Attachment 11.1

AA4 Tariff Reforms

Access Arrangement Information

2 October 2017

Access Arrangement Information (AAI) for the period
1 July 2017 to 30 June 2022

westernpower

AA4 Tariff Reforms

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Abbreviations

The following table provides a list of abbreviations and acronyms used throughout this document. Defined terms are identified in this document by capitals.

Term	Definition
AA3	Third access arrangement
AA4	Fourth access arrangement
AAI	Access arrangement information for the AA4 period
Access Code	*Electricity Networks Access Code 2004*
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
CMD	Contracted Maximum Demand
EMS	Extended Metering Services
ENUC	Excess Network Usage Charges
ETAC	Electricity Transfer Access Contract
LRMC	Long Run Marginal Cost
Metering Code	Electricity Industry (Metering) Code
NEM	National Electricity Market
NIEIR	National Institute of Economic and Industry Research
PV	Photovoltaic
SMS	Standard Metering Services
SWIS	South West Interconnected System
TEC	Tariff Equalisation Contribution
TSS	Tariff Structure Statement
WEM	Wholesale Electricity Market

1. Introduction

This attachment of Western Power's proposed access arrangement demonstrates what we are proposing in detail on reference services and reference tariffs for the fourth access arrangement (**AA4**) period commencing 1 July 2017 until 30 June 2022.

1.1 Purpose

Western Power is planning to implement new tariff structures from 1 July 2017 (commencement AA4). The purpose of this attachment is to document a pathway that considers and delivers reform to network tariffs from the commencement of AA4 with consideration of the short, medium and long term and will help inform the most appropriate network tariff structure for our customers.

This document details the pricing objectives that Western Power will achieve through its revised network tariff structures, it also shows the method we followed to begin transitioning from the current tariff structures to the preferred tariff structures in AA4.

This document has been developed following a period of consultation with our customers and key stakeholders. This document also outlines how we have addressed customer feedback.

1.2 Summary of proposal

Western Power will provide 21 reference services in the access arrangement for the AA4 period. Each reference service has a corresponding reference tariff. Of the 21 reference tariffs, the structure of 15 remain unchanged for the AA4 period.

We are proposing the following changes to reference tariffs for the AA4 period:

- introducing two new time of use tariffs
- introducing two new demand-based tariffs
- modifying peak/off-peak time periods in the existing RT5 and RT6 demand tariffs to reflect the time periods in the new time of use tariffs
- modifying existing demand-based tariffs for medium to large businesses (RT5 – RT8) to allow for bi-directional flows
- recovering Tariff Equalisation Contribution (**TEC**) from the fixed component of tariffs rather than the variable component of most tariffs.

Each of the above changes are explained throughout this document.

2. Understanding network tariffs

References services are the services an electricity network business offers to customers that wish to connect to the electricity network. Reference services are distinguishable from non-reference services in that reference services are covered by an access arrangement.

For Western Power, reference services are those services associated with transmitting or distributing electricity. The prices, standards, and terms and conditions for these services are covered by Western Power's access arrangement.

Reference services covered by an access arrangement must have an associated reference tariff, service standard benchmarks and a standard access contract. Therefore, reference services are only offered to customers that hold a standard access contract. At Western Power the standard access contract is the Electricity Transfer Access Contract (**ETAC**).

ETAC holders are typically generators, retailers and large load customers, though residential and small business customers are users of the network, these customers do not have an ETAC. Instead, the electricity retailer holds the ETAC on behalf of customers. Where a customer wishes to access the network, the retailer nominates the reference service Western Power is to provide. The retailer then pays the associated network reference tariff and passes those costs on to the end customer via the retail tariff.

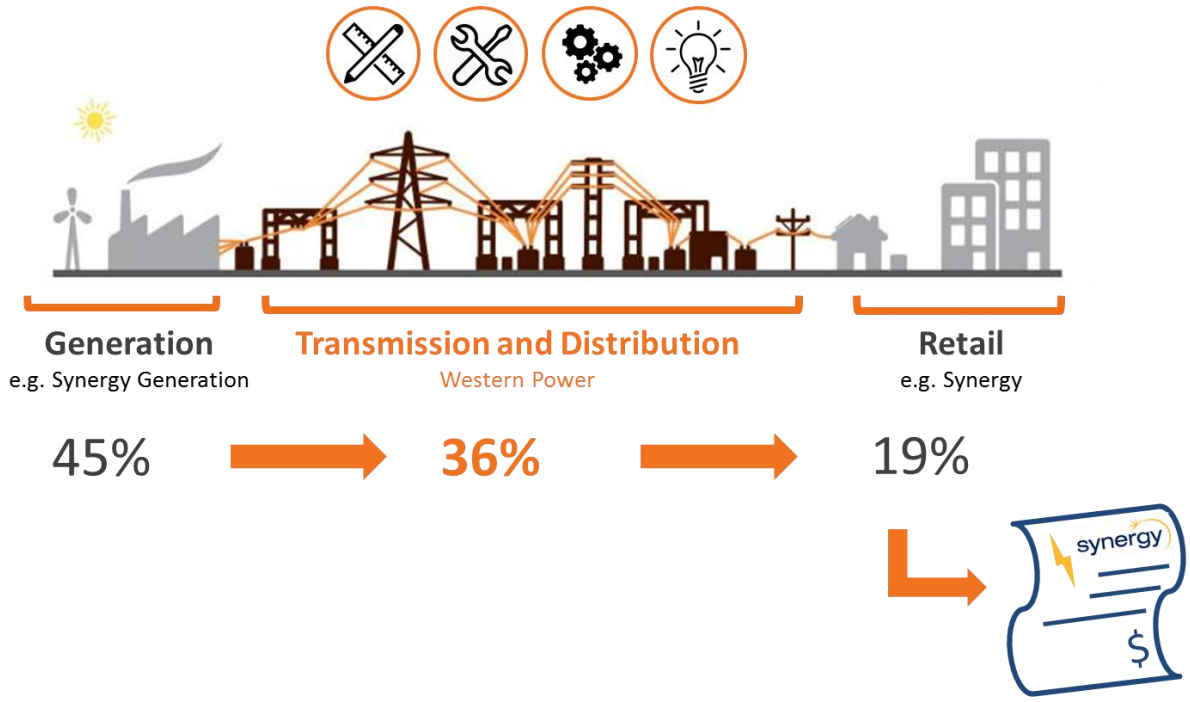
Reference services provided to residential and small use customers are administered in this way to enable Western Power to provide reference services to a large number of customers via a single ETAC. The alternative would be to have one ETAC per residential customer, which would require more than one million contracts. This would not be an efficient approach.

Although the retailer is the ETAC holder (and pays the reference tariff), Western Power is still providing transmission and distribution services to all end users. Therefore it is important that when developing new or revising existing reference services, Western Power engages with customers (end users) to ensure it is offering a suite of reference services that meet their requirements.

Western Power has presented its views on the range of reference services and tariffs that will be offered in the AA4 through the customer engagement program discussed in section 4. Our customer engagement approach was to be transparent with our proposed changes to network tariffs, commencing with retailer forums in March 2017, in accordance with section 5.2 of the Access Code. The access arrangement review facilitates further customer engagement, as Western Power can present its proposed suite of reference services to customers via the public access arrangement review process, and seeking feedback from customers on whether they satisfy their requirements.

Network tariffs are the prices customers pay for using our distribution and transmission networks. Network tariffs are one component of a customer's total electricity bill, which also include the cost of generating the electricity, and retailer costs. While customers do not see a separate charge for use of our networks on their electricity bill, on average, our tariffs comprise approximately 40 per cent of the residential customer's electricity bill.

Figure 2-1: Western Power's role in the electricity supply chain



We must ensure that our tariffs are consistent with certain principles set out in the *Electricity Networks Access Code 2004* (**Access Code**). This includes that our tariffs allow us to recover only the efficient cost of providing our services, and that they signal to customers the cost of using the network.

It is helpful to highlight the determination of tariffs does not affect the total level of revenue we derive. This is because Western Power operates under a revenue cap control mechanism applied by the Economic Regulation Authority (**ERA**). Specifically, the ERA approves a 'cap' or 'fixed revenue allowance' on the level of revenue we are permitted to collect in each year, where the cap is equal to the efficient cost of providing our reference services, which the ERA determines. In doing so, the ERA ensures that customers pay only for the efficient costs of providing services, and are protected from having to pay for any costs deemed by the ERA to be inefficient.

The ERA approves tariffs that, when combined with customer, energy and demand expectations, are expected to allow us to recover our efficient costs. Importantly, if it eventuates that we derive either more or less revenue in any particular year (say, because energy consumption differs to expectations) the revenue cap is adjusted in the next year to provide for a true-up. This framework and the structure and level of our tariffs have no effect on the total revenue we derive. Rather, the importance of tariffs draws from the resultant signals they send to customers, and the scope for those signals to encourage efficient consumption decisions.

2.1 Peak demand is the primary driver of our costs

The principal determinant of network costs is the expected maximum (or 'peak') electricity demand. When maximum demand increases, the distributor must augment its network capacity or risk the prospect of not being able to supply its customers. The network's most important obligation therefore arises from its customers' right to draw power during the system peak.

Peak demand is influenced by a number of factors, the most important of which are:

- temperature, which affects the use of heating and cooling devices, such as air conditioners
- level and location of population growth, which determines how many consumers we are supplying and from which substations.

In particular, heat waves, cold snaps and other often short-lived and infrequent events can create major spikes in electricity consumption.

Annual system-wide peak demand for our network occurs in summer during prolonged heat waves, and usually between about 3pm and 9pm – that is, when our customers arrive home and turn on household appliances e.g. air conditioners, TVs, ovens, dishwashers and lights. In winter, peak demand occurs on very cold weekday evenings when our customers heat their homes. Although peak demand in winter is slightly lower than in summer, it has a significant impact in some areas of our network.

The 2015/16 summer period was particularly hot and recorded the highest load at system peak in the South West Interconnected System (**SWIS)** to-date. In comparison, the 2016/17 summer was comparatively mild, producing an eight year low peak. Greater volatility of demand related to weather is emerging as a new feature of peak demand, as demonstrated by the last two years.

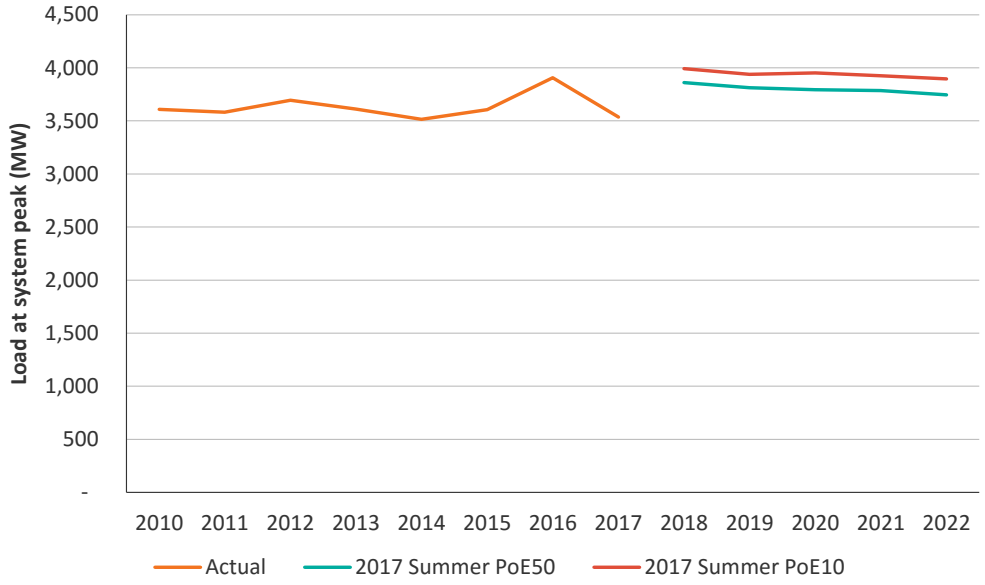
Western Power Forecasts compounding annual growth over the AA4 period of:

- -0.6 per cent in network peak demand
- 1.6 per cent in customer numbers
- -0.4 per cent in energy consumption.

Peak demand and customer numbers drive the need for investment in our network to ensure there is sufficient capacity available in the network to connect new customers and to service peak demand. The prices paid by our customers will be affected by the forecast of the number of customers and energy consumption – higher forecasts will lead to lower prices and conversely, lower forecasts will lead to higher prices.

Our growth and demand forecasts is shown in Figure 2-1 with further detail on peak demand, energy and customer number forecasts contained in Attachment 7.3.

Figure 2-1: Western Power historical and forecast network peak demand



Note, we focus peak demand based on two scenarios:

1. probability of exceedance of 50 per cent (**PoE50**) which represents a forecast value that should not be exceeded any more than one in every two years
2. probability of exceedance of 10 per cent (**PoE10**) which represents a forecast value that should not be exceeded any more than one in every ten years.

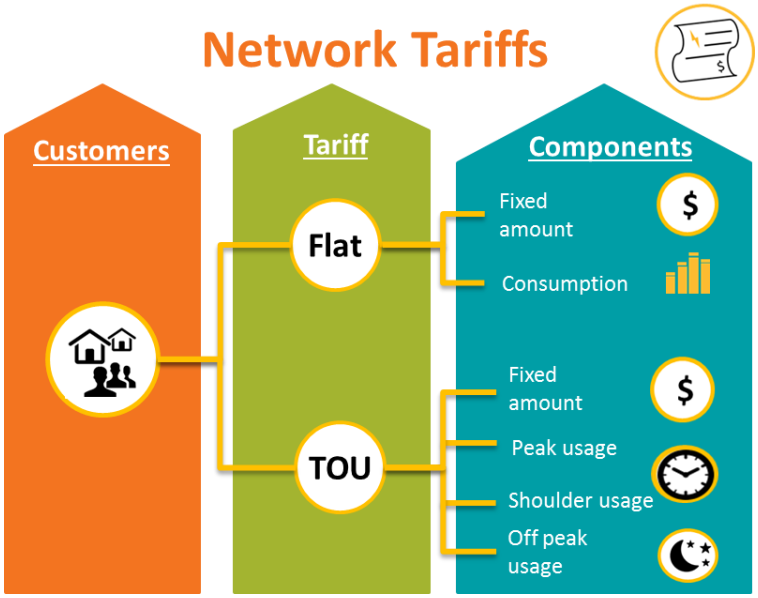
Importantly, system-wide demand is made up of demand at a number of locations across our network, at a particular time, each with different levels of spare capacity and underlying demand patterns. This has vital implications for how peak demand contributes to the need for further investment in our network. Augmentation expenditure is generally directed at particular elements of our network for which capacity is constrained. Therefore, it is localised peak demand for these areas of our network that drives our costs. These localised peaks in demand do not necessarily occur at times of system-wide peak demand – just as peak demand for a road network may occur at 8am and 6pm, with people traveling to and from work, but demand for some elements of the road network, say those surrounding schools may peak at other times such as mid-afternoon.

Even though the peak, or close to peak, levels of demand may occur only a few days a year, and are short-lived, it is imperative we build our network to ensure there is sufficient capacity to meet peak demand. If sufficient capacity does not meet peak demand, there could be electricity outages for some customers. The economic and social consequences of not being able to meet peak demand are severe.

2.2 Understanding some key terms

Before explaining the various tariff options available, and the particular tariffs that we propose, it is helpful to explain a few key terms, which we illustrate in Figure 2-2 below.

Figure 2-2: Network Tariffs



2.3 Common tariff structures

The tariff structures available to us depend on the meter type installed at a customer's connection. Meters can be divided into three broad categories:

1. basic or accumulations meters, which keep track of the total amount of electricity used
2. electronic or interval meters, which record how much electricity is used every half hour
3. advanced meters, which record half hourly data as well as a range of other information.

2.3.1 Common tariffs with basic meters

Basic meters are used by the majority of our customers and permit tariffs based on customer's total energy consumption. Common tariffs for customers with basic meters include:

- a **flat tariff** – applies a flat unit rate (c/kWh) to customers' consumption
- an **inclining block tariff** – applies different unit rates (c/kWh) to different blocks of consumption, and the applicable unit rates increase with a customer's consumption
- a **declining block tariff** – applies different unit rates (c/kWh) to different blocks of consumption, and the applicable unit rates decrease with a customer's consumption.

2.3.2 Common tariffs with electronic meters

Electronic meters enable the implementation of tariffs that vary over time, such as different unit rates applying to different time periods, such as peak and off-peak. This enables the implementation of a broad range of tariffs, including those which are capable of better reflecting costs.

The tariff options available with electronic meters include:

- a **time of use tariff** – applies different unit rates (c/kWh) at different times of the day, and where a higher rate is generally levied during periods of peak energy consumption

- a **demand tariff** – includes the application of unit rate (c/kW) to a customer's peak consumption during a defined period (generally, a period of peak demand), in combination with other tariff components
- a **critical peak pricing tariff** – applies a peak energy or demand price (c/kWh or c/kW, respectively) on a small number of 'critical' days each year, and where use of the network for the remainder of the year is charged on the basis of a significantly lower "off-peak" tariff component
- a **peak time rebate tariff** – may include multiple tariff components, but is distinguished by the rebate customers receive for limiting their use of the network on a small number of 'critical' days in each year i.e. customers receive a financial reward for reducing peak demand on certain days.

