Southern Adelaide Energy Baseline Report

For the Southern Adelaide Economic Development Board, City of Onkaparinga and City of Marion

20 March 2019

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1 Executive Summary

The Southern Adelaide Economic Development Board's (SAEDB) stated goal relevant to this project is to significantly enhance the region's appeal for further and new industry investment, attracting industry to the region through an innovative approach to energy affordability, improved security and stability of the local networks. This report, **The Southern Adelaide Energy Baseline Report**, is the first stage of pursuing this goal. The second stage, or 'Opportunities' stage, will pursue project opportunities in more detail informed by this Baseline report.

Section 2 of this report provides some background material relevant to understanding the components of the cost of electricity for businesses in South Australia and explains that the main components are wholesale energy costs and network charges.

Section 3 describes the electricity and gas infrastructure in the region and highlights that the electricity network has significant 'spare' capacity for new industry and, as illustrated in the consumption patterns presented in Section 4, is under-utilised outside of peak times.

Section 5 provides an estimate of the local energy economy: approximately $250m per annum in electricity expenditure and $30m for natural gas. The estimated investment in over 130MW of rooftop PV by households and small business also exceeds $250m over the last decade. This Section also illustrates the large number of energy service businesses based in the region.

Section 6 provides a summary of trends in the electricity markets relevant to energy consumers in the region including Wholesale prices and Renewable Energy Target costs. This section also describes the impact of South Australia's growing list of solar energy projects – rooftop and utility scale solar farms - and how this is expected to put downward pressure on wholesale electricity prices during daylight hours.

Section 7 outlines a number of opportunities to improve energy affordability and security for the region. These include providing energy advice to business and establishing an energy procurement hub, improving utilisation of the local electricity network, shifting energy consumption into solar hours and participating in the Hydrogen economy.

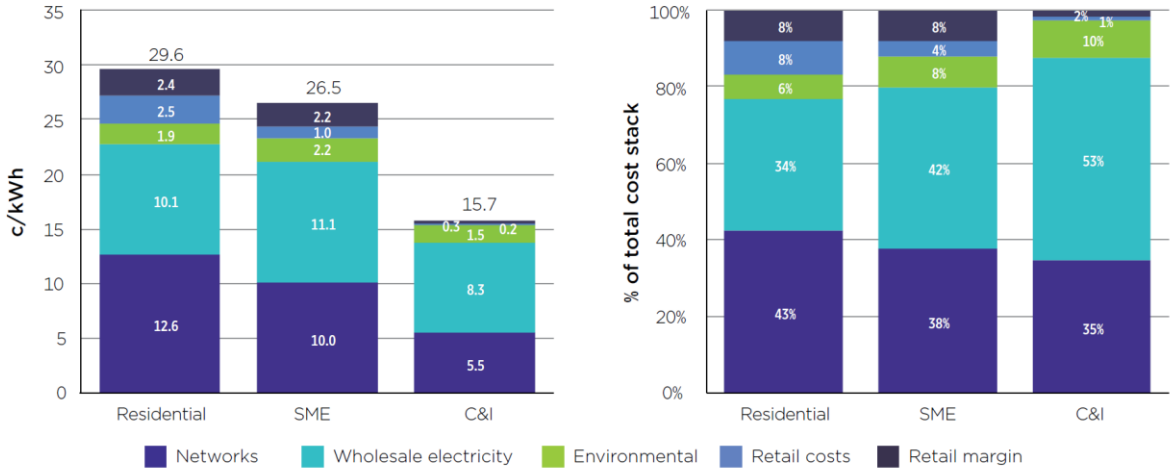
The subsequent stage of this project can develop specific projects from each of these opportunities.

2 Background

2.1 Components of the electricity cost stack for businesses

The ACCC's recent Retail Electricity Pricing Inquiry showed this national summary of the cost components for different customers.[1] The proportions shown are considered to be indicative for South Australia even though actual prices for consumers are higher in SA than the national average prices shown.

Figure 1.28: Comparison of residential, SME and C&I cost stacks, NEM wide, 2017–18 estimate, c/kWh, real $2016–17 values and percentage of cost stacks



	Residential	SME	C&I
Network	12.6	10.0	5.5
Wholesale electricity	10.1	11.1	8.3
Environmental	1.9	2.2	1.5
Retail costs	2.5	1.0	0.2
Retail margin	2.4	2.2	0.3
Total cost stack	29.6	26.5	15.7

Source: ACCC analysis based on retailers' data.

SME refers to Small Medium Enterprises and is reflective of 'small market' business customers (consuming less than 160MWh pa). C&I stands for Commercial and Industrial and refers to 'large market' business customers. As can be seen the main cost components are Networks and Wholesale Electricity.

In terms of lowering the costs for businesses in the region, the proposed solar project at Southern Region Waste Management Authority's Pedlar Creek Landfill - as a local example - would target the Wholesale Electricity component but the other elements would remain. Unlike 'behind the meter' solar projects, 'over the grid' solar projects – either in the region or over the Transmission

[1] https://www.accc.gov.au/regulated-infrastructure/energy/electricity-supply-prices-inquiry

Network from utility scale solar farms elsewhere in the state - have very limited potential to reduce network costs for energy consumers.

In the context of this report, it is important to outline that network charges – approx 35-40% of the average business customer's bill as shown above – are applied on a *statewide* or *postage stamp* basis. This obligation is applied to ensure a degree of equity in access to electricity in the areas outside of metropolitan Adelaide and the major regional towns. Without this, the cost to serve these areas of low customer density would be reflected in substantially higher prices.

The consequence of this is that location is not a determinant of this component of the bill and there is no immediate opportunity for price signals to reflect the spare capacity in the Southern Adelaide part of the network.

2.2 Survey Results

The Southern Energy Working Group surveyed 78 businesses on a range of energy issues while this report was being prepared (Feb 2019). In summary:

- 83% of respondents were small businesses with less than 20 employees.
- 68% of respondents use gas.
- When asked about current experiences with energy retailers, just over half were positive (53%), around 23% were negative about their experiences and the remainder were neutral.
- 13% (i.e. 10) respondents had recently undergone an energy audit or assessment.
- Barriers to energy-efficient solutions in businesses included renting not owning premises, access to finance, perceptions of low returns on investment (ROI) and access to expertise, skills and experience.
- Respondents indicated an expectation of rising electricity prices over the next 2-5 years (72%) compared to stable or falling prices (28%)
- Some respondents were able to identify sources of financial assistance for energy efficiency upgrades but 80% were not aware of any.
- A majority of respondents were interested in more information on bulk purchase initiatives (58%) and four businesses stated that they were currently involved in an initiative (5%).
- When asked what aspects of energy use they would like more information on, the results were quite diverse. Lighting, Insulation, Refrigeration, Hot Water, Power Factor Correction, Solar and Batteries were the more common themes.

Overall, opportunities to support businesses include the provision of information, conduct of energy assessments and potentially providing case studies of local businesses using actual dollar figures to illustrate the real ROIs being achieved. Opportunities also exist to meet the appetite for bulk purchase initiatives.

3 Energy Infrastructure

3.1 Electricity

The South Australian electricity supply chain is depicted in the image below from SA Power Networks[2]:

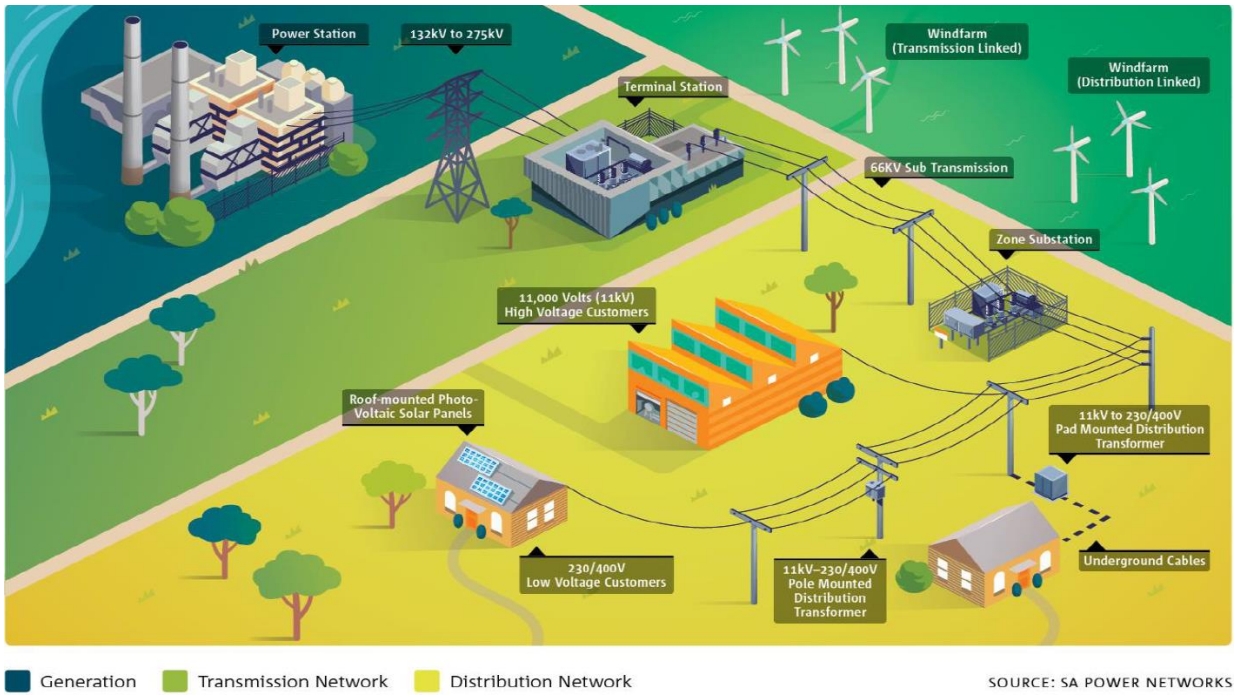


Figure 1: Indicative Electricity Supply Chain

The SAEDB region is part of SA Power Networks Distribution Network, in their Southern Suburbs Planning Region (see Figure 2, overleaf). This includes suburbs from Glenelg North to the west extending north-east to North Unley, south-west to Aldinga, and south to Willunga, from where it supplies the Fleurieu region and Kangaroo Island. There are four main connection points to ElectraNet's Transmission Network in the Southern Suburbs: City West, Magill, Morphett Vale East and Happy Valley.

