



# Demand Management Plan

2018 – 2019



Part of the Energy Queensland Group



## Message from the Head of Corporate Strategy Executive General Manager Asset Safety and Performance

I am pleased to share with you the Demand Management Plan for Energy Queensland Limited's (Energy Queensland) two electricity distributors, Energex in the South East and Ergon Energy Network (Ergon Energy) in regional Queensland. This is the first time one plan has been developed that covers both networks. It brings together a unified approach to demand management (DM) for the whole of Queensland, while at the same time acknowledging the differences in each region and network.

Our end use customers are clearly telling us their primary concern is affordability and that we shouldn't spend any more than is necessary on maintaining, operating and upgrading our network. Our DM Plan forms part of an integrated approach that also includes our forecasting, planning, intelligent grid and tariff strategies, to help lower electricity charges for our end use customers. Demand management involves working with our end use customers and our industry partners to reduce demand to maintain system reliability and ensure an affordable and secure network. The nature of this work has inevitably placed customers at the centre of all that we do.

The electricity industry is undergoing a period of rapid transformation which poses challenges but also brings opportunities. We have built

foundations of strong relationships with our partners and trust with our end use customers. This enables us to broaden the purpose for demand management to create value for our customers by meeting customer needs centred around ease, choice and control and innovation.

An opportunity I am particularly excited about is leveraging demand management services from the increasing number of internet enabled distributed energy resources (like solar PV and batteries) and appliances. In our DM Plan, we are starting the transition to using these new technologies to provide lower cost alternatives to network investment and in addition, enable us to continue to evolve in order to keep pace with our customers changing needs.

This Plan is aligned with our broader strategy of transitioning to an intelligent network of the future. We are not alone in this transition and our approach is consistent with the wider industry approach set out in Energy Networks Australia (ENA)/ Commonwealth Scientific Industrial Research Organisation (CSIRO) Electricity Transformation Roadmap (ENTR).

Each year Energex and Ergon Energy publish a DM Plan to engage and inform our stakeholders on our planned DM programs for the next five years. Our DM Plan, like

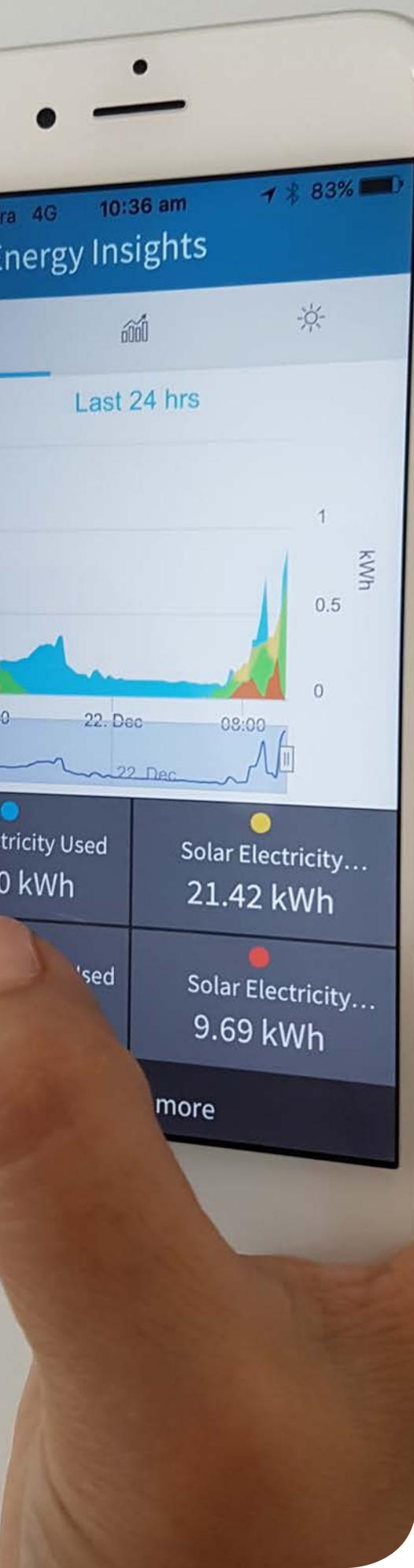
the ENTR, places the customer at the centre. The DM Plan has been developed based on ENTR scorecard principles, including:

- working with end use customers and industry partners to reduce peak demand and improve network utilisation to keep costs down
- supporting end use customers in their energy choices
- enabling connection of distributed energy resources (DER) to the grid
- coordinating network and customer resources to work together
- unlocking the value of demand response for all end use customers, not just those with DER
- paying for DM services where they deliver value

Finally, I would like to thank all the customers and industry partners already participating in our DM programs. I look forward to working with new customers and industry partners during 2018-19, as we continue to evolve our programs to meet our future network and customer needs.



Peter Price



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# 1. Introduction

## 1.1 The Purpose of the Demand Management Plan

Each year Energex and Ergon Energy publish a Demand Management Plan (DM Plan) to engage and inform our end use customers and industry partners on our planned DM programs for the next five years. It forms part of a suite of strategies being developed by Energex and Ergon Energy to help achieve Energy Queensland's vision to energise Queensland communities. Consistent with Energy Queensland's purpose, the DM Plan, outlines programs that:

- are customer centric – supporting end use customers in their energy choices
- are cost efficient – working with end use customers and industry partners to reduce peak demand and improve network utilisation to keep costs down

- improve safety, security and reliability – by coordinating network and end use customer resources to work together
- activate the market and transition – by paying for DM services where they provide value and responding to regulatory and market changes
- help achieve the Queensland renewable energy target – by enabling connection of distributed energy resources (DER) to the grid
- are fair and equitable - by unlocking the value of demand response for all end use customers, not just those with DER.

