Report to

Queensland Competition Authority

Review of Queensland Notified Electricity Retail Prices

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

VERSION

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EXECUTIVE SUMMARY

On 25 June 2009, the Premier and Treasurer directed the Authority (Queensland Competition Authority, QCA) to review electricity pricing and tariff structures in Queensland, with a view to having a new three year retail electricity pricing framework in place from 2010-11. As part of the review QCA has engaged McLennan Magasanik Associates (MMA) to consider and provide a report on:

(a) the appropriateness of each current regulated tariff;

(b) the opportunities for restructuring or consolidating the suite of regulated tariffs;

(c) the merits of the introduction of inclining block tariffs, time of use tariffs (peak and off-peak pricing), controlled load tariffs and other alternatives that may send better price signals to customers or assist with the future management of peak demand; and

(d) relevant issues concerning roll out of smart(er) meters and other technology capable of recording consumption in real time.

MMA has investigated the electricity tariffs in the context of the competitive Queensland electricity retail market. After considering a wide range of objectives to be considered in assessing tariffs, we have concluded that there are just three independent principles that should be used to assess existing and new retail tariffs:

1. Are the tariffs cost reflective?
2. Do the tariffs send price signals that promote demand management?
3. Are the tariffs logical and easy to understand?

Using indicative assessments of the costs of electricity supply, in regard to the current tariffs we have found that:

- The retail tariffs are not cost reflective and that the degree to which each is not cost reflective varies considerably
- A considerable proportion of customers yield unattractive profits/margins to retailers when supplied on the regulated tariffs
- This has the effect of restricting retailers ability to make competitive market offers to these customers
- The tariffs and the tariff setting process require significant revision to meet the tariff objectives set out by the Government.

In relation to alternative tariff structures, our analysis suggests that the tariffs available with current metrology, namely inclining block and seasonal tariffs, can achieve certain levels of cost reflectivity but only very limited demand management effects. Greater levels of cost reflectivity and demand management impacts will be achievable using time-of-use tariffs but only if/when interval meters are introduced.

Our broad recommendation regarding tariff structures is therefore that regulated tariffs for customers on accumulation meters have a flat tariff structure. Customers with ToU capable meters should be on ToU regulated tariffs with flat rates for peak and off-peak, and customers with demand meters should be on tariffs with flat energy and demand components.

Similarity of underlying cost structures suggests that up to seven of the twenty current tariffs could be discontinued, with the customers currently on those tariffs being transferred to one of the thirteen remaining regulated tariffs.

1 INTRODUCTION

1.1 The tariff review

1.1.1 Government Direction

On 25 June 2009, the Premier and Treasurer directed the Authority (Queensland Competition Authority, QCA) to review electricity pricing and tariff structures in Queensland, with a view to having a new three year retail electricity pricing framework in place from 2010-11. The Direction requires the Authority to report in two stages, as follows:

Stage 1 (completed)

a) review the Benchmark Retail Cost Index (BRCI) methodology that currently exists in Queensland and alternative pricing methodologies that could be considered to reflect the costs of supplying electricity including network costs and accounting for all State and Commonwealth Government environmental obligations.

b) review existing electricity tariff structures and assess whether current tariffs are fully cost reflective (for South East Queensland consumers), provide appropriate price signals to enable customers to understand and manage their consumption, or facilitate effective retail competition, and whether any tariffs are obsolete.

Stage 2 (to be completed by 30 November 2009)

Review alternative retail tariff structures which may assist in the long term management of peak demand and provide an incentive for customers to use electricity more efficiently. The Authority released a Request for Comments Paper regarding Stage 2 of the review on 11 September 2009.

Until a further remit is received from the Queensland Government, likely in late 2009, there is some uncertainty as to whether the Authority will be required to restructure electricity retail tariffs and set notified prices for 2010-11 under its recommended pricing framework or determine notified prices under the existing BRCI methodology.

The Authority is seeking to engage a suitably qualified consultant to:

a) provide advice regarding alternative tariff structures to assist in Stage 2 of the review; and

b) provide advice to assist the Authority when it either restructures the electricity tariffs for 2010-11 under a new pricing framework or undertakes its BRCI determination for 2010-11, whichever of those tasks the Authority will ultimately be required to perform.

1.1.2 Outline of Consultancy

The Authority engaged McLennan Magasanik Associates (MMA) to consider and provide a report to the Authority on:

a) the appropriateness of each regulated tariff that currently exists in the tariff schedule;

b) what opportunities exist for restructuring or consolidating the suite of regulated tariffs that currently exist in the tariff structure;

c) the merits of the introduction of inclining block tariffs, time of use tariffs (peak and off-peak pricing), controlled load tariffs and other alternatives that may send better price signals to customers or assist with the future management of peak demand; and

d) relevant issues concerning roll out of smart(er) meters and other technology capable of recording consumption in real time.

Having regard to the Authority's proposed new pricing methodology (Chapter 4 of the Final Report on Stage 1), MMA is required to consider and provide a report to the Authority on:

a) the effect of the increased cost reflectivity achieved under alternative tariff structures on the prices paid by different customer classes, including:

    i. the different effects on business and residential[1] customers;

    ii. the different effects on large customers (those consuming more than 100 MWh per annum) and small customers (those consuming less than 100 MWh per annum); and

    iii. the different effects on small residential consumers with very low consumption levels and small residential consumers with higher levels of consumption;

b) the applicability of each tariff to different customer classes

[1] For most of this report residential customers are referred to as domestic customers, consistent with the retail tariff nomenclature

2 ELECTRICITY COST STRUCTURES

2.1 Introduction

Electricity costs paid and incurred by retailers on behalf of their customers include:

- Energy costs – the cost of generating power as reflected in pool prices paid by the retailer and/or power purchase contracts (hedges) entered by the retailer on behalf of its customers, together with the costs of environmental schemes such as the National Renewable Energy Target (NRET) and the Queensland Gas Scheme
- Network costs – the costs of transmission (TUOS) and distribution (DUOS) levied on the retailer on behalf of its customers by the distribution company. Different tariffs apply to different customer groups
- Retail costs – the internal costs of the retailer incurred in providing services to customers, e.g. marketing, billing, enquiries and managing energy and network costs

Retailers also expect to earn a margin over the above costs and for tariff setting purposes the Retail Margin is also treated as a cost.

In some analyses the costs are distinguished by their controllability or non-controllability by retailers. Retail costs/margins are incurred directly and are controllable and energy costs are viewed as controllable because retailers manage their risk exposures. Regulated network costs are not controllable.

2.1.1 Cost drivers

The above costs are causally related to components of the customers' usage profiles:

- Energy usage – energy costs vary with energy usage. National Electricity Market (NEM) pool prices are settled every half hour while contract prices vary each month
- Maximum demand – the network capacity has to be sufficient to meet maximum half-hourly demand and network costs are strongly related to maximum demand
- Customer related (fixed costs) – the cost of serving each type of customer is relatively fixed relative to their energy consumption

2.1.2 Metrology issues

Measuring the half-hourly usage and maximum demand attributable to a customer requires that customer to have a suitable meter, known as an interval[2] meter. In Queensland customers using more than 100 MWh/yr typically have interval meters (meter types 1 to 5) whereas customers using less than 100 MWh/yr typically have accumulation meters (meter type 6) which are only capable of measuring energy

[2] Also often referred to as a "smart"meter

consumed over periods longer than the half-hour NEM settlement period. Furthermore, interval meters at customers using less than 100 MWh/yr are read as accumulation meters.

For NEM settlement purposes half hourly usage by customers with accumulation meters is determined by profiling – the half-hourly net system load profile (NSLP) is determined by subtracting from the total system load within a defined region: all interval metered consumption; estimates of non-metered load; and other defined profiles such as controlled loads that are estimated from samples of meters. Each retailer pays its share of the cost of the NSLP – for each customer meter read the retailer pays for the energy used at an average price set by the NSLP over the measurement interval, for example a month or a quarter. From the retailer's perspective this defines the energy cost for the customer.

For customers with accumulation meters it is not possible to bill on the basis of half-hourly energy or demand components and tariffs are therefore comprised of fixed charges and charges based on energy usage over the measurement interval.

2.2 Energy costs

The cost of energy is determined by the prices set at the relevant node of the NEM. Prices in the NEM are determined by despatch bids from generators and are set for 30 minute intervals – the 30 minute prices are aggregated from 5 minute interval prices applicable to generation. Prices are highly variable up to the price cap of $10,000/MWH ($12,500/MWh from 1 July 2010) and generally strongly positively correlated with demand. Retailers pay the NEM price for all each period for the energy used in that period by their customers, as estimated by the NEM operator, the Australian Energy Market Operator (AEMO) from interval meter data or profiling.

The variability of NEM prices compared to the generally fixed prices they receive from customers exposes retailers to significant risk, which retailers hedge by entering contracts with generators or others. Contracts include swaps, caps and futures and have the effect of fixing the price retailers pay for defined quantities of energy, leaving them with residual NEM price exposure to differences between energy hedged and energy used by their customers. Some retailers also obtain hedges by owning generators.

Retailers also pay additional costs associated with NRET, the Queensland Gas Scheme, NEM fees and NEM ancillary service charges. The cost of the Carbon Pollution Reduction Scheme (CPRS), likely to be introduced on July 1 2011, will be reflected in future NEM prices.

In the 2009-10 BRCI report[3] the 2009-10 energy purchase cost to retailers for the NEM load for the State (as required by law) is estimated at $57.70/MWh. Actual retailer payments are based on the relevant NSLP profile however and for the Energex region MMA estimates that the cost would be $2.79/MWh higher[4]. The additional costs estimated in the

[3] Final Decision 2009-10 Benchmark Retail Cost Index. Queensland Competition Authority, June 2009
[4] Based on the difference between the NEM price for 2008 weighted according to the Quensland and NSLP profiles.

2009-10 BRCI report total \$5.72/MWh, giving an estimated total energy cost of \$66.21/MWh for 2009-10 for consumption based on the Energex region NSLP. A more comprehensive assessment of this cost would take into account differences in the costs of hedging the NSLP profile compared to the State profile.

The only time variations that are reflected in retailers' energy payments under the NSLP are seasonal ones and hedges also have monthly or seasonal prices.

To the best of MMA's knowledge[5], the only consumption on any of the notified retail prices that is not included in the NSLPs is that on the controlled load tariffs, Tariff 31 and Tariff 33, for which there are Controlled Load Profiles (CLPS), determined by AEMO using a sample of half hourly metered controlled loads.

We have estimated the costs of energy consumed on these CLPs, CLP31 and CLP33, by calculating the NEM payments on each profile for 2008 (\$24.90/MWh and \$33.74/MWh respectively), multiplying the estimated NSLP cost above by these and dividing the results by the NEM payments on the NSLP (\$39.12/MWh) i.e. prorating by the NEM payments. The resulting estimates are: CLP31 - \$42.14/MWh; and CLP33 - \$57.11/MWh. More comprehensive assessments of these costs would take into account differences in the costs of hedging the CLP profiles compared to the State profile.

To assist in the discussion of cost reflectivity of tariffs with respect to energy costs in the Energex distribution area we have defined three concepts of cost reflectivity:

- Annual – reflects cost variations linked to variations in customers' total annual consumption
- Seasonal – reflects cost variations linked to variations in customers' total seasonal (and annual) consumption
- Peak - reflects cost variations linked to variations in customers' annual peak period and off-peak period consumption

In terms of these definitions a tariff with a single energy rate (plus a fixed service charge) can achieve annual cost reflectivity but not seasonal or peak cost reflectivity. If the rates vary by season it can achieve seasonal cost reflectivity and so on.

2.3 Network costs

Network tariffs are set through a regulatory process governed by the Australian Energy Regulator (AER) under the National Electricity Law (NEL) and National Electricity Rules (NER). The process determines the networks' revenue entitlements for five year periods using a building block approach that allows recovery of estimated operating costs, depreciation and a return on capital. Network tariffs are then set to recover the revenue

[5] The loads of some customers using over 100 MWh/yr may be excluded.

entitlement – under and over-recovery due to energy usage variation is compensated in subsequent years, so the networks are not exposed to energy variation risk.

The major cost driver for networks is maximum demand but tariffs for small users have to be based solely on fixed and energy related charges owing to the metering limitations. Combined network tariffs (NUOS = TUOS + DUOS) for Energex are listed in Table 2-1 and Table 2-2. The same tariffs apply to all relevant customers in the Energex region.

