Energy Tariffs and Vulnerable Consumers

SACOSS Report
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Introduction

SACOSS is an active participant in many debates on the policies, laws and regulations of energy market reform. Electricity prices are always a sensitive topic but this report is not about the level of prices, rather it focusses on the current surge of interest from regulators and policy makers on the 'reform' of the *structure* of electricity prices. This interest stems from the economic efficiency potential of more '*cost-reflective'* prices.

Readers interested in a discussion of the trends in the different components of electricity prices are encouraged to read the Australian Energy Market Commission (AEMC) Annual Residential Electricity Price Trends Report[1]. Readers interested in comparing energy costs between retailers are encouraged to visit the St Vincent DePaul Society's South Australian Tariff-Tracking Project[2] and the Australian Energy Regulator's *Energy Made Easy* website[3].

By and large, the prices households pay for electricity are comprised of a fixed component – the 'service access charge' or 'supply charge', and a 'rate' based on the volume of electricity consumed over the quarter. This is generally expressed as 'cents per kilowatt-hour' or c/kWh. Most households are paying somewhere around 70 cents per day for the fixed component (about $250 pa) and over 30 cents per kWh.

The numerous offers in the market from the 12 electricity retailers selling into South Australia are variations of the above with some differences in the 'structure' of tariffs. When the residential electricity market was opened up to competition in 2003, AGL Energy, the incumbent retailer, set its tariffs to have higher prices in Summer (the January-March quarter). 11 years later, 7 of the 12 retailers follow this same practice. Further, 11 out of the 12 retailers structure their tariffs in what is referred to as 'inclining blocks' where prices increase as consumption increases. The only retailer that doesn't, Powerdirect, is a wholly owned subsidiary of AGL Energy.

The use of inclining block tariffs is largely due to the influence of the network tariffs set by South Australia's monopoly electricity distribution company, SA Power Networks (SAPN). When the consumer pays their retailer, the money collected includes a large component that must be paid to SAPN[4]. Typically, the retailer will simply 'pass through' these costs to their customers but there is a trend of not doing so and simplifying the prices offered to customers. This is discussed further below.

[1] AEMC 2013, www.aemc.gov.au/Market-Reviews/Completed/retail-electricity-price-trends-2013.html

[2] St Vincent DePaul Society 2013, www.vinnies.org.au/energy

[3] AER 2013, www.energymadeeasy.gov.au

[4] The AEMC reports that this is around 48% of market offers in 2013 (2013 Residential Electricity Price Trends, South Australia factpack).

Why is summer special?

The consumption of electricity by households and small business in SA changes across the year. SACOSS analysis of data published by the Australian Energy Market Operator (AEMO) from 2003-2013 (Figure 1) shows that while the volume of electricity consumed does not vary greatly between the four quarters of the calendar year, the average wholesale price clearly does (on average, volume-weighted wholesale costs in Q1 (Jan-Mar) are double those in the other quarters).

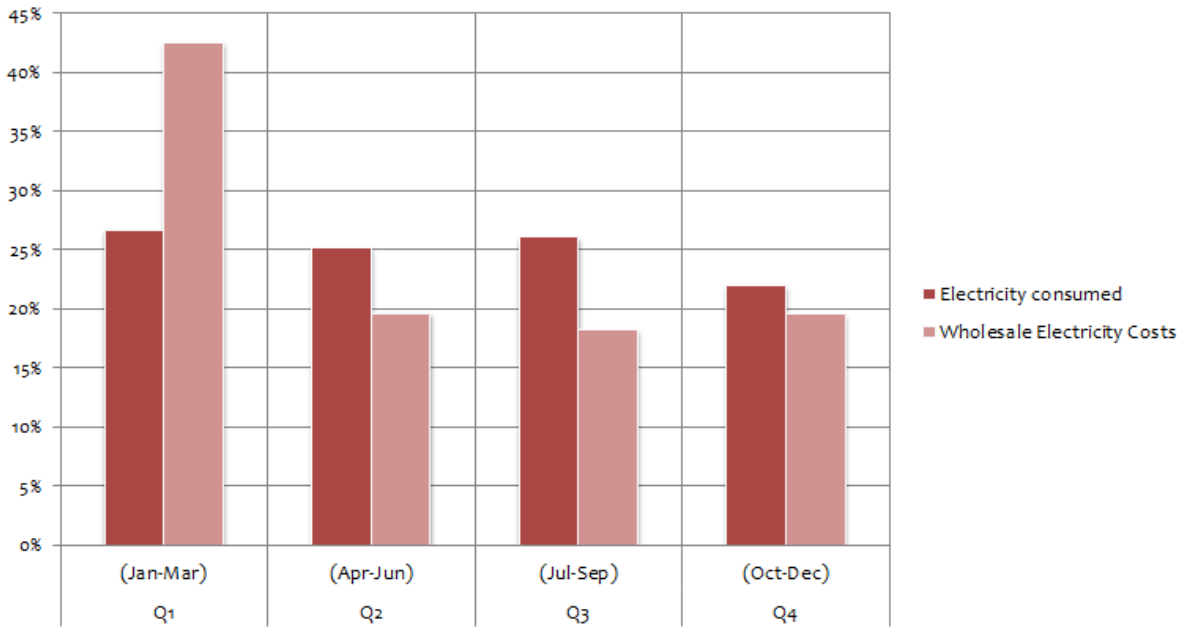

Figure 1: Relative consumption and wholesale market costs (daily net system load profile consumption multiplied by average daily wholesale market price) 01Jan2003-30Jun2003 Source: SACOSS analysis of AEMO data

The main reasons for the higher wholesale costs in Q1 are not about total consumption over the three months but the fact that demand spikes on a number of very hot days. On these occasions wholesale costs also spike and push up the average price for the period. On mild days, the price and demand resembles most other times throughout the year. This is illustrated overleaf in Figure 2 for the heatwave of 13-17 January 2014 compared to the week before and after.

