of governments and stakeholders have been established.

In the meantime, none of this activity would preclude regional business customers continuing to participate in the regulatory debate by participating in the public consultation processes run by the regulatory bodies on issues likely to affect them, including service standards, locational transmission pricing and incentives for embedded generation. These issues may be of concern to all customers but regional customers are likely to have specific interests and requirements. We suggest that, with the advent of the Australian Energy Regulator (AER), the technical substance of these processes may be no more accessible to the well informed lay person, than it has been in the past. To this end, peak bodies representing regional businesses may need to access specialist advice and support such as that facilitated by the National Electricity

Consumers Panel. This would be most effectively conducted on through pro-active planning for anticipated regulatory issues, to allow timely responses when the issues arise for public consultation.

A Quantitative data analysis

Information was collected by KPMG from a sample of 10 businesses across 27 locations in Victoria, New South Wales, Queensland and South Australia.

This Appendix sets out:

- the key findings from the quantitative analysis;
- the basis of the sample selection;
- an analysis of the sample;
- the approach to compiling the analyses;
- the basis used to compare network costs; and
- the assumptions used in the illustrative examples.

A.1 Key findings

A.1.1 Comparison of average network charges by location

Using the billing information obtained from businesses in the sample, load-weighted average network charges in cents per kWh (exclusive of GST) were calculated for each location to compare network charges across locations. Load-weighted averages have been calculated (as opposed to time-weighted averages) to allow for the differences in electricity consumption that can occur month-to-month due to a business' load profile varying throughout the year.

Table A-1 outlines for each State:

- average network charges for regional and metropolitan businesses in the sample on a cents per kWh basis; and
- the differences between the regional average network charge and metropolitan average network charge expressed in cents per kWh basis and as a percentage of the metropolitan average network charge.

By "Metropolitan", we mean within the bounds of the capital city in each State. By "Regional", we mean all other locations.

Table A-1: Average network charges – by State and Region

Regional / Metro	Average Network Charge (c/kWh)			
	Vic	NSW	Qld	SA
Regional	3.26	4.16	2.67	5.18
Metro	2.92	3.78	1.87	-
Difference (c/kWh)	*0.34*	*0.38*	*0.79*	-
Difference (%)	*12%*	*10%*	*42%*	-

Table A-1 highlights that average network charges for businesses in the sample are typically more expensive in regional locations than in metropolitan locations.

However, care has to be taken in interpreting or referring to these averages. The sample size is limited and, in addition to whether a business is located in a regional or metropolitan area, a business' average network charge is also influenced by the assets of the network the business is connected to, the network tariff structure, its load and consumption profile (primarily load factor).

There is a risk that the average differences illustrated above could reflect the impact of these other factors on the limited sample sizes rather than purely regional and metropolitan differences. Also the sample is not of sufficient size to allow a meaningful statistical correlation analysis. Therefore, we disclose in Table A-2 and Figure A-1 below the ranges of differences between metropolitan and regional areas.

There is significant variation around the average network charges calculated for a particular regional or metropolitan area. To highlight this variation, the range in average network charges calculated for businesses in particular regional and metropolitan areas is presented in the following graph to allow comparison across States.

Table A-2: Range in average network charges – by State and Region

State	Average network charge (c/kWh)				Difference between Metro and Regional			
	Metro		Regional					
	Low	High	Low	High	Low - Low	Low - High	High - Low	High - High
Vic	2.29	4.95	1.89	6.56	-17%	186%	-62%	33%
NSW	3.78	3.78	3.78	4.38	0%	16%	0%	16%
Qld	1.84	2.22	2.25	2.80	22%	52%	1%	26%
SA	5.18	5.18	-	-	-	-	-	-

Figure A-1: Range in average network charges for businesses in the sample – by State and Region