It is noted that Energex does not offer any:

- Multiple-block tariffs (declining or inclining)
- Seasonal tariffs
- Time-of-use tariffs for domestic customers

Table 2-1 Energex Network Tariffs for Standard Asset Customers – Demand Tariffs

Code	Description	Fixed Price $/day	Peak Energy $/kWh	Off-peak Energy $/kWh	Demand $/kW/ month	Minimum Demand kW
8000	High Voltage Demand	$34.55956	$0.01231	$0.01231	$6.63262	200
8100	Large Demand	$37.51498	$0.01329	$0.01329	$7.54127	400
8200	Medium Demand	$13.85474	$0.01284	$0.01284	$8.77622	120
8300	Small Demand	$1.86602	$0.01292	$0.01292	$13.53128	20

Source: Energex Limited Tariff Schedule 2009-10 Version 2A July 2009

Table 2-2 Energex Network Tariffs for Standard Asset Customers – Non-Demand Tariffs

Code	Description	Fixed Price $/day	Peak Energy $/kWh	Off-peak Energy $/kWh	Threshold
8400	Domestic (Energy only)	$0.25584	$0.06964	$0.06964	Under 25 MWh/yr
8500	Business Small	$0.25584	$0.06964	$0.06964	Under 25 MWh/yr
8600	Business Medium	$1.11585	$0.06326	$0.06326	Over 25 MWh/yr
8700	Business Small TOU	$0.25584	$0.07185	$0.04088	Under 25 MWh/yr

Code	Description	Fixed Price $/day	Peak Energy $/kWh	Off-peak Energy $/kWh	Threshold
8800	Business Medium TOU	$1.11585	$0.06879	$0.04464	Over 25 MWh/yr
9000	Controlled Load 1	$0.13452	$0.01124	$0.01124	
9100	Controlled Load 2	$0.13259	$0.02134	$0.02134	

Source: Energex Limited Tariff Schedule 2009-10 Version 2A July 2009

2.3.1 Future directions of network tariffs

In October 2008 Energex released a report discussing future tariff options[6]. The report is strongly focussed on the objective of controlling growth in peak demand, in view of recent deterioration in the network load factor and the very limited utilisation of assets required to meet peak demand.

In the large customer sector (over 100 MWh/yr) the focus is on introducing a kVA element, to reflect the associated costs. In the small customer sector that is subject to Notified Prices, Energex notes that network tariff structures that could contribute to demand management are dependent on the introduction of interval meters. Such tariffs include:

- ToU tariffs, based on consumption and / or demand;
- Critical peak pricing; or
- A combination thereof.

Interval meters are currently under trial in Queensland prior to a further national review in 2012.

In the absence of a defined timetable for introduction of interval meters, Energex small customer initiative is centred on direct load control, that is, the fitting of devices to air conditioners, pool pumps and other suitable appliances to limit appliance usage without impairing perceived performance. At present it is not clear whether this will eventually be offered through a special network tariff – trial customers are being given direct incentives to participate. Until such time as a tariff design is available this activity cannot be taken into account in considerations regarding the Notified Prices.

In general therefore there are no defined future network tariff directions that can be considered in this study.

[6] Development of Network Tariffs - Discussion Paper. Energex Limited, October 2008

2.4 Retail costs

Retail costs are directly controlled by retailers, who seek to minimise their costs while providing levels of service that satisfy customers. For each customer, retail costs do not generally change in response to changes in energy consumption and in this sense they are largely fixed costs. However retail costs do change in response to other factors, including:

- Different service levels required for different customer types, for example larger customers that are billed monthly compared to quarterly billed small customers
- Different ways of providing the same service, such as direct debit payment versus payment by cheque.
- Customer behaviour that minimises service requirement, such as payment on time.

Many retailers share the benefits of lower cost service provision by offering discounts to customers that use the lower cost option.

In the 2009-10 BRCI report the 2009-10 retail costs are estimated at $164.6m for retailing and a further $52.5m for customer acquisition, a total of $217.1m excluding the retail margin. Based on QCA's estimate of 1,978,965 customers in 2009-10, this is equivalent to $109.70 per customer.

In line with the above observations we would expect the average cost for domestic customers to be slightly lower than $109.70 and the cost for commercial and industrial customers requiring higher levels of service to be correspondingly higher. There are also retail costs associated with provision of additional meters/services, such as off-peak water heating, which are not counted in the number of customers. Allocating these costs to the relevant service would further reduce the allocation to standard domestic services. There is virtually no information on the nature of these cost variations in the public domain however and for the purposes of this study we have used a formula based on information gathered in a previous study, namely, for each customer group:

$$\text{Annual retail cost} = A \times (\text{Group Average Consumption})^{0.5}$$

The parameter A is set so that the formula yields a value of $109.70 for the domestic sector, which will result in a slight overstatement of retail costs for each sector. We believe this approach is better than using a fixed value in each sector but note that in a full cost of service study the different costs applicable to each customer group would need to be determined. The annual retail costs estimated using this approach with the tariff average consumptions reported in Table 5-2 are shown in Table 2-3.

Table 2-3 Estimated annual retail costs

Tariff Code	Retail cost
11	$110
20	$219
21	$42
22	$482
31	$27
33	$27
37	$376
41	$1,233
43	$3,232
53	$3,091
62	$194
63	$79
64	$59
65	$186
66	$259
67	$143

Source: MMA estimates

2.5 Retail margin

In the 2009-10 BRCI report the retail margin was set at 5% of gross costs (energy, network and retail), consistent with decisions in other jurisdictions[7]. The report footnoted below assumes different margins for different customer groups, 3% for small users and 5% for large users, in such a way that the $/MWh value remains relatively similar, but does not present a justification for this. For the purposes of this study we have therefore assumed that the 5% benchmark applies to all consumers.

[7] For example the recent WA review reported in "Electricity Retail Market Review. Final Recommendations Report. Review of Electricity Tariff Arrangements" Office of Energy Report to the Minister for Energy January 2009

3 CHARACTERISTICS OF AN IDEAL TARIFF STRUCTURE

3.1 The role and impact of regulated tariffs in the retail market

Retail electricity tariffs are used to calculate customer bills based upon their metered electricity consumption. Tariff revenue comprises the majority of electricity retailers' revenue and for the retailers to remain in business their total revenue must cover their costs, both internal (operating and marketing) and external (wholesale energy and network), and allow them to make appropriate levels of profit, under expected business conditions.

A wide range of tariff structures can be consistent with cost recovery in aggregate, particularly in the case of a monopoly retailer that cannot lose customers to competitors, a situation that can change the aggregate cost/revenue balance. Many such tariff structures are not cost reflective at the customer level, i.e. what the customer pays for each tariff component such as fixed service charges and energy consumption do not match the retailer's component costs. Consequently, such structures result in retailers having variable levels of profitability for different customers and some customers "subsidise" others.

In a competitive retail market it is more difficult for retailers to sustain very different levels of profitability among their customers, as the more profitable ones are likely to find, and switch to, more attractive offers from other retailers. In a competitive market therefore, in theory if not exactly in practice, retailers need to be able to offer tariffs that are cost reflective at the individual customer level, as well as striving to reduce their controllable costs.

In all competitive small customer retail markets regulated tariffs have been retained at the outset to provide price protection to customers who may not receive competitive offers from retailers, either because of their location or other factors. Details of retail tariff regulation in Queensland are described in the box below. However regulated tariffs also set a cap on the market tariffs that can be offered, since it is unlikely that a customer will switch to a market tariff that is more expensive than a regulated tariff. Customers that are less profitable to a retailer on the regulated tariff are therefore unlikely to receive attractive offers from other retailers, effectively cutting them out of the competitive market and forcing them to remain with their existing retailer.

The setting of regulated retail tariffs is therefore more complex in a competitive market than in a monopoly context and a range of criteria must be considered. This is particularly the case in Queensland, where the majority of regulated retail tariffs were established in the monopoly context and have been escalated but not thoroughly reviewed since.

Retail tariff regulation in Queensland.

Regulated electricity tariffs in Queensland, known as Notified Prices, were determined prior to FRC and are escalated each year by QCA in line with the Benchmark Retail Cost Index (BRCI). The procedure for estimating the BRCI is specified in legislation. At any time a customer that is eligible for a Notified Price may ask to be supplied under that price by the Financially Responsible Retailer, that is, the retailer that is at that time responsible to AEMO for energy consumed at that premises.

3.2 Criteria for setting regulated retail tariffs

From an economic perspective, the ideal regulated tariffs would be determined on the basis of maximising economic indicators such as international competitiveness, living standards or Gross State Product (GSP). This would involve establishing the impact of the tariffs on GSP, relative either to the current regulated tariffs or to the ideal "counterfactual" case of no tariff regulation. Such an impact assessment would clearly be an onerous economic modelling task and its outcome would probably depend upon numerous, difficult to justify, assumptions. Consequently we would not recommend determining regulated tariffs on this basis.

Alternatively, consistent with the principles underlying the introduction of FRC (refer to Appendix A), it is reasonable to assume that the principle objective in setting regulated tariffs is to facilitate competition, so that ultimately competitive forces can set the tariffs instead.

This objective and others that that should be taken into account in setting regulated retail tariffs have been set out by the Queensland Government in its directive to QCA and other criteria have been suggested by stakeholders in their submissions to QCA.

3.2.1 Government directive to QCA

The directive indicates that the following criteria should be taken into account:

1. Cost reflectivity, including:
    a. Direct pass through of network charges
    b. Pass through of RET & CPRS costs
    c. To support competition – sufficient and stable headroom
2. Uniform tariff policy to remain
    a. Consider how in the face of network tariff variation.

3. Pricing certainty
    a. 3 year mechanism from 2010-11
4. Demand management and energy efficiency
    a. Long term management of peak demand
    b. Incentives for energy efficiency

3.2.2 Other stakeholders

In their submission to QCA other stakeholders have drawn attention to the following principles in addition to those proposed in the Government directive.

1. Simplicity
    a. Customers understand impact of consumption decisions
    b. Including a one-to-one Network to Retail alignment would reduce retailer risk
2. Fairness
    a. Alignment of tariffs on a consumption/cost basis rather than customer type basis
3. Risk minimisation
    a. For retailers – may enable lower margin to be built into tariffs
    b. For customers – may reduce default

3.2.3 MMA observations

3.2.3.1 Cost reflectivity

Cost reflectivity means that each customer should pay the full cost of service. In practical terms this means that each retail tariff component should reflect the cost structure underlying the delivery of the service, basically that costs of energy consumption and peak demand should be fully reflected in energy and demand charges (costs and cost drivers are discussed in more detail in section 2).

There are two ways of interpreting the cost that must be considered, the true economic cost and the cost faced by the retailer – these can differ if, for example if a retailer pays network tariffs that do not reflect economic costs. In this report we have treated costs exclusively as the costs faced by retailers, since this is the only interpretation that is consistent with competitive markets. Inter alia it assumes that the wholesale electricity market prices electricity efficiently and that the electricity networks together with the AER price network services efficiently.

Viewing costs from the retailers' perspective ensures that achieving cost reflectivity, including a suitable retail margin, is then consistent with the objectives of:

- Supporting competition by maximising the number of customers that are profitable to retailers and receive competitive offers from other retailers
- Increasing long-term pricing certainty as variations will based only on true costs
- Minimising a retailer's risk that its revenue will fall below costs due to natural variations in demand
- Fairness between customers, since each will pay on the basis of cost rather than what they are perceived to be able to pay or some other basis
- Direct pass through of network charges and RET and CPRS costs

Consequently in what follows the above are not considered independently of the principle of cost reflectivity. It is noted however that they may need to be considered separately when the design of the BRCI replacement tariff setting process is addressed.

3.2.3.2 Uniform tariff policy

The uniform tariff policy creates tensions essentially between the retail prices applicable in the two networks, Energex and Ergon Energy. The overall level of retail pricing is consistent with the costs in the Energex network, where retailers can operate profitably without Government subsidies. However the costs in the Ergon Energy network are considerably higher and the Ergon Energy retail division receives Community Service Obligation payments from the Queensland Government to ensure electricity is affordable for regional customers (which is estimated to be around $460 million 2008/09 financial year). Therefore, other retailers are unlikely to compete profitably in the Ergon region.

In this report we have therefore based our analysis entirely on the Energex region network tariffs.

3.2.3.3 Demand management and energy efficiency

Demand management, that is, reduction of demand to avoid capacity or energy costs, is generally promoted by increasing prices for capacity and energy respectively. Conventional economic theory would suggest that if component prices are aligned with costs (tariffs are cost reflective) then the resulting level of demand is the economically efficient level and that further increases in prices would result in economically inefficient additional demand curtailment. For a number of reasons however, including the difficulty of charging customers a demand component, it is widely believed that current demand levels represent economically inefficient use of system capacity and that pricing can contribute further to demand management. In future, subject to the introduction of interval meters, it will be possible to introduce tariffs with components matching every cost driver, and thereby align cost reflectivity and demand management objectives – such tariffs may appear complex to customers however and a compromise may be necessary to maintain simplicity.