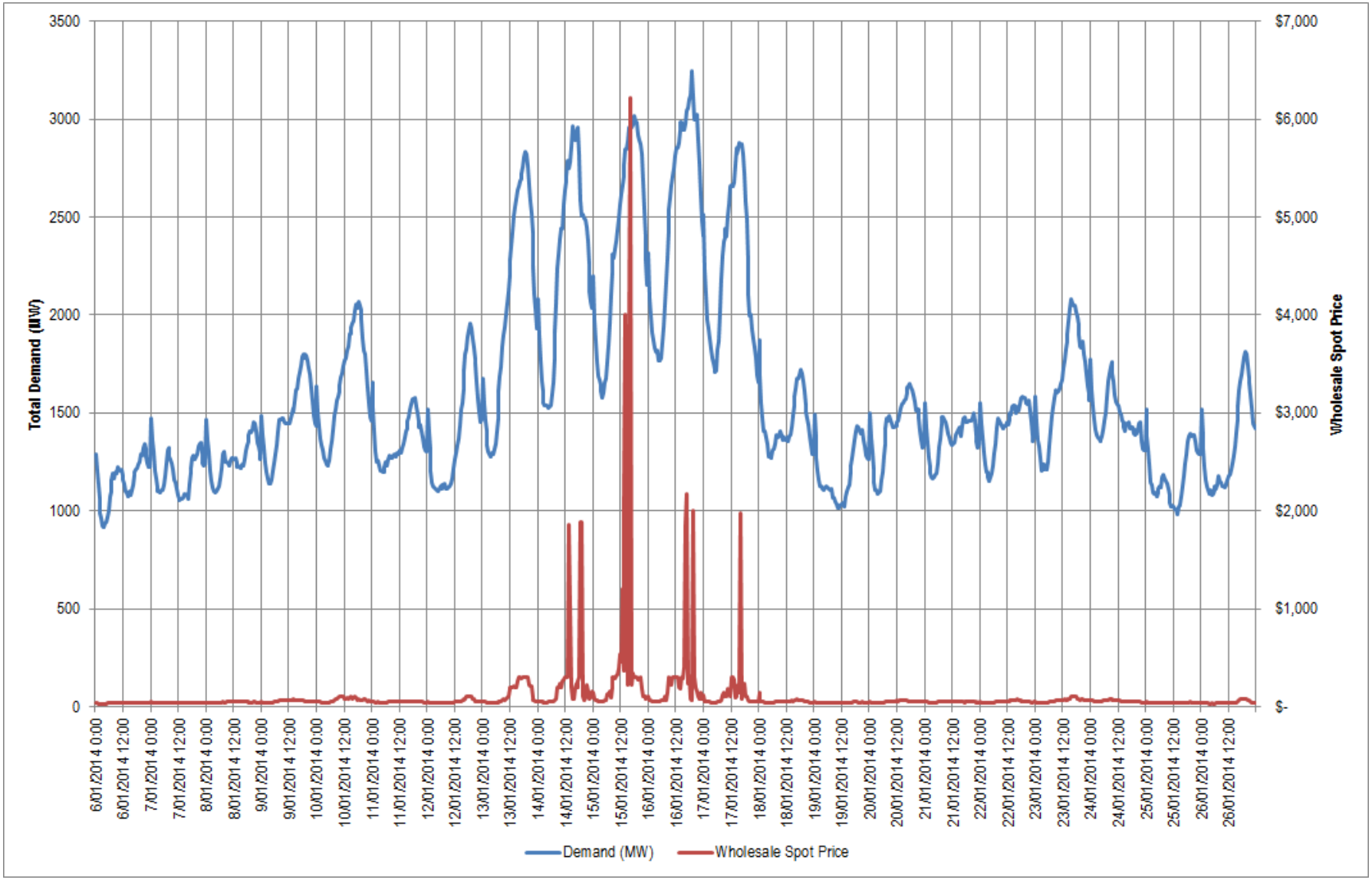

Figure 2: South Australian Total Wholesale Demand and Prices (half-hourly) for the period 6-26 January 2014. The maximum temperature recorded for Adelaide for the 13th, 14th, 15th, 16th and 17th exceed 40°C Source: AEMO

Network tariffs

SA Power Networks only offers one tariff structure for residential customers. This is an inclining block tariff as illustrated below:

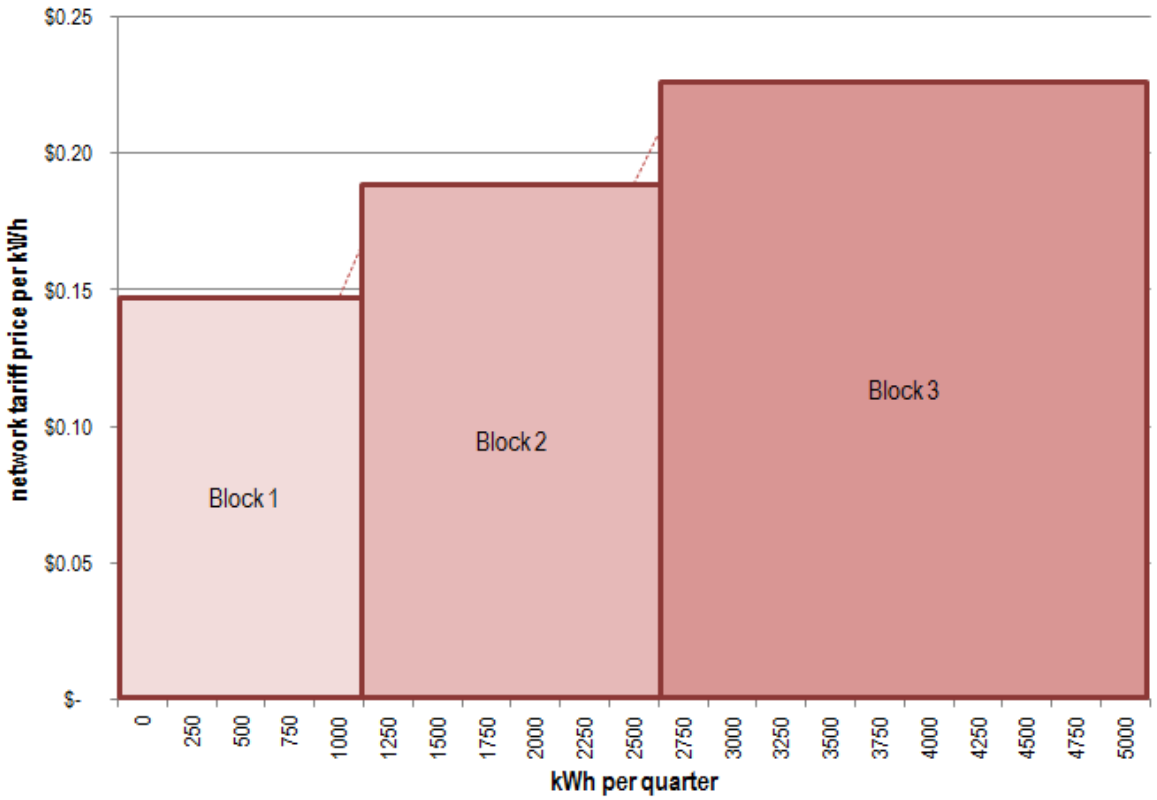

Figure 3: Illustration of Network Tariff 'block' structure for South Australian households 2013-14 Source: SACOSS presentation of SAPN prices

Figure 3 illustrates that network prices for consumption up to 1000 kWh are at one price, consumption for the next 1500 kWh in the quarter (i.e. up to 2500kWh for the quarter) are 29% higher and that consumption beyond 2500 kWh per quarter is a further 19% more expensive (54% more than the first block). It should be noted that median household consumption is around 4000 kWh per annum so around half of households would fit their average annual consumption into the first pricing block each quarter. Average consumption is around 6000 kWh per household per annum[5]. According to SAPN's forecasts for the 2010-15 Regulatory period[6], around 60% of consumption revenue is generated from consumption in the first block, around 30% from the second block and 10% from the highest block.

The fixed supply charge represents around 20% of network revenue generated from residential customers while off-peak hot water only generates 3-4% of residential revenue.

The Vinnies' Tariff-Tracking Project discusses the differences in the fixed component charged by different retailers[7].

[5] Source: ABS 4670.0 Household Energy Consumption Survey, Australia: Summary of Results, 2012

[6] Source: SACOSS analysis of SAPN Post Tax Revenue Model (PTRM), www.aer.gov.au

[7] St Vincent DePaul Society 2013, www.vinnies.org.au/energy

The following charts illustrate the relationship between retail and network tariff structures.