All of these tariffs are directed at signalling to customers the relatively higher costs imposed by use of the network during periods of peak demand, as compared with off-peak periods. In so doing, these tariffs are capable of empowering customers to take control of their electricity bills and provide financial rewards for consuming electricity in a manner that lowers our costs. Importantly, this framework ensures that any such cost savings are ultimately passed on to our customers.

2.3.3 Tariffs available with advanced meters

Advanced meters allow for all of the above tariffs, but have the major advantage of being able to communicate in real time, with Western Power and potentially retailers. Depending on the configuration of the advanced meter, the customer may be able to receive real time information and notifications regarding their usage.

2.3.4 Tariff Components

Each tariff can be comprised of one or more tariff types. Tariffs may have different structures, and may be comprised of different tariff components. For example, a tariff may comprise a fixed charge, which is a flat amount charged each year, and a usage charge, which is levied on each unit of electricity consumed in a defined period of time. These charges within a single tariff represent two separate tariff components.

2.4 Pricing objectives

Western Power's pricing objectives have been updated in the context of Western Power's strategic plan to supply customers with safe, reliable and efficient connection to electricity. In this context, we revised our pricing objectives to shape our thinking when considering the tariffs that should be offered to customers. The new pricing objectives are to provide for sufficient revenue to maintain a safe and reliable network, to encourage efficient use of the network, to provide customers with choice and for tariffs to be simple and straightforward.

We have also given regard to our existing pricing objectives under the Access Code (summarised in 5.1.1) and pricing objectives adopted by other Australian network service providers (summarised in Appendix B.3). Western Power's revised pricing objectives are shown in the Table 2.1.

Table 2.1: Revised pricing objectives

Theme	Pricing objectives
Revenue sufficiency	Tariffs should be formulated to recover revenue from users in a manner that achieves: • sufficient revenue to provide a safe and reliable network • efficient network services to all network users • sufficient revenue to recover the revenue allowance defined in the price control.
Network efficiency	Tariffs must send appropriate and effective signals to promote the economically efficient investment in, operation and use of the Western Power Network. Tariff signals will include the objective of: • informing network users of their impact on existing and future network capacity and costs • assisting in managing growth in peak demand (to avoid increases in capital expenditure requirements) • providing network users with an incentive to shift their loads away from peak to off-peak periods. Tariffs will be cost reflective by: • reflecting the actual long run, time-varying cost of service provision to network users • individual charging parameters within each tariff taking account of the long run marginal costs.
Choice	Tariffs should provide network users with tariff choices that enable them to manage their costs.
Simplicity	Be simple and straightforward, readily understood by customers and minimise administration costs, as far as is reasonable taking into account other objectives.

Western Power has mapped the pricing objectives against the corporate strategic objectives of safe, reliable and efficient connection to electricity. This is shown in Table 2.2 below.

Table 2.2: Pricing objectives strategic alignment

Corporate objectives	Pricing objective
Safe	Safety is a key focus of our business – our network tariffs will ensure that Western Power earns sufficient revenue to maintain a safe network.

Corporate objectives	Pricing objective
Reliable	Our customers expect reliability – our network tariffs will: • manage efficient use of the network at peak times so that we provide a reliable supply at all times • ensure that Western Power earns sufficient revenue to enable efficient investment in the network to maintain a reliable supply.
Efficient	Our customers want us to provide electricity efficiently reducing costs - our network tariffs will: • increase the value of the electricity network for customers through tariff choices that enable them to manage their costs • manage the efficient use of the network at peak periods to reduce the need for additional growth capital expenditure • be simple and easily understood.

Western Power considered a wide variety of tariff types against these objectives before landing on the range of tariffs being offered in the AA4 proposal. The assessment undertaken can be found in Appendix B.

3. Changes proposed to services and tariffs

We are proposing the following changes to reference services and reference tariffs for the AA4 period:

- introducing two new time of use tariffs
- introducing two new demand-based tariffs
- modifying the peak/off-peak time periods in the existing RT5 and RT6 demand tariffs to reflect the time periods in the new time of use tariffs
- modifying the existing demand-based services for medium to large businesses (A5 – A8) to allow for bi-directional flows
- recovering the TEC from the fixed component of tariffs rather than the variable component.

The proposed changes are summarised in the following sections, and in the price list information provided in Appendix F.4 of the proposed access arrangement. Table 3.1 shows the reference tariffs for the AA4 period.

Table 3.1: Summary of reference tariffs for the AA4 period

Reference Services	Reference tariff	Reference tariff description	Type of reference tariff	Revenue cap recovery	Retained from AA3[1] or new/modified changed in AA4
A1	RT1	Anytime energy (residential) tariff	Reference tariff for Dx users	Tx and Dx	Retained from AA3
A2	RT2	Anytime energy (business) tariff	Reference tariff for Dx users	Tx and Dx	Retained from AA3
A3	RT3	Time of use energy (residential) tariff	Reference tariff for Dx users	Tx and Dx	Retained from AA3
A4	RT4	Time of use energy (business) tariff	Reference tariff for Dx users	Tx and Dx	Retained from AA3
A5	RT5	High voltage metered demand tariff	Reference tariff for Dx users	Tx and Dx	Modified in AA4
A6	RT6	Low voltage metered demand tariff	Reference tariff for Dx users	Tx and Dx	Modified in AA4
A7	RT7	High voltage contract maximum demand tariff	Reference tariff for Dx users	Tx and Dx	Modified in AA4
A8	RT8	Low voltage contract maximum demand tariff	Reference tariff for Dx users	Tx and Dx	Modified in AA4

[1] Third access arrangement, period 1 July 2012 to 30 June 2017

Reference Services	Reference tariff	Reference tariff description	Type of reference tariff	Revenue cap recovery	Retained from AA3[1] or new/modified changed in AA4
A9	RT9	Streetlight tariff	Reference tariff for streetlights	Tx and Dx [2]	Retained from AA3
A10	RT10	Unmetered supplies tariff	Reference tariff for Dx users	Tx and Dx	Retained from AA3
B1	RT11	Distribution connected generation tariff	Reference tariff for Dx users	Tx and Dx	Retained from AA3
C1	RT13	Anytime energy (residential) bi-directional tariff	Reference tariff for Dx users	Tx and Dx	Retained from AA3
C2	RT14	Anytime energy (business) bi-directional tariff	Reference tariff for Dx users	Tx and Dx	Retained from AA3
C3	RT15	Time of use (residential) bi-directional tariff	Reference tariff for Dx users	Tx and Dx	Retained from AA3
C4	RT16	Time of use (business) bi-directional tariff	Reference tariff for Dx users	Tx and Dx	Retained from AA3
D1	RT17	Time of use energy (residential) tariff	Reference tariff for Dx users	Tx and Dx	New for AA4
D2	RT18	Time of use energy (business) tariff	Reference tariff for Dx users	Tx and Dx	New for AA4
D3	RT19	Time of use energy (residential) tariff	Reference tariff for Dx users	Tx and Dx	New for AA4
D4	RT20	Time of use energy (business) tariff	Reference tariff for Dx users	Tx and Dx	New for AA4
A11	TRT1	Transmission load tariff	Reference tariff for Tx users	Tx	Retained from AA3
B2	TRT2	Transmission generation tariff	Reference tariff for Tx users	Tx	Retained from AA3

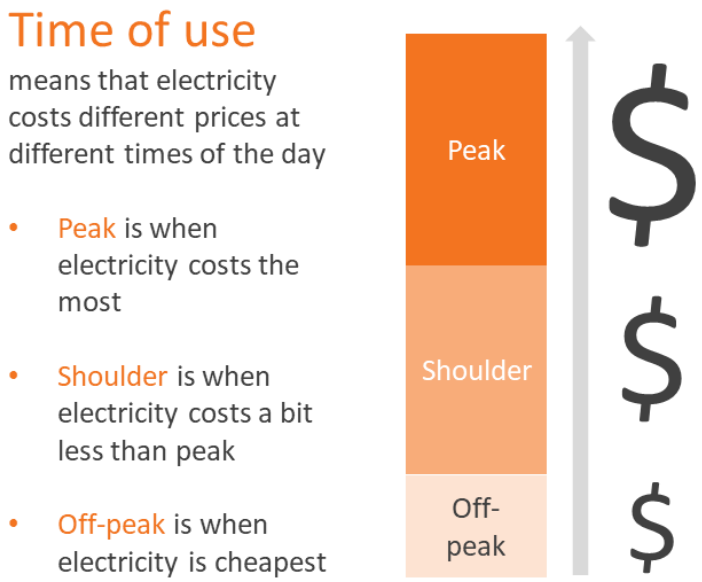
3.1 New time of use energy tariffs

Western Power proposes to introduce time of use energy tariffs for all **new** residential and small use customers who connect to the network from the AA4 period onwards.

[2] Revenue recovery for RT9 includes streetlight operating and maintenance costs.

A time of use network tariff is where customers pay a different price for using electricity at different times of the day. Currently, all residential customers pay a flat rate no matter the time of day or night they use electricity. A time of use tariff would charge a higher rate at peak times (typically late afternoon and early evening on weekdays) and a lower rate at all other times.

Figure 3-1: Time of use tariffs



The purpose of a time of use tariff is to encourage customers to spread their electricity use over the course of the day. At the moment, residential customers tend to use the most amount of electricity between 3pm and 9pm on a weekday.

Typically, people arrive home from school and work, switch on the oven, turn on the TV, do the laundry, and often use several electrical appliances. This means a lot of electricity is being distributed throughout the network at the same time, particularly on the hottest summer days when many people return home to a hot house and begin using their air-conditioning. We call this time the network peak.

As the population grows generally the network peak gets higher, which means the network must be able to cope with more and more electricity running through it. To make sure the network can cope with the peak (and so customers don't lose power), Western Power needs to reinforce and increase the capacity of the network.

With a new substation costing around $45 million, investment in increasing network capacity is expensive. It is also worth noting the highest peaks of network demand only occur a few times per year, so the cost of increasing peak network capacity is disproportionate to the amount of time the additional capacity is required.

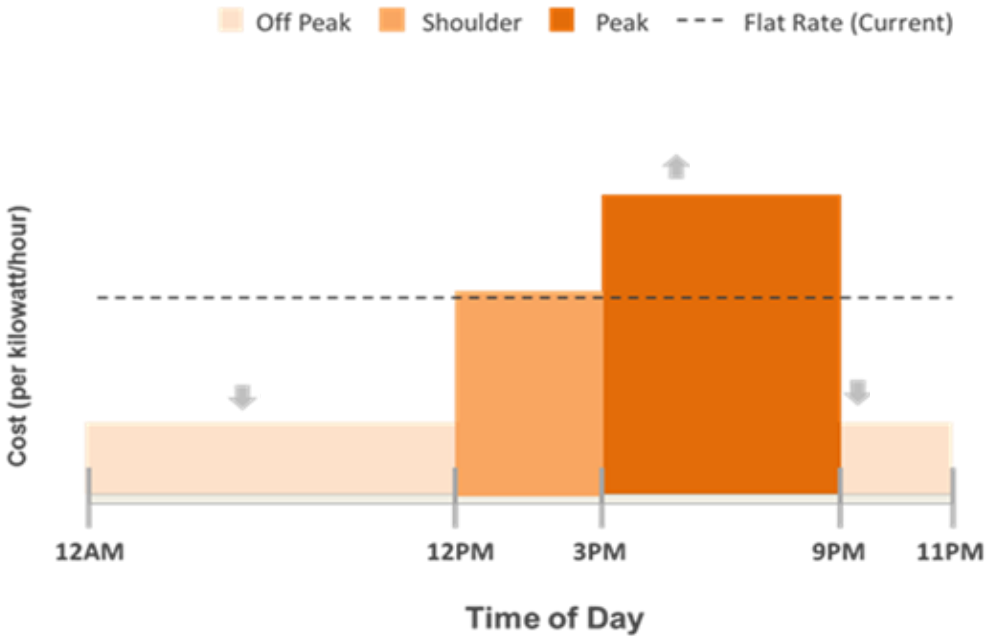
Time of use network tariffs are an alternative to the costly option of increasing network capacity. By encouraging customers to use electricity outside of peak times, the tariffs can help reduce the need for network capacity expansion, which saves customers money over the long term.

Time of use tariffs themselves can also reduce customers' bills. A trial of 750 Perth households in 2011 and 2012 found that by making a few moderate changes – washing at a different time, running the pool pump overnight, using the air-conditioning on a timer – customers saved up to $50 per year.

Time of use network tariffs can also benefit small business customers, particularly where the business is able to adjust its electricity consumption patterns. Western Power currently offers a time of use tariff (RT4-Time of Use Energy) to businesses, with about 14% of small businesses connected to the network already on the RT4 tariff.[3] The current RT4 tariff has a peak/ off-peak charging window of 8am to 10pm on weekdays. While the RT4 tariff is beneficial to customers who can shift their electricity usage to outside these times, the peak charging window is too large to accurately reflect network peak times and encourage electricity usage outside of the typical late afternoon/early evening peak demand period.

Western Power proposes new time of use network tariffs for small businesses and residential customers that better reflects peak demand times. The new tariff charges a higher rate on weekdays between 3pm and 9pm, and a lower rate between 9pm and 12pm. Customers on existing time of use network tariffs will have the option to move to these new tariffs.

Figure 3-2: Time of use structure



As more and more customers take up time of use tariffs, it should result in lower system peaks and negate the need for costly peak capacity investment over the long-term.

A time of use network tariff requires customers to have advanced meters (or at least electronic or interval meters)[4]. From AA4 onwards, Western Power proposes all new connection customers will have advanced meters installed by default and will be put on the time of use tariff. As existing meters reach end-of-life,

[3] Western Power also provides the RT3 Time of Use Energy tariff to around 12,000 residential customers, which has the same 7am - 9pm peak/off-peak charging window as the RT4 tariff.

[4] Electronic or interval meters have the capability to record time of use, but do not have the communications links of an advanced meter, and therefore has to be read manually.

they will be replaced with advanced meters and the customers will then have the option to move to time of use tariffs. [5]

Feedback from customers on time of use tariffs has been positive. Customer forums and surveys conducted during 2016 indicates customers are generally willing to change their electricity usage behaviours once they understand the impact of peak demand. As a result, there is appetite for time of use tariffs, particularly among younger customers.

Retailers will play a major role in the effectiveness of time of use tariffs. The retail tariff structure must reflect the network tariff structure in order for time of use tariffs to give customers the appropriate price signals to shift their electricity consumption patterns. Retailers are also key to the successful roll-out of information to customers about the new tariffs. Western Power will continue to engage with retailers to ensure network and retail tariffs are aligned, and customers are fully informed of the benefits of moving to time of use tariffs.

The new time of use tariffs are:

- RT17 - Time of use energy (residential) tariff
- RT18 - Time of use energy (business) tariff.

3.1.1 New demand-based tariffs

Residential and small business customers will also be offered a demand-based tariff for the first time. Demand tariffs are similar to time of use tariffs, however a demand tariff considers a customer's maximum usage in any one 30 minute period rather than total consumption over a time period. This sends a much stronger signal about the impact customer behaviour can have on the overall system peak.

As this is the first time residential customers will be offered this type of tariff, it is being offered on an opt-in basis only and will have a very small demand component to begin with to allow time for customers to understand the impact of this type of charge. This style of tariff is only possible due to the introduction of advanced meters, which allow for more data to be captured than via a traditional meter.

The initial tariff offering will charge the same tariff components of the time of use tariffs described above, albeit at a slightly reduced rate, with an additional component for the maximum demand in the peak window of 3pm to 9pm.

The rates for the energy and demand components will be set with the intention the average customer would pay the same under a flat rate, time of use or demand based tariff.

The new demand tariffs are:

- RT19 - Time of use demand (residential) tariff
- RT20 - Time of use demand (business) tariff.

3.1.2 Changes to RT5 and RT6

Around 4,000 medium-sized business customers operate on the existing demand network tariffs (RT5 and RT6). Western Power proposes to amend the time periods for peak and off-peak usage in the discount

[5] Note, Western Power is responsible for the network tariffs only, which is then passed on by the retailer. The retail tariff the customer pays is ultimately determined by retailers, therefore customers would need to approach their retailer in order to make the switch to time of use.

factor for RT5 and RT6 tariff, bringing them in line with the new residential time of use tariff discussed above.

Currently, the RT5 and RT6 peak and off-peak time periods are weekdays 8am to 10pm, and 10pm to 8am respectively. A 14-hour peak period does not accurately reflect the actual network peak, which typically occurs between 4pm and 7pm on weekdays. Concentrating the peak charging time period around the time the network peak actually occurs, increases the likelihood customers would shift electricity consumption away from the network peak times. Therefore the RT5 peak and off-peak usage periods for use within the discount factor will be the same as the new residential time of use tariff. We will also adjust the operation of the discount factor to ensure these changes are revenue neutral.

3.1.3 Changes to reference services A5 to A8 to allow for bi-directional flows

Currently the reference services A5 to A8 only allow for a one-way flow of electricity. They are known as exit services, and are for businesses that operate as a load at all times. Over the AA3 period Western Power received numerous requests from retailers to create a variation of these reference services that allow for bi-directional flows. This is largely driven by the increase in installations of solar photovoltaic systems by commercial customers.