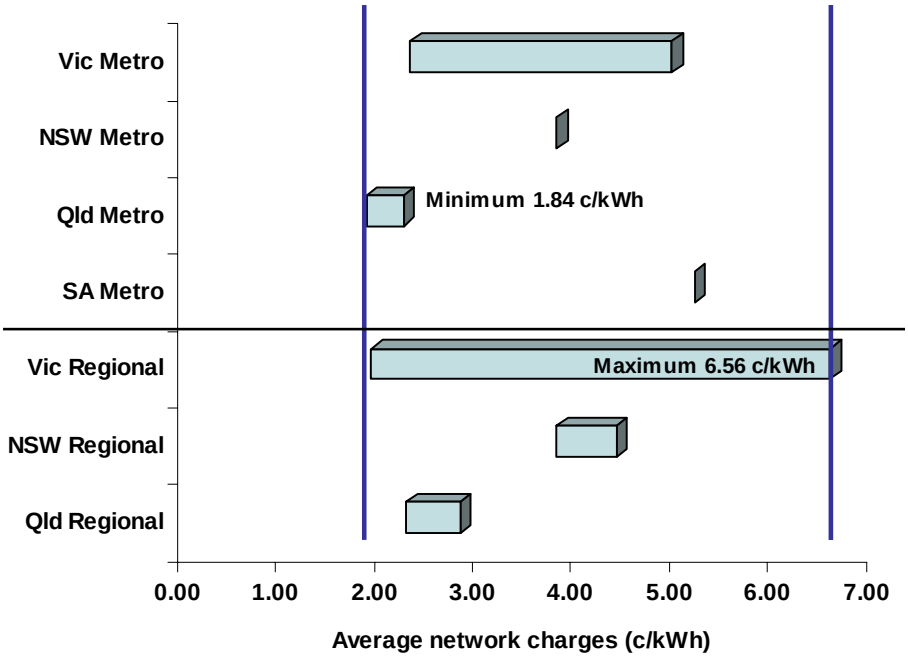


Table A-2 and Figure A-1 illustrate that:

- for NSW and Queensland the lowest regional charge was no less than or greater than the highest metropolitan charge;
- Victoria has the greatest range of metropolitan and regional prices. This may reflect the greater sample size available from that State;
- unlike the other States the Victorian sample disclosed the greatest overlap between regional and metropolitan prices. For example, only one location in the Victorian regional sample had an average price that was greater than the highest Victorian metropolitan price of 4.95 cents per kWh in the sample;
- the lowest price in the Victorian sample arose at a "regional location". However, this may not be typical of regional locations generally. We explain why below in the further commentary on each state; and
- there is only one business from South Australia in the sample. However, South Australia has only one distribution network, and therefore "postage stamp" distribution network pricing might be expected to apply regardless of metropolitan or regional location. Accordingly, the South Australian metropolitan location has a relatively high "metropolitan" network price.

We have also analysed the sample to compare the differential between "metropolitan distribution areas" and "regional distribution areas" (which does not correspond entirely to the definitions of "metropolitan" and "regional" used above) where we have assumed:

- Victoria:
  - all of Powercor and SP AusNet customers to be in a "regional distribution area";
  - all other network customers to be in a "metropolitan distribution area";
- NSW:
  - all of County Energy and Energy Australia customers to be in a "regional distribution area";
  - all Integral Energy customers to be in a "metropolitan distribution area";
- Queensland:
  - all of Ergon Energy's customers to be in a "regional distribution area"; and
  - all Energex customers to be in a "metropolitan distribution area".

On this basis, we found the following ranges of differentials in the sample.

Figure A-2: Range in average network charges for businesses in the sample – by State and Distribution area