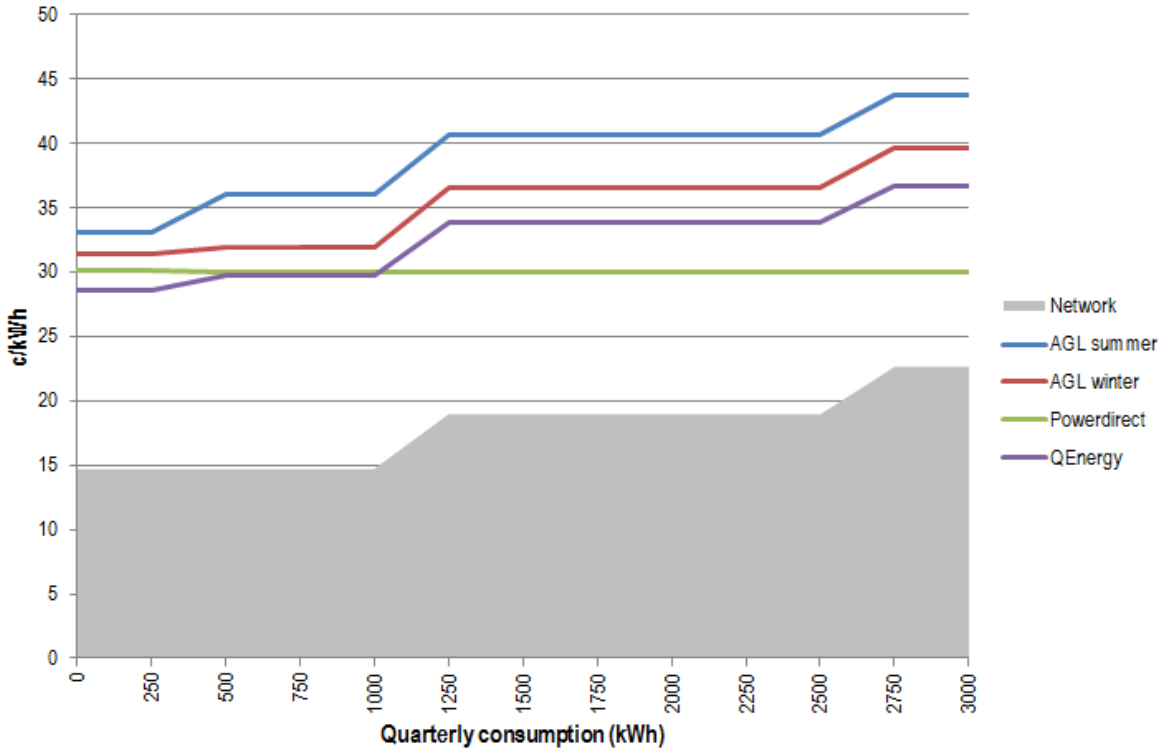

Figure 4: Illustration of selected Electricity Retail and Network Tariff 'block' structure for South Australian households 2013-14

Figure 4 compares the tariff steps of selected retail tariffs. The summer and winter components of the AGL Standing Contract, an 'all seasons' retail tariff from QEnergy and the 'flat rate' offer from Powerdirect, with the 'inclining block' structure of the Network tariff.

Figure 5 on the other hand illustrates the structure of the retail component once the network tariff is removed. As can be seen, these are relatively 'flat' except for the Powerdirect offer which shows that their component diminishes at higher levels of consumption. In effect, this is offset somewhat by having one of the market's higher fixed charges but it does represent a price structure that delivers lower costs to consumers of relatively large amounts of electricity.

The effect of the Powerdirect structure can be seen in the ranking of results returned from Energy Made Easy where they are one of the most competitive for consumption above the average of around 6000 kWh per year.

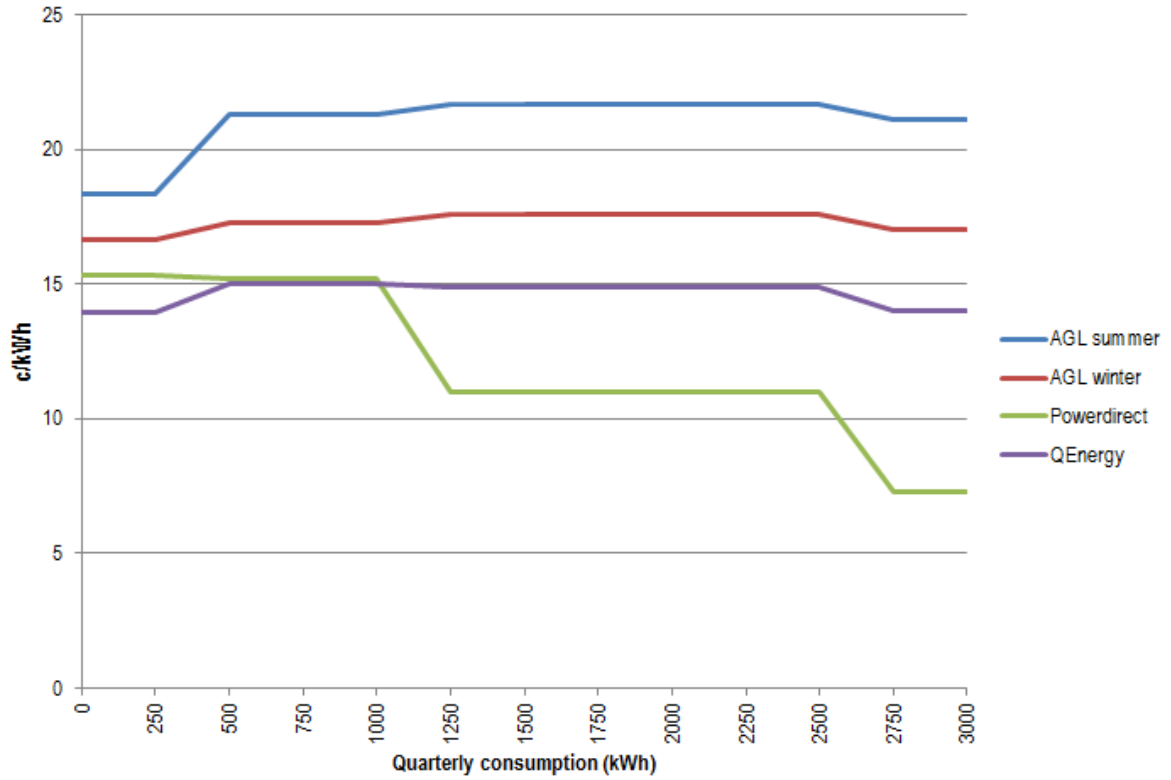

Figure 5: Illustration of selected Electricity Retail Tariff structures net of network charges for South Australian households 2013-14

The St Vincent de Paul Tariff-tracking project has shown this sort of customer segmentation in the Victorian market but this is the only example found in the South Australian context.