The reference tariffs for these services are already demand based, therefore no changes to tariff structures are required to accommodate this amendment. Changes to the reference services are detailed in Appendix E of the access arrangement.

3.1.4 Changing how the TEC is recovered

Each tariff consists of a fixed and variable component. The fixed tariff component is essentially a standing charge, payable by all customers regardless of how much electricity they consume.

In recent access arrangement proposals, Western Power and other network operators have increased the fixed tariff component at a higher rate than the variable component. This is because most of a network business' costs are fixed.

In line with the premise of cost reflectivity, it is reasonable the fixed component of a network tariff reflects the fixed costs of running the network. Historically, the fixed charges increased from 27 per cent for an average bill to 40 per cent over the AA3. It should be noted these fixed charge increases were offset by variable charge decreases, meaning the change is revenue neutral.

For the AA4 period, Western Power proposes to increase the fixed component of all network tariffs, offset by decreases in variable components. The main driver for the increase is to recover the TEC from the fixed component of the network tariff rather than the variable component.

The TEC is a payment, gazetted by State Government, which Western Power collects via its network tariffs, and is directed to Horizon Power. The TEC is essentially a subsidy designed to ensure customers located in regional Western Australia (supplied by Horizon Power) pay the same price for electricity as customers connected to the SWIS.

For most tariffs, the TEC is currently fully recovered from the variable network tariff components. This is despite the TEC being to all intents and purposes a fixed and unavoidable cost, determined by State Government. Western Power considers it reasonable the TEC should be wholly collected via the fixed tariff component. Recovering the TEC from fixed tariff components would also mean the regional subsidy is shared equally by all Western Power customers.

In most cases, customers will be no worse off as a result of the increased fixed charges because there would be an offsetting decrease in variable charges.

The forecast changes in the fixed and variable components of each tariffs are detailed in the price list information provided in Appendix F.4 to the revised access arrangement.

3.1.5 Changes to the reference services document

The reference services are documented in Chapter 11 and Appendix E of the Access Arrangement Information (**AAI**) for the AA4 period setting out all of the services we offer, including the eligibility criteria, reference tariff, service level and applicable contract for each service.

Unlike the rest of the policies and contracts appended to the access arrangement, the AA3 reference services document had very little additional information on definitions and how to interpret the document. The lack of detailed information led to implementation issues over the course of the AA3 period.

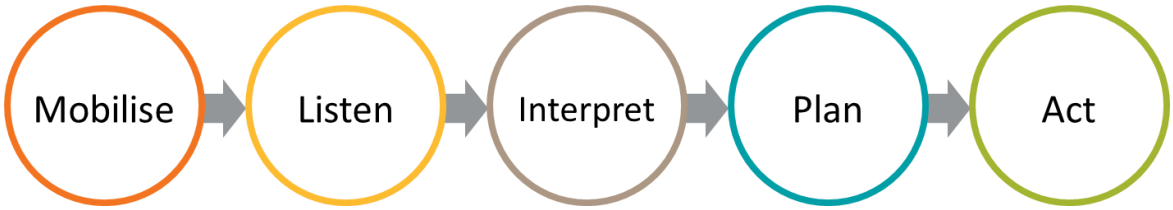
The revised reference services document now includes definitions for all terms used in the document. This provides clarity around which customers are classified as residential, voluntary/charity or business. In addition, all of new services and modifications to services discussed above have been incorporated into the document.

4. Customer engagement

Between September 2015 and January 2016, Western Power conducted a Customer Engagement Program[6] which allowed us to understand customer preferences to inform its future business plan and adapt to the changing regulatory environment. Our customer engagement program was designed to:

- obtain customer and stakeholder input into our proposed expenditure strategy and plan
- be far reaching and represent all customer groups
- establish an ongoing conversation with customers – providing feedback on how their participation helped influence the AA4 proposal
- obtain customer insights to integrate into our business decision-making processes
- measure the success of engagement through methods including direct feedback and advocacy.

Figure 4-1: Customer engagement program development phases



Western Power used a mixture of qualitative and quantitative methods including customer workshops, telephone surveys, targeted customer interviews, customer reference groups and online surveys. Five research themes underpinned the structure of the discussions with customers, being:

- customer experience
- network connection and innovation
- network safety
- network reliability
- access and affordability.

Insights from the Customer Engagement Program have shaped our thinking on the services we will provide and the technology we will invest in over the next five years. For example, customers have told us they do not necessarily want us to improve overall levels of reliability, but they are happy for us to target expenditure on pockets of the network where reliability is lower than average – so all customers receive a consistent level of performance.

Customers have also told us they would consider new tariff structures and expect Western Power to invest in new technologies that are effective alternatives to traditional 'poles and wires' solutions. Commentary on how customer feedback has influenced our expenditure is provided in Access Arrangement Information chapter 4 Customers, stakeholders and community engagement.

We also engaged with electricity retailers and generators in a series of forums held during 2016 and 2017. Generators and retailers provided feedback on access provisions and proposed new tariff structures, which we have built into our AA4 proposal.

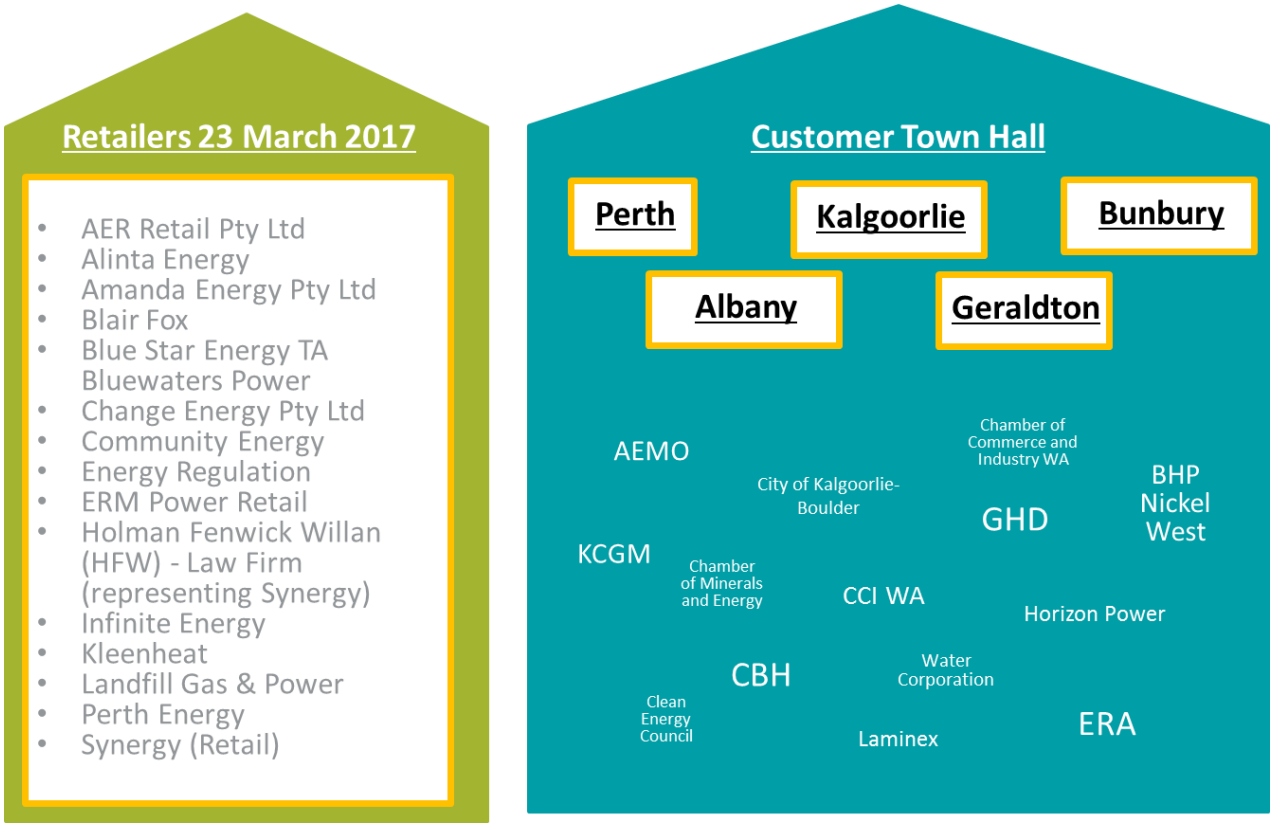
6 Customer Insights Report: https://westernpower.com.au/media/2061/customer-insights-report-2016.pdf

Feedback from customers on time of use tariffs has been positive. Customer forums and surveys conducted during 2016 show customers are generally willing to change their electricity usage behaviours when understanding the impact of peak demand. As a result, there is appetite for time of use tariffs, particularly among younger customers.

4.1 Retailer and generator forums

As well as the customer engagement program described above, we also conducted several retailer and generator forums where our proposed changes to services and tariffs were outlined (amongst other things). The following retailers and generators were engaged during the development of tariff proposal:

Figure 4-2: Retailer and public consultation engagement[7]



The following feedback, along with our response to each item, was received:

*Demand Based tariff (RT5 and RT6) need to change so that the demand measurement is monthly rather than a rolling 12 month average. This is consistent with demand based tariffs in the National Electricity Market (**NEM**) and represents a fairer outcome to the customer.*

- Western Power has considered this but has decided to leave the tariff structure unchanged. Using a 12 month rolling average gives a much clearer signal in terms of the impact that peak demand has on the network. The network is designed to service maximum demand on the network, regardless of whether it is for 1 hour a year or all hours

[7] Full list of Customer Town Hall invitees can be found in Appendix C

of the year. Switching to monthly demand would soften this signal and will reduce the incentive for customers to be mindful of the impact their demand has at all times.

Western Power should consider moving to a much higher level of fixed charge and let retailers decide on the best tariff structure.

- Recovering more revenue on a fixed basis has an appeal to Western Power, particularly from a revenue stability point of view. However, there are a number of reasons why we have not increased the fixed charge much higher than current levels:
  - The variable components give Western Power the opportunity to send signals around the most efficient use of the network. A fully fixed tariff structure removes this option.
  - Section 7.6 (a) of the Access Code requires that the incremental cost of service provision is recovered by variable components. This limits the extent to which tariffs can be fixed.

*Western Power should review the Excess Network Usage Charges (**ENUC**) pricing structure. Does the ENUC compromise the economic efficiency of the Wholesale Electricity Market (**WEM**) by imposing an artificial disincentive on a generator for generating up to its actual capacity?*

- Western Power has reviewed the application of the ENUC in the AA4 period ensuring it is more targeted to areas of the network with genuine network constraints. See Appendix F.4 of the access arrangement for further discussion of the change.

Western Power should consider converting all currently manually read interval meters to communications as this should save meter reading costs.

- Western Power is proposing a gradual installation of advanced meters to balance the upfront costs of replacing meters against ongoing meter reading costs. Replacing meters before the end of their useful life is not cost-effective at this point in time. As more of the metering population is an advanced meter, Western Power may look at an accelerated replacement program. This is unlikely to be in the AA4 period.

4.2 Synergy feedback

Synergy also provided a request for a range of new reference services. While this request was not provided with enough time to be fully incorporated into the AA4 access arrangement proposal, our initial view on the proposed reference services follows. We will continue working with Synergy to understand how these proposed services can be incorporated.

- Synergy proposed a range of time of use tariffs as opt-in:
  - Opt-in was considered but ultimately not progressed. Our proposal to move all new customers on to time of use would result in only around a third of our customers being on time of use tariffs by the end of AA4. Looking at the experience in the eastern states when opt-in had been used shows very few customers make the effort to take up the opt-in option. While this approach reduces customer choice, it brings forward the time where customers can meaningfully contribute to peak demand reduction and hence lower costs to serve customers.

- The range of tariffs proposed by Synergy included several with time periods that do not reflect the demand time periods on the network. As stated earlier, the main driver for a network business is building to meet peak demand. The proposal to have a low overnight rate, for example, would not address any network constraints caused by peak demand.

- Synergy proposes a range of reference services that cater for intra-day capacity swaps:
  - Western Power has not had due time to consider these reference services from Synergy. Our preliminary comments are these services are unlikely to be compatible with the requirements set out in the Technical Rules, Applications and Queuing Policy and Transfer and Relocation Policy at a minimum.

- Synergy proposes reference services for load limiting and load control:
  - These issues are addressed as part of the submission Western Power is making to the ERA on changes to the Metering Code Model Service Level Agreement (**MSLA**).

4.2.1 Service Classification

Synergy considered a number of extended metering services (**EMS**) (ASP-2; ASP-3; ASP-4; MDP-12; MDP-13; MDP-14) should be considered "covered services" and reclassified to standard metering services (**SMS**). Additionally:

- Synergy requested meter installations for new connections be moved from a standard metering service to an extended metering service
- Perth Energy, Alinta and Change Energy requested the service MDP-7 (historical interval data provision) revert back to a standard metering service. Western Power had proposed this be provided as an extended metering service.

As a result, revenue recovery for these services would then be included in the annual fixed standard metering service charge.

Western Power agrees with Synergy that these services are "covered services". Further, Western Power considers all services defined in the MSLA are "covered services", in accordance with the definition in the Access Code.

As per the Access Code, Western Power sets out its proposed price control mechanisms in the Access Arrangement Contract. As part of the AA4 proposal, and consistent with the AA3 contract, Western Power is proposing revenue for services defined as standard metering services be recovered within the revenue cap as reference services, and by omission, all other services defined in the MSLA are non-revenue cap (non-reference) services.

As per section 6.6(e) of the Electricity Industry (Metering) Code (**Metering Code**), Western Power seeks to price these services at the efficient incremental cost for delivering the service. Where a service leverages an existing metering functionality in situ, only the incremental cost to provide the service is included (for example, the pricing of a remote re-energisation service only contemplates the operator time to deliver the service, not any proportion of the capital cost of the metering infrastructure).

Western Power considers standard metering services includes the basic metrology functions to enable the market to function, consistent with the objectives of the Metering Code. Western Power considers it is reasonable and appropriate to charge for extended metering services on an individual basis, due to the non-routine nature in which they arise for an individual consumer.

Western Power notes that including EMS defined services within the SMS charge means customers who do not require these services in a given period will pay a higher SMS charge than they otherwise would.

Western Power considers it appropriate to include a price signal for these services, to ensure they are requested as and when required, and are not effectively provided on an “unlimited” basis. This will assist with operational forecasts to deliver these services.

Western Power has addressed each of the specific service requests as part of detailed responses in Appendix E of the AAI.

5. Legislative and regulatory requirements

Western Power has considered its obligations under the legislative and regulatory framework to ensure the proposed tariff structures can be approved by the ERA as part of its AA4 determination.

5.1 The ERA and the Access Code

The ERA has a role to ensure Western Power's reference tariffs comply with the legislative and regulatory framework through the access arrangement review process and annual price list approval. If the ERA is satisfied the reference tariffs comply with the legislative and regulatory framework then the price list can be approved. If the ERA is not satisfied that the reference tariffs comply then Western Power will need to resubmit its access arrangement proposal and revised price list.

Under the legislative and regulatory framework Western Power's reference tariffs must comply with the requirements of the Access Code and the pricing methods included in the access arrangement.

The Access Code provides a broad framework to guide the structure of reference tariffs. The implication of this is that the Access Code (through its primary pricing objective) provides for a wide range of tariffs structures and prices.

To ensure our proposed tariffs complied with the Access Code, we have reviewed our obligations under the following sections of the Access Code:

- Section 2.1 (Access Code objective)
- Chapter 7 (Pricing methods) sets out the requirements reference tariffs must comply with
- Chapter 8 (Price lists) sets out the approval process for Western Power's price lists.

5.1.1 Access Code objective

The Access Code objective is an economic efficiency objective and provides an overarching high-level objective against which the pricing strategy must be tested.

The Access Code objective is detailed in section 2.1 as:

> *2.1 The objective of this Code ("Code objective") is to promote the economically efficient:*
>
> *(a) investment in; and*
>
> *(b) operation of and use of,*
>
> *networks and services of networks in Western Australia in order to promote competition in markets upstream and downstream of the networks.*

5.1.2 Chapter 7 - Pricing methods

The primary objectives of the pricing methods in the Access Code are for reference tariffs to recover the forward-looking efficient costs and for the reference tariffs to be between incremental and stand-alone costs of providing reference services.

- Incremental cost is the costs Western Power would avoid if it were not to provide service to a user or group of users.

- Stand-alone costs reflect the costs Western Power would incur if it were just providing service to a single user or group of users.

The primary objectives are detailed in section 7.3:

> 7.3 Subject to sections 7.5, 7.7 and 7.12, the pricing methods in an access arrangement must have the objectives that:
>
> (a) reference tariffs recover the forward-looking efficient costs of providing reference services; and
>
> (b) the reference tariff applying to a user:
>
> (i) at the lower bound, is equal to, or exceeds, the incremental cost of service provision; and
>
> (ii) at the upper bound, is equal to, or is less than, the stand-alone cost of service provision.