Energy efficiency refers to the level of energy use per unit of (economic) output. Increasing

Increasing energy efficiency is generally aligned with energy demand management. Misalignment is possible, for example if introduction of a time-of-use tariff encourages peak demand reductions with off-peak demand increases that lead to overall energy usage increases. Here too however the energy efficiency outcome would depend on whether there was an increase in output or not.

In this report we have tried to avoid the term "pricing efficiency" so as to avoid confusion between efficiency meaning cost reflective and efficiency meaning encouraging demand management or energy efficiency, and have focussed directly on the concepts of cost reflectivity, demand management and energy efficiency.

3.3 Recommended criteria

Based on the above we have used the following three principles to assess existing and new retail tariffs:

1. Are the tariffs cost reflective?
2. Do the tariffs send price signals that promote demand management?
3. Are the tariffs logical and easy to understand?

In MMA's experience it is seldom possible to select an a priori weighting or trade-off that should be given to these criteria to determine future tariffs without examining the tariff options in detail to gain an understanding of the implications of different trade-offs.

We would judge whether these criteria are present in a particular tariff as follows:

1. Cost reflective?
    a. Do fixed charges in the tariff match estimated fixed costs? (Refer to section 5.2.1 for examples)
    b. What are the retail margins applicable to each customer subgroup i.e. with the same relevant consumption patterns? Are the margins similar or variable? Refer to section 5.2.2 for examples)
2. Demand Management price signals?
    a. Qualitative – describe impacts on each customer (relative to a standard tariff such as a flat tariff – refer to section 4)
    b. Quantitative – apply price elasticity approach to quantify and estimate aggregate impact (Refer to section 6)
3. Logical and easy to understand?
    a. What is the likelihood that customers will respond to the complex price signals?

3.4 The ideal tariff structure

The ideal tariff structure for all customer groups in terms of cost reflectivity would have a time-of-use structure fully reflecting the dynamics of network and energy costs. Such a tariff would also almost certainly fulfill the demand management objective but until trialed on consumers it is not clear how much of the dynamics it would be worth incorporating beyond a flat time-of-use (ToU) structure. Given the array of tariff options possible, to retain a simple range of regulated tariffs it may be most practical to make the regulated tariffs simple flat ToU tariffs and leave more exotic versions to the market.

A bigger issue than that however is that ToU tariffs require interval or ToU meters and cannot be offered with accumulation meters.

3.4.1 Interval meters

The Ministerial Council on Energy has undertaken a number of evaluations of the costs and benefits of replacing all accumulation meters with interval or "smart" meters. While Victoria has already committed to a rollout timeframe, other jurisdictions, including Queensland, are conducting further trials and evaluations prior to determining a timeframe. The decision regarding the rollout timeframe may not be taken until 2012.

At present there are some 230,000 ToU meters installed in the Energex Network, of which approximately 200,000 are on domestic premises. As domestic customers are not offered a ToU network tariff, these meters are read as accumulation meters. Subject to a network tariff being made available to these customers it would be possible to offer them a retail ToU tariff. To avoid creating further tariff/cost misalignment, a separate ToU meter profile would need to be created for these meters. Provided both the flat and ToU domestic tariffs were cost reflective, retailers may be indifferent to which tariff the customers selected.

4 MERITS OF AND ISSUES WITH STANDARD RETAIL TARIFF STRUCTURES

4.1 Tariff designs

A number of tariff designs have been in common use in Queensland and elsewhere. The following sections address whether these designs meet the objectives set out in section 3.

4.2 Flat tariff

A flat tariff has a fixed supply charge accompanied by a flat rate applicable to all consumption at all times of the day, week, and year. The fixed supply charge generally recovers fixed costs such as fixed network charges and retail costs while the flat consumption rate reflects the average energy and demand costs across all time periods. The flat tariff is very simple to understand but cannot convey information about cost structure or information about time variation – the price signal is constant and provides no incentive to change the timing of consumption.

From a retailer's perspective, a flat retail tariff can achieve cost reflectivity at an annual level provided the relevant network tariff is a flat tariff and energy costs are uniform among customers at the annual level, as is the case for the domestic sector. Non-cost reflectivity can arise if:

- Either of the charges is misaligned with the underlying costs, for example if the fixed charge under-recovers fixed costs and the consumption rate is set above the average variable costs attributable to the relevant customer group. In this case retailers will earn a lower margin on customers who use less electricity and a higher margin on those who use more.
- If the network tariffs are not flat tariffs
- In addition, a flat tariff cannot reflect the variation of energy costs across time, even the seasonal variations reflected in retailer payments under the NSLP. As a result, the margins earned by retailers are likely to vary between customers with different seasonal usage profiles.

For customers however, the simplicity of flat rates has some attraction. They are easy to understand and most customers who choose competitive providers appear to prefer the certainty of fixed prices, either annual or seasonal, and appear to be willing to pay the corresponding risk premium for the certainty of flat rates.

The current flat tariffs, such as Tariff 11, could be changed in a number of ways:

- Made more cost reflective on an annual basis, if they are not currently
- Replaced by other tariff structures

Any change will have two primary impacts:

- It will cause bill increases to some customers and bill reductions to others.
- Those facing bill increases will most likely reduce consumption and vice versa. Aggregate consumption may however increase or decrease.

4.3 Declining block tariff

Declining block tariffs (DBT) have a fixed charge and a two-step energy rate structure in which the price of electricity decreases with increasing use: a lower price is charged per kWh for consumption over a set threshold. The DBT structure therefore provides cheaper energy to high volume users.

In the past declining block tariffs were considered to be more economically efficient than flat tariffs in which the fixed charge under-recovered fixed costs, as they allow for the recovery of the fixed cost components in the fixed supply charge and initial block, while the second block rate can be fully reflective of the variable costs of supply. This means that declining block tariffs can be made more cost-reflective and reduce the level of cross-subsidies between small and large users, compared to a flat tariff with a fixed supply charge that is less than fixed costs. However, they cannot ever be fully cost reflective, if the underlying network and energy costs do not have a declining block structure.

The reducing price encourages increased consumption, i.e. lowers the incentive for energy conservation above the threshold use, relative to a flat tariff structure. Details of the impact of introducing or withdrawing a declining block tariff depend critically on the previous/replacement tariff.

Customers using below the threshold will pay more (for the same consumption) and customers using above the threshold will pay less, compared to a flat tariff.

4.4 Inclining block tariff

Inclining block tariffs (IBT) have a two-step energy rate structure in which the price of electricity increases with increasing use: a higher price is charged per kWh for consumption over a set threshold. The IBT structure therefore encourages demand management above the threshold level of consumption.

IBT structures have often been seen as a means to signal the correct information about the cost of supply of electricity, particularly demand (capacity) related costs, as well as a tool to reconcile the objectives of cost recovery and efficiency on the one hand and equity and distributional aims on the other. In theory, inclining block tariffs allow for the costs of producing electricity to be recovered without increasing electricity costs for low users, on the assumption that low electricity users are also low income earners. This assumption however does not hold universally given differences in household size and the limited ability of those living in rented dwellings to substitute other energy consumption for electricity or engage is certain energy efficiency options. Moreover, from a retail perspective IBTs cannot ever be fully cost reflective if the underlying network and energy costs do not have an inclining block structure.

Designing an IBT without any inclining block network or energy cost structures as guidance is somewhat arbitrary, as there are three parameters to select, the block rates and the threshold. For example the block rates could be set at $0.01/kWh above and below the flat rate and the block threshold determined so as to maintain aggregate revenue. Alternatively, minimum and maximum retailer margins could be chosen and the parameters chosen to meet these targets.

The increasing price discourages consumption at levels above the threshold, relative to a flat tariff structure. Details of the impact of introducing or withdrawing a declining block tariff depend critically on the previous/replacement tariff.

Customers using below the threshold will pay less (for the same consumption) and customers using above the threshold will pay more, compared to a flat tariff.

4.5 Seasonal tariff

Seasonal tariff structures price electricity at different rates at different times of the year reflecting changes in the costs of providing electricity during these times. A seasonal tariff applies different energy consumption charges during different periods, e.g. changes quarterly, and may be set to track the actual cost of supply and recover the actual costs of providing electricity more fairly and accurately than flat tariffs, inclining or declining tariffs.

Seasonal tariffs primarily provide incentives for energy conservation during seasons when prices are higher, such as summer, and this may also contribute to reducing (maximum) demand.

Seasonal tariffs can be designed in various ways. With seasonal rates prices vary by season and are fixed and known by customers in advance. However, the pricing scheme remains quite static because the prices in each season are constant and independent of the real time conditions in the electricity system.

From a retailer's perspective, a seasonal retail tariff can achieve cost reflectivity at a seasonal level provided the relevant network tariff is a flat or seasonal tariff and energy costs are uniform among customers at the seasonal level, as is the case for the domestic sector.

The varying seasonal prices provide varying incentives to all customers to increase or decrease consumption relative to a flat tariff. However it is reasonable to expect that all customers will respond in the same way so that the aggregate response is predictable, for example if the summer energy rate increases then summer energy use (and most likely peak demand) will fall.

Customers using more than the average percentage of their consumption in higher priced seasons will pay more than under a flat tariff and customers using more than the average percentage of their consumption in lower priced seasons will pay less than under a flat tariff.

4.6 Time of use tariff

Time of use (ToU) tariffs price electricity at different rates at different times of the day and/or week. From a retail perspective, a ToU retail tariff can be cost reflective provided the relevant network tariff is a ToU tariff and/or energy costs are paid on a ToU basis by the retailer. Neither of these conditions apply at present for domestic customers and the more widespread introduction of ToU tariffs is viewed as conditional on the introduction of interval meters.

ToU tariffs offer greater energy management opportunities than other two-part tariff structures, particularly to customers who can shift load from one time of day to another. As prices will be set higher during peak demand periods, time of use tariffs are able to provide price signals for energy conservation in peak times. ToU price signals will, however, be most effective when the overall tariff levels are set at cost reflective prices and the introduction of smart meters especially with in-home display could significantly increase the visibility of ToU prices to customers.

Time-differentiated tariffs can be designed in various ways. With TOU rates prices vary by blocks of time within the day and are fixed and known by customers in advance. However, the TOU pricing scheme remains quite static because the prices in each time block are constant and independent of the real time conditions in the electricity system.

The time varying prices provide incentives to customers to increase off-peak and decrease peak consumption relative to a flat tariff. It is reasonable to expect that all customers will respond in the same way so that the aggregate response is predictable, i.e. peak use and most likely peak demand will fall. Combined seasonal TOU tariffs could be used to reinforce this effect.

Customers using more than the average percentage of their consumption in the peak period will pay more than under a flat tariff and customers using more than the average percentage of their consumption in off-peak period will pay less than under a flat tariff.

4.7 Controlled load tariffs

The demand management impact of the above tariff structures relies upon the price signals contained within the tariffs. Direct load control, that is, the fitting of devices to air conditioners, pool pumps and other suitable appliances to limit appliance usage while minimising the perceived performance impact, provides a more direct approach to demand management.

At present there are two domestic load control tariffs: Tariff 31, which provides a minimum of 8 hours supply per day generally between 10pm and 7am; and Tariff 33, which provides a minimum of 18 hours supply per day, with timing at the discretion of the distributor. Future load control initiatives, such as those currently being trialled by Energex, are likely to focus on reducing peak demand by cutting supply to appliances such as air-conditioners for short periods of time. In general this would not involve separate metering of the appliances.

To apply such initiatives on a wide scale, particularly in the absence of interval metering, an incentive to participate has to be provided through retail tariff offerings. For retailers to differentiate participants in a load control scheme from other customers it would appear to be necessary for:

- Networks to offer specific load control tariffs, at a discount to standard "anytime" tariffs
- Separate load profiles to be created by AEMO to enable retailers to identify energy cost savings compared to the NSLP.

Given that the networks would use load control to manage their own peaks, which are only partially correlated with energy price peaks, it is possible that retailers may not be able to identify cost savings for the new load profile compared to the NSLP.

At present it is not clear how load control will be offered and until a network tariff design is available it is not possible to consider the appropriate retail tariffs and whether they should be regulated.

5 ASSESSMENT OF THE CURRENT REGULATED RETAIL TARIFFS

5.1 Tariff description

There are currently twenty regulated retail tariffs as set out in Table 5-1. The numbers of customers and consumption on each tariff are shown in Table 5-2.