The future direction for tariffs

Recent reviews by both the Australian Energy Markets Commission (AEMC) and the Productivity Commission (PC) have highlighted the opportunities for increased efficiency and tackling the peak demand phenomenon through *cost-reflective* pricing[8].

The AEMC is also considering a change to the National Electricity Rules proposed by the Standing Council on Energy and Resources (SCER) that seeks to ensure more *cost-reflective* network pricing[9].

SACOSS is participating in this process and has been considering what constitutes 'cost reflective' network pricing in the South Australian context. The following quote from SA Power Networks makes it clear[10]:

[8] See AEMC's Power of Choice Review, http://www.aemc.gov.au/market-reviews/completed/stage-3-demand-side-participation-review-facilitating-consumer-choices-and-energy-efficiency.html, the PC's Inquiry into Electricity Network Regulatory Frameworks, http://pc.gov.au/projects/inquiry/electricity and the Standing Council on Energy and Resources (SCER) Demand Side Participation Workstream, http://www.scer.gov.au/workstreams/energy-market-reform/demand-side-participation/

[9] AEMC Reference ERC0161 *Distribution Network Pricing Arrangements*, initiated 14 November 2013

[10] SAPN Pricing Submission 2013-14, http://www.sapowernetworks.com.au/centric/industry/our_network/network_tariffs.jsp, pp. 12 & 29

"… to a greater extent than any other Australian distributor, SA Power Networks' summer demand is sensitive to the effect of air conditioning demand. High summer peak demands occur during heat wave conditions, which correspond with periods when the elements of the system have least capacity and the power factor of loads is poor."

Extremely 'peaky' conditions such as these heatwaves require network assets and capacity that is under-utilised during much of the year, driving distribution costs higher on a per unit of energy served basis than comparable interstate networks"

As a consequence, the management of summer demand has a high priority in SA Power Networks' tariff reform strategies. This leads to an emphasis on providing network price signals that will encourage both residential and business customers to manage their demand by the following means:

- *The price levels of existing tariff structures;*
- *The development of more cost reflective tariff structures; and*
- *The development of innovative new tariff structures."*

As discussed above for wholesale energy prices and illustrated in Figure 2,the key cost driver for the network in SA is *peak demand* during heat waves.

The SCER Rule change proposal is seeking to drive network pricing towards what is referred to as 'Long Run Marginal Cost' (LRMC). The AEMC describes this in the consultation paper for the rule change[11]:

"Marginal costs represent the change in costs that arise from a change in demand in the 'short run' or 'long run'. In the short run, investments in capacity and overhead is fixed and so marginal cost captures operational inputs such as additional labour, materials and energy. However over the long run all inputs can feasibly be altered such that marginal cost captures the cost of building additional capacity."

And:

"LRMC is important for cost reflective network tariffs because it signals the future costs of investing in the network. As consumption increases, the capacity of the network requires augmentation to accommodate the additional demand. Therefore, in order for consumption decisions to take into account these increased costs, current network tariffs need to reflect the expected additional costs arising from additional consumption."

By way of introduction it is important to emphasise the important role of *capacity* compared to *energy*. A household's electricity consumption has two fundamental attributes encapsulated in these terms of *capacity* and *energy*. *Capacity* refers to the maximum rate of electricity consumption (measured using the units of kilowatts, kW or kilo-volt-amperes, kVA) whereas *energy* refers to the total amount of energy consumed over a period of time (measured as kilo-watt-hours). Usually this is expressed as an annual total.

To be clear, one is a rate, the other is a volume. The underlying costs of physically producing, transporting and distributing electricity are related to both of these attributes – how much is consumed as well as how fast it is consumed. Generally speaking, capacity results in fixed costs whereas volume relates to variable costs - capital expenditure versus operating expenditure or *capex* vs. *opex* in commercial language.

The long run marginal cost of network expansion is expressed in relation to the cost of *capacity* as opposed to the current approach based on the pricing of *energy*. That is, pricing based on the *rate* of consumption rather than the *volume* of consumption. This is the fundamental change in the approach at the basis of this rule change request.

[11] AEMC 2013, http://www.aemc.gov.au/electricity/rule-changes/open/distribution-network-pricing-arrangements.html, p. 13

The residential electricity market is settled as the residual of the wholesale market based on what is referred to as the Net System Load Profile (NSLP). In the absence of individual time of use metering, all small customers (residential plus small businesses) with a simple accumulation meter are assumed to have consumed at times of the day represented by the NSLP.

It is possible to consider the average impacts of LRMC pricing based on our understanding of the South Australian Net System Load Profile (NSLP)[12] and SAPN's own estimates of LRMC from previous Pricing Proposals[13].

The following charts have been drawn from AEMO data of half-hourly NSLP demand since 1 January 2003. Figure 6 is a plot of the annual consumption prior to each date (rolling annual consumption) and shows a clear and steady decline from the peak annual consumption (the year to June 2010) to the present.