According to SA Power Networks 2018 Distribution Annual Planning Report, there are **no** system limitations in the Southern Suburbs region forecast for the 2018/19 to 2022/23 period[3]. The online Network Opportunity Maps published by the Australian Renewable Energy Agency (ARENA) provide a visual representation of the available capacity on the network[4]. The map for the SAEDB region illustrates that substantial capacity exists at most substations (see Figure 2).

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[2] www.sapowernetworks.com.au 2018 Distribution Annual Planning Report
[3] 2018 DAPR Sections 6 and 7
[4] www.energynetworks.com.au/accessing-network-opportunity-maps

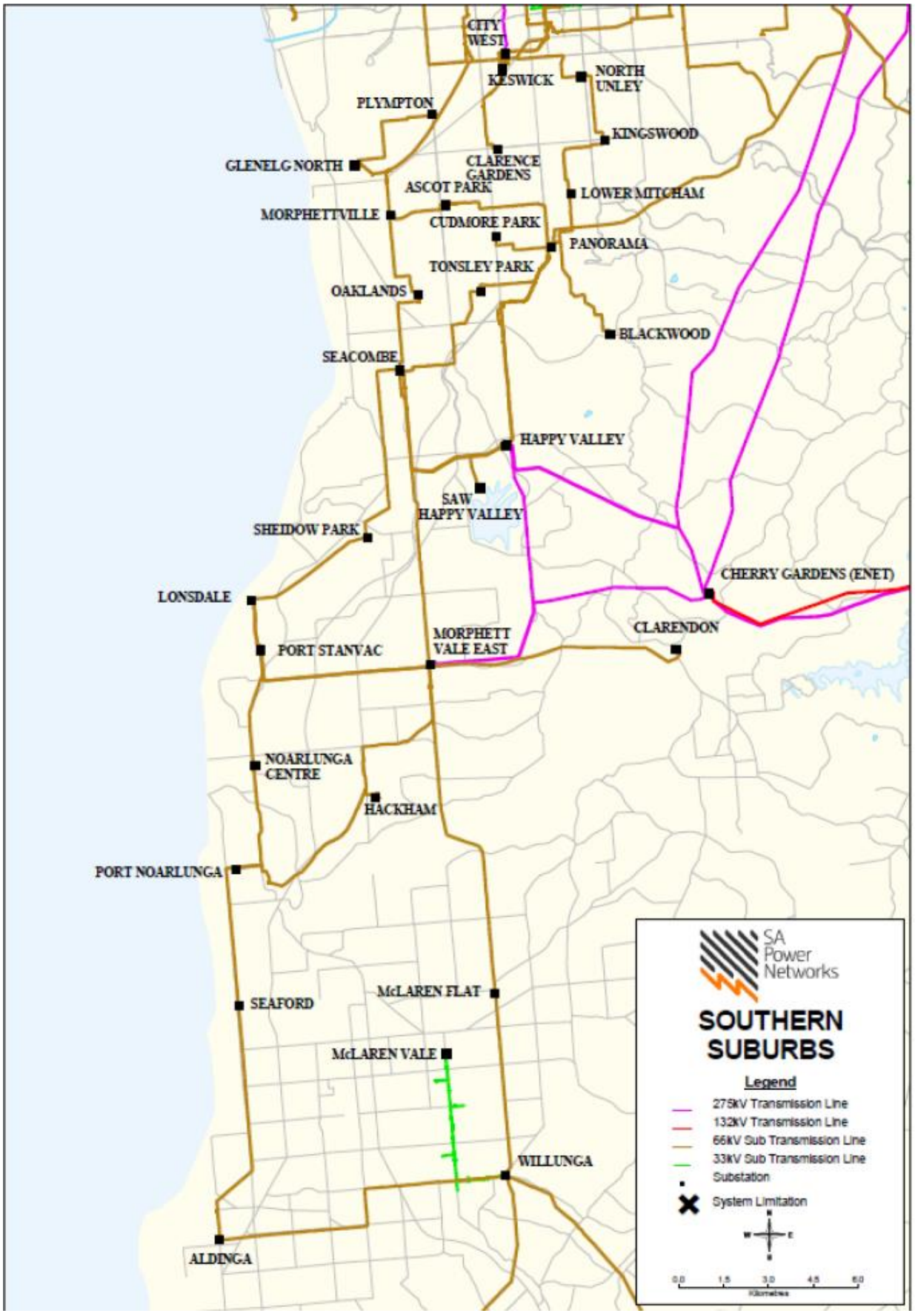

Figure 2: SA Power Networks Southern Suburbs Network Region

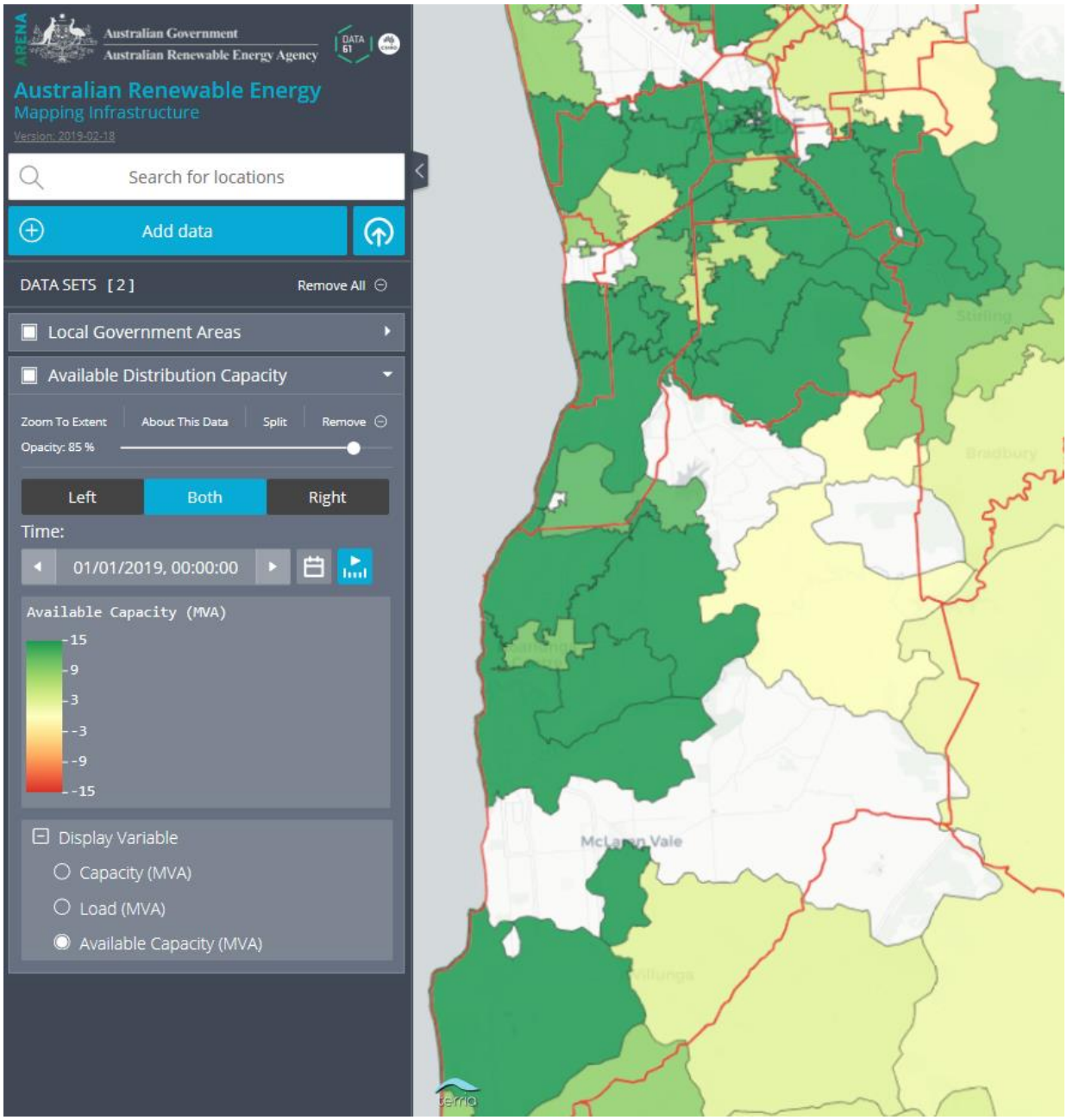

Figure 3: Network Opportunity Maps

The White patches on the map in Figure 3 correspond to absence of data rather than indicating no spare capacity. The source data (SA Power Networks Distribution Annual Planning Reports) indicate that for the large patch across the lower portion of the map, similar levels of spare capacity exist:

- Seaford 66/11kV is rated at 15.8 MVA and has a 2018/19 forecast demand of 9.8 MVA indicating 6MVA of spare capacity
- McLaren Flat 11kV TF1 is rated at 15.5 MVA, and has a 2018/19 forecast demand of 6.3 MVA = 9 MVA spare

- McLaren Flat 11kV TF2 is rated at 15.2 MVA, and has a 2018/19 forecast demand of 2.4 MVA = 12 MVA spare

It is recommended that the SAEDB seek to have the missing data restored in the next update of the maps as it is a positive story for the region that would be easier to tell if the maps were complete.