The DM plan meets Energex and Ergon Energy's regulatory requirements under section 127C of the Queensland Electricity Regulation, which requires an annual DM Plan to be submitted for each upcoming financial year.

## 1.2 What's in the DM Plan

Our plan is organised into sections:

- Sections one, two and three provide information about us, our network, customers participating in our program and demand management
- Section four provides details the drivers shaping our strategy
- Section five details our strategy for the next seven years<sup>1</sup> and includes our principles, programs and initiatives
- Section six details costs and performance targets for the 2018-19 financial year.

Our DM Plan forms part of an integrated approach that also includes our forecasting, planning, intelligent grid and tariff strategies, to help lower electricity charges for our end use customers. Demand management involves working with end use customers and our industry partners to reduce demand to maintain system reliability in the short term and over the longer term, defer the need to build more 'poles and wires'.

<sup>1</sup> The Qld Electricity Regulation requires a five year strategy to 2023, we have extended the strategy by two years to align with the next AER regulatory period ending on 30 June 2025.



Any questions or feedback?

Talk to the Customer Interactions Team  
**For South East Queensland contact us on:**  
[positivepayback@energex.com.au](mailto:positivepayback@energex.com.au)  
**For regional Queensland contact us on:**  
[demandmanagement@ergon.com.au](mailto:demandmanagement@ergon.com.au)

# 2. About Energy Queensland

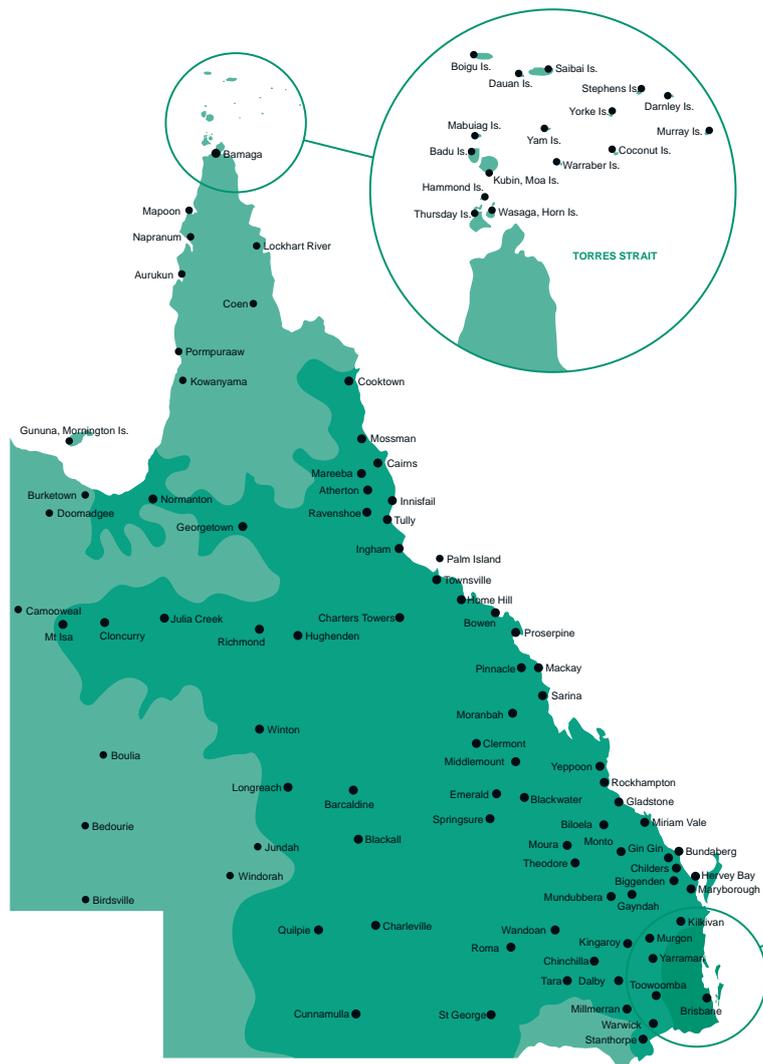
## 2.1 Our businesses

Energy Queensland came together as a Group in June 2016 to build on our proud history of powering Queensland and create a community-focused energy business ready for the future. The Group includes our two electricity distributors, Energex in the South East and Ergon Energy in regional Queensland. These two businesses build, operate and maintain the 'poles and wires' that bring power to end use customers' homes and businesses across Queensland.

## 2.2 Our networks

The Energex and Ergon Energy electricity distribution networks cover 1.7 million km<sup>2</sup> across Queensland. Ergon Energy supplies electricity to homes and businesses over a vast area covering around 97% of the State – from coastal and rural centres to remote communities of outback Queensland and the Torres Strait. Ergon Energy also services 33 isolated systems. Energex's network supplies electricity to homes and businesses in the South East region of the State. South East Queensland region includes the major urban areas of Brisbane, Gold Coast, Sunshine Coast, Logan, Ipswich, Redlands and Moreton Bay.