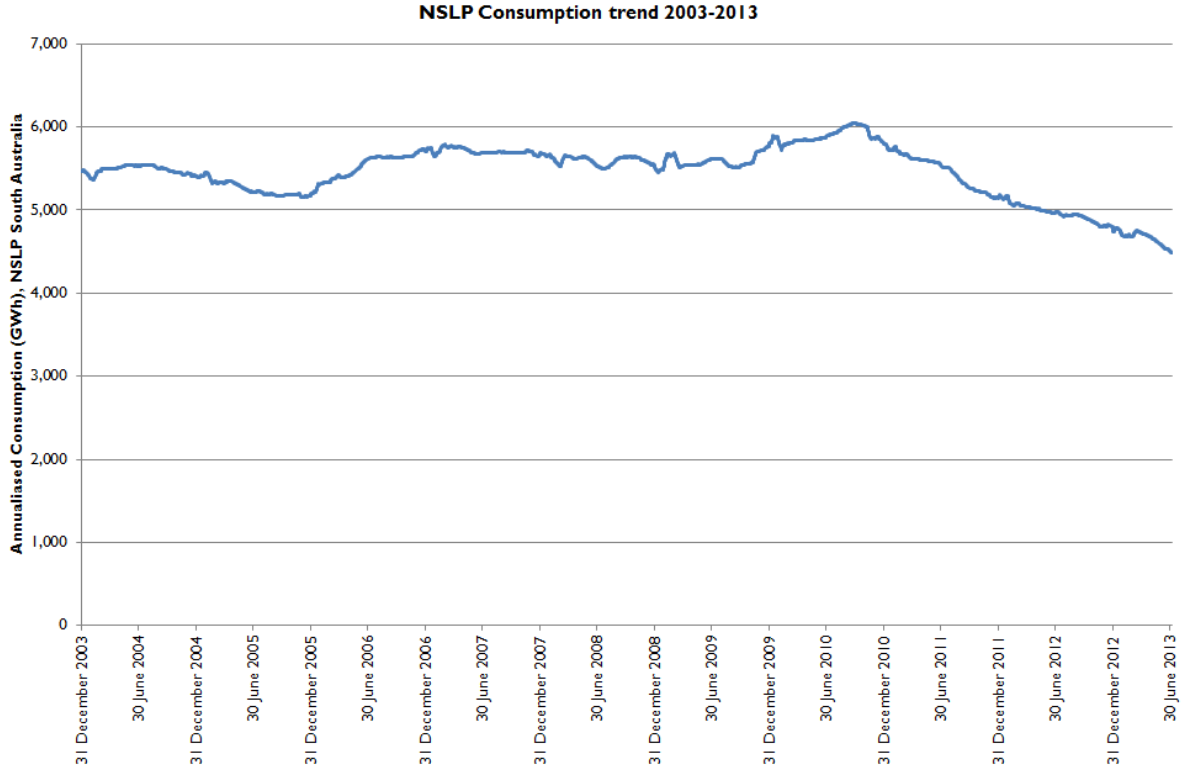

Figure 6: Annualised NSLP consumption, South Australia 2003-2013. Source SACOSS analysis of AEMO data.

Figure 7 is a plot of the NSLP peak demand recorded in the 12 months prior to each date and illustrates that peak demand of 2,132MW occurred in the summer of 2008-9 and has not been replicated in subsequent years.

The equivalent data for the heat waves of January 2014 will be published later in 2014 and it is expected that peaks will approach, but not exceed, previous highs.

[12] AEMO 2013, www.aemo.com.au/Electricity/Data/Metering/Load-Profiles

[13] SAPN 2013, www.sapowernetworks.com.au/centric/industry/our_network/network_tariffs.jsp