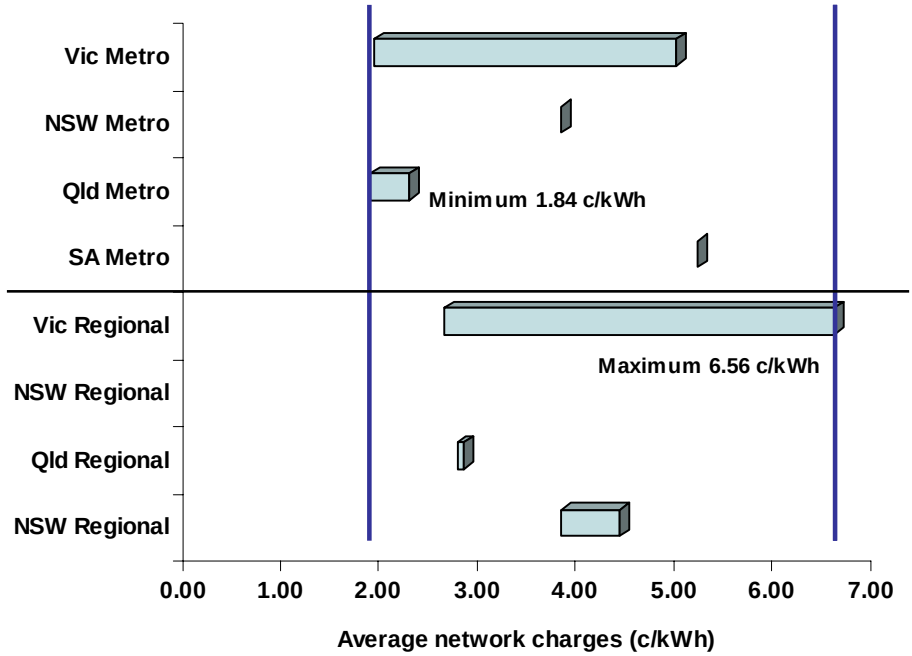


Table A-3: Range in average network charges for businesses in the sample – by State and Distribution area

State	Average network charge (c/kWh)				Difference between Metro and Regional DBs			
	Metro DB		Regional DB					
	Low	High	Low	High	Low - Low	Low - High	High - Low	High - High
Vic	1.89	4.95	2.59	6.56	37%	247%	-48%	32%
NSW	3.78	3.78	3.78	4.38	0%	16%	0%	16%
Qld	1.84	2.25	2.73	2.80	48%	52%	21%	24%
SA	5.18	5.18	-	-	-	-	-	-

We comment that:

- for NSW and SA, there is no difference from the results outlined above in Table A-3and Figure A-1;
- Victoria has the greatest range of average prices for both regional and metropolitan distribution areas and the greatest degree of overlap;
- some regional members of the Victorian sample had average prices less than metropolitan prices, although the "regional" business with the lowest price is located within a "metropolitan distribution area";

- both Queensland and NSW demonstrated more distinct differences between metropolitan distribution area and regional distribution area prices than Victoria, which became more pronounced for Queensland due to one "regional" business being located within a "metropolitan distribution area".

A.1.2 Other factors that cause variation in average network charges

Comparison of average network charges by industry sector

The differences in average network charges calculated for businesses in the sample are strongly influenced by a business' load profile and load factor, which are often related to the nature of the business and the demands it places on the network.

Table A-4 outlines the average network charges for regional and metropolitan businesses in the sample by State and Industry sector as classified by the ASX[6].

Table A-4: Average network charges – by State, Region and Industry

State	Regional / Metro	Average Network Charge (c/kWh)		
		Consumer Staples	Industrials	Materials
Vic	Total	2.72	3.86	3.56
	Regional	2.83	4.19	4.08
	Metro	2.54	3.19	3.25
	Difference (c/kWh)	*0.29*	*1.00*	*0.83*
	Difference (%)	*12%*	*31%*	*25%*
NSW	Total	4.11	-	4.24
	Regional	4.11	-	4.36
	Metro	-	-	3.78
	Difference (c/kWh)	-	-	*0.58*
	Difference (%)	-	-	*15%*
Qld	Total	2.28	-	-
	Regional	2.67	-	-
	Metro	1.87	-	-
	Difference (c/kWh)	*0.79*	-	-
	Difference (%)	*42%*	-	-
SA	Total	-	5.18	-
	Metro	-	5.18	-
	Difference (c/kWh)	-	-	-
	Difference (%)	-	-	-

As highlighted by Table A-5, industry sector and load profile can impact on a business' average network charge. We note that industry sector does not impact on the differential between regional and metropolitan average network prices, and that the different averages for regional and metropolitan businesses is a function of variability within the sample.

[6] The ASX uses the joint Standard and Poor's/Morgan Stanley Capital International Global Industry Classification Standard (GICS) to classify listed entities. GICS consists of 10 Sectors aggregated from 24 Industry Groups, 67 Industries, and 147 Sub-Industries currently covering over 27,000 companies globally.

For the Victorian businesses included in the sample, those businesses in the Consumer Staples have significantly lower average network charges in both regional and metropolitan locations than those businesses in the Industrials and Materials sectors. Low average network charges are also associated with businesses in the sample that have relatively flat consumption profiles and a high load factor, which results in more efficient use of the electricity network. In comparison, businesses in the sample that have variable consumption profiles and low load factors due to the production-cycle nature of their operations may have a less efficient use of the network.