Table 5-1 Queensland Regulated Retail Tariffs

Code	Description
11	Domestic (Lighting, Power, and Continuous Water Heating)
20	General Supply (not to apply in conjunction with 21,22,62 or 63)
21	General Supply (not to apply in conjunction with 20,22,62 or 63)
22	General Supply - Time-of-Use (not to apply in conjunction with 20, 21, 62 or 63)
31	Night Rate (Super Economy)
33	Controlled Supply (Economy)
37	Non-Domestic - Heating Time of Use (Obsolescent)
41	Low Voltage General Supply Demand
43	General Supply Demand (Time of Use)
53	High Voltage General Supply Demand (Time dependent)
62	Farm - Time-of-Use (not to apply in conjunction with 20, 21, 22 or 63)
63	Farm - Time-of-Use (obsolescent)
64	Irrigation - Time-of-Use (obsolescent)
65	Irrigation - Time-of-Use
66	Irrigation (Annual Fixed Charge)
67	Farm (Customers under rural subsidy scheme)
68	Irrigation pumping in Drought Declared Area
71	Public Lamps (Ergon area only)
81	Traffic Signals - Continuously Operating
91	Watchman Service Lighting

Source: Queensland Government Gazette Vol 351 No 41, 9 June 2009

Table 5-2 Regulated retail tariff annual consumption and customers in 2008-09

Code	Consumption (MWh)	Customers	Average Consumption (kWh)	% of Consumption	% of Customers
11	7,031,524	1,353,830	5,194	46.4%	57.1%
20	2,069,315	100,278	20,636	13.6%	4.2%
21	17,268	22,642	763	0.1%	1.0%
22	1,282,843	12,809	100,152	8.5%	0.5%
31	587,178	243,072	2,416	3.9%	10.2%
33	1,448,035	613,344	2,361	9.5%	25.8%
37	72,960	1,197	60,953	0.5%	0.1%
41	650,687	991	656,596	4.3%	0.0%
43	1,537,658	341	4,509,262	10.1%	0.0%
53	32,997	8	4,124,579	0.2%	0.0%

Code	Consumption (MWh)	Customers	Average Consumption (kWh)	% of Consumption	% of Customers
62	169,127	10,412	16,243	1.1%	0.4%
63	136	51	2,674	0.0%	0.0%
64	425	283	1,501	0.0%	0.0%
65	92,088	6,163	14,942	0.6%	0.3%
66	85,403	2,943	29,019	0.6%	0.1%
67	2,006	228	8,799	0.0%	0.0%
68	8,394	1,458	5,757	0.1%	0.1%
71	70,996	320	221,864	0.5%	0.0%
81	5,054	27	187,200	0.0%	0.0%
91	2,492	2,486	1,002	0.0%	0.1%
Total	15,166,587	2,372,883	6,392		

Source: QCA

The current component charges under the tariffs accounting for most customers and usage are set out in Table 5-3 and Table 5-4.

Table 5-3 Components of non-demand tariffs

			Peak or Anytime Charges				Block Thresholds	
Code	Service Charge $/month	Minimum Charge $/month	Block 1 $/kWh	Block 2 $/kWh	Block 3 $/kWh	Off-Peak $/kWh	Block 1 kWh	Block 2 kWh
11	$6.59		$0.1713					
20	$11.95		$0.1920					
21		$10.68	$0.2385	$0.2240	$0.1705		100	10,000
22	$26.32		$0.2333			$0.0822		
31		$4.59	$0.0699					
33		$4.59	$0.1029					
37		$4.36	$0.2554			$0.1021		
62	$12.59		$0.2452	$0.2073		$0.0867	10,000	
63		$22.93*	$0.4350	$0.2662	$0.2085	$0.0917	100	10,000
64		$11.26	$0.2125			$0.1167		
65		$12.59	$0.1956			$0.1077		
67		$11.26	$0.2117					

Source: Queensland Government Gazette Vol 351 No 41, 9 June 2009

* Based on minimum annual payment

Table 5-4 Components of demand tariffs

			Demand Charges		Energy Charges		Demand Block Thresholds
Code	Service Charge $/month	Minimum Charge $/month	Block 1 $/kWh	Block 2 $/kWh	Peak $/kWh	Off-Peak $/kWh	Block 1 kW
41	$40.29		$28.28		$0.06		
43	$40.29		$12.24		$0.12	$0.05	
53	$104.18	$10.68	$26.79		$0.0563		
66	$27.74	$12.43*	$19.88	$59.78	$0.1025		7.5

Source: Queensland Government Gazette Vol 351 No 41, 9 June 2009

* Based on minimum annual payment

5.2 Assessment of cost reflectivity

5.2.1 Fixed components

A key aspect of cost reflectivity is the extent to which the service charge or minimum charge in the retail tariff covers the fixed costs to the retailers, namely the fixed network charges and retail costs, plus a 5% margin on these. Table 5-5 shows, for the Energex network, MMA estimates of:

- annual retail tariff service charges less network fixed charges, for each network tariff applicable to the retail tariff; and
- annual retail tariff service charges less estimated total fixed costs.

Total fixed costs include network fixed charges, retail costs as presented in Table 2-3 plus a 5% margin on these costs. As we do not have estimates of retail costs for tariffs 71, 81 and 91, these have not been assessed. Given the nature of our retail cost estimates for different classes of customer, the estimates involving total fixed costs should be regarded as provisional.

The estimates show that the fixed charges in many retail tariffs do not recover fixed network charges and that for only one retail tariff/network tariff combination does the fixed charge recover the full fixed cost faced by retailers. In general therefore it can be said that the fixed charges in the retail tariffs under-recover costs and are not cost reflective.

This implies that, where retail tariffs recover costs in aggregate, i.e. across all customers on the tariff, the variable and demand charges must be over-recovering costs, a consequence of which being that larger users will be more profitable to retailers than smaller users. This is assessed in further detail in the following section.

Table 5-5 Estimated retail tariff fixed cost recovery (Energex network)

Retail tariff	Network Tariff	Retail service less network fixed ($/yr)	Retail service less total fixed costs plus margin ($/yr)
11	8400	-$14	-$134
11	8600	-$328	-$464
20	8500	$50	-$184
20	8600	-$264	-$514
21	8500	$35	-$14
21	8600	-$279	-$344
22	8700	$222	-$288
22	8800	-$91	-$618
31	9000	$6	-$25
33	9100	$7	-$25
37	8500	-$41	-$440
37	8600	-$355	-$770
41	8300	-$198	-$1,527
41	8200	-$4,574	-$6,121
43	8100	-$13,209	-$17,288
53	8000	-$11,364	-$15,241
62	8700	$58	-$151
62	8800	-$256	-$480
63	8700	$182	$94
63	8800	-$132	-$235
64	8500	$42	-$25
64	8600	-$272	-$354
65	8500	$58	-$142
65	8600	-$256	-$472
66	8300	-$348	-$655
66	8200	-$4,724	-$5,249
67	8500	$42	-$113
67	8600	-$272	-$442

Source: MMA estimates

5.2.2 Retail margin variation

The overall cost reflectivity of retail tariffs can be assessed in a number of ways. From the perspective of whether retail margins are sufficient to support competition it is most useful to examine the retail margins (revenue less costs) for different customer groups on the same tariff, i.e. customers with different energy consumption or load profiles, where load profiles are relevant to tariff revenue and energy or network costs.

For all tariffs such as Tariff 11 where customers' energy cost is determined from the Net System Load Profile (NSLP), energy costs paid by retailers are determined by their customers' aggregate energy use or consumption per billing period. Energy costs are dependent on customers' seasonal (quarterly) load profile according to the NSLP for that period but not on each individual customer's actual half-hourly or daily profiles. At the time of completing this study MMA does not have reliable information regarding the ranges of quarterly profiles applicable to any of the retail tariffs and except where

specifically indicated below we have effectively assumed that all customers' energy usage profiles are the same as the NSLP profile. Consequently their annual energy costs are equal to their annual energy usage multiplied by the average anytime cost of $66.21/MWh (refer to section 2.2).

In the following sections the network costs assumed are the relevant Energex network charges as documented in section 2.3 and the retail costs are as in Table 2-3.

The retail margin is calculated as:

Margin = (Annual Tariff Revenue- Annual Costs)/Annual Costs

and compared with the benchmark 5% margin.

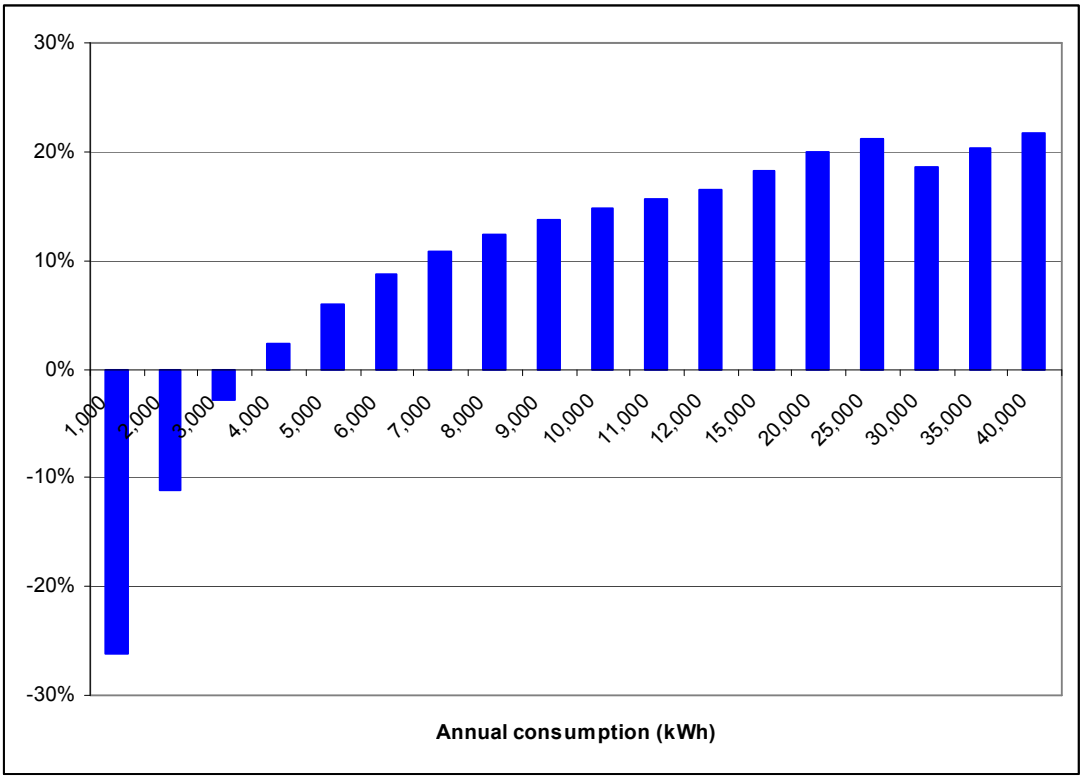
For each of the tariffs covering more than 0.5% of consumption (Tariffs 11, 20, 22, 31, 33, 41, 43, 62, 65 and 66 – refer to Table 5-2) we have estimated the margins for a range of representative consumption levels ranging from 10%-20% of the average usage on that tariff to 500%-1,000% of average and, where applicable for alternative load factors and/or peak to off-peak load profiles.

5.2.2.1 Tariff 11

Figure 5-1 illustrates the variation in retail margin for Tariff 11, with annual consumption ranging from 1,000 kWh to 40,000 kWh (the average is 5,194 kWh). It shows that tariff revenue from customers using less than 5,000 kWh/yr will generate margins of less than 5%, i.e. margins that are likely to be unattractive to competing retailers. However tariff revenue from customers using more than 5,000 kWh/yr will generate attractive margins of more than 5%, even those using more than 25,000 kWh that attract the higher network tariff (Tariff 8600).