These primary objectives are very broad which has been noted by the ERA:

> *The efficiency requirements of these objectives are broad, requiring only that the reference tariffs recover the forward-looking efficient costs of providing reference services and that the reference tariff applying to a user recovers an amount of revenue that is greater than the incremental cost of service provision and less than the stand-alone cost of service provision.*[8]

The ERA has previously acknowledged it is unable to impose/require particular tariff structures due to the broad nature of the Access Code primary objective:

> *The Authority considers that there could be efficiency benefits of long-run marginal cost pricing of electricity network services provided by the SWIN. However, in considering the pricing methods under the proposed access arrangement revisions, the Authority does not have a role in approving levels and structures of reference tariffs to the level of detail that would enable the Authority to impose particular tariff structures, such as a structure that would reflect long-run marginal costs.* [9]

Western Power notes the Access Code does not require prices to be set with reference to the long run marginal cost, as is required in the National Electricity Rules.

In addition, section 7.4 includes a number of secondary pricing method objectives. These include the:

- charges paid by different users of a reference service differ only to the extent necessary to reflect differences in the average cost of service provision to the users; and
- structure of reference tariffs so far as is consistent with the Access Code objective accommodates the reasonable requirements of users collectively; and
- structure of reference tariffs enables a user to predict the likely annual changes in reference tariffs during the access arrangement period; and

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8 Economic Regulation Authority, Final Decision on Proposed Revisions to the Access Arrangement for the Western Power Network, 5 September 2012, para 2059

9 Economic Regulation Authority, Final Decision on Proposed Revisions to the Access Arrangement for the South West Interconnected Network, 4 December 2009, para 1065

- structure of reference tariffs avoids price shocks (that is, sudden material tariff adjustments between succeeding years).

Section 7.5 provides guidance on how to reconcile conflicts between the primary and secondary objectives. The Access Code objective is to be used to reconcile the conflict but, where necessary, permits the primary objective to prevail over the secondary objectives.

Section 7.6 provides guidance on how the fixed and variable components of the tariffs should be set. Variable components should recover incremental costs (costs Western Power would avoid if it were not to provide service to a user or group of users) and fixed components should recover all other costs.

Section 7.7 includes specific requirements for reference tariffs for users with demand less than 1,000 kVA.[10] For these users the reference tariff cannot vary as a result of differences in geographical location.

Sections 7.9 to 7.11 allows for discounts to be applied to reference tariffs in certain situations:

- Prudent discounts – apply where it is necessary to discriminate between users to aid economic efficiency. For example, where a user can demonstrate that another supply option will provide a comparable service at a lower price.
- Discounts for distributed generating plant – apply where Western Power's costs are lower as a result of a generator connecting at the distribution network.

Finally, section 7.12 of the Access Code provides for TEC to be included as a tariff component for distribution network users only.

5.1.3 Chapter 8 - Price lists

Chapter 8 of the Access Code sets out the requirements and processes for Western Power to submit price lists to the ERA for approval and for the ERA to approve or not approve a proposed price list.

An access arrangement may, or may not, include a requirement for Western Power to submit price lists to the ERA for approval. Under section 4.36, the ERA may require price lists to be submitted to it for approval if it considers it would improve the operation of the access arrangement. Currently, Western Power's access arrangement requires to the submission of a price list to the ERA for approval. The AA4 proposal price list and price list information can be found in appendices F.3 and F.4.

[10] Customer on the same reference tariff with an annual maximum demand of less than 1 MVA are changed an identical rate, regardless of their geographical location.

6. Transition strategy

6.1 Overview

In line with our strategy to transition to cost-reflective tariffs, new customer connections will have an advanced meter installed and be assigned to our new time-of-use tariffs, and will have the option to opt-in to the demand tariff.

Existing customers' meters will be replaced with advanced meters for two broad reasons:

1. they require a new meter as there are changes at the customer premises (for example, installation of a Photovoltaic (**PV**) system requires a meter capable of measuring energy flows both into and out of the network)
2. the meter requires replacing for compliance or other reasons.

For customers who have made a change and therefore require a new meter, Western Power is proposing to move these customers to the new time of use tariff. Where the customer has not requested a change in service, but had a new meter installed, they will be able to remain on their current reference service and tariff.

The new time of use and demand reference services will be available to any customer with an advanced meter.

6.1.1 Tariffs available

We plan to offer our residential customers four network tariffs:

- a **flat rate tariff:** comprised of a fixed charge (cents per day) and a flat usage charge (in cents per kWh) that does not vary by time or by consumption level
- an old **time of use tariff**, which is comprised of a fixed charge (dollars per annum), and a usage charge (in cents per kWh) that varies depending on the time of day in line with existing charging windows
- a new **time of use tariff**, which is comprised of a fixed charge (dollars per annum), and a usage charge (in cents per kWh) that varies depending on the time of day in line with new charging windows that are consistent with the pricing principles set out in the Access Code. This will be the default network tariff for all new connections from AA4 commencement, and may be voluntarily adopted by existing customers that have an advanced meter
- a **demand tariff**, which is comprised of a fixed charge (dollars per annum), a usage charge (in cents per kWh) that varies depending on the time of day, and a demand tariff (in cents per kW per month) which is levied on the customer's peak consumption during a defined period. This tariff will be opt-in for all customers with an advanced meter.

The structure and charging parameters for each of these network tariffs are summarised in the table below.

Table 6.1: Tariff structure and charging parameters

Network tariff	Components	Measurement	Charging parameters
Flat tariff	Fixed	c/day	Supply charge reflecting a fixed amount per day

Network tariff	Components	Measurement	Charging parameters
	Usage	c/kWh	Charge applied to energy consumption
Old time of use tariff	Fixed	c/kWh	Supply charge reflecting a fixed amount per day
	Usage (Peak)	c/kWh	Charge applied to energy consumption between 7:00am to 9:00pm on weekdays (excluding public holidays)
	Usage (off-peak)	c/kWh	Charge applied to energy consumption during all other times
New time of use tariff	Fixed	c/day	Supply charge reflecting a fixed amount per day
	Usage (peak)	c/kWh	Charge applied to energy consumption between 3:00pm to 9:00pm on weekdays
	Usage (shoulder)	c/kWh	Charge applied to energy consumption between 12:00pm to 3:00pm on weekdays
	Usage (off-peak)	c/kWh	Charge applied to energy consumption during all other times
Demand tariff	Fixed	c/day	Supply charge reflecting a fixed amount per year
	Usage (peak)	c/kWh	Charge applied to energy consumption between 3:00pm to 9:00pm on weekdays
	Usage (shoulder)	c/kWh	Charge applied to energy consumption between 12:00pm to 3:00pm on weekdays
	Usage (off-peak)	c/kWh	Charge applied to energy consumption during all other times
	Demand	S/kW/month	Charge applied to maximum usage in any one 30 minute period between 3:00pm to 9:00pm on weekdays

6.2 Transition approach

Our approach to transitioning customers to our new tariffs has been with the intent of getting as many customers to the new tariffs with as little impact as possible. The principles underpinning the transition from Western Power's current tariffs to the proposed tariffs include:

- **cost of transition will be minimised** - by leveraging the advanced meter installation program, there is no need to spend money on costly meter re-programming or replacements

- **tariff settings** - differentials between peak and off-peak will shift at a low rate per year to ensure customer impacts are minimised and revenue impacts are minimal
- **speed of transition** - the final detail of the transition strategy will depend on the AA4 revenue allowance:
  - Lower revenues (with price reductions) in AA4 will allow for a rapid transition to the new tariff structures
  - Higher revenues (with price increases) in AA4 may require a longer period for customers to transition from the existing to the new tariff structures.

7. Tariff design

7.1 Peak periods for the time of use tariffs

The Access Code provides that our tariffs should reflect the efficient costs of providing network services. The ERA has interpreted this requirement as encouraging more cost reflective pricing. That is, tariffs should reflect the cost of the incremental supply of network services, so that:

- prices should be lower when there is more spare capacity on the network, because increased demand will not lead to additional investment i.e. the cost of fulfilling the additional demand is low
- prices should be higher when there is less spare capacity on the network, because increased demand for electricity may require additional investment i.e. the cost of fulfilling the additional demand is high.

However, there are currently impediments to the full application of cost reflective pricing. In the **SWIS**, the low penetration of interval meters limits the number of customers to whom cost reflective pricing can be applied. There are also implementation and equity issues in transitioning to location-based pricing, due to the increased complexity in such tariff structures.

For customers that have interval meters, setting higher prices at times of greater demand results in tariffs that better reflect efficient costs, as compared to a tariff with the same prices at every time of day. To that end, Western Power has proposed charging windows for its time of use and demand tariffs that send efficient and cost reflective signals to customers. Our peak periods reflect times of high network stress and congestion, where the cost of fulfilling additional demand is high. We have also incorporated shoulder times around the peak which aid in avoiding issues surrounding customers shifting load and creating new peaks.

In the sections that follow we have looked at the time of the day, week and year to determine the most appropriate way to structure our tariffs.

7.1.1 Seasonality – our network is predominantly summer peaking

The underlying driver of peak demand, and hence congestion, on our network is temperature:

- in summer, the highest demand generally occurs on working days when the daily average temperature exceeds 30 degrees Celsius
- in winter, the highest demand generally occurs on working days when the daily average temperature is at or below around 10 degrees Celsius.

This relationship is set out in the below example for Mandurah seen in Figure 7-1 below.

Figure 7-1: Mandurah mean temperature breakdown 2010-2015

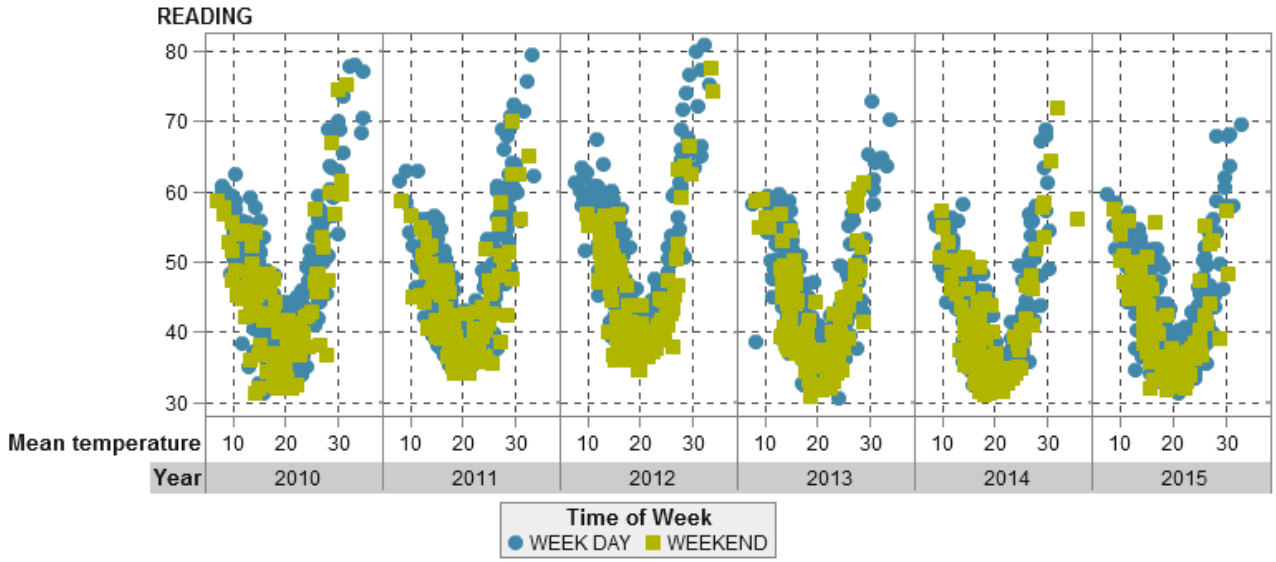
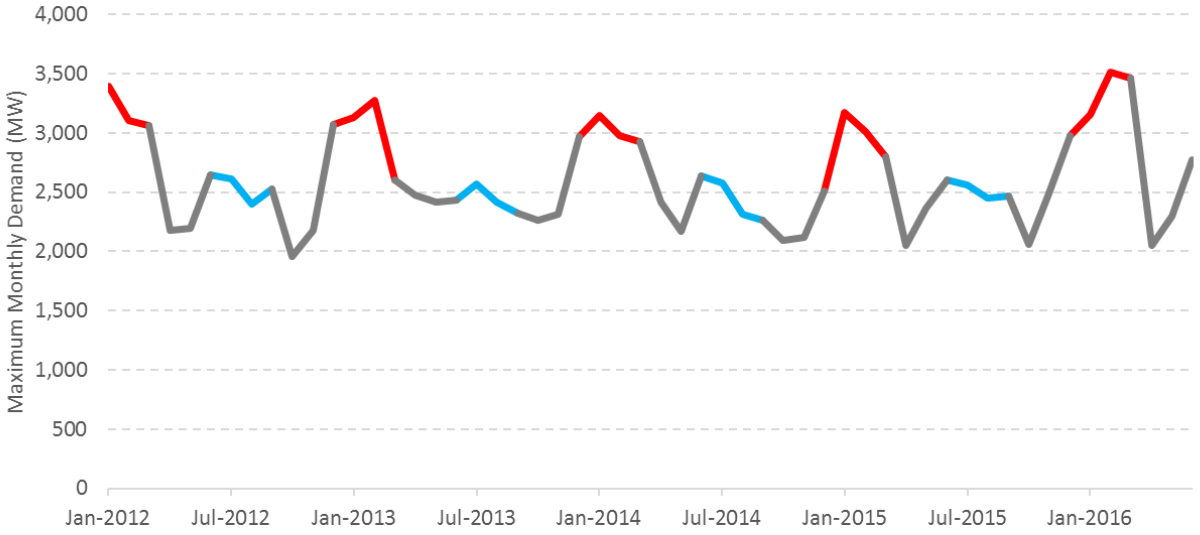


Figure 7-2 shows maximum monthly demand (**MW**) across our network for the period January 2012 to June 2016. As can be seen, system-wide peak demand is significantly higher in the summer months than it is in winter[11]. This suggests a principle driver of network costs is the level of electricity consumption on hot summer days, when network congestion is significantly higher than at other times of the year as customers use air-conditioning to cool their homes.

Figure 7-2: Maximum monthly demand (MW) across our network



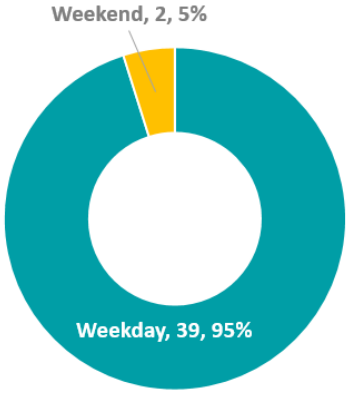
7.1.2 Days of the week – our network on weekdays

Figure 7-3 breaks down the number of days in 2016 on which peak demand was greater than 95 per cent of substation capacity. As can be seen, 95 per cent (39) of these days occurred during the week, which further

[11] However, there are areas of the network where peak demand occurs in the winter.

demonstrates peak demand occurs on weekdays. For this reason, we propose to apply peak price only on weekdays (i.e. Monday to Friday).

Figure 7-3: Peak demand greater than 95%



7.1.3 Time of day – Our network peaks between 3pm and 9pm.

The definition of the time-bands over which our time of use tariffs will apply is of critical importance. Cost reflective tariffs should signal to customers the time of the day during which the level of congestion on our network is high, thereby enabling customers to manage their energy usage during those times.

There is considerable diversity across our network, both in terms of our customers' demand characteristics and spare capacity. Augmentation expenditure is generally directed at particular elements of our network for which capacity is constrained – that is, it is localised peak demand that drives our costs. However, these localised peaks do not necessarily occur at the same time – that is, peak demand for capacity constrained elements of our network do not necessarily coincide with system-wide peak demand.

It follows that there is an inherent tension between:

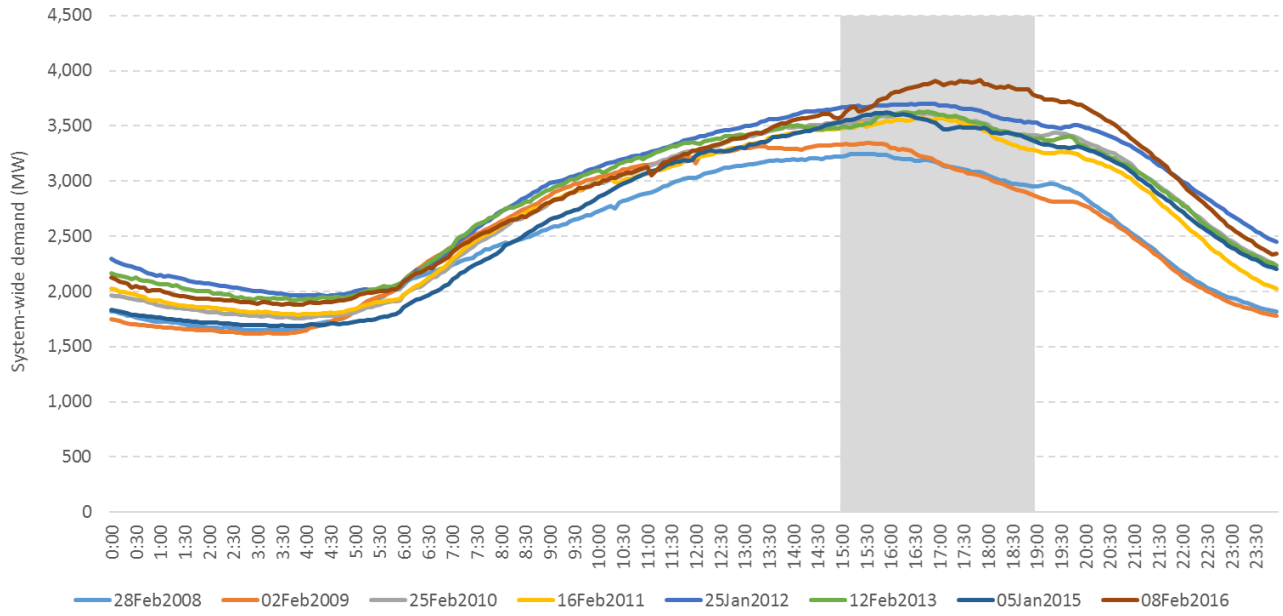
- price signals that reflect the cost imposed by location specific peak demand, which drive network costs
- the obligation, imposed on us by the State government, to implement postage-stamp pricing.