In terms of network reliability, there is no publicly available data that separates out the reliability performance of the region from the rest of the Metropolitan network. SA Power Networks does manage a list of the worst performing feeders but this is provided to ESCOSA on a confidential basis. As such we were unable to determine if any parts of the SAEDB region met this criteria.

Similarly, for power quality issues – especially over voltage issues that have been affecting solar inverters in recent times – there is no publicly available data to indicate if this is more or less prevalent in the region than elsewhere.

In both cases, SAPN have stated (when interviewed for this report) that such issues are transient in nature as SAPN acts to rectify any underlying issues.

3.2 Gas

The Australian Gas Networks' Distribution Network extends to McLaren Vale and Aldinga as shown in this coverage map provided by Australian Gas Networks (Figure 4).

There is very little specific information on quantities and end-uses for the region. An estimate of regional consumption can be obtained by taking a pro-rata approach to statewide figures. The Cities of Marion and Onkaparinga represent around 15% of dwellings (Source: ABS Census 2016) and according to ESCOSA, around 10,400 TJ of gas is sold to the state's 448,000 domestic, Industrial and Commercial Customers[5]. An estimate of gas use in the region is therefore around 1,500 TJ per annum. Small customers are likely to be paying between $20 and $30 per GJ of gas delivered, larger customers would pay somewhat less (more around $15/GJ including network costs). At an average $20/GJ, the regional consumption estimate of 1500 TJ (1,500,000 GJ) equates to around $30m pa.

For small businesses and residential customers the fixed price of connection is a significant proportion of cost.

[5] *Energy performance report 2017-18 – time series data tables* from www.escosa.sa.gov.au/projects-and-publications/publications

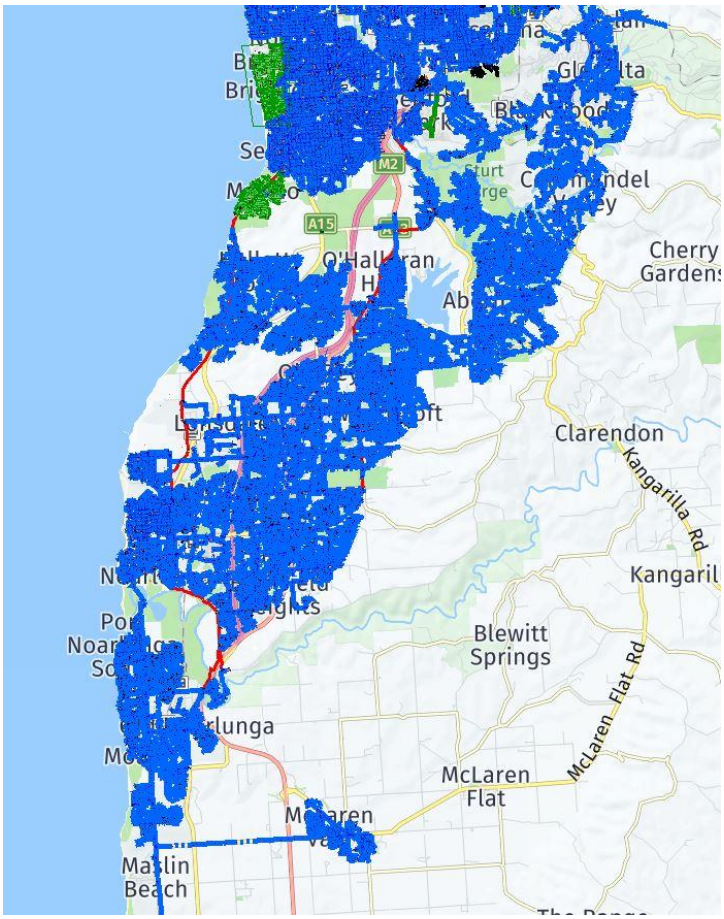

Figure 4: Reticulated Natural Gas coverage – Southern Suburbs (Source: AGN)

The price of gas for business and industry is very topical and wholesale prices have risen dramatically as a result of Australia's LNG export industry and Commonwealth Government interventions have been required as have inquiries by the Australian Competition and Consumer Commission.

Hydrogen is emerging as they key opportunity for gas infrastructure beyond its current uses. The South Australian Government has produced a Hydrogen Roadmap[6] and the CSIRO has also published important material recently[7].

The Australian Gas Infrastructure Group (AGIG) is developing the Hydrogen Park of SA at Tonsley[8]. HyP SA will contain a 1.25 MW electrolyser plant that will produce hydrogen from renewable electricity, which will then be injected into the local gas distribution network.

AGIG have also stated that they are investigating the establishment of a co-located National Hydrogen Centre of Excellence at Tonsley.

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[6] www.renewablessa.sa.gov.au/topic/hydrogen/hydrogen-roadmap
[7] www.csiro.au/en/Do-business/Futures/Reports/Hydrogen-Roadmap
[8] http://www.renewablessa.sa.gov.au/topic/hydrogen/hydrogen-projects/hydrogen-park-south-australia

4 Electricity Consumption

4.1 Consumption Patterns

SA Power Networks publishes 30-minute interval data for each of its main substations[9]. From this we can see that regional demand peaks sharply on a number of summer days.

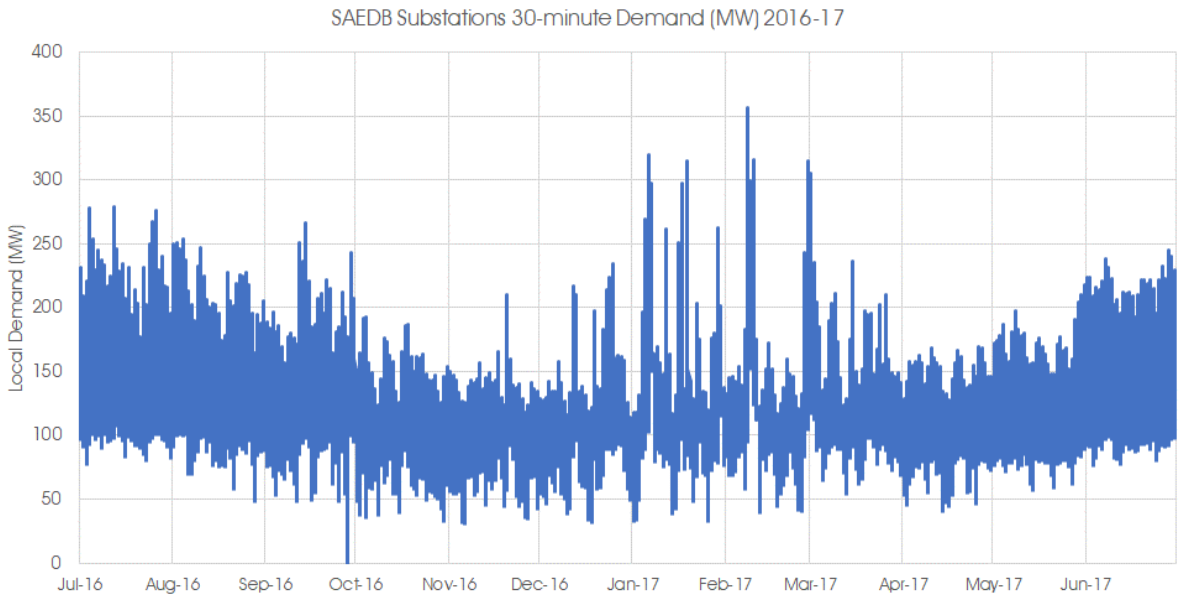


Figure 5: Regional Electricity Demand 2016-17

The peaks in demand in January-March are obvious. These short spikes in demand can be reflected in what is known as a load duration curve that illustrates the utilisation of infrastructure capacity over a year. As shown in Figure 6, 50% of demand is only apparent for less than 10% of the year.

This poor level of electricity network infrastructure utilisation is common in South Australia and contributes to the state's relatively high network charges and energy prices – the network is built to meet peak demand, but the costs are largely recovered from the volume of electricity that flows. Conversely, this can be seen as an opportunity to lower prices by improving utilisation of the existing network. Figure 7 replicates Figure 6 but shows the combined rated capacity of the major substations (668 MVA) in the region and illustrates the substantial under-use of the available capacity – and hence the capacity evident in the Network Opportunity Maps (Figure 3).