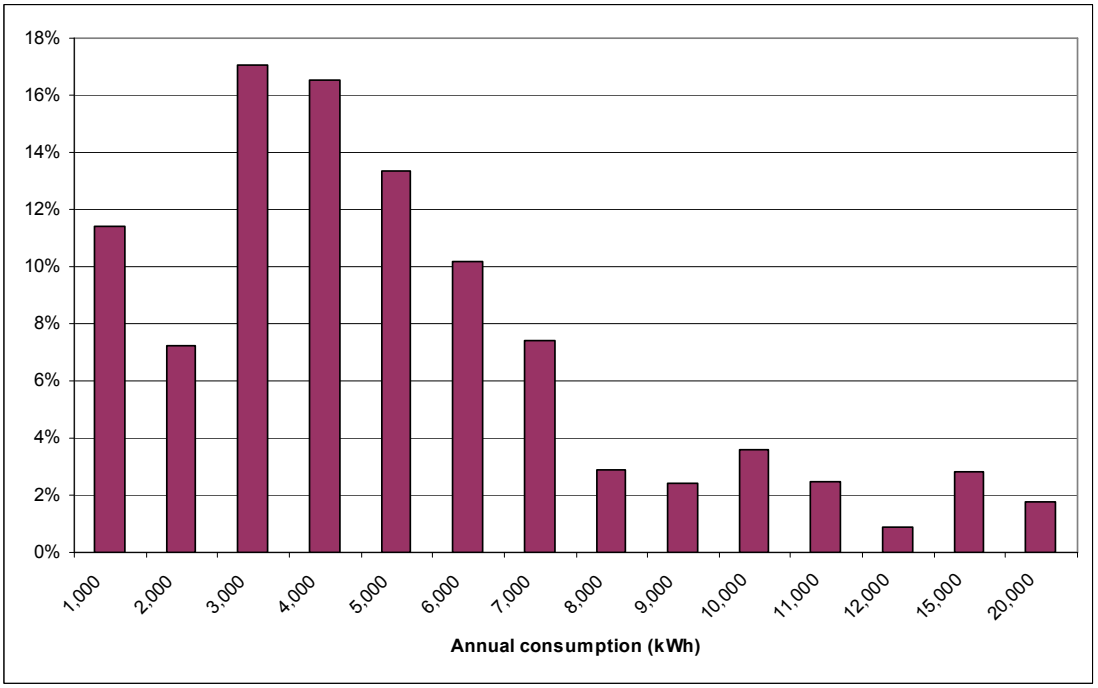
The estimated percentages of domestic customers in each consumption range are shown in Figure 5-2, which is derived from network consumption data provided by Energex. It is noted that all consumers using 20,000 kWh/yr or more are included in the 20,000 kWh/yr percentage. The figure suggests that 52% of customers use less than 5,000 kWh/yr and are therefore in the "unattractive" margin category. Nevertheless the weighted average margin is estimated at 6.6%, showing that the tariff recovers costs in aggregate even though it is not cost reflective at the individual customer level.

Figure 5-1 Tariff 11 retail margin variation with annual consumption



Source: MMA estimates

Figure 5-2 Estimated Tariff 11 customer profile as at December 2008

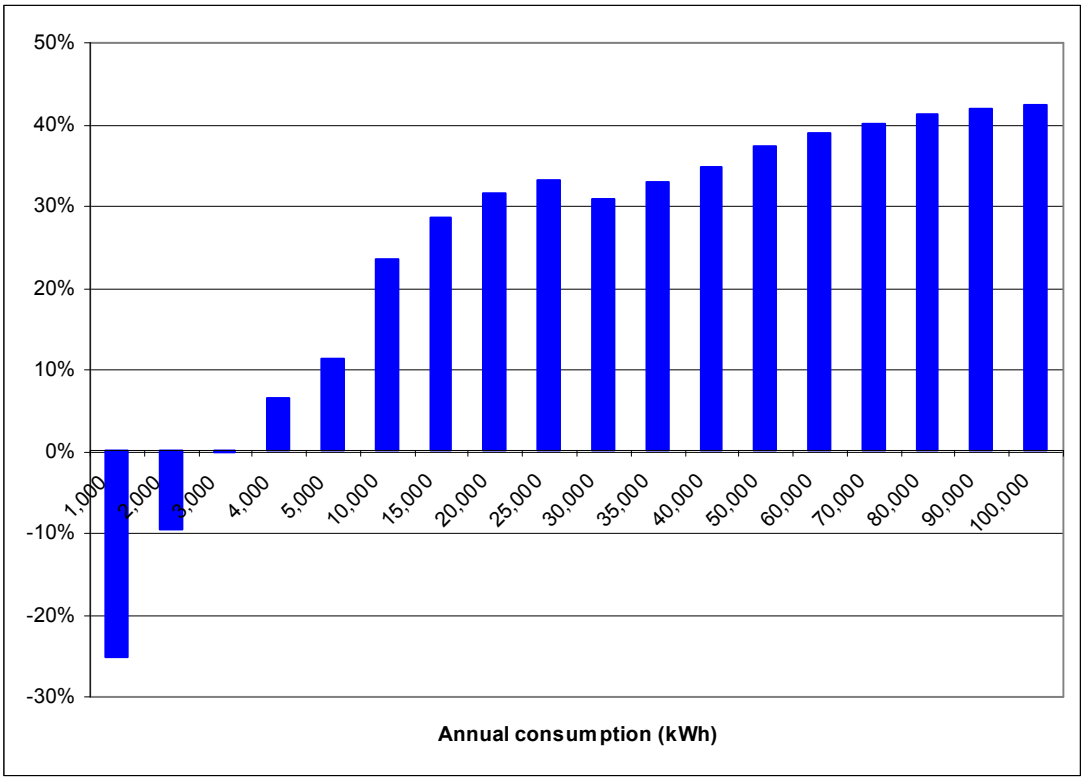


Source: MMA estimates based on network consumption data provided by Energex

5.2.2.2 Tariff 20

Figure 5-3 illustrates the variation in retail margin for Tariff 20, with annual consumption ranging from 1,000 kWh to 100,000 kWh (the average is 20,636 kWh). The tariff has a very similar profile to Tariff 11 but with slightly higher margins. The figure shows that tariff revenue from customers using less than 4,000 kWh/yr will generate margins of less than 5% and customers using more than 5,000 kWh/yr will generate margins of more than 5%, even those using more than 25,000 kWh that attract the higher network tariff (Tariff 8600). MMA has no information regarding the customer usage profile applicable to this tariff and therefore cannot estimate the aggregate margin or level of cost recovery.

Figure 5-3 Tariff 20 retail margin variation with annual consumption



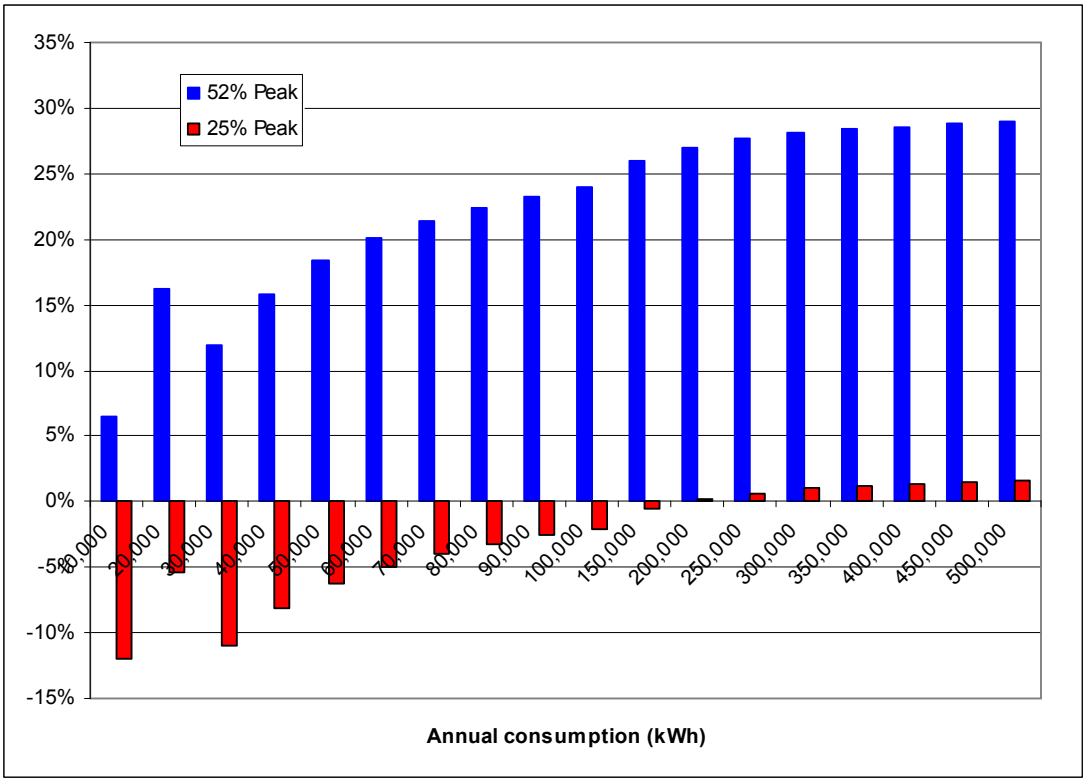
5.2.2.3 Tariff 22

Tariff 22 is a time-of-use tariff. We have calculated tariff revenues and margins assuming a peak : off-peak split the same as in the Energex NSLP, namely 52% : 48%, and by way of an example, also calculated revenue and margins for a 25% : 75% split.

Figure 5-4 illustrates the variation in retail margin for Tariff 22, with annual consumption ranging from 10,000 kWh to 500,000 kWh (the average is 100,152 kWh). On the assumed peak : off-peak usage split the tariff yields an above 5% margin at all consumption levels considered. However at the lower 25% peak split, the tariff yields a below 5% margin at all levels considered. The sensitivity of margins to peak : off-peak profile could be reduced or eliminated only if all customers are moved to interval or ToU meters.

MMA has no information regarding the customer annual usage profile applicable to this tariff and therefore cannot estimate the aggregate margin or level of cost recovery.

Figure 5-4 Tariff 22 retail margin variation with annual consumption



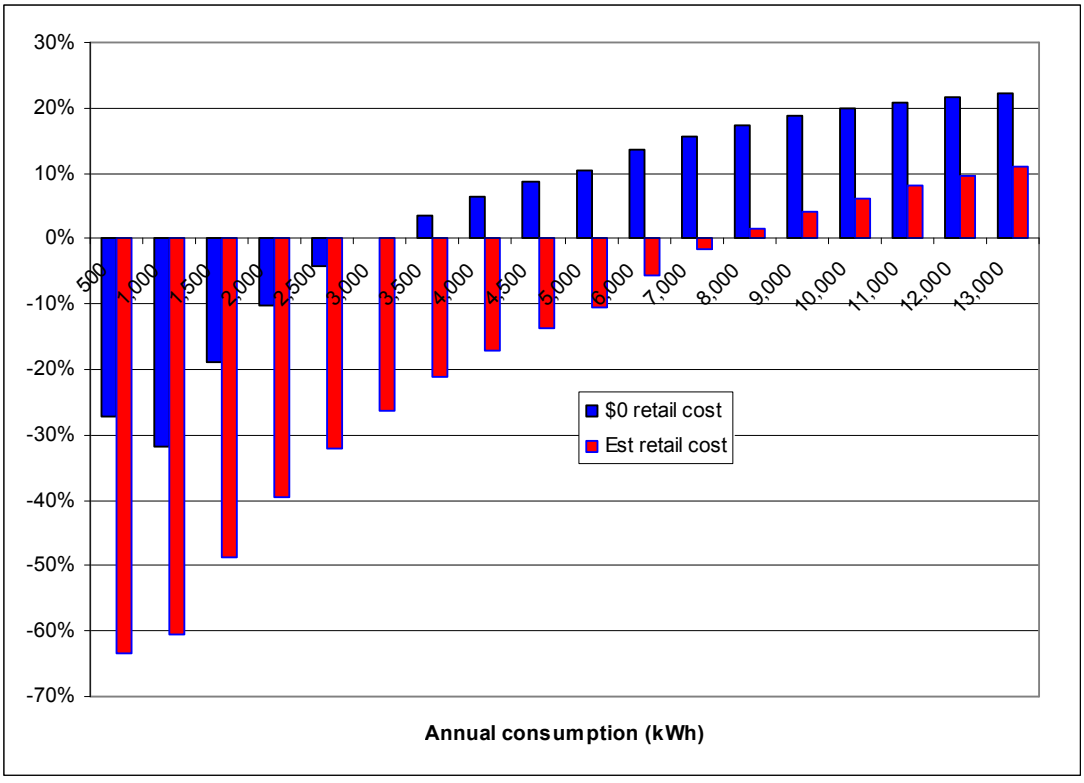
5.2.2.4 Tariff 31

Tariff 31 is an off-peak controlled load tariff for which the energy costs to retailers are determined by a separate load profile, CLP31. We have calculated tariff revenues and margins using two different estimates of retail costs, owing to uncertainty regarding the costs that apply to tariffs where customers are also on another tariff (Tariff 11) and the incremental cost of service may be lower than our formula suggests.

Figure 5-5 illustrates the variation in retail margin for Tariff 31, with annual consumption ranging from 500 kWh to 13,000 kWh (the average is 2,416 kWh). At the estimated retail cost the tariff yields an above 5% margin only at very high consumption levels. At an assumed zero retail cost the margin profile is similar to that of Tariff 11.

MMA has no information regarding the customer annual usage profile applicable to this tariff and therefore cannot estimate the aggregate margin or level of cost recovery.