### Our service area



7,355 employees 

 34 stand-alone and grid-connected power stations

220,000km  powelines

 1.7 million power poles

3  network control centres

 2.2 million connected customers

34,600GWh  electricity delivered a year

4,824MW	2,637MW
South East Queensland peak demand	Regional Queensland peak demand

 459,000 solar energy systems connected

355MW  of medium to large scale renewables connected

-  Regional network - Ergon Energy Network
-  Isolated supply - Ergon Energy Network
-  Ergon Energy Retail
-  South East Network - Energex

# 3. Demand management

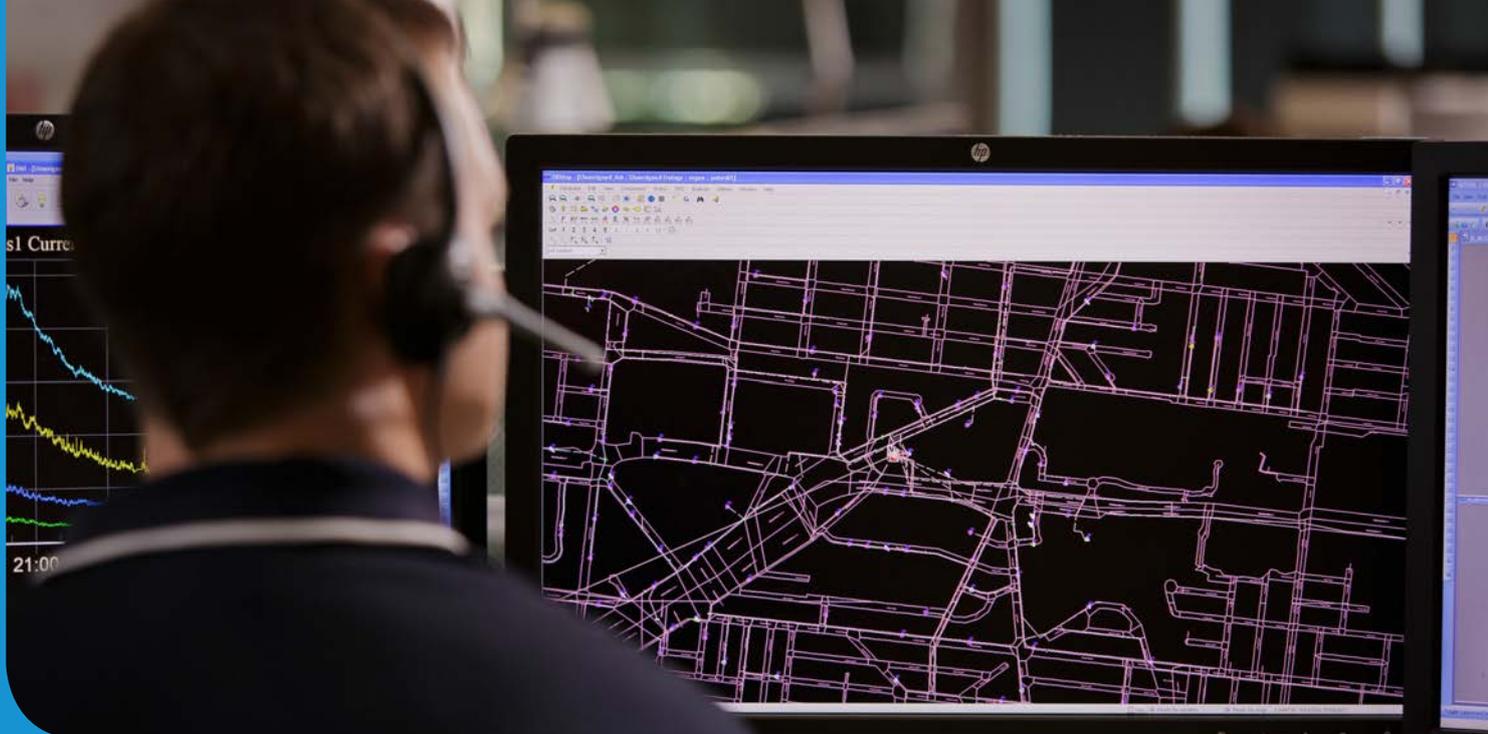
## 3.1 What is demand management?

DM involves working with our end use customers and industry partners to reduce demand to maintain system reliability in the short term and over the longer term, defer the need to build more ‘poles and wires’. Demand management solutions can be in front or behind the meter and include:

- direct load control
- distributed generation, including standby generation and cogeneration
- demand response
- energy efficiency
- fuel substitution (e.g solar PV)
- interruptible loads
- load shifting
- power factor correction
- pricing/tariffs

Further information on each of these and also examples of Energex or Ergon Energy programs are provided in Table 1.

Demand Management Solution	Description	Active Energex/Ergon Energy DM program
<b>Direct load control</b>  Flexible load shape	With direct load control, end use customers pay reduced tariffs and/or receive incentives in return for allowing the network operator to remotely reduce consumption of selected electrical equipment owned by the end use customer (e.g. air conditioners, water heaters). Direct communication links between the network operator and the end use customers’ electrical equipment enable remote switching of customer’s loads at short notice in response to particular problems on the electricity network.	<ul style="list-style-type: none"> <li>• PeakSmart air conditioning</li> <li>• Appliances on load control tariff (during extreme weather events)</li> </ul>
<b>Demand response</b>  Flexible load shape	With demand response end use customers get a financial incentive for changing (usually reducing) their electricity use in response to a signal from the network operator and/or high prices in the electricity market. Demand response is typically used by network operators to provide targeted load reductions on their networks.	<ul style="list-style-type: none"> <li>• Demand response from end use customer solar PV and batteries (trials)</li> </ul>
<b>Distributed generators</b>  Peak clipping	Customers are paid to install, or networks install generators at a lower cost than building network. These generators are relatively small and modular and connected directly to the local distribution network. Distributed generation can inject energy into the electricity network close to the load it serves and reduces demand on the portion of the network which would otherwise supply the load.	<ul style="list-style-type: none"> <li>• Mobile generation plant (network owned)</li> <li>• Contracted Non-network Alternative generation (customer owned)</li> </ul>
<b>Interruptible loads</b>  Peak clipping	Customers have a contract/agreement or are on a tariff structure which financially rewards them to shed loads at certain times. Interruptible loads provide the right for a network operator to interrupt supply to an end use customer, typically during a system emergency.	<ul style="list-style-type: none"> <li>• Interruptible load contracts are in place with end use customers under Target Area Incentives program</li> </ul>
<b>Energy efficiency</b>  Conservation	Customers are financially rewarded through reduced energy operating costs. The objective of energy efficiency projects is to reduce the quantity of energy used per unit of output or delivered service. Energy efficiency leads to reduced load levels on the electricity network across the day. Energy efficiency can be used to slow load growth on the network.	<ul style="list-style-type: none"> <li>• Energy efficiency projects at end use customer premises are partly funded under Target Area Incentives program.</li> </ul>