[9] **SAEDB Substations** are those identified as most closely representing the populations of the Cities of Onkaparinga and Marion. These are: Aldinga, Ascot Park, Clarendon, Cudmore Park, Hackham, Happy Valley, McLaren Flat, Morphett Vale East, Morphetville, Noarlunga Centre, Oaklands, Port Noarlunga, Port Stanvac, Seacombe, Seaford, Sheidow Park, Tonsley Park, Willunga

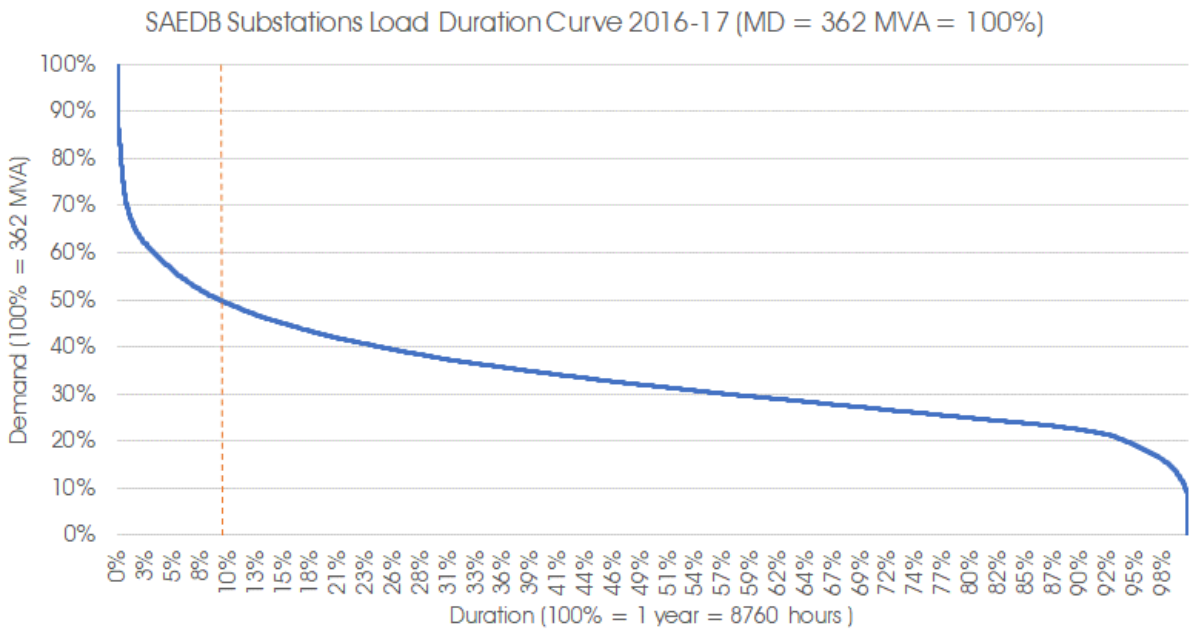


Figure 6: Regional Load Duration Curve (Source: SAPN)

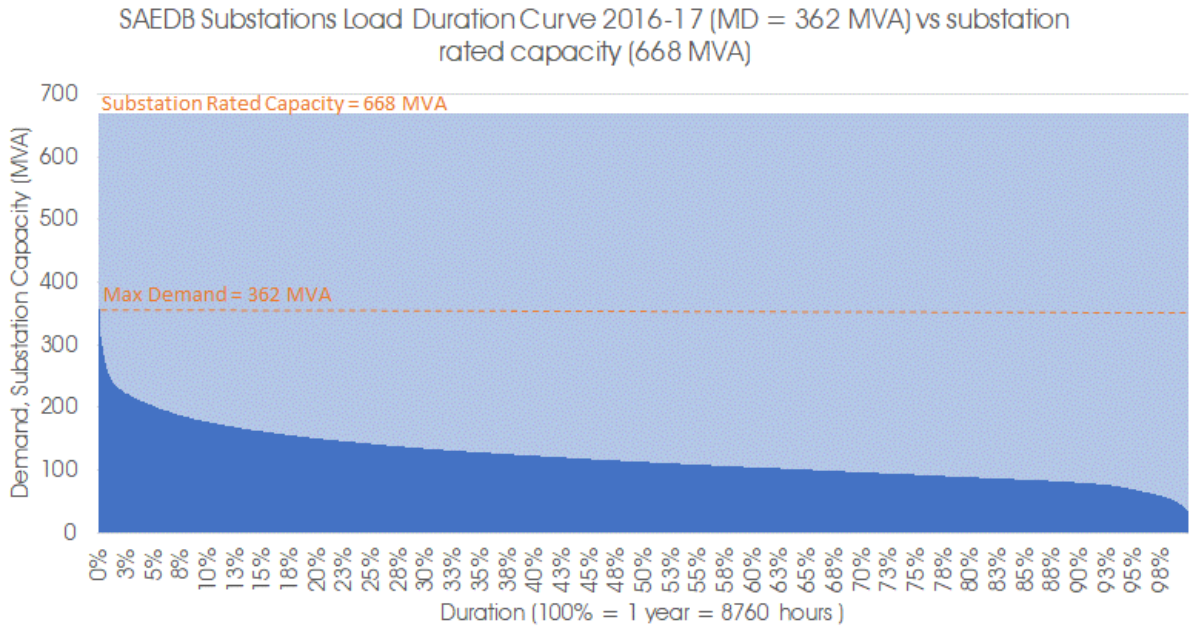


Figure 7: Regional Load Duration Curve compared to Substation Rated Capacity 2016-17 (Source: SAPN)

4.2 Local Electricity Generation

4.2.1 Solar

According to the Australian PV Institute and based on Clean Energy Regulator data up to September 2018, regional rooftop PV capacity is 134MW:

Marion (C)(44060)	Onkaparinga (C)(45340)	Combined
Est. dwellings: 37461	Est. dwellings: 71549	Est. dwellings: 109,010
Installations: 11518 (approx. 30.1% of dwellings)	Installations: 26836 (approx. 36.6% of dwellings)	Installations: 38,354 (approx. 35.1% of dwellings)
Est. installed capacity: 40,094 kW	Est. installed capacity: 93,636 kW	Est. installed capacity: 133,730 kW

Table 1 – Solar Power System data – source APVI, Clean Energy Regulator

4.2.2 Other generation capacity

The region is also home to some significant generation capacity of around 212 MW 'embedded' in the local Distribution Network. These include:

- Pedlar Creek Landfill 4MW (from 2019);
- The SA Government Generators – a procurement process commenced in late 2018 for a 25 year lease of the four-unit 123MW gas/diesel power plant at Lonsdale commencing no earlier than May 2019; and
- Snowy Hydro's diesel generators at Lonsdale (20 MW) and Pt Stanvac (65 MW). [10]

[10] www.snowyhydro.com.au/our-energy/gas/diesel/

5 The regional energy economy

5.1 An estimate of size

An estimate of the size of the SAEDB regional energy economy has been derived based on estimated electricity and gas consumption in the region and estimates of electricity and gas prices.

Of the nearly 1100 GWh of grid electricity consumption measured for the region:

- Residential estimate of 460 GWh pa (approx. 45%) at an average bundled price of $0.35/kWh ($350/MWh) = c$190m pa
- Business (Small, Commercial and Industrial) estimate of 600 GWh at an average bundled price of $0.25/kWh ($250/MWh) = c$160m pa

This equates to a combined electricity expenditure of around $250m pa. Further, it is estimated that around $30m of gas is consumed by homes and businesses in the region (Section 3.2).

There is also 134MW of 'consumer owned' PV (from close to zero in 2008) that generates around 175 GWh[11] of electricity pa that is not reflected in the above figures. At an average investment of around $2,000/kW installed, households and businesses have invested around $270m in meeting some of their electricity needs.

5.2 Key Businesses in the Local Energy Economy

The major Commercial and Industrial energy users in the region are expected to include[12]:

- SA Water (WWTPs, Desalination Plant)
- Shopping Centres (Westfield Marion, Noarlunga Centre, Southgate, Castle Plaza etc)
- Businesses located in the region's manufacturing and commercial precincts such as Lonsdale, St Mary's, Tonsley, Melrose Park, Edwardstown, Plympton
- Flinders University and Medical Centre

There are also numerous businesses with an energy focus located in the region including:

- SIMEC Zen Energy (www.zenenergy.com.au; www.simecenergy.com.au/)
- Seeley International (www.seeleyinternational.com/)
- REDARC (www.redarc.com.au)

[11] A number of alternate methods could be applied to valuing this electricity. At a conservative 10c/kWh, 175GWh is worth $17.5m pa, increasing the estimate by a further 6%.

[12] Actual energy consumption is commercially confidential information not available in the public domain and not used for this report. The summary presented is based on our knowledge of the region and the types of economic activities that have high energy use

- Azzo Automation (http://azzo.com.au/)
- ELWA Energysavers (www.elwa.com.au/)
- CCT Energy Storage (www.cctenergystorage.com/ Lonsdale)
- Power and Drive Solutions (www.poweranddrive.com.au, Lonsdale)
- EfficientSee (http://www.efficientsee.com.au/)
- Sol Energy (http://solenergy.com.au/)
- Sustainability House (SUHO, Edwardstown https://suho.com.au/)
- Sustainable Works (www.sustainableworks.com.au, Clarendon)
- Keystones Solar Group (http://keystones.com.au/)
- Solar Man (http://solarman.net.au/)
- Solar Depot (http://solardepot.com.au)
- Apex Energy (www.apexenergyaustralia.com.au/)
- My Energy Engineering (http://www.myenergysolar.com.au/)

There is very likely to be more service providers in the region and it is recommended that SAEDB establish a more complete list of such businesses.

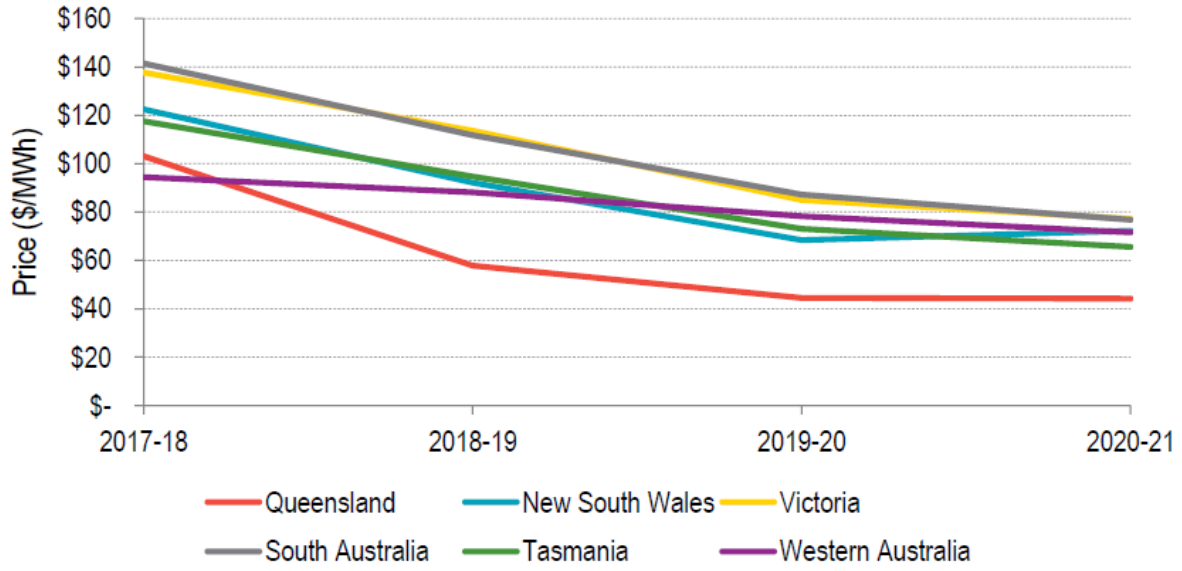
6 Relevant aspects of the National Electricity Market

6.1 Wholesale Pool

The National Electricity Market operates on a compulsory wholesale electricity pool that, from 2021, will settle on a five-minute basis[13]. There is much uncertainty in projecting long term wholesale electricity prices but there are publicly available reports that suggest downward pressure on wholesale prices in coming years. Further, there is strong evidence that this downward pressure will be most pronounced during 'solar hours' of the day.