It is therefore important that the definition of the peak period is informed by an understanding of both location-specific demand, because this drives future costs, and system-wide demand, because prices will apply on a system-wide basis.

Analysis of system-wide peak demand

Figure 7-4 illustrates demand for our distribution network on the top peak day in each year from 2008 to 2016. The figure shows, at system level, peak demand has tended to fall between about 3pm and 7pm (the shaded area), and has been moving later in the day, over time.

Figure 7-4: System-wide peak demand 2008 - 2016

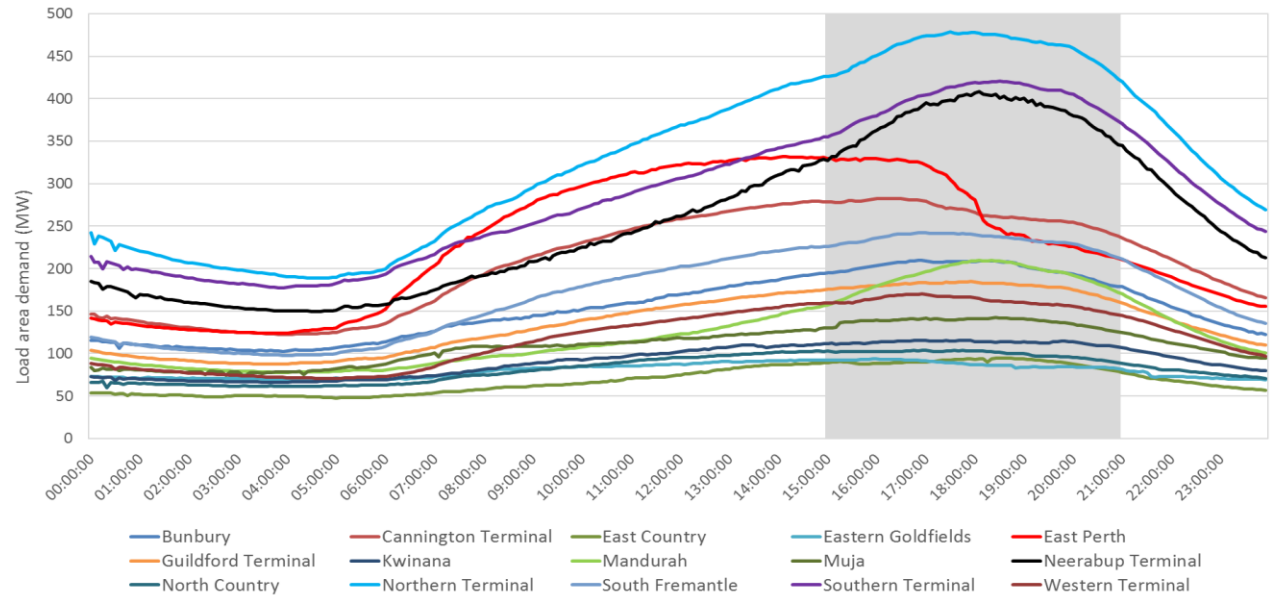


However, our distribution network comprises a number of different load areas that, in turn, are comprised of a number of substations each with different customers and correspondingly different load profiles.

Analysis of peak demand by load area

Figure 7-5 below illustrates the diversity of demand profiles across our 15 load areas. Each load profile has been calculated as the average of load on the top 5 peak days in each load area in 2016. We have limited our analysis to the top peak days in the year, as opposed to an average load profile over the course of the entire year, since it is demand on these days that ultimately drives investment in network infrastructure.

Figure 7-5: Demand profiles average of load on top 5 peak days



The key observations to be drawn from this figure are:

- there is a diverse range of demand characteristics across our network
- the approximate timing of system peak demand (i.e. 3pm to 7pm) does not capture well the diversity in timing of peak demand across our network
- a broader period from 3pm to 9pm will capture peak demand in each load area, and also encompasses the period of system peak demand.

The diversity in demand across our network can be distinguished by the nature of the customers with each load area. To illustrate this, we have separately analysed the demand profiles in load areas corresponding to the three main customer types –residential, small business, and large business/industrial.

Residential load areas

The load areas of Mandurah, Neerabup Terminal, Northern Terminal and Southern Terminal are principally characterised by residential customers. The figure below presents the average demand profiles for each of these load areas on their peak days in 2016.

Figure 7-6: Residential load areas 2016

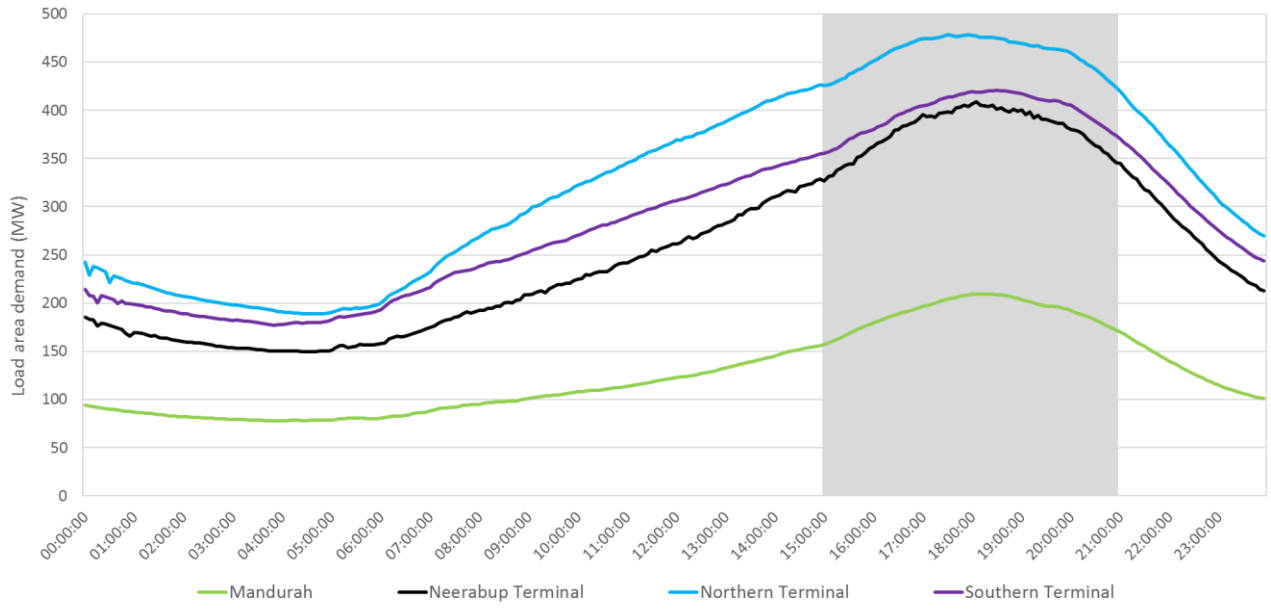


Figure 7-6 shows demand in residential areas peaks around 6:30pm, and is at elevated levels between 3pm to 9pm. These peaks are driven by the use of air-conditioning on particularly hot summer days after our customers arrive home from school or work and are exacerbated by the absence of a cooling sea-breeze in the afternoon, and the presence of a warm land-breeze. These factors contribute to peak demand levels that extend reasonably late into the evening, as compared with peak demand for other networks on the east coast.

Small business load areas

While demand in the abovementioned load areas is driven primarily by residential customers, demand in the East Perth load area is driven primarily by business customers in the Perth CBD. Figure 7-7 below sets out the average demand profile for the East Perth load area on peak days in 2016.

Figure 7-7: Small Business load areas 2016

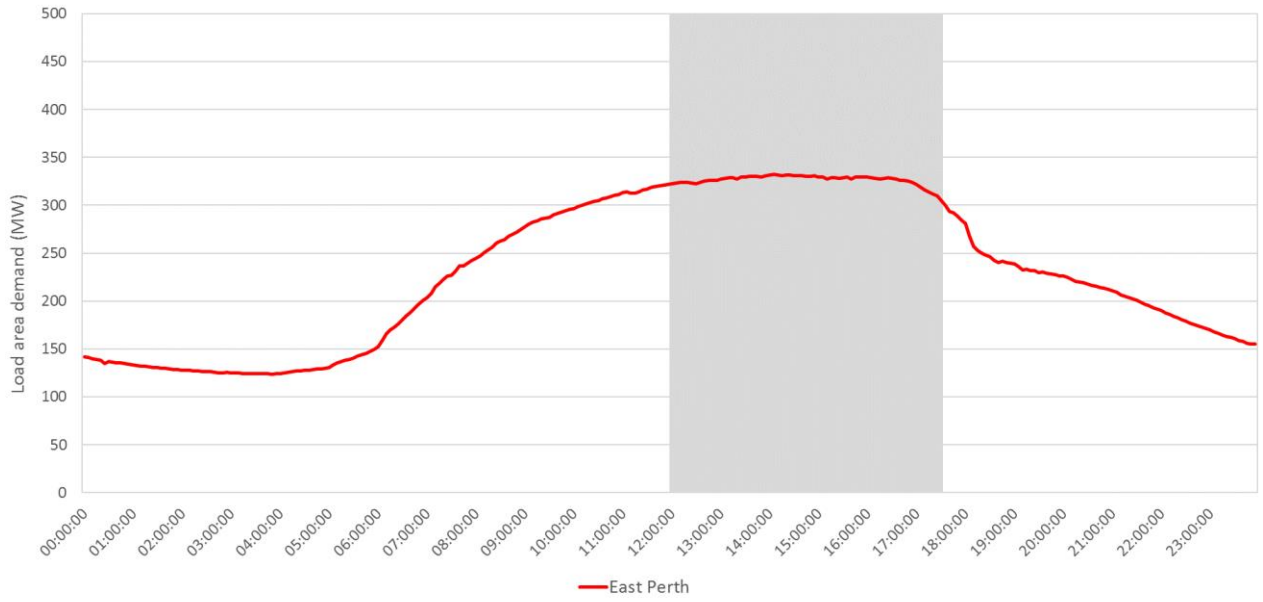


Figure 7-7 reflects the less pronounced but longer lasting peak period at substations underpinned primarily by business customers, as compared with those underpinned by residential customers. In general, demand:

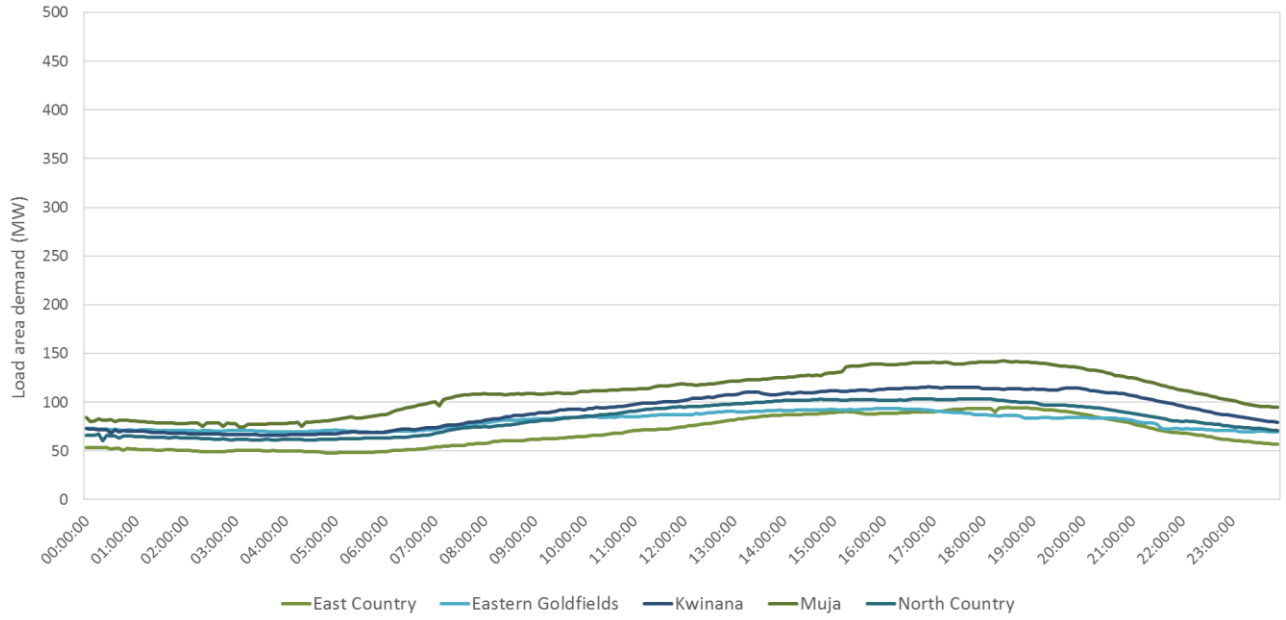
- begins to rapidly increase from about 6am, as people begin to arrive at work
- is at elevated levels for the duration of typical working hours (from about 8am to 5:30pm)
- reaches a long-lasting peak in the afternoon, which stretches from about 12pm to 5:30pm
- rapidly decreases after 5pm, as people begin to leave work.

This time band differs considerably to system-wide peak demand, and for load areas underpinned primarily by residential customers. We note a price signal which targets peak demand in residential areas (i.e. after 3pm) may encourage business customers to shift their electricity usage to earlier in the day, and potentially exacerbate the localised peak in the East Perth region. However, we also note there is currently excess network capacity in East Perth, such that an increase in the level of peak demand in this region is unlikely to lead to any material costs over the course of the forthcoming access arrangement period.

Large commercial and industrial load areas

Western Power has several load areas characterised by large commercial and industrial customers, being East Country, Eastern Goldfields, Kwinana, Muja and North Country. Figure 7-8 below shows the average demand profile on peak days in these load areas is relatively flat. In the presence of a flat demand profile, there is likely to be limited merit in the application of a time of use tariff.

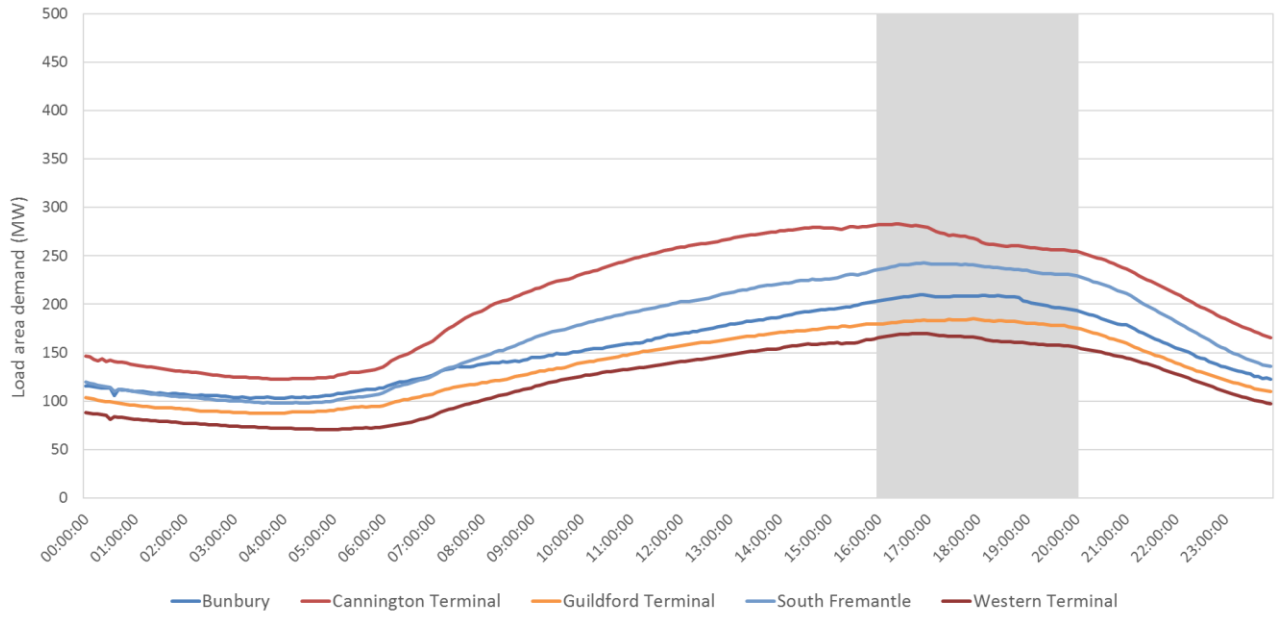
Figure 7-8: Large commercial and industrial load areas 2016



Other load areas

Our remaining load areas (Bunbury, Cannington Terminal, Guildford Terminal, South Fremantle and Western Terminal) are comprised of a mixture of residential and business customers. The existence of both types of customers contribute to load profiles for these areas that are flatter than the load profiles in areas that are predominately either residential or business. A time period from 4pm to 8pm will capture the peak period in these areas as seen in Figure 7-9.