Demand Management Solution	Description	Active Energex/Ergon Energy DM program
<p><b>Power factor correction</b></p> 	<p>Customers on demand tariffs with good power factor have reduced demand costs. Power factor in alternating current (AC) circuits is the ratio of actual energy consumed (watts) versus the energy flowing through the wire (also known as apparent power). Power factor correction aims to reduce the difference between the energy consumed and the apparent power so as to reduce energy wastage and network losses. It can reduce the size of network assets required.</p>	<ul style="list-style-type: none"> <li>• Power factor correction projects at end use customer premises are partly funded by Target Area Incentives program.</li> </ul>
<p><b>Renewable energy</b></p> 	<p>Customers with renewable energy resources such as batteries or solar PV are financially rewarded through lower electricity bills. Harnessing renewable energy is a key strategy to optimise network performance. The intermittent and distributed nature of energy from these sources has presented challenges to networks used to dealing with one way flows.</p>	<ul style="list-style-type: none"> <li>• Demand response from end use customer solar PV and batteries (trials)</li> </ul>
<p><b>Load shifting</b></p> 	<p>Customers pay reduced electricity costs by shifting their use to non-peak times that have lower tariff prices. Load shifting involves altering electricity use patterns so that on-peak electricity use is shifted to off-peak periods. To achieve network-related objectives, load must be shifted away from the peak period on the whole network or on the relevant network element.</p>	<ul style="list-style-type: none"> <li>• Appliances on load control tariff</li> </ul>
<p><b>Tariffs/pricing</b></p> 	<p>Customers are rewarded by reducing demand during peak periods. Pricing initiatives are typically used to change end use customers' energy-using behaviour to reduce demand at the time of the system peak. Typically, pricing initiatives are applied to particular customer classes and usually not targeted to geographical areas where network constraints occur.</p> <p>Smart meters can assist with tariff/pricing programs as they enable the implementation of time-varying pricing. Also data from smart meters provides end use customers with detailed information from which to develop demand reduction plans.</p>	<ul style="list-style-type: none"> <li>• Appliances on load control tariff</li> <li>• Impact of cost reflective tariffs – time of use, seasonal time of use and demand tariffs (trials)</li> </ul>

Table 1: Demand management solutions

(Source: adapted from <http://www.efa.com.au/Library/David/Published%20Reports/2010/InternationalBestPracticeinEEandDSMforNetworkSupport.pdf>)

## 3.2 Customers enrolled in our Demand Management Programs

Our end use customers are those residents, businesses and major customers participating in our DM programs. These are summarised in the Table 2.



These programs provide incentives to households that connect electric hot water systems, pool pumps and other appliances to load control tariffs, and to end use customers who participate in the PeakSmart air conditioning program. These programs are supported by manufacturers, appliance retailers and installers and builders

		Ergon Energy region	Energex region
<b>PeakSmart air conditioning</b>	On days of extreme demand, PeakSmart air conditioners can be signaled by the network operator to reduce their energy consumption.	Approximately 1,000 PeakSmart air conditioners rewarded	Over 87,000 PeakSmart air conditioners rewarded
<b>Control load tariffs – hot water and pool pumps</b>	Hot water systems and pool pumps connected to control load tariffs are switched on and off to ensure they operate outside of peak demand periods.	Approximately 320,000 hot water systems	Approximately 770,000 hot water systems
		Approximately 8,000 pool pumps	Approximately 28,000 pool pumps