Figure 5-5 Tariff 31 retail margin variation with annual consumption



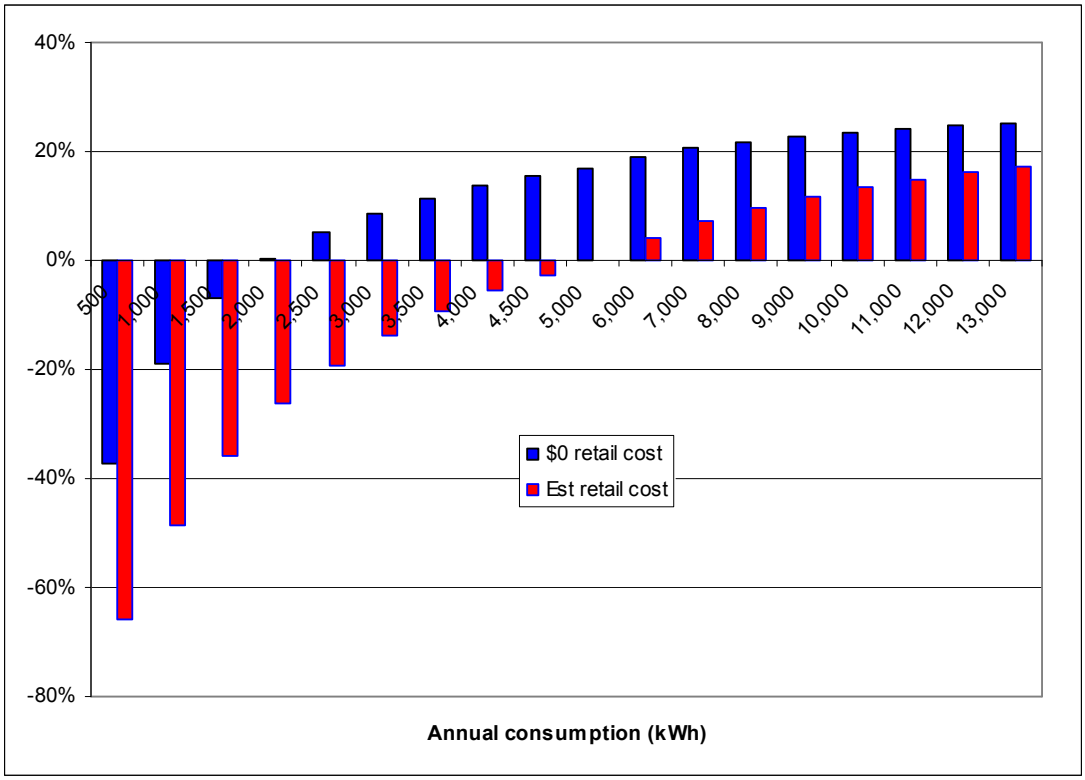
5.2.2.5 Tariff 33

Tariff 33 is also a controlled load tariff for which the energy costs to retailers are determined by a separate load profile, CLP33. We have calculated tariff revenues and margins using two different estimates of retail costs, owing to uncertainty regarding the costs that apply to tariffs where customers are on another tariff (Tariff 11) and the incremental cost of service may be lower than our formula estimate.

Figure 5-6 illustrates the variation in retail margin for Tariff 33, with annual consumption ranging from 500 kWh to 13,000 kWh (the average is 2,416 kWh). It is very similar to but has slightly higher margins than Tariff 31.

MMA has no information regarding the customer annual usage profile applicable to this tariff and therefore cannot estimate the aggregate margin or level of cost recovery.

Figure 5-6 Tariff 33 retail margin variation with annual consumption



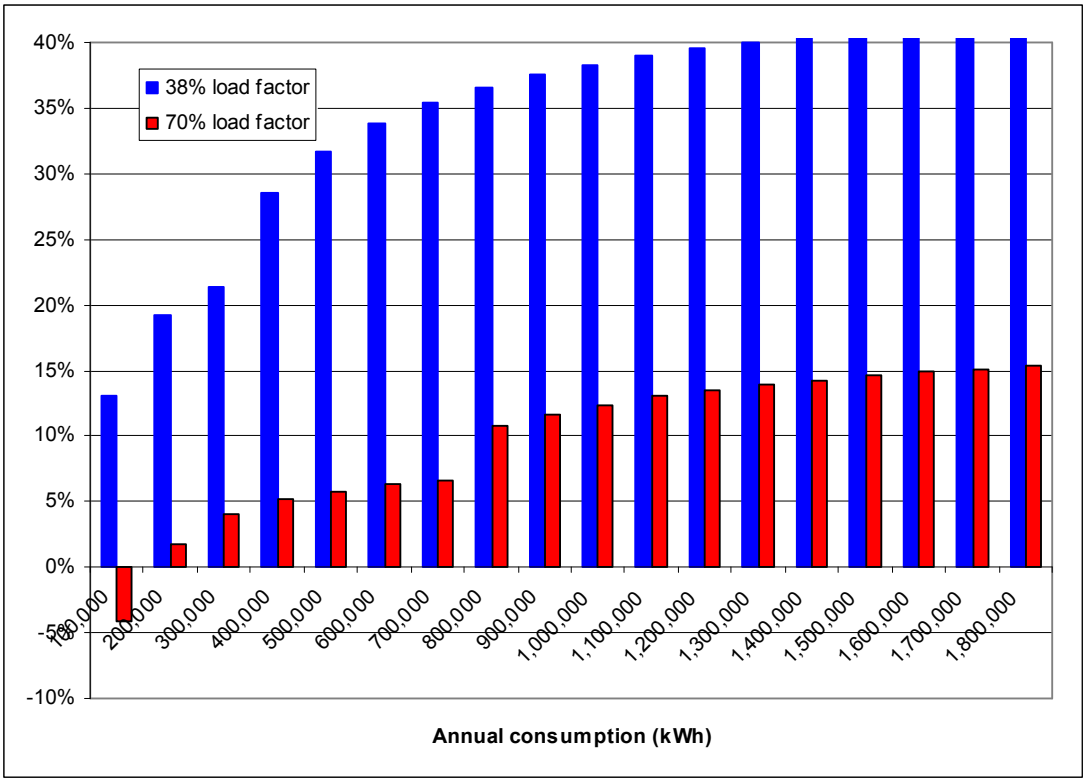
5.2.2.6 Tariff 41

Tariff 41 is a business tariff with a demand charge. We have calculated tariff revenues and margins using two different load factors to derive the demand component from annual energy, the NSLP average of 38% and a value of 70% which may be more typical of customers on this tariff.

Figure 5-7 illustrates the variation in retail margin for Tariff 41, with annual consumption ranging from 100,000 kWh to 1,800,000 kWh (the average is 656,596 kWh). At the NSLP load factor the tariff yields an above 5% margin at all consumption levels considered. However at a 70% load factor the tariff yields a below 5% margin at lower consumption levels.

MMA has no information regarding the customer annual usage profile applicable to this tariff and therefore cannot estimate the aggregate margin or level of cost recovery.

Figure 5-7 Tariff 41 retail margin variation with annual consumption



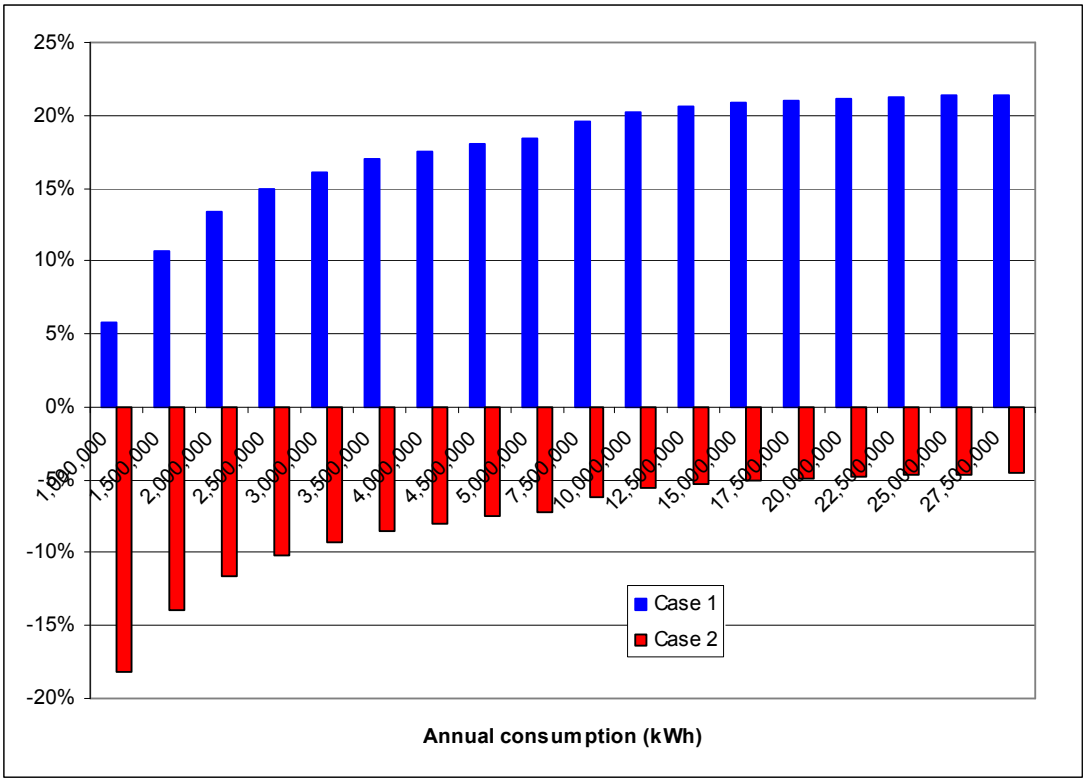
5.2.2.7 Tariff 43

Tariff 43 is a time-of-use tariff with a demand charge. We have calculated tariff revenues and margins for two different sets of assumptions regarding peak : off peak split and load factors: Case 1 - 52% : 48% split and 38% load factor (the NSLP values); Case 2 - 25% : 75% split and 70% load factor.

Figure 5-8 illustrates the variation in retail margin for Tariff 43, with annual consumption ranging from 1,000,000 kWh to 27,500,000 kWh (the average is 4,509,262 kWh). Under the NSLP assumptions the tariff yields an above 5% margin at all consumption levels considered. However, with the alternative assumptions the tariff yields a below 0% margin at lower consumption levels.

MMA has no information regarding the customer annual usage profile applicable to this tariff and therefore cannot estimate the aggregate margin or level of cost recovery.

Figure 5-8 Tariff 43 retail margin variation with annual consumption



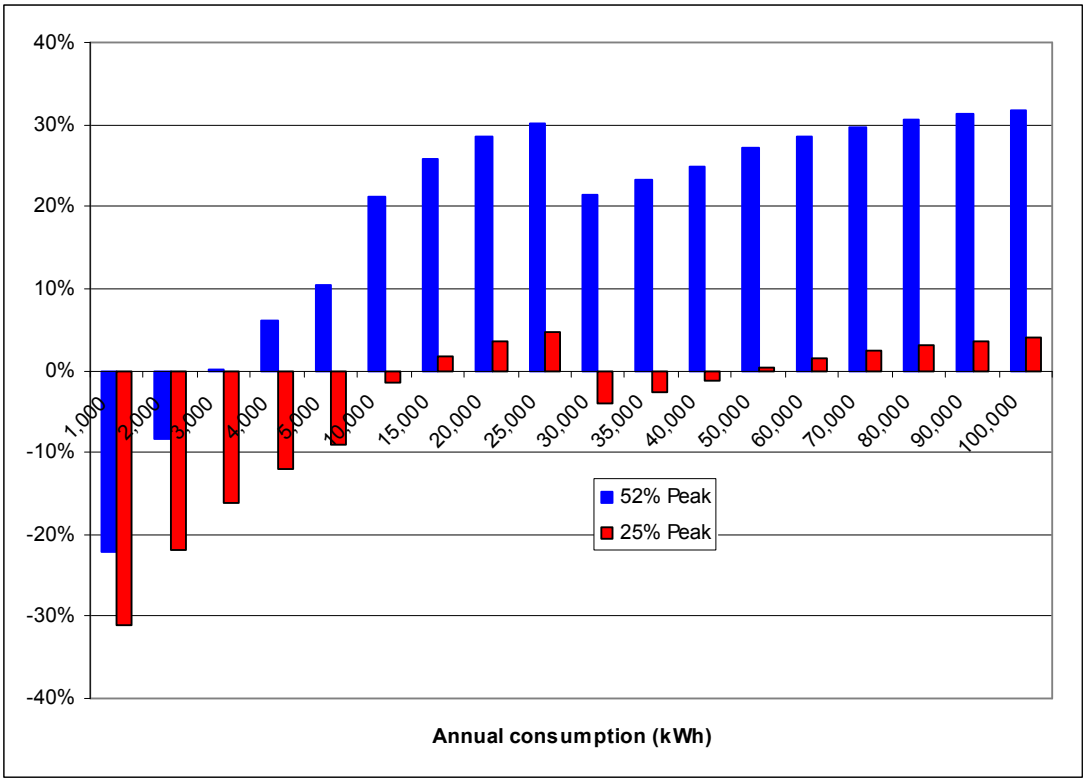
5.2.2.8 Tariff 62

Tariff 62 is a farm time-of-use tariff. We have calculated tariff revenues and margins assuming a peak : off-peak split the same as in the Energex NSLP, namely 52% : 48%, and by way of an example, also calculated revenue and margins for a 25% : 75% split.