The four Queensland businesses in the Consumer Staples sector have the lowest average network charges in the sample (for both regional and metropolitan businesses). These differences are likely to be a function of specific network tariffs negotiated by those businesses and the consumption profile for businesses in the sample.

Comparison of average network charges by level of consumption

Table A-5 outlines the average network charges for regional and metropolitan businesses in the sample by State and level of consumption on a cents per kWh basis.

Table A-5: Average network charges – by State, Region and level of consumption

State	Regional / Metro	Average Network Charge (c/kWh)			
		<1,000,000 kWh	1,000,000 - 5,000,000 kWh	5,000,000 - 10,000,000 kWh	>10,000,000 kWh
Vic	Regional	6.56	3.65	2.91	3.04
	Metro	4.95	3.00	-	2.84
	Difference (c/kWh)	*1.61*	*0.65*	-	*0.20*
	Difference (%)	*32%*	*22%*	-	*7%*
NSW	Regional	-	-	4.36	4.11
	Metro	-	3.78	-	-
	Difference (c/kWh)	-	-	-	-
	Difference (%)	-	-	-	-
Qld	Regional	-	2.55	-	2.73
	Metro	-	2.22	-	1.84
	Difference (c/kWh)	-	*0.33*	-	*0.88*
	Difference (%)	-	*15%*	-	*48%*
SA	Regional	-	-	-	-
	Metro	*5.18*	-	-	-
	Difference (c/kWh)	-	-	-	-
	Difference (%)	-	-	-	-

Data for locations outside of Victoria is limited, restricting comparison by annual consumption level to Victoria and, to a lesser extent, Queensland.

There is a general trend in the average network charges for Victorian businesses in the sample (both regional and metropolitan) to decrease as the annual consumption level increases. Further, the difference between regional and metropolitan average network charges for Victorian businesses in the sample (both regional and metropolitan) also decreases as the annual consumption level increases. This is likely to be a function of the network tariff structures for

businesses in the sample, with the larger businesses able to spread their fixed charges over larger total consumption resulting in a lower average network charge than businesses with lower annual consumption levels.

Queensland businesses in the sample have the lowest average network charges in the sample, regardless of annual consumption level. However, Queensland businesses with annual consumption greater than 10,000,000 kWh have the most significant difference between regional and metropolitan average network charges (48 percent). Again, this is likely to be a function of the customer specific network tariffs in the sample, as discussed above.

A.1.3 Impact of the Victorian Transmission Equalisation Adjustment (TEA)

The impact of the removal of the TEA on the difference between regional and metropolitan average network charges was analysed based on the 2006 Equalisation Adjustment, see Table A-6 below.

The average impact (on a cents per kWh basis) on each distribution area across all customers was assessed by referring to the:

- equalisation adjustment (dollars per annum, GST exclusive)[7]; and
- an assumption of energy consumption (kWh)[8];

for each distribution area (refer Table A-6 below).

Table A-6: Impact of Equalisation Adjustment on a cents per kWh basis (GST exclusive)

	SPI AusNet	Powercor	Alinta	CitiPower	United Energy
2006 Equalisation Adjustment	($2,963,400)	($11,406,600)	$3,102,600	$3,552,000	$7,715,400
Forecast energy consumption (GWh)	7,374	10,024	4,213	5,702	7,665
Impact (c/kWh)	-0.04	-0.11	0.07	0.06	0.10

This analysis indicates that the impact on the difference between average network charges for regional and metropolitan customers removing this adjustment would have ranged from 0.1 to 0.21 cents per kWh (being the differences between the impact on Citipower and SP AusNet and the difference between United Energy and Powercor[9] respectively).

Table A-7 shows the impact of the removal of the TEA on the difference between average network charges for regional and metropolitan businesses in the sample, using the difference between the impact for the relevant distribution areas where the businesses with lowest and highest average network charges are located.

[7] VENCorp, Electricity Transmission Use of System Prices 1 July 2006 – 30 June 2007, published 15 May 2006
[8] Essential Services Commission, 2006 Electricity Distribution Price Review
[9] Where SP AusNet and Powercor are regarded as being 'regional' and Alinta, Citipower and United Energy are regarded as being 'metropolitan'.