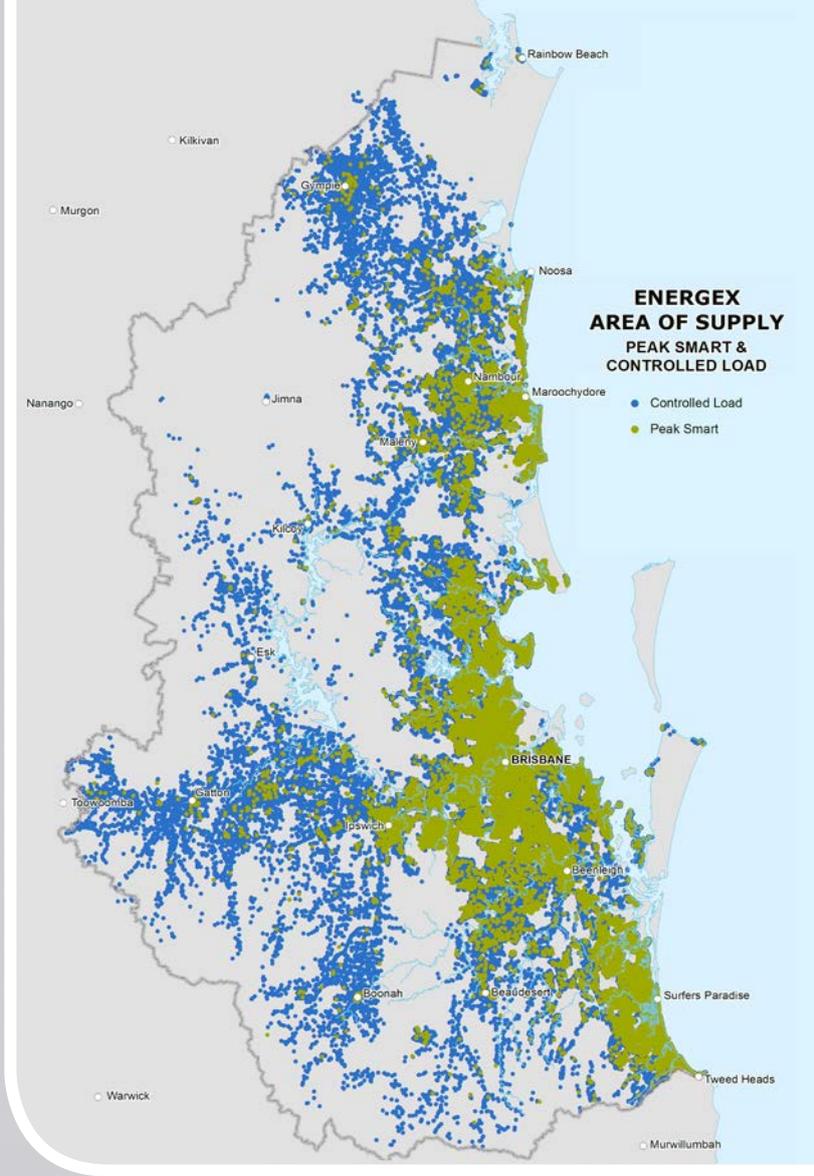
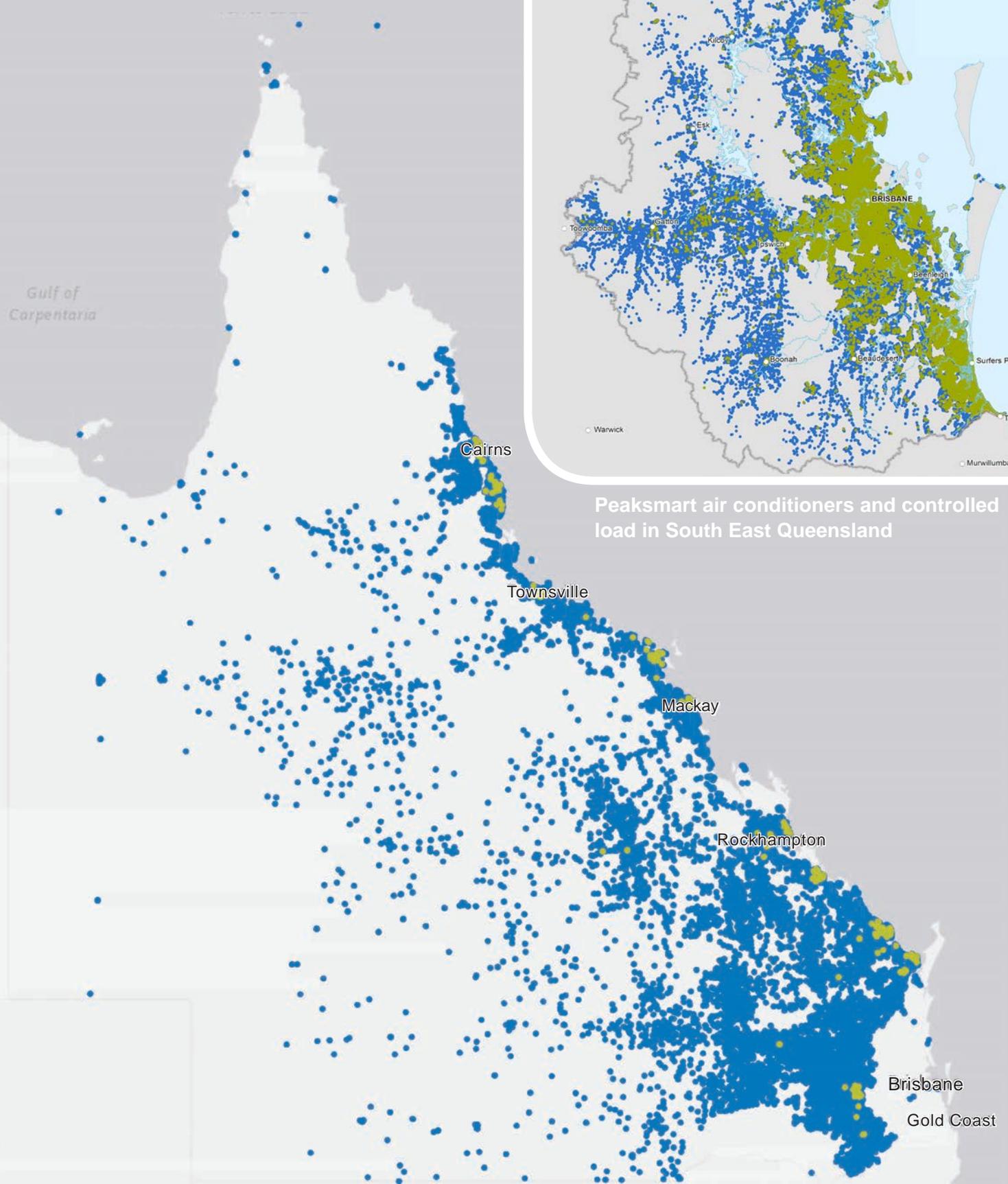


These programs offers incentives to small, medium to large businesses and major customers located in areas where demand reductions are required (Target Areas) and install or upgrade equipment/appliances to reduce peak electricity demand. These programs are supported by suppliers, industry associations, aggregators, energy retailers and national brands (with multiple premises).