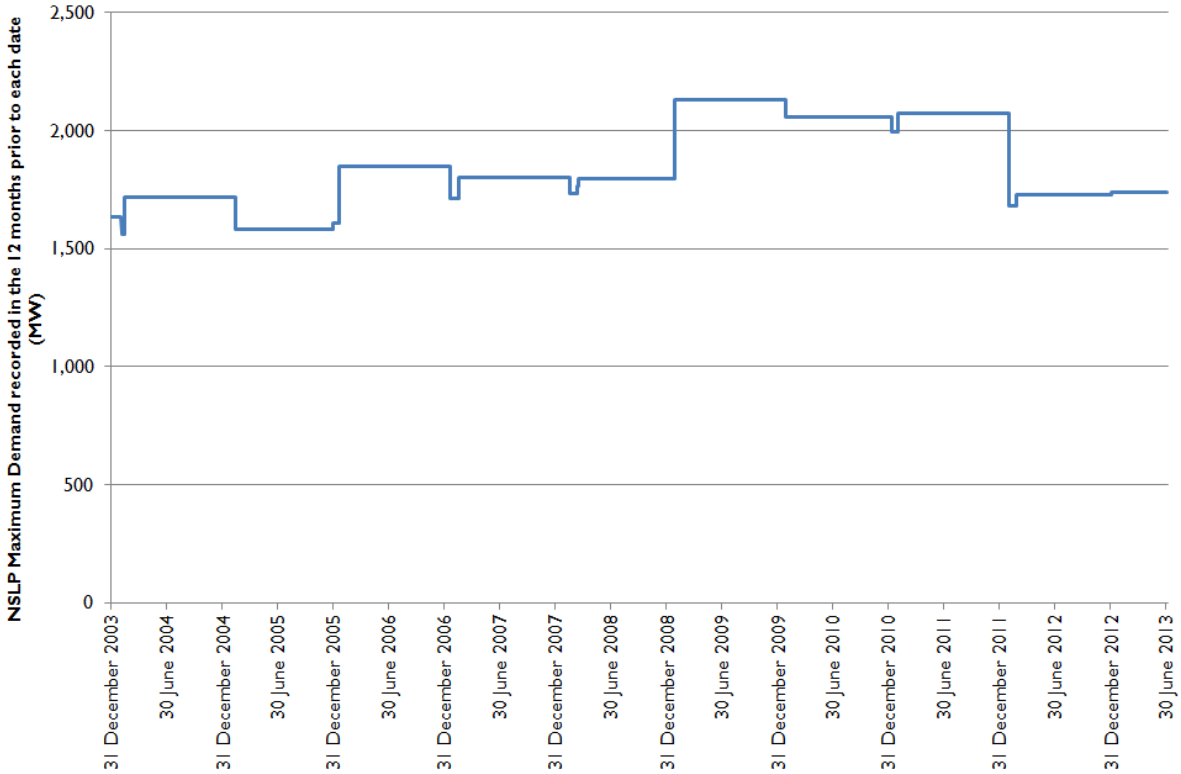

Figure 7: Annualised NSLP maximum demand, South Australia 2003-2013. Source SACOSS analysis of AEMO data.

The Long Run Marginal Cost of distribution network expansion has been estimated by SA Power Network in its Annual Pricing Proposals as $156/kVA for residential ($2013/14) and $148/kVA for small business[14] according to the following formula:

$$LRMC(AIC) = \frac{PV(growth\ related\ \ capex) + PV(growth\ related\ \ opex)}{PV(incremental\ \ demand)}$$

Where:

growth related capex is the annualised capital expenditure to meet the additional demand and new customer connections forecast over the forecast period;

growth related opex is the incremental annual cost of operating and maintaining the newly constructed network and connection assets over the forecast period; and

incremental demand is the forecast change in kVA demand compared with the base year of 2009/10

Two important points can be made from this. Firstly, LRMC is measured in terms of capacity, that is in $/kVA. A move to LRMC pricing in SA would therefore need to incorporate capacity or demand based charging to unlock significant efficiency benefits. This is a significant change for small consumers in SA and while theoretically appealing, is likely to have substantial but unknown distributional impacts.

Secondly, the preceding charts illustrate that since the 'base year' of 2009/10 the capacity demanded by small consumers has in fact fallen. While the 2014 summer figures are not yet known, they are not expected to exceed the previous peaks. SAPN's 2013/14 figures are based on a simple escalation of the figures determined in 2010 where the denominator in the formula was

[14] The methodology is contained within Appendix E of SAPN's 2013/14 Pricing Proposal, www.aer.gov.au/node/20180

based on demand projections agreed at the start of the regulatory period (with 10% Probability of Exceedence, PoE). SACOSS is concerned that, depending on how LRMC is determined and applied, in the current environment of declining demand and consumption, LRMC will likely be assessed to be a very low value and hence the recovery of total allowed *revenue* will potentially be largely allocated to fixed charges.

To illustrate this further, it is important to clarify that – all else being equal – the total cost of the network service and therefore the regulated revenue to be collected by SAPN does not change in the short term. On current estimates, SAPN collect around $550m per annum from households and small businesses[15] for the energy represented by the NSLP. This energy has a peak demand around 2,100 MW and therefore if this peak demand was charged at LRMC, on SAPN's recent estimates of $156/kVA[16], this would generate around $365m of the total revenue: 66% - two thirds.

The debate on LRMC network pricing also extends to how to collect the 'residual' amount – around one-third of revenue in our example. One way would be to increase the fixed component and SACOSS is concerned that this can have a regressive effect on the effective price paid by smaller consuming households.

Based on the above, the future direction of network pricing may be that one day all households and small businesses end up paying substantial 'demand charges' based on their summer peak demand and smaller energy charges – much like larger business customers already do[17].

We also note AEMO's forecasts of little or no growth in either consumption or summer peak demand over the coming decade from the 2013 National Electricity Forecasting Report (NEFR). The following charts are taken from the AEMO reports and illustrate energy and demand forecasts for the next decade at levels below what has already been experienced.

[15] Source: SACOSS estimates for relevant residential and small business tariffs from SAPN Post-Tax Revenue Model (PTRM), www.aer.gov.au

[16] kVA is related to kW in alternating current (AC) electrical circuits by what is known as the "power factor". For the residential and small business class of customers this has been assumed for the purposes of the example to be 0.9.

[17] Refer to http://www.sapowernetworks.com.au/centric/industry/our_network/network_tariffs.jsp for a listing of the current network tariffs payable by different customer classes.