Table A-7: Removal of TEA – impact of difference in charges

	Average Network Charge (c/kWh)	
	Lowest	Highest
Regional (range in sample)	1.89	6.56
Metro (range in sample)	2.29	4.95
Comparison of lowest Regional to lowest Metro & highest Regional to highest Metro		
Difference between Regional and Metro (c/kWh)	*-0.40*	*1.61*
Difference between Regional and Metro (%)	*-17%*	*33%*
Estimated difference after backing out of TEA (c/kWh)	*-0.40*	*1.80*
Estimated difference after backing out of TEA (%)	*-17%*	*36%*
Comparison of lowest Regional to highest Metro & highest Regional to lowest Metro		
Difference between Regional and Metro (c/kWh)	*-3.06*	*4.27*
Difference between Regional and Metro (%)	*-62%*	*186%*
Estimated difference after backing out of TEA (c/kWh)	*-3.09*	*4.48*
Estimated difference after backing out of TEA (%)	*-62%*	*196%*

This suggests that if the TEA is completely removed, then the regional and metropolitan price differentials in the sample would increase by up to 9 percent of metropolitan network prices (on a cents per kWh basis).

We note that the TEA is an inter-network cross subsidy and can only have an impact on average network charges for businesses in different distribution areas not on regional and metropolitan businesses in the same distribution areas.

Table A-8 shows the impact on the average network charges for businesses in the sample, using the impact for the relevant distribution areas where the businesses with lowest and highest average network charges are located.

Table A-8: Removal of TEA – impact on average network charges for businesses in sample

	Average Network Charge (c/kWh)	
	Lowest	Highest
Regional (range in sample)	1.89	6.56
Metro (range in sample)	2.29	4.95
Average network charge after backing out of TEA		
Regional (range in sample)	*1.79*	*6.67*
Metro (range in sample)	*2.19*	*4.88*

A.2 Comparison of data - unit of measurement

Network charges may typically include standing charges and load and demand based charges. A load-weighted average charge in cents per kWh has been the unit of measure used to compare network charges across locations. This unit of measure has been utilised in preference to the

other bases of charge or percentage of the total electricity bill or absolute network costs due to several factors:

- firstly, average cents per kWh is broadly accepted as an appropriate basis for the comparison of network tariffs. Standing and demand based charges tend to be less significant components of many network bills;

- comparing the percentage of total electricity bill attributable to network costs does not allow a reasonable basis for comparison as this can be impacted by the retail component of a customers bill that is determined by competitive market forces; and

- it normalises the charges for differences in total consumption and thereby provides a standardised basis of comparison for businesses of different sizes, load shapes and loss factors.

Whilst loss factors do vary by location and region they are not a separately itemised component within a customers network charges on their electricity bill. Rather they are included as one of many factors used within the determination of a network tariff that is ultimately approved by the relevant regulator. Accordingly, since loss factors are but one of many factors included within the determination of a network tariff it is not appropriate to analyse the impact of the differences in loss factors by region when determining a customers average network charges.

In addition, loss factors are typically incorporated as a component within the retail charges of a customer's bill. However as this component is not regulated and subject to market forces it is not appropriate to directly compare the impact of varying loss factors on customers' average retail charges.

A.3 Illustrative examples assumptions

The following outlines the assumptions used in the calculations for the illustrative examples in section 2.

A.3.1 General assumptions

Consumption

The base cases use the actual monthly peak and off peak consumption data from November 2005 to October 2006 for two businesses in the sample located in regional Victoria. This includes one low voltage customer with annual consumption around 1,400,000 KWh and a high voltage customer with annual consumption around 9,000,000 KWh.

Annual network charges have been calculated using the base case actual monthly peak consumption, off peak consumption and maximum demand data, and applying a comparable tariff for the particular business type in each location (see description of the tariffs included below).

Peak demand and power factor

The base case (a business in the sample located in regional Victoria) has peak demand measured in terms of kW. The network owners in the jurisdictions of NSW and SA however, measure peak demand in kVA. To determine the total network charges for a business located in either of these regions, we have made an assumption about the equivalent peak demand in kW to enable meaningful comparison against the base case.

The conversion of peak demand from kVA to kW involves a power factor. This is the ratio of *real power* to *apparent power*, which measures how effectively current is converted to useful output. The power factor lies between 0 and 1, with 1 being most efficient.

For the purposes of the case study, we have assumed the business to have a power factor of 0.90.

For the purposes of the case study, we have also assumed that both the low voltage and high voltage customer operate on a consistent basis seven days per week, and therefore peak maximum demand is around the same level as off-peak demand.