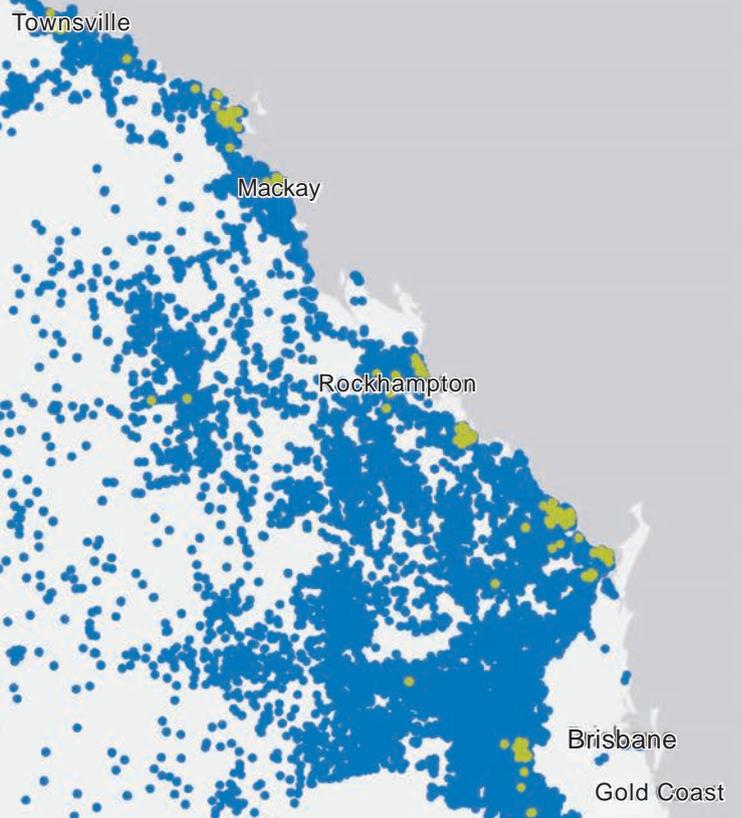
		Ergon Energy region	Energex region
<b>Target Area Incentives: Power factor correction (PFC)</b>	Power factor correction equipment is installed to improve energy supply inefficiencies and reduce peak demand.	Approximately 41 power factor correction installations	Approximately 530 power factor correction installations.
<b>Target Area Incentives: Energy efficiency</b>	Peak demand reduction through replacement/ upgrade of lighting, motors, refrigeration and building management systems.	Approximately 185 installations or upgrades	Approximately 260 installations or upgrades
<b>Non Network Alternative projects: Generation contracts</b>	Peak demand reduction through contracted generation (customer or third party owned)	9 contracts	1 contract

Table 2: Participation in our DM programs

# Peaksmart air conditioners and controlled load (hot water and pools) across Queensland



## Peaksmart air conditioners and controlled load in South East Queensland





### 3.2.1 Queensland's power system: Summer Preparedness Plan 2017-18

An important outcome of our end use customers' participation is that together they provide almost 850MW of demand reductions that can be called upon during extreme demand periods or emergency response (see Table 3). By managing these loads Energex and Ergon Energy can help

maintain electricity supply to our end use customers and communities during times of extreme demand on the network. This capability is called up in Queensland's power system *Summer Preparedness Plan 2017-18*.

DM Program end use customers	Energex (MW)	Ergon (MW)	Total (MW)	How our customers help the network
Load control tariff 33 (hot water and pool pumps)	367	103	470	Reduce peak demand
Load control tariffs (other appliances)	0	48	48	Reduce peak demand
Load control tariff 31 (hot water)	154	52	206	Reduce peak demand
Peak Smart Air Conditioners	58	0	58	Improves reliability on extreme weather days
Contracted demand response	24*	27	51	Provide efficient non network alternative
Network mobile and embedded generation	0	17	17	Provide efficient non network alternative
<b>Total</b>	<b>603</b>	<b>247</b>	<b>850</b>	

Table 3: Demand reductions available from our end use customers

\*Different to Appendix C due to rounding



## 4. Drivers shaping our plan

### 4.1 New technologies

Today, over one third of detached houses across Queensland have solar PV on their roof and 355MW of medium to large scale renewables are connected to our networks (see Figure 1). The bidirectional energy flows from the systems represents a new use case for the existing network. Batteries and electric vehicles (see Figures 2 and 3), whilst low in number at the moment, are on the rise and likely to surge in popularity once purchase costs fall. This has expanded our traditional role from providing our end use customers access to electricity to also enabling alternative forms of electricity generation in a safe, reliable, affordable and equitable manner.

#### Solar PV Installations in Queensland

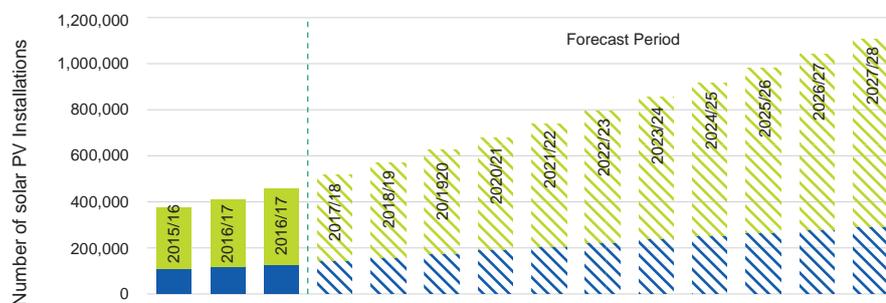


Figure 1.