Figure 7-9: Other load areas 2016



Peak demand at the sub-station level

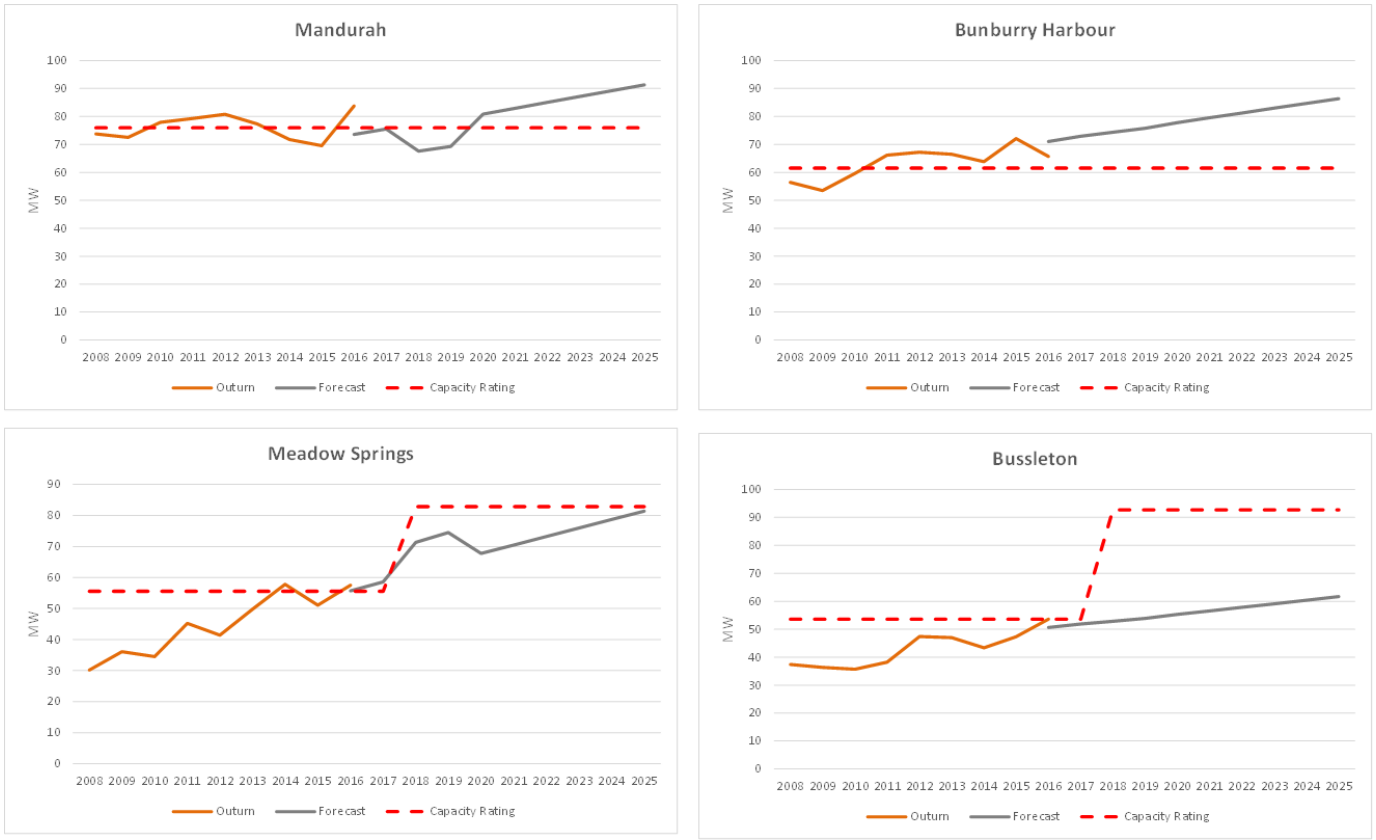
Having considered peak demand at a system-wide and load area level, we turn to an assessment of peak demand for zone substations that are expected to face constraints over the forthcoming access arrangement period.

We focus our analysis on four substations for which increases in demand have led to capacity constraints:

- substations in the Mandurah load area: Mandurah (MH) and Meadow Springs (MSS)
- substations in the Bunbury load area: Busselton (BSN) and Bunbury Harbour (BUH).

Demand on these substations is underpinned primarily by residential customers. Figure 7-10 below illustrates the outturn and forecast growth in demand at these substations along with their ratings capacity.

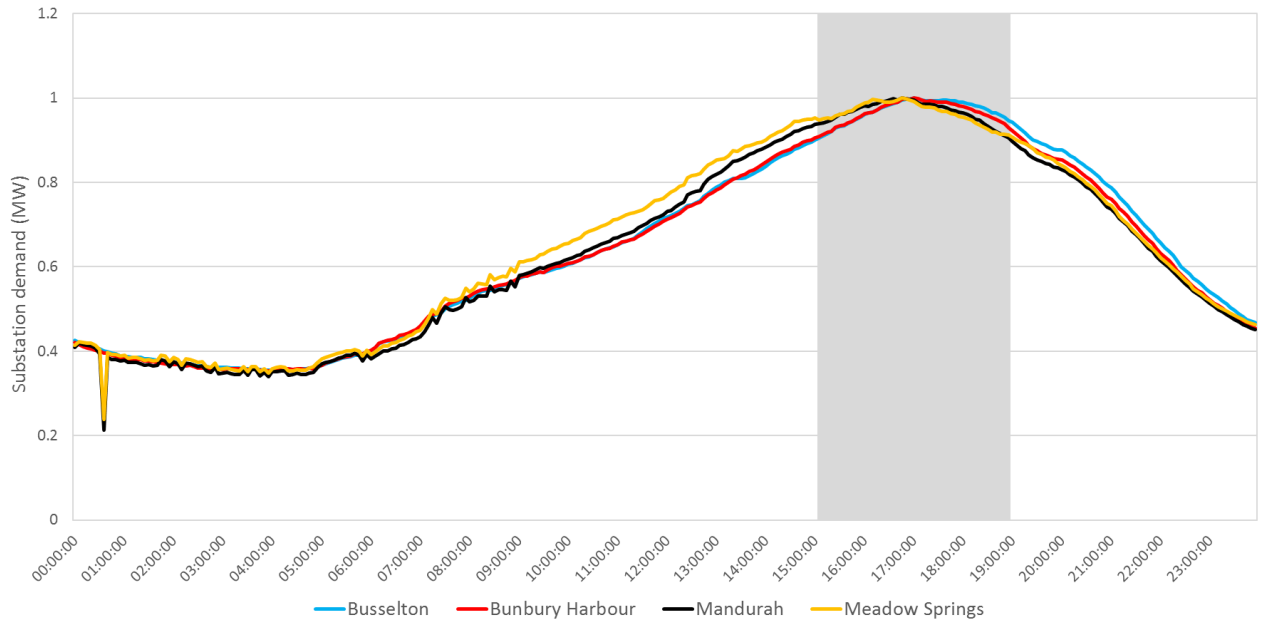
Figure 7-10: Peak demand at the sub-station level



The above figures warrant further explanation. First, it is informative to note demand can exceed ratings capacity in some circumstances, although this puts at risk the level of service reliability demanded by our customers. We also note we have been shifting load from Mandurah to Meadow springs to alleviate the capacity constraint at the former. We will continue to do so in the future, as evidenced by the forecast reduction in demand at Mandurah, and corresponding increase in demand at Meadow Springs, 2018 and 2019.

Figure 7-11 below illustrates the average daily load profile across the five peak demand days for each of these substations in 2016.

Figure 7-11: Substation demand - daily load profile



As can be seen, demand at these substations follows a typical residential load profile. Demand peaks in the summer period at around 5pm, and is at elevated levels between about 3pm to 7pm, corresponding with customers returning home from school or work.

Conclusion on the time of day

As we have demonstrated, there is considerable diversity in the timing of peak demand across our network. This has implications for the definition of the peak period for our time of use and demand tariffs. As noted above, Western Power is required to implement postage-stamp pricing, which means customers in one location should pay the same tariff as similar customers in any other location on the network. In effect, this prevents any form of locational pricing, and hence the capacity to set different peak periods for different load areas corresponding to the customer composition and characteristics in each area.

This creates tension between defining a peak period that is; sufficiently broad so as to capture the diversity in the timing of peak demand, but not so broad as to weaken the peak price signal.

In our view, the 3pm to 9pm period strikes an appropriate balance between these factors.

7.2 Verification of our forecasts

Our peak demand forecasts have been verified internally against the peak demand forecasts published by the Australian Energy Market Operator (**AEMO**) in the annual Electricity Statement of Opportunities for Western Australia. They have also been independently reviewed by the National Institute of Economic and Industry Research (**NIEIR**).

In verifying our forecasts against the AEMO's peak demand forecasts, we need to consider the difference between the two forecasts. These differences arise because the forecasts are used for different purposes and forecast the peak demand at a different point in the system. The AEMO forecasts the peak demand that is required to be supplied by generators. As a result, it includes losses on the transmission and distribution network. Our forecast of peak demand does not include losses in the transmission network and some consumption outside the boundaries of the Western Power network.

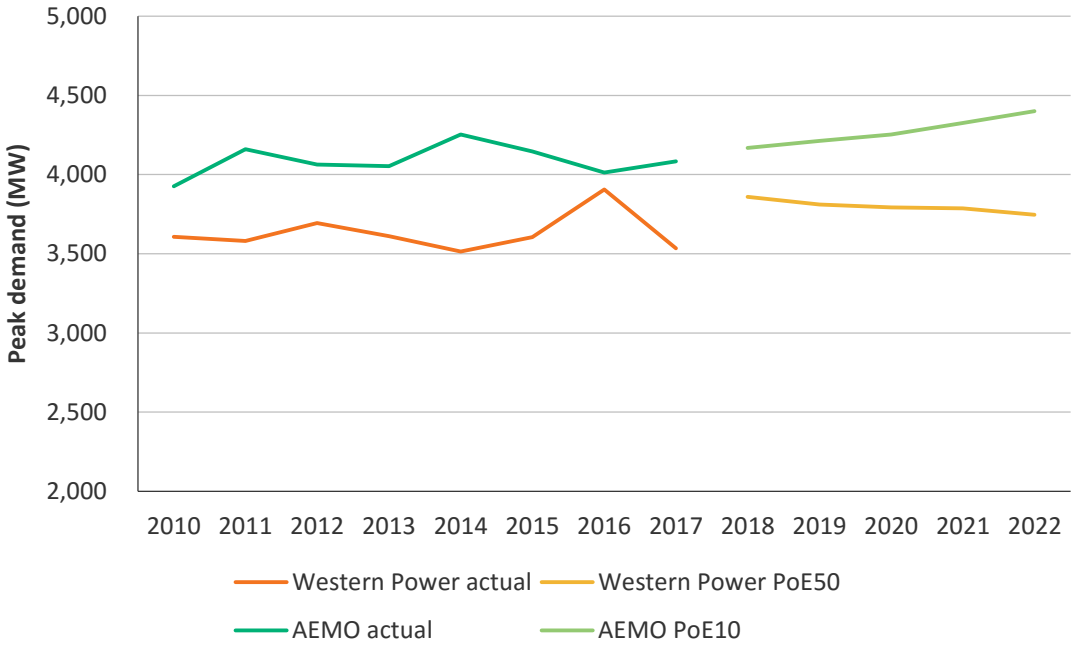
The key differences between Western Power and the AEMO's forecast methodologies are provided in Table 7.1.

Table 7.1: Differences in forecast methodology, the AEMO and Western Power

Reason	AEMO	Western Power
Model Choice	Top down OLS structural models – typically good for identifying the cause of variation but have poor predictive capacity	Bottom up time series models with exogenous variables – less useful for identifying cause but much better predictive capacity Forecasting network exports and imports separately Top down reconciliation using GAM spline structural models
Variable Selection	Excluded all negatively correlated inputs (price, energy efficiency)	Far greater consideration for price and energy efficiency
Technology	AEMO and WP took very similar views on PV, battery and Electric Vehicle uptake, although the assumptions on impact vary	
Block Loads (large new customers)	AEMO and WP took a very similar view on block loads	
Economic Growth	3.3% p.a. (10yr)	1.8% p.a. (5yr)
Population/Customers	WA tomorrow (ignores economic downturn)	Regression on customer numbers
Residential Consumption	0.3% p.a. (10yr)	-2.1% p.a. (5yr)
Non-Residential Consumption	0.8% p.a. (10yr)	0.1% p.a. (5yr)

While Western Power and the AEMO each develop forecasts for different purposes and using different methodologies, the trends are still comparable. Figure 7-12 shows the comparison of our network peak demand forecast and the AEMO's peak demand forecast.

Figure 7-12: Comparison of Western Power and the AEMO forecasts of peak demand



We periodically commission independent auditors to review our annual peak demand forecasting methods to ensure that good industry practice is applied consistently.

In 2016, the NIEIR was commissioned to perform such a review. While favourable, the NIEIR suggested changes in method that may lead to further improvement in terms of insight and forecast accuracy. In summary, these are to:

- produce top-down demand model to validate bottom up process
- segment demand into base load and temperature sensitive load
- directly incorporate weather correction into the PoE50 demand forecasts
- improve the solar photovoltaic power systems modelling for both energy & peak demand forecasts
- estimate models based on interval specific peak times where possible.

Three of the recommendations have been implemented. We are in the process of assessing the remaining recommendations with a view to implementing those that will improve our current forecasting methods.

Appendix A

Tariff Evaluation

A.1 Detailed tariff evaluation

Western Power has evaluated a range of tariff designs against Western Power's pricing objectives (see section 5.1.1). The following sections detail Western Power's preferred tariff designs and an assessment against Western Power's pricing objectives.

The evaluation required Western Power to make trade-offs between each the pricing objectives. Western Power has given more weight to the revenue sufficiency and network efficiency than to the other factors. However, each tariff design has its own strengths and weaknesses and it is unlikely that any particular tariff design will perform well against every objective. For example, a tariff design that incentivises improvements in network efficiency may be complex and cause revenue uncertainty.

Western Power has considered the metering required for each tariff design. Whilst it would be preferable to recommend tariff designs that are based on demand, these are not implementable with the current metering infrastructure for residential and small businesses customers.

The following table summarises the evaluation of each tariff design against the four pricing objectives.

Key: ● Strong Performers ○ Poor Performers

	Revenue Sufficiency	Network Efficiency	Choice	Simplicity
Residential / Small Business				
Inclining Block tariff	◔	◔	◔	◕
Time of use	◑	◑	◕	◕
PV export tariff	◔	◔	○	◕
Large Business				
Time of use Demand	◕	◕	◕	◕
Transmission				

ATMD/CMD	◕	◑	◑	●
With Smart Meter Infrastructure				
Residential – Critical Peak Pricing	○	◕	◕	◑
Residential – Time of use Demand	◕	◕	◕	◔

A.2 Aspirational tariff designs – with smart meter

If Western Power had a critical mass of smart meters, we could introduce tariffs at the residential level that reflected the demand that customers are placing on the network. A detailed evaluation has been undertaken on two tariffs designs, but at this time these will not be recommended for detailed design or implementation.

Time of use demand

This tariff performed very well against all pricing objectives, with the exception of simplicity. However, as current metering limitations mean introducing a demand based tariff isn't possible without a prohibitively high cost meter replacement investment. This tariff structure will be revisited upon availability of smart meters.

Critical Peak Pricing

This tariff performed very well against all pricing objectives, with the exception of revenue sufficiency due to linkages between weather and critical peak days. This tariff is essentially a means for pricing demand in energy terms. Current metering limitations means 30 minute interval data isn't feasible due to prohibitive meter reprogramming cost, and data capture capability limitations within the bulk of existing metering fleet. This tariff structure will be revisited upon availability of smart meters.

A.3 Preferred tariff design – current metering infrastructure

The current metering infrastructure allows for Western Power to implement more targeted time of use tariff than is currently the case.

A.3.1 Time of use – residential/small business

Time of use tariffs divide the day into time periods and provide a schedule of rates for each period. Typically, these periods include peak, off-peak and shoulder pricing periods. This type of tariff can be implemented with existing electronic metering infrastructure, but will require meters to be re-programmed.