Figure 5-9 illustrates the variation in retail margin for Tariff 62, with annual consumption ranging from 1,000 kWh to 100,000 kWh (the average is 16,243 kWh). On the assumed peak : off-peak usage split the tariff yields a below 5% margin at consumption levels below 4,000 kWh. However at the lower 25% peak split, the tariff yields a below 5% margin at all levels considered. The sensitivity of margins to peak : off-peak profile could be reduced or eliminated only if all customers are moved to interval/ToU meters.

MMA has no information regarding the customer annual usage profile applicable to this tariff and therefore cannot estimate the aggregate margin or level of cost recovery.

Figure 5-9 Tariff 62 retail margin variation with annual consumption



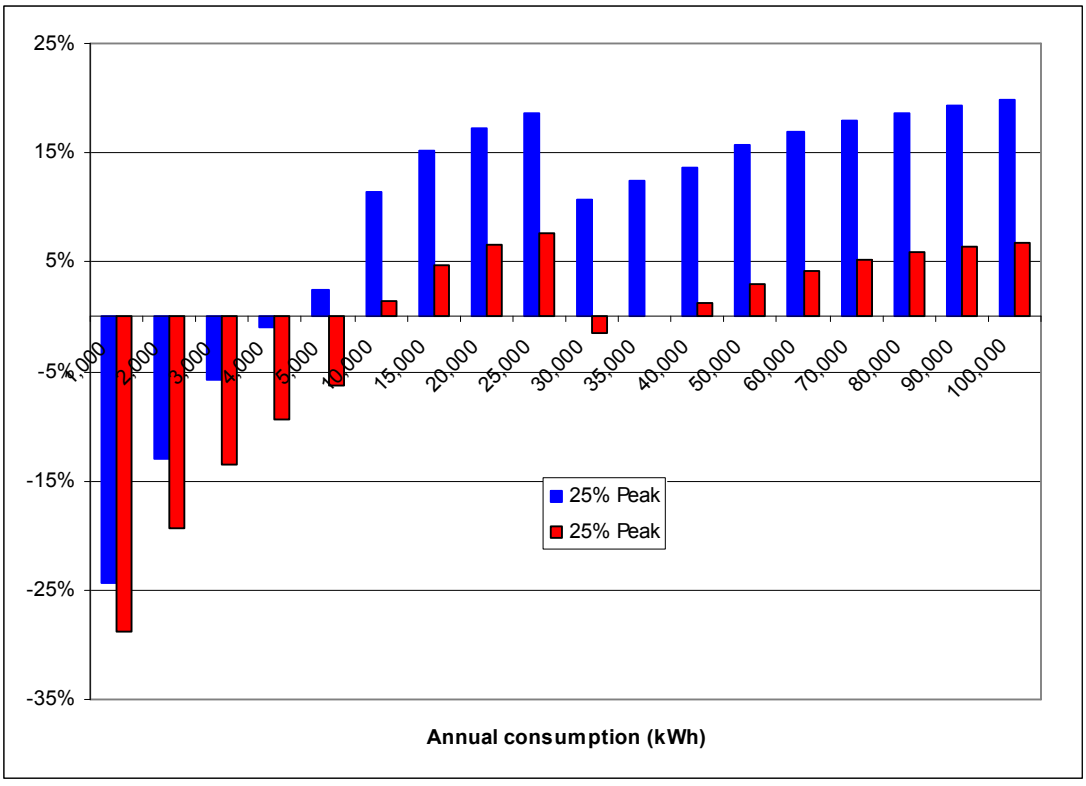
5.2.2.9 Tariff 65

Tariff 65 is an irrigation time-of-use tariff. We have calculated tariff revenues and margins assuming a peak : off-peak split the same as in the Energex NSLP, namely 52% : 48%, and by way of an example, also calculated revenue and margins for a 25% : 75% split.

Figure 5-10 illustrates the variation in retail margin for Tariff 65, with annual consumption ranging from 1,000 kWh to 100,000 kWh (the average is 14,942 kWh). On the assumed peak : off-peak usage split the tariff yields a below 5% margin at consumption levels below 5,000 kWh. However at the lower 25% peak split, the tariff yields a below 5% margin up to 15,000 kWh and between 25,000 kWh and 50,000 kWh. The sensitivity of margins to peak : off-peak profile could be reduced or eliminated only if all customers are moved to interval/ToU meters.

MMA has no information regarding the customer annual usage profile applicable to this tariff and therefore cannot estimate the aggregate margin or level of cost recovery.

Figure 5-10 Tariff 65 retail margin variation with annual consumption



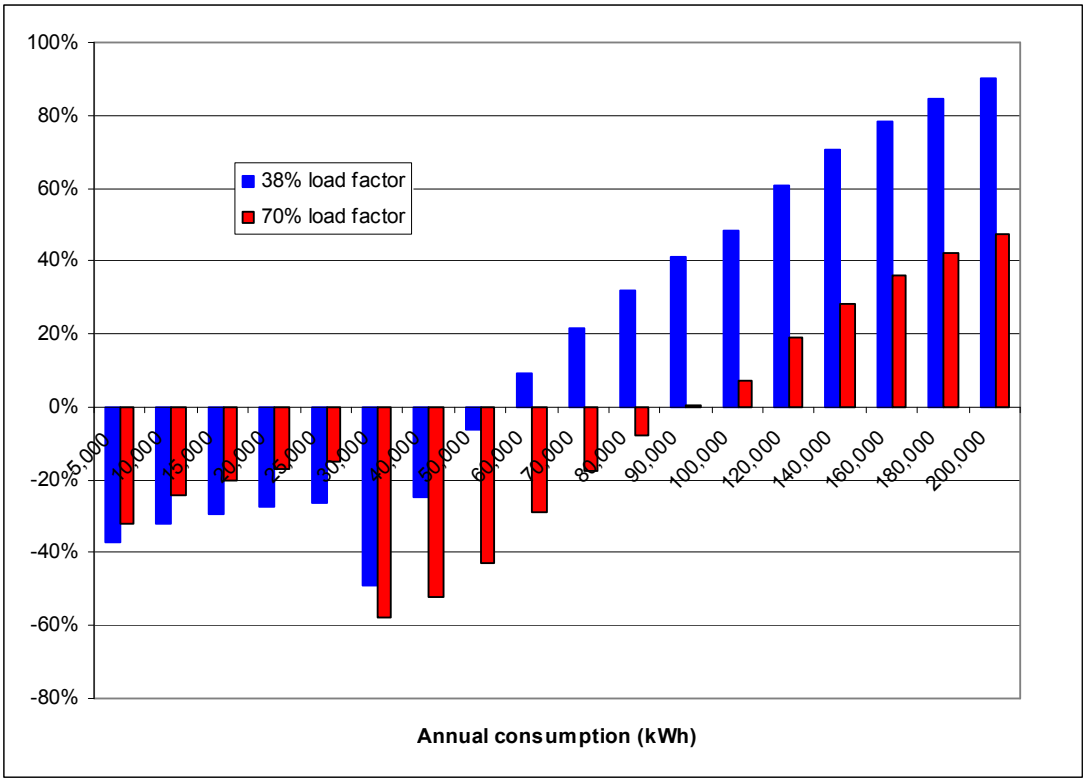
5.2.2.10 Tariff 66

Tariff 66 is an irrigation tariff with a demand charge. We have calculated tariff revenues and margins using two different load factors to derive the demand component from annual energy, the NSLP average of 38% and a value of 70% which may be more typical of customers on this tariff.

Figure 5-11 illustrates the variation in retail margin for Tariff 66, with annual consumption ranging from 5,000 kWh to 200,000 kWh (the average is 29,019 kWh). At the NSLP load factor the tariff yields a below 5% margin at consumption levels below 70,000 kWh. However, at a 70% load factor the tariff yields a below 5% margin up to 120,000 kWh. At high consumption levels the tariff yields extremely high margins.

MMA has no information regarding the customer annual usage profile applicable to this tariff and therefore cannot estimate the aggregate margin or level of cost recovery.

Figure 5-11 Tariff 66 retail margin variation with annual consumption



5.3 Conclusion

We conclude from the analysis in this section that:

- Retail and network tariffs are not sufficiently aligned
    - Retailers do not recover their fixed costs
    - Network pricing signals are muted and the ability of tariffs to contribute to demand management is limited (though this is also partly due to the non-availability of interval meters for most customers)
- There are considerable subsidies between tariffs (customer types) and within tariffs (between groups with different consumption levels and profiles)
- The retail tariffs are not cost reflective and that the degree to which each is not cost reflective varies considerably
- A considerable proportion of customers yield unattractive profits/margins to retailers when supplied on the regulated tariffs
    - This has the effect of restricting retailers ability to make competitive market offers to these customers
    - This directly reduces the size of the competitive market and the number of new entrant retailers the market is likely to attract
    - Ultimately, the level of competition and benefits from competition would be weakened
- The balance of customers that are profitable when supplied on the regulated tariffs will be competed away or retained on lower margins
    - In the longer term retailers who have to supply customers on regulated prices will be stuck with unprofitable customers which would place their financial viability at risk
- The tariffs and the tariff setting process require significant revision to meet the tariff objectives set out by the Government.

6 ASSESSMENT OF RETAIL TARIFF OPTIONS

6.1 Introduction

In this section we assess the merits of the retail tariff options described in section 4, in relation to the domestic tariff, Tariff 11. The basis for the comparison is a cost reflective flat tariff, that is a flat tariff that would yield 5% margins for the majority of the relevant consumption levels, i.e. become cost reflective on an annual basis as defined in section 2.2. Because of the multiple network tariffs that are applied to Tariff 11 this can only be achieved for consumption levels up to 25,000 kWh, which however covers almost all relevant customers.

The merits assessment is conducted in line with the criteria put forward in section 3.3, cost reflectivity, demand management impact and logical/easy to understand.

6.2 Cost reflective flat tariff

MMA has not undertaken a comprehensive cost analysis to accurately determine the most cost reflective flat tariff for domestic customers. However using the costs derived in section 2, we have derived an indicative cost reflective flat tariff for the purpose of comparison with the cost reflectivity and demand impacts achieved using the alternative tariff structures discussed in section 4. The cost reflective domestic flat tariff derived for this purpose has a variable rate of $0.1426/kWh.

6.2.1 Demand impact

Consumers' price response to price changes is determined by their price elasticity, that is, the percentage change in consumption for each 1% change in price. Economic theory suggests that consumers respond to changes in each element of the tariff, particularly the price of the marginal block that determines the cost of their incremental changes in consumption. However, the models that capture these effects[8] have a structure that implies that all customers respond the same way to changes in tariff structure. For example in a single block tariff such as Tariff 11, if the block charge decreases, as it would in moving to more cost reflective tariffs, all customers would increase usage. This seems inappropriate in a context where some customers would face increases in their average prices, and may be expected to reduce rather than increase consumption, and other customers may face decreases in their average prices and may be expected to increase consumption.

To estimate load changes we have therefore assumed that customers respond to average price changes, which means that for Tariff 11, which we estimate recovers costs on

[8] See for example "OLS and Instrumental Variable Price Elasticity Estimates for Water in Mixed-Effect Models Under a Multipart Tariff Structure", Nadira Barkatullah, London Economics April 2002

average, changing to a more cost reflective tariff would cause some customers to reduce consumption and others to increase consumption. The same elasticity of -0.25, which is believed to be typical[9], has been applied to each group of customers.

For Tariff 11 this approach suggests that a change to a more cost reflective tariff would increase average consumption by 28 kWh or 0.5%, i.e. the increase in usage by large customers would outweigh the decrease in usage by smaller users.

6.3 Inclining block tariff

Issues relating to the design of an inclining block tariff are illustrated here by considering such a structure to replace Tariff 11. For simplicity we have chosen to use just two blocks.