The Australian Energy Markets Commission (AEMC) publishes annual retail price projections for residential customers[14]. The 2018 Projections are based on Wholesale Cost Modelling by EY that indicates a fall back to an average wholesale price of around $80/MWh (8c/kWh) by 2021.

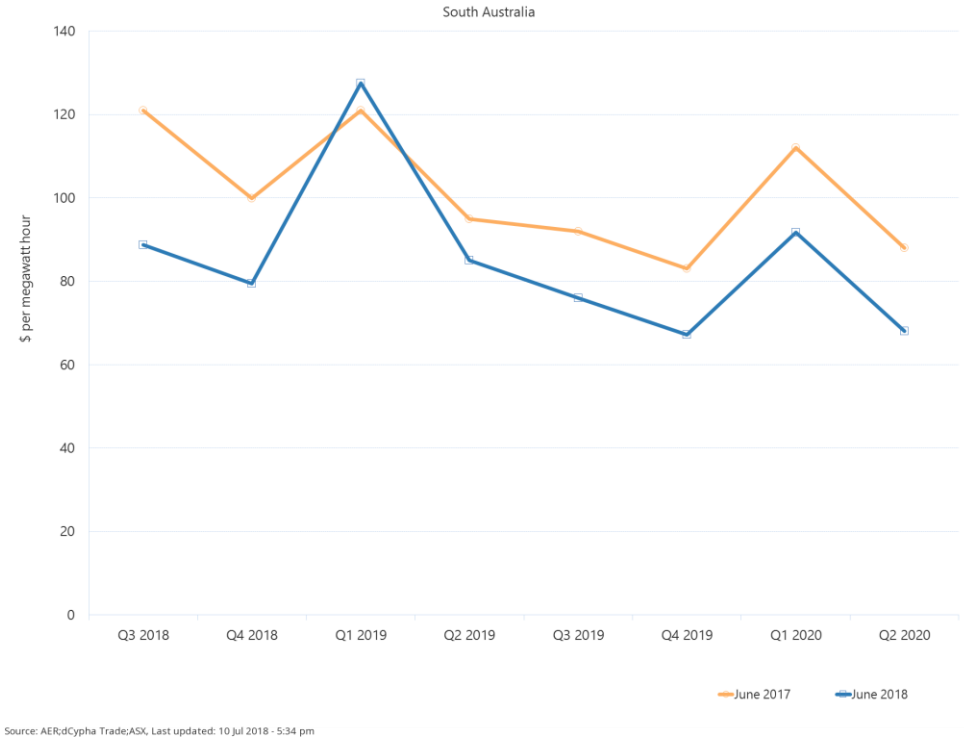
Figure 4: Average wholesale electricity spot market price forecast for the base scenario



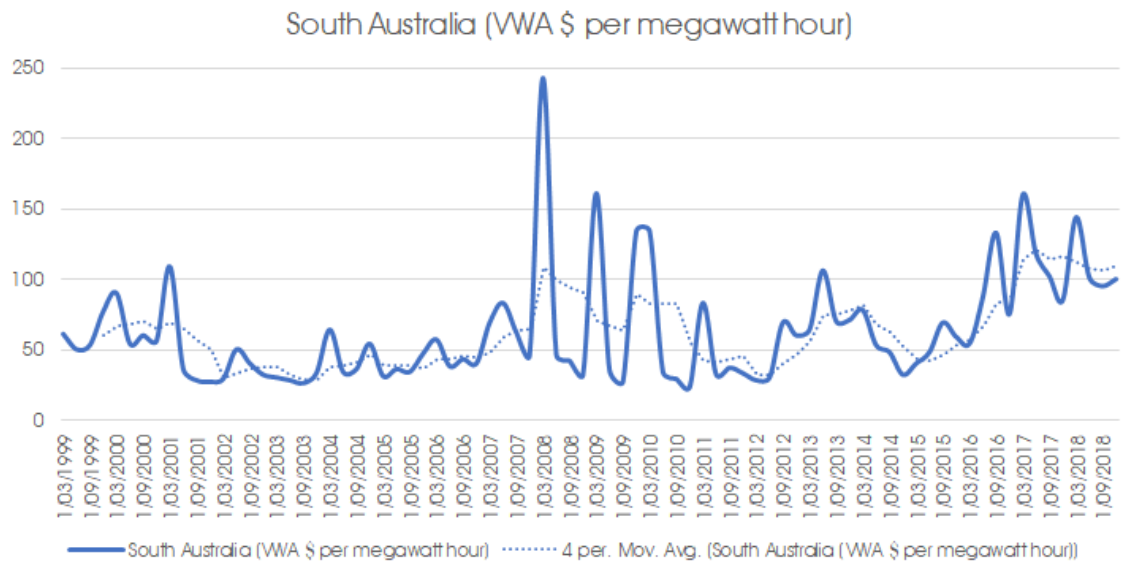
* Note that the Western Australia wholesale electricity price in Figure 4 is based on market modelling and includes the estimated cost associated with the reserve capacity mechanism in addition to wholesale balancing market price
** ACT results are based on NSW price outcome

The Australian Energy Regulator (AER) publishes summary data for the NEM futures market (from sources including the ASX)[15]. For South Australia, the data indicates a clear decline in base futures prices after Q1 2019 similar to that of the EY modelling for the AEMC of around $80/MWh.

[13] www.aemc.gov.au/rule-changes/five-minute-settlement
[14] AEMC 2018 Residential Price Trends, December 2018 www.aemc.gov.au
[15] www.aer.gov.au/wholesale-markets/wholesale-statistics/south-australia-comparative-base-futures-prices



The following chart is of quarterly volume weighted average spot prices in SA[16]. The dashed line represents the 12-month rolling average price and highlights how the recent period has been well above long-run averages:



Longer term projections are made more difficult by the lack of a settled national energy policy but the trajectory for solar power generation is potentially a stronger guide to the longer-term economics of solar projects and renewables PPAs. This is discussed in the next section.

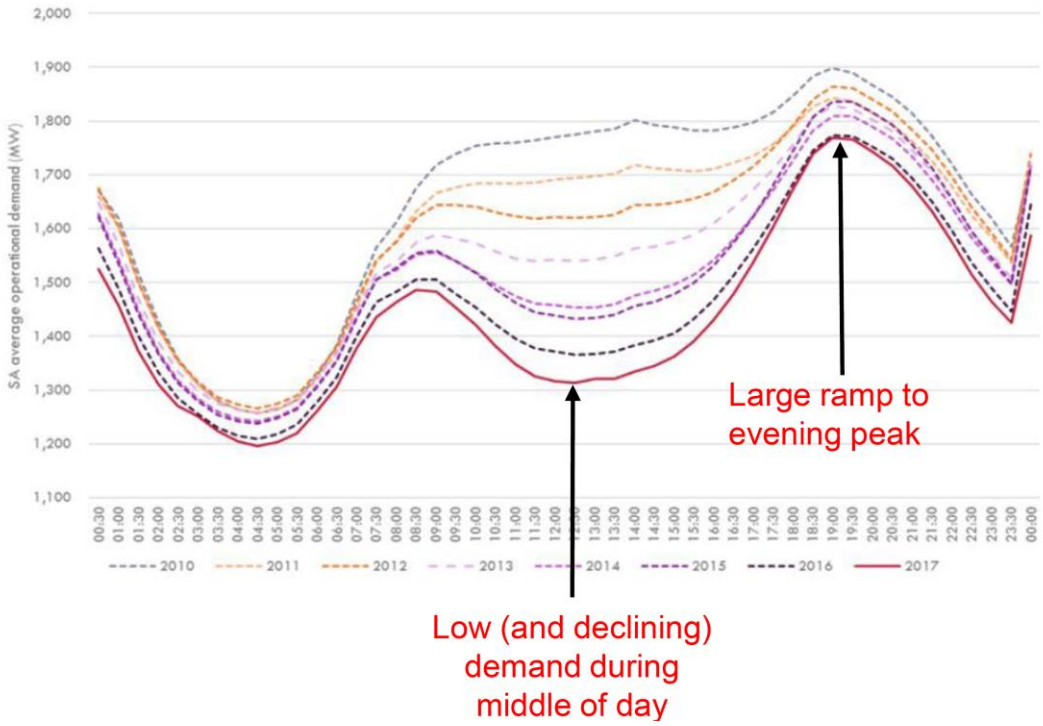
[16] www.aer.gov.au/wholesale-markets/wholesale-statistics/quarterly-volume-weighted-average-spot-prices

6.2 South Australia's 'solar electricity market'

There is evidence that South Australia's growing solar power capacity will place strong downward pressure on revenues for solar projects. AEMO's 2018 South Australian Electricity Report stated (p14):