#### Battery uptake in Queensland

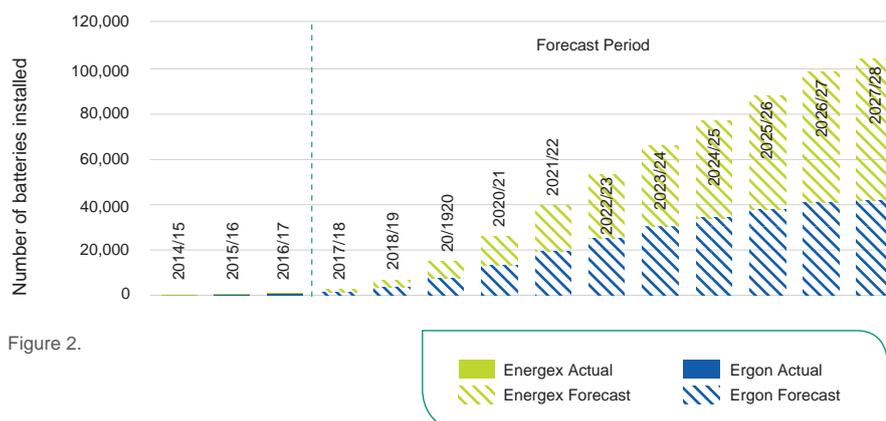


Figure 2.



The adoption of these technologies is significantly changing end use customer's load profiles. Our networks are experiencing lower minimum demand, higher ramps (steeper peaks) in demand and lower energy consumption growth. Refer Figures 4 and 5. Climate change is increasing the probability of extreme weather events and average temperatures. The summers of 2016-17 and 2017-18 were both very hot and new system demand records were set. This trend is expected to continue. A recent report by AEMO outlined the key system changes and operational challenges (refer to Table 4).

### Electric vehicle uptake in Queensland

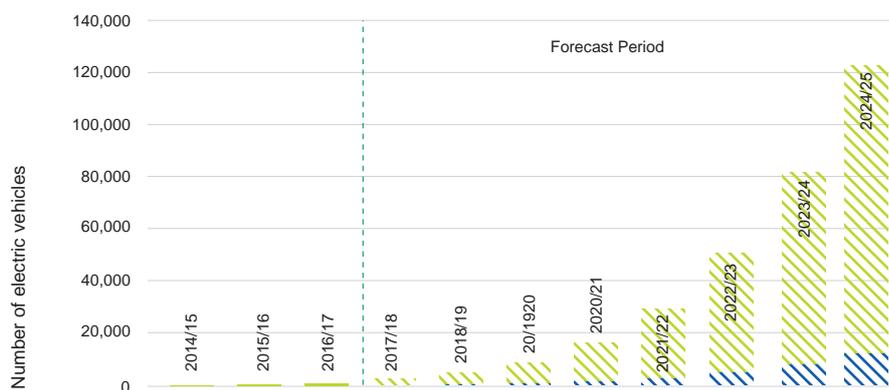


Figure 3.

### Energy delivered and forecast energy growth for Queensland

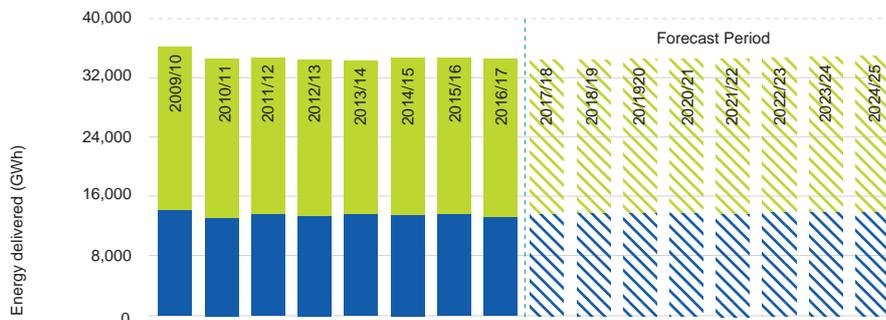


Figure 4.



Issue	What we are seeing	Operational implications	Potential avenues to address
<b>Changing supply mix</b>	<ul style="list-style-type: none"> <li>• More variable renewable energy</li> <li>• Less dispatchable generation</li> <li>• Older resources</li> </ul>	<ul style="list-style-type: none"> <li>• Increased variability and uncertainty in the resource mix</li> <li>• Increased reliance on directions</li> </ul>	<ul style="list-style-type: none"> <li>• Forecasting improvements</li> <li>• Valuing flexible performance</li> <li>• Strategic reserves</li> <li>• Day-ahead markets</li> <li>• Integrated system planning</li> </ul>
<b>Changing electricity demand</b>	<ul style="list-style-type: none"> <li>• Higher ramps for peaks</li> <li>• Lower minimum demand</li> <li>• More active customers</li> <li>• More distributed energy resources (DER)</li> </ul>	<ul style="list-style-type: none"> <li>• Increased variability and uncertainty in demand</li> <li>• Erosion of baseload</li> <li>• Increased ramping requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Forecasting improvements</li> <li>• Use of DER</li> <li>• Valuing flexible performance</li> <li>• Strategic reserves</li> <li>• Day-ahead markets</li> <li>• Integrated system planning</li> </ul>
<b>Changing impact of weather</b>	<ul style="list-style-type: none"> <li>• Temperature changes</li> <li>• Extremity of weather events</li> </ul>	<ul style="list-style-type: none"> <li>• Increased demand</li> <li>• Increased stress on system over prolonged heat periods</li> <li>• Increased risk of disruption</li> <li>• Increased uncertainty</li> </ul>	<ul style="list-style-type: none"> <li>• Planning operating standards</li> <li>• Use of DER</li> <li>• Optimising utilisation of demand side response – reserves to manage uncertainty and support greater system resilience</li> <li>• Forecasting improvements</li> </ul>

**Table 4:** Key system changes and operational challenges

Source: AEMO 2018. AEMO Observations: Operational and market challenges to reliability and security in the NEM, pg 3.