A.3.2 Tariffs used in the analysis for Low Voltage business case study

The most recent applicable tariffs have been utilised. Victoria has calendar year tariffs, whereas NSW, Queensland and South Australia have financial year tariffs.

Victoria regional – Powercor Large Low Voltage Demand (DL) – Available to large customers, with demand greater than 250 kW and supply voltage less than 1,000V. Prices effective 1 January 2006 – 21 December 2006.

Victoria metropolitan – Citipower Large Low Voltage Demand (C2DL) - Available to large customers, with demand greater than 120 kW and supply voltage less than 1,000V. Prices effective 1 January 2006 – 21 December 2006.

NSW regional – Country Energy BLND3A0 LV ToU Demand – Applicable to business premises whose consumption exceeds 100 MWh per annum and connected to the LV distribution system in locations across Country Energy's distribution area (excluding Far West Region). Prices effective 1 July 2006 – 30 June 2007.

NSW metropolitan – Integral Energy LV Demand ToU - Demand ToU prices apply to each supply point consuming 160 MWh per annum and over. Prices effective 1 July 2006 – 30 June 2007.

Queensland regional – Ergon Large Demand DUoS (EDL) and TUoS for Rockhampton - East Zone pricing (connected to National Grid). Standard Asset Customers with consumption greater than 100MWh per annum. Rockhampton is a regional city with industry and is a location within the sample. Rockhampton is one of 41 transmissions connection points in Ergon's distribution area. Prices effective 1 July 2006 – 30 June 2007.

Queensland metropolitan – Energex Large Demand (DL) - Standard Asset Customers with consumption less than 4 GWh per annum. For customers with minimum chargeable demand of 400 kW. Prices effective 1 July 2006 – 30 June 2007.

South Australia – ETSA Utilities Low Voltage Stepped Demand (VLVS) – For low voltage customers with minimum chargeable demand of 100 KVA. Prices effective 1 July 2006 – 30 June 2007.

A.3.3 Tariffs used in the analysis for High Voltage business case study

Victoria regional – Powercor High Voltage Demand (DH) – Available to large customers, with demand greater than 1,000 kW and supply voltage greater than 1,000V and less than 22,000V. Prices effective 1 January 2006 – 21 December 2006.

Victoria metropolitan – Citipower High Voltage Demand (C2DH) - Available to large customers, with demand greater than 1,000 kW and supply voltage greater than 1,000V and less than 22,000V. Prices effective 1 January 2006 – 21 December 2006.

NSW regional – Country Energy BHND3A0 HV ToU Demand – Applicable to business premises whose consumption is connected to the HV distribution system in locations across Country Energy's distribution area (excluding Far West Region). Prices effective 1 July 2006 – 30 June 2007.

NSW metropolitan – Integral Energy LV Demand ToU - Demand ToU prices apply to each supply point consuming 160 MWh per annum and over. Prices effective 1 July 2006 – 30 June 2007.

Queensland regional – Ergon High Voltage DUoS (EDH) and TUoS for Rockhampton - East Zone pricing (connected to National Grid). Standard Asset Customers with consumption greater than 100MWh per annum. Rockhampton is a regional city with industry and is a location within the sample. Rockhampton is one of 41 transmissions connection points in Ergon's distribution area. Prices effective 1 July 2006 – 30 June 2007.

Queensland metropolitan – Energex High Voltage (DL) - Standard Asset Customers with consumption less than 4 GWh per annum. For customers with minimum chargeable demand of 400 kW. Prices effective 1 July 2006 – 30 June 2007. Note: given that consumption is greater than 4GWh per annum, the tariff should be a 'Connection Asset Customer' tariff. However, 'Connection Asset Customers' have fixed charges are site-specific which can vary significantly, making assumptions on the scale of the fixed charge problematic.

South Australia - ETSA Utilities High Voltage Stepped Demand (VHVS) – For high voltage customers with minimum chargeable demand of 100 KVA. Prices effective 1 July 2006 – 30 June 2007.

B Glossary

Demand - The unit of electricity required. Demand is typically measured in kilowatts (kW) or megawatts (MW).

Load - The amount of electricity delivered or required over time. Load is typically measure in kilowatt hours (kWh) or megawatt hours (MWh).

Load profile - The variation in load over time.