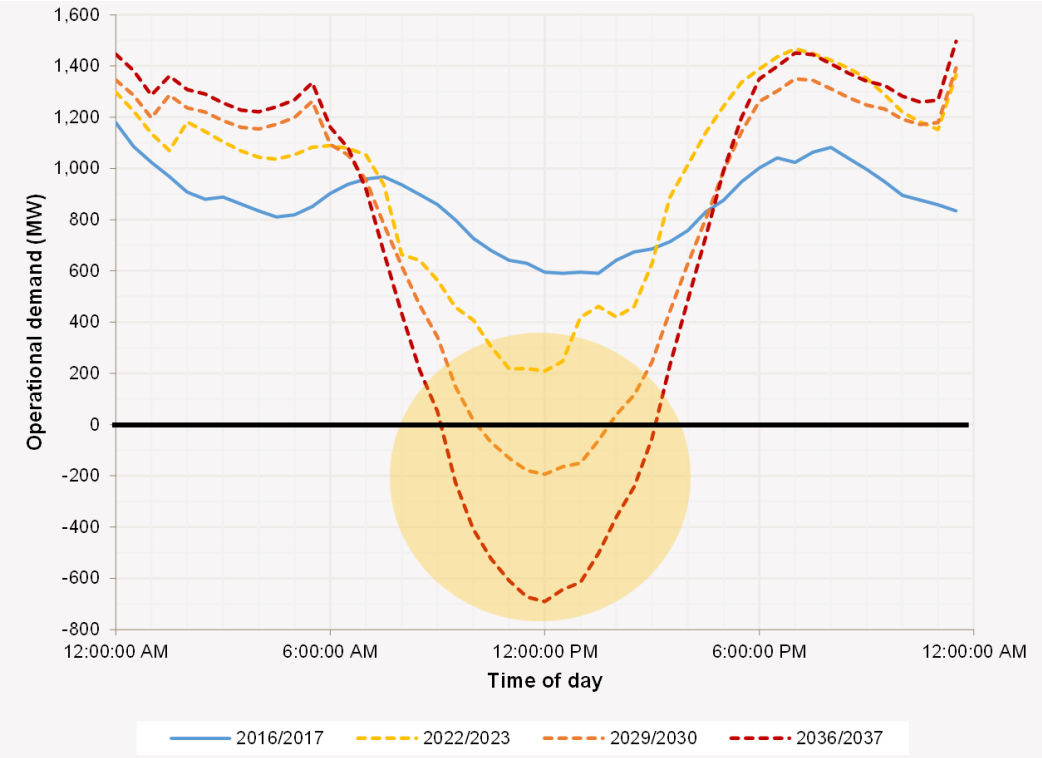
> *"Rooftop PV systems continue to be installed at a very high rate. An additional 155 megawatts (MW) was estimated to have been installed in 2017-18 across business and residential sectors, bringing the total estimated residential and business PV combined capacity in South Australia to 930 MW. Of the two sectors – business and residential – the business sector saw stronger relative growth by a considerable margin."*
>
> (p15) *"Rooftop PV installed capacity is forecast to grow steadily over the next 10 years, reaching 1,432 MW in 2027-28."*

The following chart from the SA Department of Energy and Mining (DEM)[17] illustrates the impact of solar on daytime demand since 2010:



The following chart from DEM illustrates the view within DEM and AMEO that solar production will regularly exceed South Australian demand by the end of the 2020s:

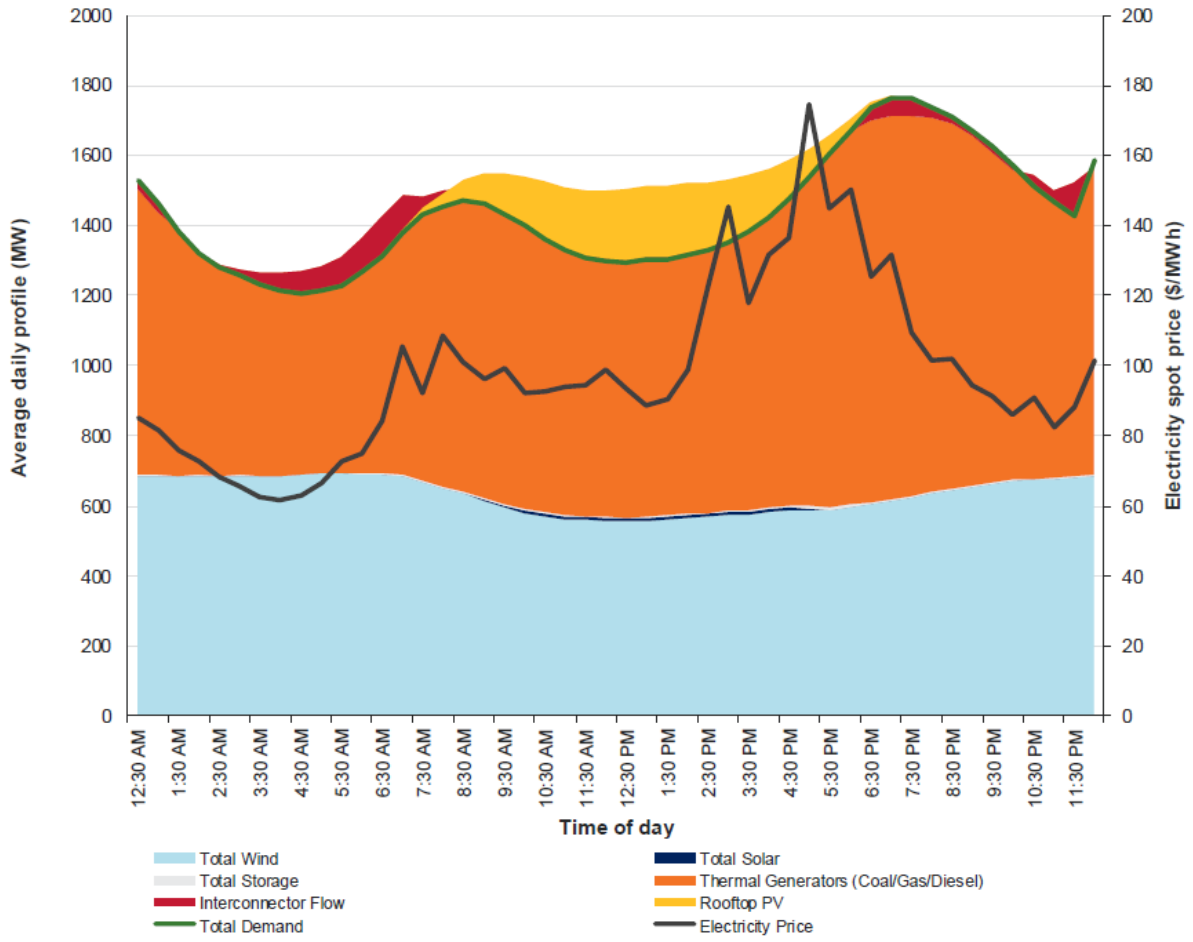
[17] Presentation 3 December 2018, Mr Vince Duffy, Executive Director
www.energymining.sa.gov.au/energy_and_technical_regulation/energy_resources_and_supply/south_australian_demand_management_trials_program



The impact on wholesale prices of solar across the day is also becoming apparent. The following chart from AEMO's 2018 South Australian Electricity Report illustrates the average price across the hours of the day in 2017-18[18]. As is clearly shown, the highest prices are achieved after solar production has peaked. The data behind the chart indicates that the wholesale price for solar, on average, was around $108/MWh in 2017-18.

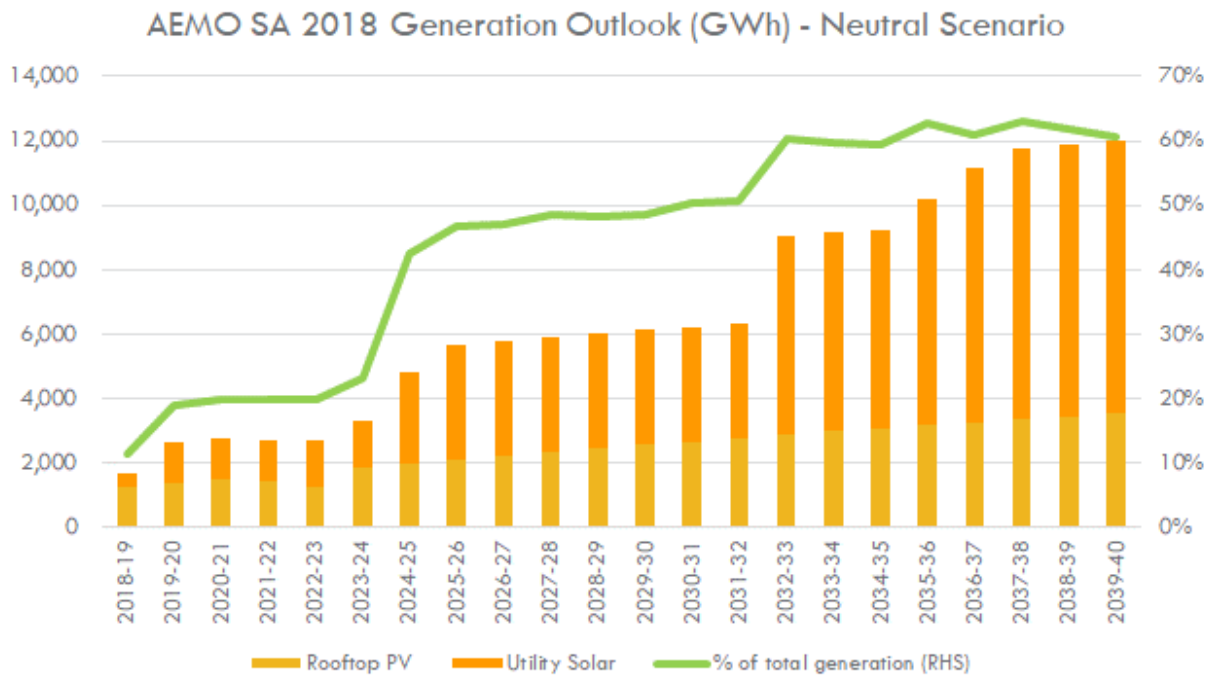
[18] "The average daily supply profile for South Australia, seen in Figure 12, represents the supply (in MW) for each 30-minute trading interval of a day, averaged over the 2017-18 financial year."