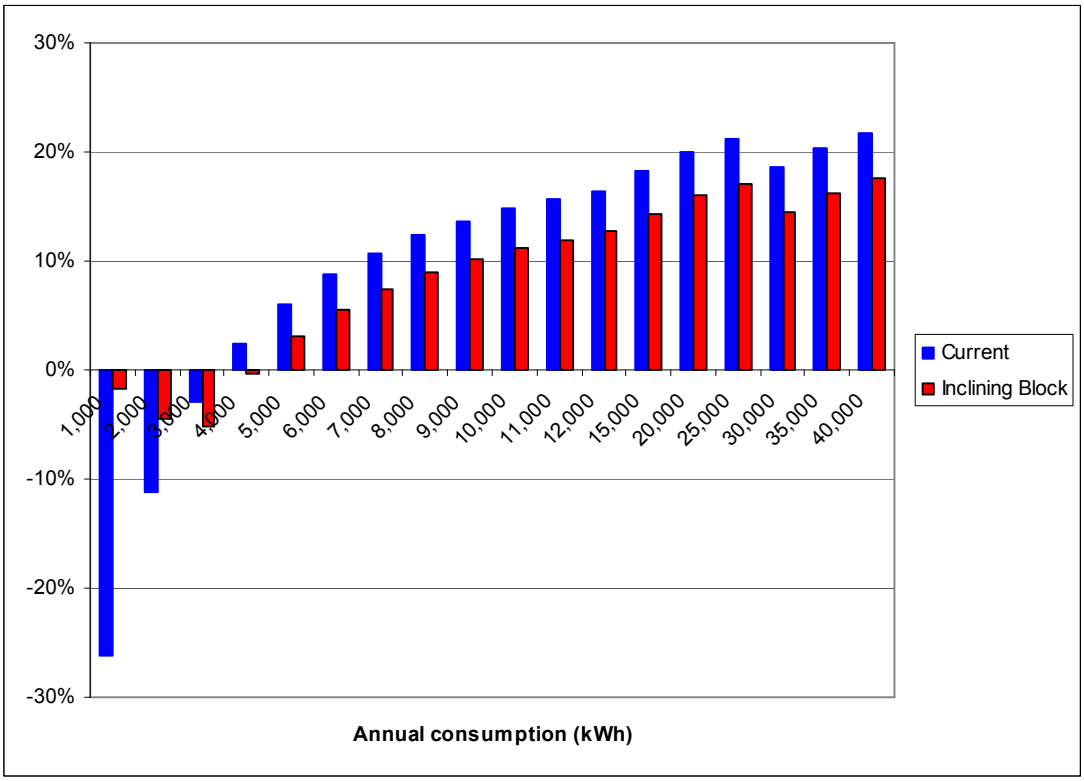
For the majority of customers on network tariff 8400, any deviation from the cost reflective variable rate will result in variations in the retail margins from the 5% target. For illustrative purposes we have designed the blocks by determining a value X such that with Block 1 = variable rate – X and Block 2 = variable rate + X and an appropriate threshold, the margin is above -5% for all customer groups. This results in X = $0.0226/kWh with Block 1 applicable up to 237.5 kWh/month or 2850 kWh/yr. Figure 6-1 illustrates the variation of margins for different customer groups – the number of customers with unattractive margins is actually higher than for the current tariff. The reduction in margins for consumption higher than 25,000kWh reflects the change in network tariffs at that consumption level.

Relative to the current tariff the inclining block structure would increase average consumption by 18 kWh or 0.4%. Relative to the cost reflective flat tariff this is a reduction of 10 kWh or 0.2%.

If the network tariffs became inclining block the demand response could be enhanced without further deterioration in cost reflectivity.

[9] NIEIR, published in AEMO Staetment of Opportunities 2009

Figure 6-1 Tariff 11 retail margin variation for current and inclining block structures



6.4 Seasonal tariff

Issues relating to the design of a seasonal tariff are illustrated here by considering such a structure to replace Tariff 11.

As noted in section 2.2 the only time variation in energy payments by retailers on behalf of customers included in the NSLP is seasonal, as shown in Table 6-1. Since the network tariff is not seasonal, the variation in NSLP payments can be used to define the block rates. The differences in the block rates are relatively small.

Table 6-1 Seasonal NSLP payments and corresponding block rates, based on 2008-09 data

Season	NSLP Payments ($/MWh)	Estimated Total Cost ($/MWh)	Seasonal Block rate ($/kWh)
Annual	$39.12	$66.21	$0.1426
Summer	$42.49	$69.58	$0.1460
Autumn	$30.36	$57.45	$0.1339
Winter	$41.42	$68.51	$0.1449
Spring	$41.22	$68.31	$0.1447

The resulting seasonal tariff will be more cost reflective than the most reflective tariff using the current structure because it will reflect differences in cost between customers with different seasonal consumption profiles, i.e. it will yield a uniform 5% margin not only for customers with different annual consumption but also different seasonal consumption, with the exception of those on network tariff 8600.

Table 6-2 shows the estimated demand responses to the seasonal tariff, relative to the cost reflective tariff with the current structure. This suggests that a seasonal tariff could achieve small demand reductions in higher priced seasons, offset by demand increases in lower priced seasons.

Table 6-2 Demand response to seasonal tariff relative to cost reflective flat tariff

Season	kWh/customer	%
Annual	0	0%
Summer	-7	-0.5%
Autumn	14	1.2%
Winter	-4	-0.3%
Spring	-4	-0.3%

If the network tariffs became seasonal the demand response could be enhanced while maintaining cost reflectivity.

MMA acknowledges that greater seasonal tariff variability may result if quarterly electricity contract prices, as illustrated in Table 6-3, are used to estimate the total energy cost instead of the variations in NSLP payments used in the above analysis. This would be our preferred approach, however it was not readily implementable within the context of this study.

Table 6-3 Quarterly electricity contract prices ($/MWh)

Season	Peak	Off-Peak	Flat
Q110	83.73	23.00	49.15
Q210	44.23	23.00	31.75
Q310	42.82	23.00	31.75
Q410	52.90	23.00	36.00

Source: NextGen, 13-10-09

6.5 Time-of-use tariff

Time-of-use tariffs are available to business users but not to domestic users. Introduction of a domestic time-of-use tariff would not be feasible unless accompanied by availability of suitable meters, such as interval meters. Cost reflectivity of a new domestic ToU tariff would depend critically on whether:

- A network ToU tariff was made available to domestic users
- Customers on the ToU tariff were peeled off the NSLP and their energy costs billed either on a new collective load profile or on their independent load profiles.

For this analysis we assume that both of these changes occur, recognising that this may take time which would delay introduction. We assume that the applicable network tariff would be 8700, currently available only to small business users. We have not tested whether this would be revenue neutral for Energex. To estimate energy costs we have used the NSLP peak and off-peak profiles to derive NEM costs and adjusted the total cost of energy. The resulting retail tariff has the following peak and off-peak charges:

Peak Energy Charge: $0.1564/kWh

Off-Peak Energy Charge: $0.1000/kWh

It is noted that relative to the cost reflective tariff with the current structure the off-peak charge decreases more than the peak charge increases, mainly because of the assumed network charges.

This ToU tariff will be more cost reflective than the most reflective tariff using the current structure because it will reflect differences in cost between customers with different daily consumption profiles, i.e. it will yield a uniform 5% margin not only for customers with different annual consumption but also different daily consumption.

Our analysis of the demand responses to this ToU tariff, relative to the cost reflective tariff with the current structure, suggest that peak energy consumption will decline by 1.9% while off-peak energy consumption will increase by 5.9%, the asymmetry being due to the different changes to peak and of-peak rates noted above. The aggregate increase in energy consumption would be 1.6%. These results could be different if the price elasticities for peak and off-peak usage are materially different.

6.6 Summary assessment of options

Table 6-4 summarises our findings on each of the options for replacing Tariff 11.

Table 6-4 Assessment of options

Tariff option	Cost reflectivity	Demand impact	Simplicity	Implementation
A. Cost reflective, current structure	Annual – Yes Seasonal – No Peak - No	Increase relative to current tariff	Very simple	Straightforward
B. Inclining block	Annual – Reduced relative to A Seasonal – No Peak - No	Limited decrease rel. to A.	Customers will not know when they have exceeded threshold each billing period	Straightforward
C. Seasonal	Annual – Yes Seasonal – Yes Peak - No	Limited decrease in peak season rel. to A.	More rate changes than necessary. Could simplify to two seasons	Requires tariffs to change quarterly
D. Time-of-use	Annual – Yes Seasonal – No Peak - Yes	Strong decrease in peak rel. to A.	Reasonably simple	Requires commitment to new network tariff and load profiling

Based on our analysis we conclude that the tariffs available with current metrology, namely inclining block and seasonal tariffs, can achieve certain levels of cost reflectivity but only very limited demand management effects. Greater levels of cost reflectivity and demand management impacts will be achievable using time-of-use tariffs but only if/when interval meters are introduced.

Our broad recommendation is therefore that regulated tariffs for customers on accumulation meters have a flat tariff structure. Customers with ToU capable meters should be on ToU regulated tariffs with flat rates for peak and off-peak, and customers with demand meters should be on tariffs with flat energy and demand components.

This recommendation would change if Energex introduced inclining block or seasonal network tariffs for customers on accumulation meters, in which case the retail tariffs should reflect the relevant network tariff structure. There are no signs that Energex intends to do this however.

7 RECOMMENDED TARIFF STRATEGIES

Based on our analysis of cost reflectivity of the majority of tariffs, combined with insights into the impact of inclining block, seasonal and time-of-use tariffs for the domestic sector, we recommend the tariff strategies in Table 7-1. The recommendations include discontinuing up to seven tariffs.

Table 7-1 Recommended tariff strategies

Code	Strategy	Second best option / comments
11	Move to cost reflective flat tariff. Different tariffs for small and large users to match network tariffs.	Seasonal cost reflective tariff
20	Move to cost reflective flat tariff. Different tariffs for small and large users to match network tariffs.	Seasonal cost reflective tariff
21	Discontinue tariff. Move customers to Tariff 20	
22	Move to cost reflective time-of-use tariff. Different tariffs for small and large users to match network tariffs.	
31	Move to cost reflective flat tariff	Limited seasonal variation in off-peak energy costs.
33	Move to cost reflective flat tariff	Limited seasonal variation in off-peak energy costs.
37	Discontinue tariff. Move customers to Tariff 22.	
41	Move to cost reflective demand tariff Different tariffs for small and large users to match network tariffs.	
43	Move to cost reflective demand/peak-off peak tariff Different tariffs for small and large users to match network tariffs.	
53	Consider discontinuing and merging with Tariff 43. Network tariffs do not reflect this structure.	
62	Move to cost reflective time-of-use tariff with only one peak block. Different tariffs for small and large users to match network tariffs.	Consider merging with Tariff 22 - need to consider Ergon Energy implications.
63	Discontinue tariff Move customers to Tariff 62.	
64	Discontinue tariff Move customers to Tariff 62.	
65	Discontinue tariff Move customers to Tariff 62.	Move to cost reflective time-of-use tariff. Different tariffs for small and large

Code	Strategy	Second best option / comments
		users to match network tariffs.
66	Move to cost reflective demand/peak-off peak tariff Different tariffs for small and large users to match network tariffs.	Consider merging with Tariff 41 - need to consider Ergon Energy implications.
67	Not assessed	Minor tariff
68	Not assessed	Minor tariff
71	Not assessed	Require retail cost details for assessment
81	Not assessed	Require retail cost details for assessment
91	Not assessed	Require retail cost details for assessment

APPENDIX A COMPETITIVE RETAIL MARKETS

Australia's national competition policy has, since the mid 1990s, been premised on the assumption that Australia's international competitiveness and hence living standards would be enhanced by using competitive forces to increase efficiency and community welfare, rather than relying upon regulated monopolies in many sectors of the economy[10].

Since this time, the hitherto monopoly dominated Australian electricity market has been transformed in accordance with this policy:

- Competition has been introduced to the generation and retail sectors
- The transmission and distribution sectors have been placed under more efficient regulation and independent regulators (one regulator for Eastern Australia), with non-regulation an option where there is perceptible competition
- Competitive and monopoly sectors have been ring-fenced to remove barriers to accessing monopoly assets

Similar reforms have been made in other countries. For technical and economic reasons retail competition has been introduced progressively, starting with large users with suitable metering and an ability to negotiate supply with retailers and progressing to small users (full retail competition or FRC) after development of processes supporting energy cost allocation and customer transfer.

In an ideal retail market prices would be set by that market, that is, there would be no price regulation, prices or tariffs set by Governments or regulators that retailers (some or all) are obliged to offer to all eligible customers. In all small customer markets however, some form of price regulation has been retained at the commencement of FRC, to ensure that market dominance, barriers to market entry and other factors did not enable incumbent or legacy retailers to set uncompetitive prices for any sectors of the market, for example customers in rural areas where there are no new entrants. In most small customer markets price regulation is still in place: only in Victoria and the UK, where levels of retail competition are among the highest, has all retail price regulation been withdrawn, with the option for its re-introduction if market power re-emerges.

[10] National Competition Policy, Report by the Independent Committee of Inquiry, August 1993.