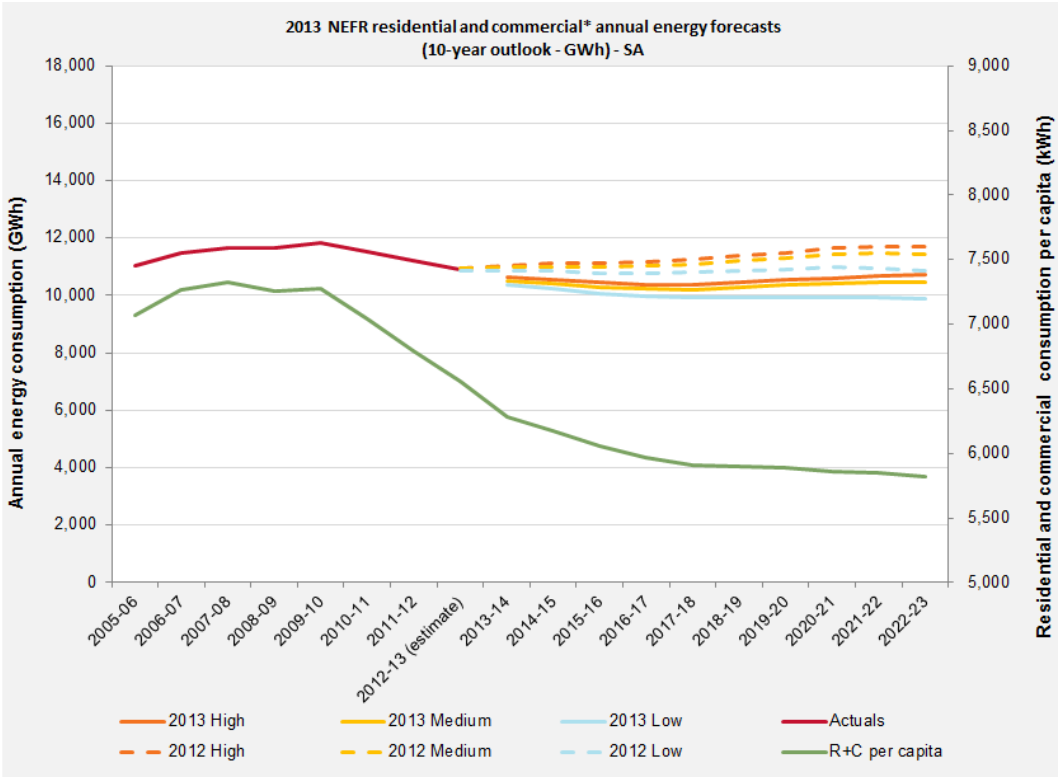

Figure 8: South Australian residential and commercial sector annual energy forecasts (10 year outlook – GWh) Source: AEMO

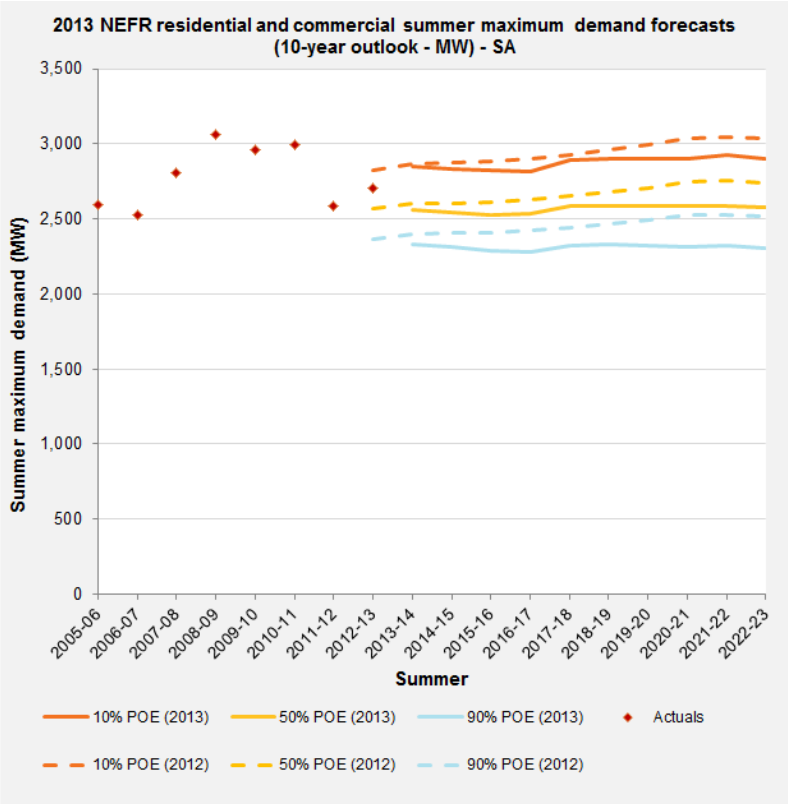

Figure 9: South Australian residential and commercial sector summer maximum demand forecasts (10 year outlook – MW) Source: AEMO

Smart meters

Any move to demand-based charging would also allow the retail component of tariffs to adopt similar pricing. As illustrated before, the summer-bias in wholesale pricing can be attributed to peaks in demand. It is reasonable to expect that any move in network pricing structures would likely be mirrored to a significant extend in the prices charged by retailers. However, all of this potential hinges on the capability of the electricity meters installed at homes and small businesses.

Currently, the vast majority of meters are what are referred to as 'accumulation meters' – they simply count the total volume of electricity consumed but not when it was consumed. Any move to more 'cost-reflective' pricing beyond extending the 'summer' component of existing structures, would need to see a time-of-use function incorporated.

A national Smart Meter Program[18] has been underway for a number of years and a full roll-out is almost complete in Victoria[19]. The South Australian Government has recently initiated consultation on a policy for making new and replacement meters 'smart-ready'. SACOSS will be actively participating to advocate the interests of vulnerable energy consumers as this complex set of reforms unfold further.

This project was funded by the Consumer Advocacy Panel (www.advocacypanel.com.au) as part of its grants process for consumer advocacy projects and research projects for the benefit of consumers of electricity and natural gas.

[18] More information is available at www.scer.gov.au/workstreams/energy-market-reform/demand-side-participation/smart-meters/ and www.aemo.com.au/Electricity/Retail-and-Metering/National-Smart-Metering-Program

[19] More information is available at http://www.smartmeters.vic.gov.au/