Figure 12 Average daily supply profile averaged for the 2017-18 financial year



Looking forward, there is significantly more solar capacity planned – from 'utility scale' solar projects in particular. The 110MW Bungala Solar Farm began generating in 2018[19]. This is the first 'utility scale' solar farm in SA and adds to the state's 930MW of rooftop solar. AEMO reports a further 218MW as committed and 2,387MW as 'proposed'. The following chart from AEMO's 2018 Integrated System Plan illustrates how they expect solar to reach 50% of total generation in SA by around 2030[20]:

[19] http://www.reachsolarenergy.com.au/bungala.html,
[20] http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Integrated-System-Plan



Given that almost all of this solar capacity will be competing to sell its output during daylight hours, we are projecting strong downward pressure on wholesale prices for solar projects.

In our view, solar projects are unlikely to return more than $100/MWh from the spot market in the short term and a value of around $80/MWh for the period 2020-2030 may still prove to be optimistic.

The impact is being felt in the low-voltage parts of the network first as a 'solar trough'. SA Power Networks 2020-25 Regulatory Reset Proposal Overview Section 7: Tariff Structure Statement (page 36) states:

> *"Solar rooftop generation is exceeding localised demand in many parts of our network, creating a solar 'trough' in the middle of mild sunny days. Cost-reflective tariffs that encourage customers to shift electricity use into the 'solar trough' will help manage this emerging issue and avoid augmenting the network to cope with this surplus energy."*

The network tariffs for residential customers proposed for 2020-25 include a new residential tariff for all customers with a smart meter that has peak, off peak and a 'solar sponge' from 10AM to 3PM. Indicative rates for this tariff in 2020-21 are 18c/kWh peak, 7.2c/kWh off peak and only 3.6c/kWh during the solar sponge. This is illustrated below to show the strong incentive that will exist to shift residential consumption to the middle of the day:

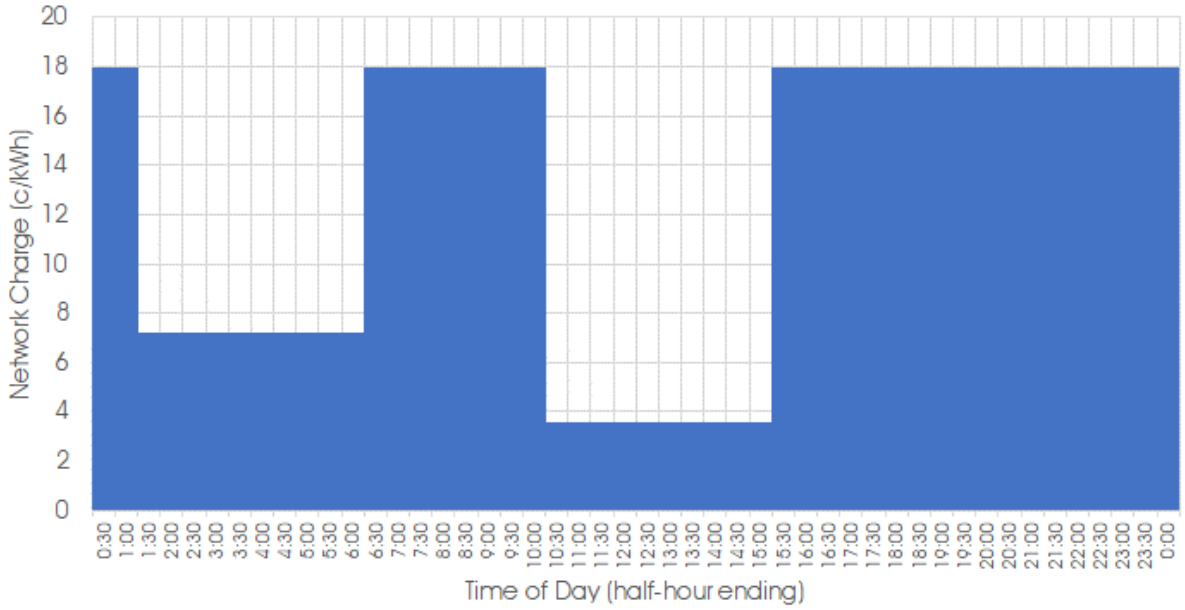


Figure 8: Proposed Residential Network Tariff for 2020-21 (Source: SAPN DRAFT TSS)

The final form of this tariff is not yet agreed and the price signal sent to customers will ultimately be decided by electricity retailers. However, SAPN expect around 40% of households will have a smart meter by 2025 and these will all be assigned to this sort of tariff. In our view this strong price signal will create opportunities for innovative approaches to reducing household electricity bills.

6.3 Renewable Energy Target

A key source of revenue for renewable projects has been from the sale of the certificates required by electricity retailers to meet their obligations under the Commonwealth's *Renewable Energy (Electricity) Act 2000*[21]. These certificates are known as LGCs and price projections are based on futures markets and consideration of supply and demand fundamentals. These costs are passed on to consumers as part of their electricity bills.

In terms of market fundamentals, the Clean Energy Regulator reported in January 2018 that the 2020 Renewable Energy Target will be met by existing and committed projects[22]. There is no current commitment from either side of federal politics to extend the RET and so the target (of 33,000 GWh per annum) will remain constant until 2030 when the legislation expires. Some new certificates will likely need to be created to make up for plant outages and retirements

[21] More information at the Clean Energy Regulator website: http://www.cleanenergyregulator.gov.au/RET/Pages/default.aspx
[22] CER Media Release "Record year of investment means Australia's 2020 Renewable Energy Target will be met" 23 January 2018 available from http://www.cleanenergyregulator.gov.au/RET/News-and-updates#January-2018

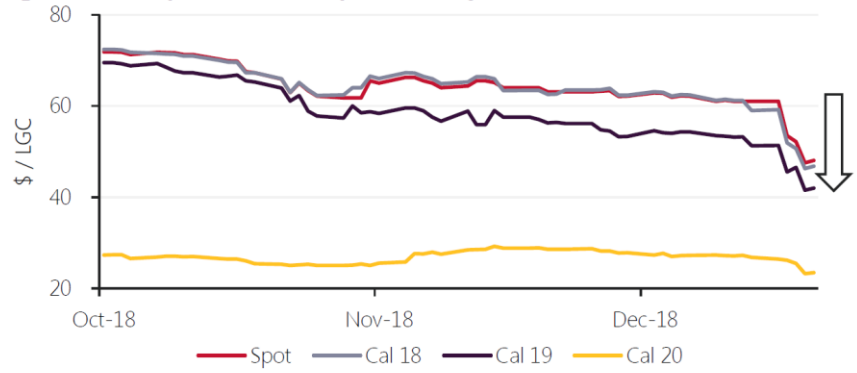
and LGCs can also be used as a way of voluntary offsetting greenhouse emissions. As a result, the value of LGCs is not expected to fall to zero but it is expected that the price of LGCs will fall from its heights of over $80/MWh in early 2018 to below $20 for the period 2020-2030.

Mercari is an active trader of LGCs and publishes futures prices for LGC trades[23]. The following table illustrates recent trades in LGCs to be delivered out to calendar 2022 and shows a steady decline in price over the years and also during the period of preparing this report.

Tenor	Mid Point Index 11 December 18	Mid Point Index 16 January 19	Mid Point Index 07 February 19
Spot	61.250	44.875	38.000
Cal 18	61.475	44.300	37.900
Cal 19	53.375	44.725	36.800
Cal 20	27.125	25.750	23.750
Cal 21	18.450	16.950	15.250
Cal 22			12.250

The Australian Energy Market Operator (AEMO) also sources prices from Mercari and published the following chart in their regular Quarterly Dynamics report (this one for Q4 2018)[24]:

Figure 21 LGC spot and forward prices over Q4 2018



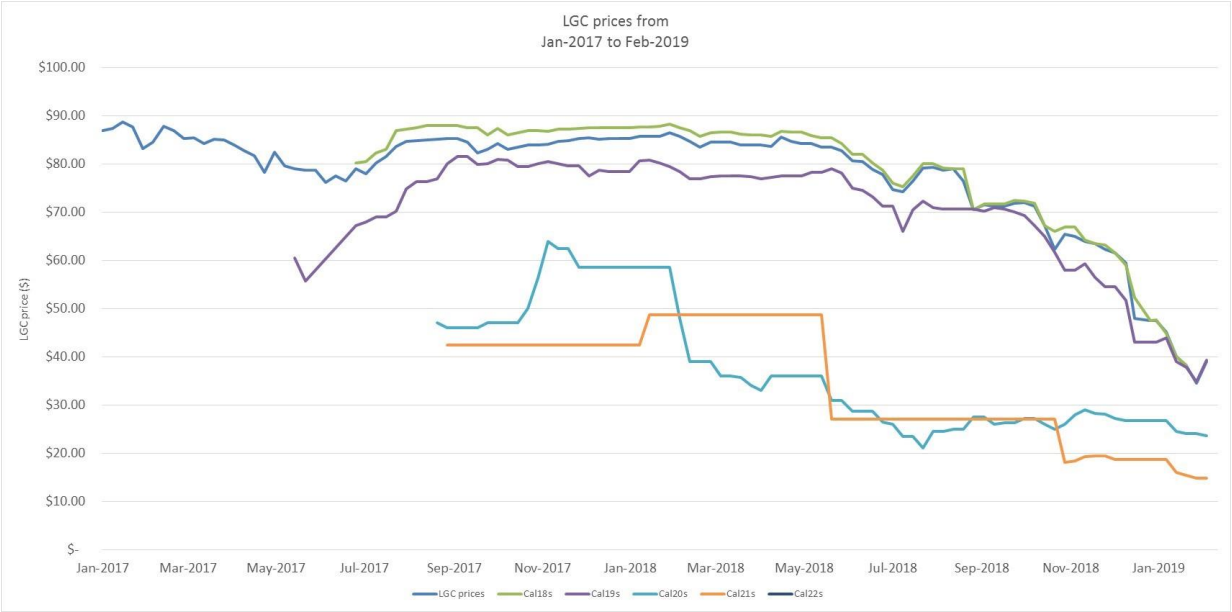
Source: Mercari

Table 4 LGC prices

Product	Change over Q4 18
Spot	▼ $24.25 (34%)
Cal 18	▼ $25.38 (35%)
Cal 19	▼ $28.53 (40%)
Cal 20	▼ $2.63 (10%)