Objectives	Description
Revenue Sufficiency	Time of use tariffs will allow for adequate revenue capture based on consumption, rather than demand placed on the network, with non-discretionary loads contributing towards revenue capture. Western Power's initial ability to forecast customer usage patterns and response within time of use periods is unproven, carrying some revenue risk. Applying assumed profiles to data history will help reduce this risk. However, over the long term, observed customer responsiveness to prices will likely become more predictable.
Network Efficiency	Time of use tariffs inform customers of their impact on existing and future network capacity and costs. Price signals are used as a mechanism to encourage customers to shift consumption away from peak period use, thereby assisting in the management of growth in peak demand. Prices reflect typical daily network load profiles, which encourages customers to use less electricity when network utilisation costs are highest. Charging more at peak times reduces cross subsidisation between customers who use the network at peak times, and those that do not.
Choice	Time of use tariffs provide network users with a strong price signal to make energy consumption choices that shift consumption away from peak periods, thereby enabling them to manage their cost of electricity.
Simplicity	Time of use tariffs are relatively easy to understand from a customer perspective, and can be implemented with existing metering infrastructure. Once customers understand the peak, off-peak, and shoulders times, understanding of applicable electricity charge rate is simple and straightforward.

A.3.2 Time of use – large business

Time of use demand tariffs divide the day into time periods and provide a schedule of rates for each period. Typically, these periods include peak, off-peak and shoulder pricing periods. Demand or capacity tariffs, are based on how much of the network's capacity has been used by the customer during the billing period. This type of tariff is supported by existing interval metering.

Objectives	Description
Revenue Sufficiency	Time of use demand tariffs will provide sufficient revenue capture based on the demand placed on the network. Demand tariffs promote revenue sufficiency as it is the customer's highest demand that sets the electricity charge. Demand tariffs provide a strong link between revenue and the cost of provision of service. However, Western Power's ability to forecast customer time of usage patterns on a demand basis is unproven but it is feasible to forecast with the existing data history. The ability to link capacity charges with underlying network costs provides strong support for revenue sufficiency.
Network Efficiency	Time of use demand tariff informs customers of their impact on existing and future network capacity and costs. Price signals are used as a mechanism to encourage customers to shift consumption away from peak period use, thereby assisting in the management of growth in peak demand. Prices reflect typical daily network load profiles, which encourages customers to use less electricity when network utilisation costs are highest. Charging more at peak times reduces cross subsidisation between customers who use the network at peak times, and those that do not.
Choice	Time of use tariffs provide network users with a strong price signal to make energy consumption choices that shift consumption away from peak periods, thereby enabling them to manage their cost of electricity.
Simplicity	Time of use demand tariffs are well understood by large business customers and are supported by the existing interval metering.

A.4 Existing tariff structures

Western Power assessed the following current tariff designs against the revised pricing objectives. We found these tariff designs continue to meet the pricing objectives. It is recommended these tariff designs are retained into the future.

A.4.1 Time of use demand – small to large business

Time of use demand tariffs divide the day into time periods and provide a schedule of rates for each period or a discount of off-peak usage. Typically, these periods include peak, off-peak and shoulder pricing periods. Demand or capacity tariffs, are based on how much of the network's capacity has been used by the customer during the billing period. This type of tariff is supported by existing interval metering.

Objectives	Description
Revenue Sufficiency	Time of use demand tariffs will provide sufficient revenue capture based on the demand placed on the network. Demand tariffs promote revenue sufficiency as it is the customer's highest demand that sets the electricity charge. Demand tariffs provide a strong link between revenue and the cost of provision of service. However, Western Power's ability to forecast customer time of usage patterns on a demand basis is unproven but it is feasible to forecast with the existing data history. The ability to link capacity charges with underlying network costs provides strong support for revenue sufficiency.
Network Efficiency	Time of use demand tariff informs customers of their impact on existing and future network capacity and costs. Price signals are used as a mechanism to encourage customers to shift consumption away from peak period use, thereby assisting in the management of growth in peak demand. Prices reflect typical daily network load profiles, which encourages customers to use less electricity when network utilisation costs are highest. Charging more at peak times reduces cross subsidisation between customers who use the network at peak times, and those that do not.
Choice	Time of use tariffs provide network users with a strong price signal to make energy consumption choices that shift consumption away from peak periods, thereby enabling them to manage their cost of electricity.
Simplicity	Time of use demand tariffs are well understood by large business customers and are supported by the existing interval metering.

A.4.2 Demand tariff – Large business/transmission

Demand or capacity tariffs, are based on how much of the network's capacity has been used by the customer during the billing period. Typically, customers have a contracted maximum demand (**CMD**), and are charged a higher tariff if they exceed their specified demand threshold. This type of tariff is supported by existing interval metering.

Objectives	Description
Revenue Sufficiency	Contracted maximum demand tariffs will provide sufficient revenue capture based on the demand placed on the network. Demand tariffs promote revenue sufficiency as it is the customer's highest demand that sets the electricity charge. A CMD tariff provides a strong link between revenue and the cost of provision of service. Transmission pricing is based on the annual 10 peak summer days and 10 peak winter days.
Network Efficiency	A CMD tariff informs customers of their impact on existing and future network capacity and costs. CMD tariffs encourage consistent stable load profile. However, as a CMD tariff provides no time signal to shift load from peak times, it provides a weak form of cost reflectivity.
Choice	A CMD tariffs provides network users with limited choices to manage their electricity costs, other than reducing their CMD.
Simplicity	The concept of CMD tariff is well understood in large business and is supported by the existing interval metering and billing systems. A CMD transmission tariff is widely used across Australia and provides a consistent tariff structure Australia-wide to large transmission customers.

A.5 Other tariff designs considered but discounted

Western Power evaluated a range of other tariff designs. At this time it is recommended no further work on detailed design or implementation of these tariffs occurs.

The tariff evaluation involved assessment of a broad range of candidates. A number of these will not be investigated further due to these options performing poorly against our pricing objectives, other successful tariff options providing benefits in a more suitable manner, and implementation complexity issues. Another significant factor in choosing not to investigate tariff options further, such as demand based tariffs, which performed well against our pricing objectives, was based on existing network meter limitations, and the significant investment required to overcome these.

A.5.1 Inclining block

Under an Inclining Block Tariff, consumption over a specified consumption threshold(s) is charged at the rate applicable to that block of consumption. Tariff rates increase as a customer's consumption increases. This type of tariff can be implemented with a standard accumulation meter.

Objectives	Description
Revenue Sufficiency	An Inclining Block tariff will allow for adequate revenue capture based on consumption, rather than demand placed on the network. Revenue sufficiency is sensitive to rate and tariff design within each block. Setting of consumption thresholds must be mindful of balancing pricing to ensure sufficient revenue is recovered from lower tariff thresholds for basic needs, while not encouraging adverse overall consumption reductions to avoid higher tariff rates applicable within each incremental consumption threshold.
Network Efficiency	Inclining Block tariffs encourage consumption reduction, as higher rates are charged as consumption increases. As consumption increases contribute to requirements for network augmentation, this price signal informs network users of their impact on existing and future network capacity. However, it is peak demand rather than total demand that is a key driver of network cost. As incremental block pricing has no time signal, it provides no incentive to reduce or shift demand during peak periods, meaning this type of tariff provides limited benefits for network efficiency.
Choice	Inclining Block tariffs typically set lower consumption blocks to cover the majority of consumption, providing network users with limited energy consumption choices that will enable them to manage their costs. However, as consumption thresholds are breached and rates increase, customers have limited choices in regards to managing electricity costs.
Simplicity	Inclining Block tariffs are easily understood by customers, and can be implemented with existing metering infrastructure. However, from a customer perspective, monitoring and understanding when consumption thresholds have been breached, to understand when they are moving from one block to another, is difficult. Design and setting of both the number and level of blocks requires a clear understanding of demand elasticity.

A.5.2 Photovoltaic (PV) export tariff

The PV export tariff is a flat rate (c/kWh) usage based export charge, paid by the customer for all electricity exported to the network (net generation). Essentially it is a cost recovery charge to residential PV owners for use of the distribution network, to reflect the costs of additional infrastructure, and associated technical and operational issues to ensure system stability in managing increasing output from geographically disperse embedded generation. The tariff can be easily implemented with existing bi-directional metering.

In the lead up to AA3, Western Power considered an export charge during the design of the bi-directional tariffs.

Objectives	Description
Revenue Sufficiency	PV export tariff revenue will help recover additional cost to the distribution system, and help reduce cross subsidisation of customers with PV generation by customers without PV's. It also helps reduce the impact of costs outside of Western Power's control, such as reactive power support.
Network Efficiency	The PV export tariff helps inform network users of their impact on network costs in relation to infrastructure and management of the additional load from PV generation. The PV export tariff will assist to reduce demand at peak times by encouraging PV owners to increase the utilisation of energy they generate by load shifting to match peak PV generation, which is predominantly outside network and residential peak times. This may provide the additional flow on benefit of helping to reduce electricity consumption at peak times, for houses with PV's.
Choice	The tariff provides customers with choice in regards to load shift to optimise energy usage with peak PV generations times. It also provides a further incentive when purchasing PV systems, in regards to matching PV system size with household energy needs.
Simplicity	The PV export tariff is a straight-forward tariff design but will not be easily understood from a customer perspective, as charging for excess PV generation exported to the network runs counter to existing financial incentives. In addition to this, most customers have limited knowledge of the complexity in managing the stability of the electricity network, and how this relates to PV issues such as fluctuating generation output and geographic spread.

Other tariffs excluded from further analysis

Residential/small business energy tariffs

The following consumption based tariff designs will not be investigated further, due to weakness against the pricing objectives. The following table summarises the reasons why these tariffs designs were excluded.

Tariff design	Reasons tariff design excluded
Seasonal – Flat rate	• Revenue sufficiency – revenue risk related to variability in summer energy consumption Network efficiency - broad seasonal based tariffs lack a time signal, severely limiting impact on peak demand.

Tariff design	Reasons tariff design excluded
Seasonal – Time of use	• Revenue sufficiency – revenue risk related to variability in summer energy consumption Simplicity - Seasonality adds complexity to the time of use tariff, however it is acknowledged that the Synergy SmartPower product is a seasonal time of use tariff.
Declining Block	Network efficiency - encourages energy consumption to increase but provides no time signal to manage peak demand (indifference to when energy used).

Demand tariffs

The following tariff designs will not be investigated further, due to weakness against the pricing objectives. The following table summarises the reasons why these tariffs designs were excluded.

Objectives	Description
Overnight Tariff (strong time of use signal for overnight usage)	This tariff is not required as an effective time of use tariff will provide a strong peak price signal and incentives to encourage load shift or off-peak usage.
Controlled Loads	This tariff is not required as an effective time of use tariff will provide strong peak price signals and incentives to encourage load shift or off-peak usage, whilst providing the benefit of allowing the customer to choose to use electricity at other times.

Large business

The following tariff designs will not be investigated further, due to weakness against the pricing objectives. The following table summarises the reasons why these tariffs designs were excluded.

Tariff design	Reasons tariff design excluded
CMD with Co-incident Peak (trial candidate end of AA3)	The benefit of this tariff is that it encourages additional demand reduction at critical times, on critical days. However, accurate prediction of when the peak will occur is difficult, making responding to the price difficult and therefore ineffective. This tariff could be considered for a trial toward the end of AA4, to test revenue sufficiency and customer response.

Tariff design	Reasons tariff design excluded
Seasonal Time of use (Demand)	Revenue sufficiency - revenue risk related to variability in summer energy demand Network efficiency - broad seasonal based tariffs lack a time signal, severely limiting impact on peak demand.

Transmission

The following tariff designs will not be investigated further, due to weakness against the pricing objectives. The following table summarises the reasons why these tariffs designs were excluded.

Tariff design	Reasons tariff design excluded
CMD with Co-incident Peak (trial candidate end of AA3)	The benefit of this tariff is that it encourages additional demand reduction at critical times, on critical days. However, accurate prediction of when the peak will occur is difficult, making responding to the price difficult and therefore ineffective. This tariff will be considered for a trial toward the end of AA3, to test revenue sufficiency and customer response.
Time of use (Off peak discount); Seasonal Time of use (Off-peak discount); Large users (Off-peak discount)	These tariff structures will not be investigated further as load shift risk likely to result in under recovery of revenue. Transmission customers have dedicated assets which means this is an ineffective mechanism; minimal benefits from load diversity.
Real Time Pricing	This tariff structure will not be investigated further due to prohibitive IT infrastructure support costs, complexity, and 30 minute pricing intervals not providing a meaningful match to longer run production schedules.

Appendix B

Pricing Objectives

B.1 Pricing Objectives

This appendix details Western Power's current pricing objectives and the pricing objectives of other Australian network service providers including Tariff Structure Statements.

B.2 Western Power's current pricing objectives

In summary, Western Power current approach is to comply with the pricing objectives of the Access Code and with Western Power's own pricing objectives detailed in the Price List in appendix F.1 of the proposed Access Arrangement Information, these are detailed below.

Pricing objective theme	Description
Revenue sufficiency	To recover revenue from users in a manner that is: • Economically efficient • Transparent • Practical • Equitable Achieve the reference service revenue to maintain a viable network business and to deliver efficient network services to all network users.
Cost-reflectivity	Be as cost reflective as is reasonable to reflect the network user's utilisation of the network including use of dedicated assets.
Network efficiency	Promote efficient use of the network through appropriate price signalling.
Price stability	Maintain price stability and certainty to enable network users to make informed investment decisions.
Simplicity	Be as simple and straightforward as is reasonable taking into account other objectives.

In Western Power's current pricing methodology, the following principles are followed to achieve our pricing objectives:

1. Tariffs are designed to recover the revenue cap revenue entitlement while meeting any side constraints to prevent price shock to users.
2. The prices will be based on a well-defined and transparent methodology.
3. The prices will be based on analysis of the cost of supply provision that includes:
    a. definition of the classes of service provided
    b. allocation of fixed and variable network costs to service classes
    c. price setting to recover the fixed and variable costs.
4. Prices will signal the economic cost of supply provision in that they will:

a. avoid cross subsidies between classes of service

b. avoid cross subsidies between customers within each class of service.

5. Provided that economic costs are covered, prices will be responsive to user requirements in order to:

   a. avoid economic bypass

   b. allow for negotiation where provided within the Access Code.

6. Provide economic signals to encourage efficient use of the network.

7. Reference tariffs for users with annual energy demand below 1 MVA are uniform (consistent with the section 7.7 of the Code), but will meet the pricing principles described above, as far as is practical.

In general these principles are a re-statement of the Access Code requirements.

B.3 Other Australian network businesses

This section summaries pricing objectives from other Australian network Businesses. The NER defines the high level pricing principles other Australian network service providers must comply with. In summary they are:

- Prices are to be between avoidable cost and stand alone cost.
- Tariffs are to take account of long run marginal cost (**LRMC**).
- Transaction costs associated with the tariff.
- Whether retail customer are able to respond to price signals.

These high level pricing principles are similar to those in the Access Code with the exception of the requirement to apply LRMC. The Access Code does not explicitly include the requirement to take account of LRMC.

Pricing on the basis of LRMC assumes prices should be based on the cost of meeting an increase in demand over an extended period of time. As demand on the electricity network increases, network capacity needs to be expanded to accommodate the additional demand. In order to provide correct signals for customers, prices must account for LRMC as it can provide appropriate signalling to customers and will assist in achieving a stable tariff structure over the forecast period.

In addition to the explicit requirements under the NER, a number of network service providers publish additional objectives they are seeking to achieve through their tariffs and price settings. In general it is the government owned companies that have published additional objectives – the privately owned companies prefer to restrict themselves to meeting the explicit requirements of the NER only. These additional objectives are summarised below. - Summary of other Australian network service provider pricing objectives.

Pricing objective theme	Description
No cross-subsidisation	For a network user, or group of users, there should be no cross subsidies between each tariff class
Network efficiency	Tariffs should incorporate appropriate signals to inform network users of their impact on existing and future network capacity and costs, and to encourage demand management. Including:

Pricing objective theme	Description
	• assisting in managing growth in peak demand (to avoid increases in capital expenditure requirements). • providing customers with an opportunity to shift their loads away from peak to off-peak periods. • providing customers with meaningful choices of tariff options, taking account of customers' likely behavioural response. • using inter-tariff class rebalancing where necessary to provide improved pricing signals.
Equity	• Tariffs should be equitable for customers and reflect a reasonable allocated share of cost. Tariffs should reflect the users' utilisation of the existing network and the use of specific dedicated assets. • All retailers are to be treated equitably and to minimise any potential impediments to effective full retail contestability.
Price stability	• Tariffs should not widely fluctuate over time to permit customers to make informed investment decisions. • Seeks to ensure that proposed changes do not introduce price shocks.
Cost-reflectivity	• As far as possible, tariffs should reflect the actual cost of service provision to customers. • Set tariffs to recover the revenue allowance defined by the price controls. • Ensures pricing is cost-reflective so efficient price signals are provided to customers. Individual charging parameters within each tariff take account of the long run marginal costs. Also consider inter-customer group equity. • Tariffs should reflect the role of networks in providing capacity. • Tariffs should align with the largely fixed costs of the network and revenues. • Tariffs should signal the costs of using the network at peak times.
Simplicity	Tariffs should be simple and straightforward to apply, based on a well-defined and clearly explained methodology, be readily understood by customers and minimise administration costs.
Revenue sufficiency	Tariffs should be formulated to recover the permitted weighted average prices/revenue cap under the determination.
Revenue volatility	To the extent possible, tariffs should be structured to minimise monthly and annual variations to revenue.
Demand Management	To the extent possible, tariffs should be set in a way which provides incentives and opportunities for demand management.