The Clean Energy Regulator uses data from another LGC trader TFS Green and recently published a similar price trajectory[25]:

[23] www.lgc.mercari.com.au accessed 11 December 2018, 16 January 2019, 07 February)
[24] Released Feb 13 2019 and available from http://www.aemo.com.au/Media-Centre/AEMO-publishes-Quarterly-Energy-Dynamics---Q4-2018
[25] http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/Large-scale-Renewable-Energy-Target-market-data/large-scale-generation-certificate-market-update



Taking all of the above into account, we recommended the application of a conservative approach to LGC prices from 2020 until 2030 of around $10-$15 when evaluating projects or electricity contracts.

6.4 Microgrids, Embedded Networks and District Energy Schemes.

The supply of electricity to households and businesses is a regulated activity in Australia and the regulatory frameworks cater for situations where, instead of a dedicated connection to the electricity grid (often referred to as the shared network), energy consumers are connected to private electricity networks. These are usually referred to as *embedded networks* or *inset networks*. The district energy scheme at Tonsley is an example of an arrangement regulated under this framework. Renewable energy 'hubs' and microgrids also fall under this framework and the Australian Energy Markets Commission is actively reforming the regulatory frameworks that apply[26].

The intent of the framework is to replicate the consumer protections available to all other energy customers (South Australia operates under the National Energy Customer Framework administered by the Australian Energy Regulator). This sector specific framework sits alongside the protections provided under Australian Consumer Law and includes access to industry specific dispute resolution (The Energy and Water Ombudsman in SA).

With the increased number of these embedded networks and increasing interest in local energy schemes, the Australian Energy Markets Commission (AEMC) released a Draft Report in

[26] www.aemc.gov.au/market-reviews-advice/updating-regulatory-frameworks-embedded-networks, https://www.aemc.gov.au/news-centre/media-releases/consultation-starts-regulatory-arrangements-stand-alone-power-systems.

their Market Review*: Updating the Regulatory Frameworks for Embedded Networks* on 31 January 2019[27]. The report sets out the AEMC's view on how electricity should be regulated inside private electricity networks. This process will update the framework for regulating energy 'on-selling' in shopping centres, airports, apartment buildings, retirement villages etc.

The proposed changes will enhance the ability of consumers within these private networks to access electricity supply from a retailer of their choice. Changes to metering obligations also mean that operators of these private networks will not be able to 'capture' customers and impose higher prices than would be the case otherwise – a common complaint under the existing arrangements from customers but an important component of the business case for proponents.

These changes are relevant when considering an energy hub or other on-selling arrangement. The cost of regulatory obligations are likely to place pressure on the business case for small scale, local schemes.

[27] www.aemc.gov.au/market-reviews-advice/updating-regulatory-frameworks-embedded-networks

7 Opportunities

Based on the survey responses, market context and infrastructure utilisation, we have distilled the following general opportunities from this Baseline Report.

It is recommended that the SAEDB discuss these and determine which of these to prioritise for development into specific initiatives. The 'Opportunities' stage of this project (the second stage, subsequent to this Baseline Report) can be used to develop a suite of initiatives that promote the energy opportunities available to businesses in the region.

7.1 Energy Advice for Business

the Australian Competition and Consumer Commission Retail Electricity Pricing Inquiry found that small businesses tend to have limited bargaining power to lower their prices and limited resources to identify and implement energy efficiency measures[28]. In response, the Australian Government released details of the Business Energy Advice Program (BEAP) on 06 February 2019 when it opened applications for 'roll-out partners' for the program. The program aims to "… *deliver trusted advice to help small businesses get better energy deals and reduce their usage*"[29].

Ensuring local small businesses can access this service – or something similar - should be considered a priority. Prioritising higher energy using businesses such as those in Section 5 would be a logical place to start.

As noted in Section 5, there are a number of businesses with an energy services focus based in the region. Connecting these with local energy users would be a logical inclusion in such an initiative. There is very likely to be more service providers in the region and it is recommended that SAEDB establish a more complete list of such businesses.

A well utilised example of 'quick wins' for many types of small business is the South Australian Government's Retailer Energy Efficiency Scheme (REES) program for upgrades for Commercial Lighting[30]. AGL for example offers "free" LED lighting upgrades under the scheme[31].

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[28] www.accc.gov.au/regulated-infrastructure/energy/electricity-supply-prices-inquiry
[29] Media Release The Hon. Angus Taylor MP Minster for Energy 17 December 2018 http://www.environment.gov.au/minister/taylor/media-releases/mr20181217.html ; 07 February 2019 http://www.environment.gov.au/minister/taylor/media-releases/mr20190206.html
[30] http://www.energymining.sa.gov.au/energy_and_technical_regulation/energy_efficiency/retailer_energy_efficiency_scheme and www.escosa.sa.gov.au/industry/rees/overview/rees-overview
[31] without endorsing the scheme, more information is available here: http://rees.agl.com.au/business/

In response to the survey, providing case studies of local businesses using actual dollar figures to illustrate the real ROIs being achieved is likely to be an effective tool for engaging more businesses.

7.2 Energy Procurement Hub

As indicated by the survey responses (Section 2.2), an opportunity exists to pursue local bulk purchase initiatives. We must acknowledge that such initiatives often have 'cat herding' attributes but, in our experience, there is value in facilitating an opportunity to share different energy procurement experiences even if a 'bulk deal' is not the end result.

There has been significant attention paid to corporate renewable power purchase agreements (PPAs) in recent times, where large energy users have been able to secure long-term electricity supply contracts while underwriting new renewable energy generation projects. This approach has been adopted by individual entities as well as buying groups. Substantial resources detailing the pros and cons of such approached are published by the Business Renewables Centre Australia[32] and not reproduced here. However, the general approach of buying groups has seen a resurgence of interest on the back of the positive stories emerging.

It is recommended that the SAEDB engage with the SA Department of Industry and Skills to consolidate work underway on similar procurement initiatives.

7.3 Network Utilisation

As shown in Section 4, the local electricity grid has substantial capacity at the substation level and that current consumption patterns mean that outside of peak times there is much more capacity available to drive economic activity.

As a first step, it is recommended that the SAEDB seek to have missing data restored in the next update of the Network Opportunity Maps as it is a positive story for the region that would be easier to tell if the maps were complete (Section 3.1).

Further, it is recommended that the SAEDB engage directly with SA Power Networks and Australian Gas Networks in order to create a regular dialogue on electricity and gas infrastructure that can be shared with local industry to inform investment decisions.

[32] https://businessrenewables.org.au/knowledgebank/

7.4 Shifting demand to solar hours

Opportunities exists to improve network utilisation by increasing electricity consumption during solar hours. As shown in Section 6.2, network tariffs are expected to lower the cost of consumption during solar hours. If electricity retailers can be encouraged to pass this price signal on to customers then a range of opportunities emerge to lower electricity bills for households in the region.

It is recommended that the SAEDB engage directly with SA Power Networks on tariff reform to identify opportunities for local businesses to lower costs.

7.5 The Hydrogen Economy

Opportunities exist for regions to establish themselves as leaders in this increasingly prospective space. The SAEDB region has an advantage in the Hydrogen Park for SA initiative at Tonsley described in Section 3.2. It should be noted that Hydrogen developments in other locations are also occurring[33].

The South Australian Government's Renewable Technology Fund has provided a $3.6 million grant towards a $7.7 million project at UniSA's Mawson Lakes campus that includes hydrogen production and a 50kW hydrogen fuel cell, a 0.45MWh flow battery, 3.2 million litres of chilled water storage and 1.8MW of ground and roof mounted solar PV. The project will cut campus emissions by 35 per cent and reduce peak demand on the grid and is being designed as a testing facility.

The same fund is supporting a "green hydrogen" plant at Port Lincoln to be built by Hydrogen Utility (H2U) and including a 10MW hydrogen-fired gas turbine, fuelled by local wind and solar power, and a 5MW hydrogen fuel cell[34].

Renewables developer Neoen's 50 megawatt (MW) Hydrogen Super hub planned at Crystal Brook is envisioned to be the world's largest co-located wind, solar, battery and hydrogen facility.

It is recommended that SAEDB engage directly with Australian Gas Networks on developing a Hydrogen Centre for Excellence at Tonsley.

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[33] http://www.renewablessa.sa.gov.au/topic/hydrogen/hydrogen-projects
[34] https://reneweconomy.com.au/s-a-to-host-australias-first-green-hydrogen-power-plant-89447