It is interesting to note that Endeavour Energy includes an objective to constrain average distribution price increases to no more than the rate of inflation for (at least) the next six years. Ergon Energy has a similar objective to constrain network charge increases to less than CPI over the long term (post 2020).

B.4 Tariff Structure Statement

Under the NER, network service providers are required to submit a Tariff Structure Statement (**TSS**) to the Australian Energy Regulator (**AER**) for each regulatory control period. The AER have made their views on tariff reforms very clear, which are, each network distributor are required to disclose their tariff intentions and each business submits a TSS based on their individual needs and wants. The AER applied a consistent approach to all businesses and ensured every company offered time of use as a minimum to new customers, but ideally a demand tariff. This is despite retailers being under no obligation to pass these new structures on to customers. Many retailers explicitly stated they would not change their tariffs.

Below contains a summary of proposed time of use and the AER final decisions of six network service providers.

Network	Decision	Reasons - initial submission, draft response, revised submission and final response: Residential and small business tariffs : https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs

ActewAGL	Not approved initial submission,
	
	Approved final decision
		Approved features
		• The inclusion of demand tariffs for residential and small business customers
		• The assignment of new customers, and customers who make major alterations to their supply, on to demand tariffs
		• Accounting for customer impacts in proposed tariff changes, including alignment with introduction of metering competition for small consumers
		Rejected features
		• Peak charging window should be limited to either a single evening window, or restrict the morning charging window to winter only, &/or implement off-peak weekend periods
		• Low voltage commercial kW demand tariffs should incorporate a peak demand charge rather than an anytime demand charge
		Revised TSS Response to draft decision 4 October 2016
		• adjusted the charging window of the residential demand tariff and adopted an anytime window for the LV demand tariff
		  • demand charge will apply to a residential customer's maximum demand between 5:00 – 8:00pm, of each day all year around.
		  • Proposed peak demand charging window that applies from 7:00am – 5:00pm on weekdays, all year round
		• Although not required based on the draft decision, amendments made to proposed tariff assignment policy to include opt-out provision for small customers assigned by default to a demand tariff
		Final TSS Response to draft decision 28 February 2017
		• Approved;
		  • ActewAGL has adequately addressed our concerns from the draft decision.
		  • Approved changes to tariff assignment policy
		https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs/actewagl-tariff-structure-statement-2017

Network	Decision	Reasons - initial submission, draft response, revised submission and final response: Residential and small business tariffs : https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs
Ergon Energy	Approved	**Approved features** • Exhibits movement along the cost reflectivity spectrum, incorporating time of use & demand tariff options for small customers, complementing existing cost reflective tariffs for large customers • Includes tariffs with varying charges targeting network peak demand • Demonstrates Ergon Energy has accounted for customer impacts by making small customer time of use & demand tariffs opt–in & gradually increasing the demand charge component of small customer demand tariffs to equal LRMC • Applied reasonable approaches to estimate LRMC & incorporate it in tariff structures **Revised TSS Response to draft decision 4 October 2016** • No adjustments **Final TSS Response to draft decision 28 February 2017** • Approved https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs/ergon-energy-tariff-structure-statement-2017
Energex	Approved	**Approved features** • Exhibits movement along the cost reflectivity spectrum, incorporating time of use and demand tariff options for small customers, complementing existing cost reflective tariffs for large customers (as per Ergon) • Includes tariffs with varying charges targeting network peak demand (as per Ergon) • Demonstrates Energex has accounted for customer impacts including by making small customer time of use & demand tariffs opt-in & capping the demand charge component of small customer demand tariffs • Applied a reasonable approach to estimate LRMC & incorporate it in tariff structures (as per Ergon) **Revised TSS Response to draft decision 4 October 2016** • No adjustments **Final TSS Response to draft decision 28 February 2017** • Approved https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs/energex-tariff-structure-statement-2017

Network	Decision	Reasons - initial submission, draft response, revised submission and final response: Residential and small business tariffs : https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs
Ausgrid	Not approved initial submission, Approved final decision	**Approved features** • Incorporates Time of use options for small consumers, complementing existing cost reflective tariffs for large customers • Proposed transitioning towards greater recovery of residual costs from fixed charges to manage customer impacts • Introduction of transmission-use-of-system only tariff for customers connected to its transmission network **Rejected features** • Not clear that declining block tariffs (for residential & small business consumers) reflect the efficient recovery of costs or provide efficient price signals to consumers (further evidence required justifying declining block tariff or use a flat rate tariff) • Charging windows for peak and shoulder periods in Time of use tariffs are too long (shorten them, or justify length) • In terms of access to Time of use tariffs, customers should be treated equally regardless of whether they have embedded generation or not • Shift from use of energy consumption to current transformer connection as a basis of allocating medium & large customers with a low voltage connection to specific tariff classes is not sufficiently justified **Revised TSS Response to draft decision 4 October 2016** • Replace the declining block tariff with a flat tariff, which strikes a better balance between customer impact and more quickly reducing usage charges to reflect estimated long run marginal costs • Introduce seasonal peak periods and reform the winter peak period for residential customers (summer 2pm – 8pm and winter 5-9pm). • Assigning new customers and reassigning some existing customers to more cost reflective tariffs • Removing shoulder period on weekends for small business customer and public holidays **Final TSS Response to draft decision 28 February 2017** • Approved https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs/ausgrid-tariff-structure-statement-2017

Network	Decision	Reasons - initial submission, draft response, revised submission and final response: Residential and small business tariffs : https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs

Endeavour Energy	Not approved initial submission,
	
	Approved final decision
		Good features (approved)
		• Incorporating time-of-use options for small consumers, complementing existing cost reflective tariffs for large customers (as per AusGrid)
		• Proposed transitioning towards greater recovery of residual costs from fixed charges (as per AusGrid)
		• New low voltage transitional demand tariff for customers whose annual consumption requires a demand tariff
		• Changes to inclining block tariff structure for large customers to encourage switching to demand tariff
		Rejected features
		• Inclusion of declining block tariffs inappropriate (as per AusGrid)
		• Charging windows are too long (as per AusGird)
		• Less reliance on an opt-in approach with changes required to tariff assignment policy (&/or other aspects of the TSS) to hasten transitioning to cost reflective tariffs, particularly for residential & small business customers
		Revised TSS Response to draft decision 4 October 2016
		• Transition its residential declining block tariff to a flat tariff over the next two years
		• From 1 July 2018:
		  • All new customers (who will all have smart meters under the metering rule change) be assigned to a time-of-use tariff with the option to opt-out a flat tariff (residential customers) or inclining block tariff (small business customers)
		  • Existing customer who modify or upgrade their existing network connection will be assigned to a time of use tariff with the option to opt-out to the non-time of use
		• Removed the shoulder period on non-business days, and provided further explanation regarding its method for determining its peak shoulder and off-peak hours.
		Final TSS Response to draft decision 28 February 2017
		• Approved
		https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs/endeavour-energy-tariff-structure-statement-2017

Essential Energy	Not approved Not approved final decision	**Good features** • Incorporating Time of use options for small consumers, complementing existing cost reflective tariffs for large customers (as per AusGrid) • Proposed transitioning towards greater recovery of residual costs from fixed charges (as per AusGrid) **Rejected features** • Inclusion of declining block tariffs inappropriate (as per AusGrid) • Charging windows are too long (shorten them, or justify length) (as per AusGrid) • Less reliance on opt-in approach for transition to cost reflective tariffs for residential & small business customers (as per Endeavour Energy) **Revised TSS Response to draft decision 4 October 2016** • Replaced declining block tariffs with flat tariffs,

Network	Decision	Reasons - initial submission, draft response, revised submission and final response: Residential and small business tariffs : https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs

		• Removed the morning peak window on weekdays for residential and small business customers, but kept the morning peak window on weekdays who have a basic accumulation meter with time of use capability
		• Commencing 1 July 2017
		  • Assigning all new connections, meter upgrades and solar PV installations to time of use tariff appropriate to their metering technology in the first instance with the option to opt-out to an alternative tariff
		  • Introduced new residential and small business time of use tariffs with amended charging windows
		Final TSS Response to draft decision 28 February 2017
		• Not approved, AER agreed with most but disagreed with the timing of some of its tariff assignment changes for residential and small business customers. Essential Energy proposed the assignment take effect from 1 July 2017, AER require this assignment to take effect from 1 July 2018 so this occurs no earlier than the timing of the AEMC's metering rule changes.
		• https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/pricing-proposals-tariffs/essential-energy-tariff-structure-statement-2017

Appendix C

Customer Town Hall

westernpower

It's ON

C.1 Customer Town Hall

Through an extensive customer engagement program the following companies were invited to provide feedback on proposed network tariffs for the AA4 period.

Albany	Bunbury	Kalgoorlie	Geraldton		Perth	
53 Invitees	34 Invitees	47 Invitees	153 Invitees		124 Invitees	
Agriculture	Bunbury Geographe Chamber of Commerce and Industry	Alinta Energy	ABC Mid West Wheatbelt	Mansom Engineering	AEMO	Main Roads
Albany Chamber of Commerce	Bunbury Ports	ATCO Australia	Afgri Equipment Pty Ltd	Market Creations	Airconomix	Masonic Care WA
Albany Chamber of Commerce and Industry	Busselton Chamber of Commerce and Industry	BHP Billiton Nickel West	Agricultural Region	MBA Geraldton North West Branch	BGC	Master Electricians Australia
CBH Group	City of Bunbury	BHP Nickel West	Allied Corporate Health	Member for Agricultural Region	Cameron Chisholm Nicol (Architects)	MBA
City Of Albany	City of Busselton	Chamber of Minerals and Energy WA	Aurizon Holdings	Member for Agricultural Region	CCI WA	Member for the East Metropolitan Region
Denmark Chamber of Commerce	Cristal	City of Kalgoorlie-Boulder	B&J Catalano Pty Ltd	Member for Geraldton	Chamber of Commerce and Industry WA	Metropolitan Redevelopment Authority
Department of Agriculture and Food, Western Australia	Doral Group	CME	Bhagwan Marine	Member for Moore	City of Armadale	Mirvac
Department of Fisheries	Geographe Enterprises	CME	Blue City Mediations	Member for North West Central	City of Bayswater	Murdoch University
Department of Planning	GHD	Coolgardie Shire Council	Brookfield Rail	Members of Agricultural Region	City of Canning	National Electrical and Communications Association
	Griffin Coal Mining Co	EVOLUTION Mining (La Mancha and Mungari)	Byland Fabrication	Merkanooka Haulage	City of Cockburn	NBN Co
	Iluka	Federal Member for O'Connor	CBH	Mid West CCI	City of Fremantle	
	Laminex		Central Earthmoving		City of Gosnells	
					City of Joondalup	
					City of Mandurah	
					City of Melville	

Albany	Bunbury	Kalgoorlie	Geraldton		Perth	
Department of Regional Development	Manjimup Chamber of Commerce and Industry	Goldfields-Esperance Development Commission	Central Regional TAFE	Mid West Ports	City of Nedlands	Norman Disney & Young (Engineering Consultants)
Department of Sport and Recreation	Margaret River Chamber of Commerce and Industry	Hanking Gold	Chamber of Minerals & Energy of WA	Mid West Ports Authority	City of Perth	Office of Senator Scott Ludlam - Media and Campaigns Advisor
Department of Transport	Shire of Augusta and Margaret River	Kalgoorlie MP	City of Greater Geraldton	Mid Wests Ports	City of Rockingham	Office of Tom Clifford MLC (East Metropolitan) - Electorate Officer
Forrest Hill Farms	Shire of Bridgetown-Greenbushes	Kalgoorlie-Boulder Chamber of Commerce and Industry	Clayton & Weir Consultants	Midwest Chamber of Commerce and Industry	City of South Perth	Peel Develoment Commission
Great Southern Development Commission	Shire of Capel	KCGM	Community Electricity	Midwest Development Commission	City of Stirling	Perth Airport
Landcorp	Shire of Dardanup	Member for Eyre	Cooperative Bulk Handling (CBH Group)	Nexus Risk Services	City of Subiaco	Programmed
Leapfrog Business Solutions	Shire of Donnybrook-Balingup	Member for Kalgoorlie	Cramer & Neill Refrigeration	Northern Agricultural Catchments Council (NACC)	City of Swan	Property Council
Main Roads	Shire of Harvey	Member for Kalgoorlie (representing)	Crothers Construction Pty Ltd	Novus Autoglass & Tint-a-Car Geraldton	City of Vincent	Public Transport Authority
Member for Albany	Shire of Manjimup	Metal X Ltd	Cummins Geraldton	Nufab Industries	City of Wanneroo	PUO
Member for Blackwood Stirling	Shire of Nannup	Mining & Pastoral MP's	Dept of Industry, Innovation and Science	Oakajee Training	Clayton Utz	Ramsay Health
Milne Agricultural Group	Simto (Earthmoving and Mine Site Construction)	Northern Star (Kalgoorlie Ops)	Diab Engineering	Ocean & Earth Training Specialists	Clean Energy Council	Robinson Bowmaker Paul Energy
Ravensthorpe Regional Chamber of Commerce	South West Development Commission	Norton Gold Paddington Operations	DP Energy Australia Pty Ltd	Ocean Air	Cleantech	Shire of Kalamunda
Regional Development		Paddington Gold		Ocean and Earth Training Specialists	Consumer Credit Legal Service (WA) Inc.	Shire of Mundaring
				Ocean Centre Hotel	Co-operative Bulk Handling	
					Curtin University of Technology	
					Department of Fire and Emergency Services	
					Department of Health	

Albany	Bunbury	Kalgoorlie	Geraldton		Perth	
Australia Great Southern	Water Corporation	TransAlta Energy	Eneabba Gas Ltd	Panaceum Group	Department of Housing	Shire of Peppermint Grove
Shire of Denmark	Western Power	Western Areas Ltd	ERM / Wambo Power Ventures Pty Ltd / New Gen	Paper Plus Office National	Department of Treasury	Shire of Serpentine-Jarradale
Shire of Jerramungup		Western Power	Extension Hill Pty Ltd	Patience Bulk Haulage Pty Ltd	Edith Cowan University	St John of God Hospitals
Shire of Plantaganet			Federal member for Durack	Platinum Electricians Midwest	Energy Made Clean	St Vincent de Paul Society
Shire of Plantagenet			Fleet Hydraulics	Principal Policy Advisor	Energy Safety	Telsa
Shire of Ravensthorpe			Fuel Fix & Tanks2Go	Principal Policy Advisor	Energy Tec	Telstra
Silver Chain			GCo Electrical	Qube Ports & Bulk Geraldton	ERA	Town of Bassendean
Small Business Centre Great Southern			GE Group	Queens Supa IGA	Financial Counsellors' Association	Town of Cambridge
South Coast Natural Resource Management			Geraldton Air Charter	RCR Mining Pty Ltd	Fremantle Ports	Town of Claremont
Southern Ports			Geraldton Building Services & Cabinets	Regional Development Australia - Mid West	HFM Asset Management	Town of Cottesloe
Southern Ports Albany			Geraldton Community Bank	Research Officer	HIA	Town of East Fremantle
Stirlings to Coast Farmers			Geraldton Fishermans Co-op	Roadrunner Mechanical	Horizon Power	Town of Mosman Park
University of WA			Geraldton Fuel	RSM Bird Cameron	IBMS (Engineering Consultant)	Town of Victoria Park
WA Country Health Service			Geraldton Guardian	S & K Electrical Contracting Pty Ltd	Jandakot Airport	UDIA
			Geraldton Signmakers		Jaxon	University of Western Australia
			Geraldton Toyota		KWM	VSUN Energy
					Landcorp	WA Farmers

Albany	Bunbury	Kalgoorlie	Geraldton		Perth	
WA Farmer's Federation We are Localise			GG Pumps and Electrical Pty Ltd GHD Pty Ltd Greenough River Solar Farm and Mumbida Windfarm GWN 7 Geraldton Hille, Thompson & Delfos- Surveyors & Planners Holcim Australia Horizon HR Horizon Power Hosexpress Humfrey Land Developments Ian Blainey's office Iluka Resources Kalbarri Visitor Centre Karara Mining Ltd Keen Bros Driver Training KSI Global Australia Pty Ltd	Shine Aviation Services Shire of Chapman Valley Shire of Irwin Shire of Morawa Shire of Northampton Shire of Perenjori Sokerol WA Specialised Reline Services Sun City Plumbing Tersum Energy The Glass Co. WA Pty Ltd Tidal Energy Australia Pty Ltd Toxfree UWA WA Country Health Service Midwest WA Farmers Federation Water Corporation	Lease Equity (Property Management)	WA Local Government Association (WALGA) WA Sports Trust WACOSS Water Corporation Wesfarmers (CSBP) Western Australia Council of Social Services (WACOSS) Western Power Westnet Wheatbelt Development Commission

Albany	Bunbury	Kalgoorlie	Geraldton		Perth	
			Leader of the National Party of Australia (WA), Member for Central Wheatbelt Local Members Office Maicon Engineering Main Roads WA - Midwest Gascoyne Region Maintenance Systems Solutions PTY LTD	Westnet WesTrac Equipment		