## Peak demand in Queensland

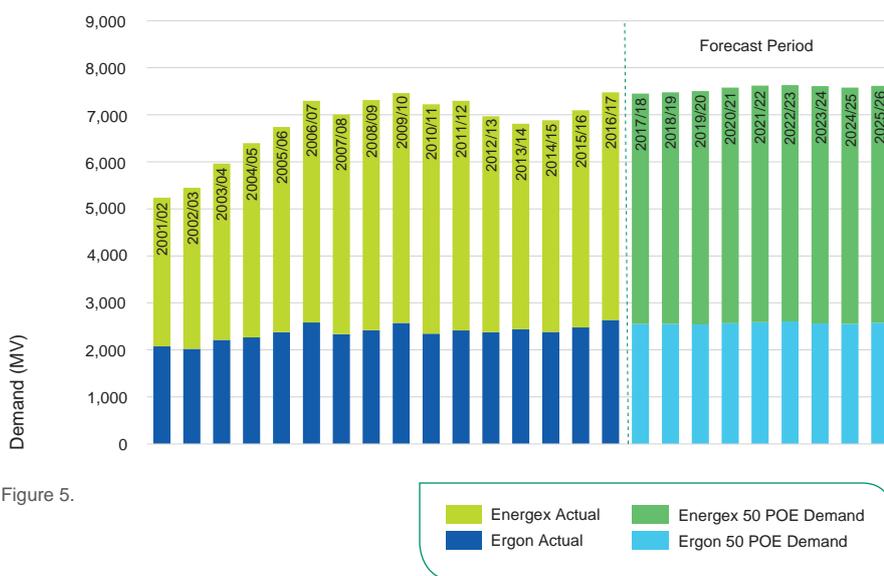


Figure 5.

Increasingly, end use customer distributed energy resources (like solar PV and batteries) and appliances are internet enabled and this has seen the emergence of a new energy services industry – aggregators or virtual power plants (VPPs). These aggregators manage a fleet of appliances and/or generators and offer a range of services to end use customers, networks, retailers and system operators.

These changes are shifting our network risks and requiring us to reallocate our expenditure mix. It is also requiring us to change our business model to one where solutions to these issues are delivered in partnership with our industry partners and end use customers.



## Demand Response in Action – Right time right place

Commencing on Sunday 11 February 2018, South East Queensland experienced heat wave conditions for five days. The network experienced high demand across this period and a new system peak record of 4,824MW occurred on 14 February 2018. Increased use of air conditioners was the main contributor to the surge in demand on the network. A number of substations and feeders with mainly residential customers experienced localised peaks between 5pm and 8pm. Solar energy generated from roof top PV systems reduced demand on the network during daylight hours

however, it was unable to reduce the evening peak in these areas. These localised peaks placed sections of the network at risk of having outages.

In response, demand response was implemented across the five days. Energex signalled PeakSmart air conditioners to cap their energy consumption to 50%, reducing demand on the network, while still enabling customers to stay cool. Additionally on 14 and 15 February, the heating of hot water systems on load control tariffs was delayed to later than usual to further reduce localised demand.

PeakSmart air conditioning participants (n=617) were surveyed in the following week and most (77%) reported not noticing any change in their air conditioner nor any change in comfort level (73%). Over 80% of respondents would recommend the program to others and would like to participate in similar programs.

By reducing the demand on the network from air conditioning load and hot water heating, Energex was able to reduce the number of fuse faults and keep the electricity supply on for customers during this time of extreme demand on the network.



## 4.2 Customer engagement

To ensure we deliver successful DM programs, we continually undertake stakeholder engagement to further understand what our end use customers, stakeholders and the broader community value and expect from us – now and in the future. These insights help us to develop programs that address these values and expectations.

### 4.2.1 Our stakeholders

The electricity industry is a complex and challenging environment, with a diverse range of stakeholders both within Queensland and nationally. Our stakeholders are the many individuals, groups, businesses or organisations who participate in our DM programs, or could potentially be impacted by our operations or could affect our ability to deliver for our end use customers. Refer to our stakeholder wheel (Figure 6). The stakeholder 'ecosystem' is not static and sometimes customers or stakeholders can move between segments.



Figure 6: Stakeholder wheel



Figure 7: Our industry partners

## Government

As a Queensland Government owned corporation, we engage with our Shareholding Ministers and their respective offices, and the Department of Natural Resources, Mines and Energy (DNRME) and Queensland Treasury. We also work closely with a range of other Queensland and Australian Government bodies.

## Industry regulators

The Australian Energy Regulator (AER) sets the revenue we are allowed to collect as a distribution business every five years, and oversees other national regulations. This DM Plan supports our Energex and Ergon Energy regulatory

submission to the AER for the 1 July 2020 to 30 June 2025 control period. We also engage with a range of electricity industry regulators including the Queensland Energy Regulator, to whom the DM Plan is provided each year for approval.

## End use customers

We engage with our end use customers particularly those participating in our DM program, including residential, small business, medium to large businesses, agricultural and major customers. We engage through focus groups, market research, surveys and through our in-market incentive programs.

## Industry partners

The delivery of our programs relies on our industry partners (see Figure 7). Our partners provide important services to end use customers participating in our DM programs including advice, installation of appliances and technologies and monitoring and verification. We have established a Trade Ally Network, a register of local, state wide and national businesses to help end use customers explore energy efficiency and DM opportunities and incentives available. As new technologies and capabilities emerge, our Industry Partners will grow.



Our partners provide important services to end use customers participating in our DM programs including advice, installation of appliances and technologies and monitoring and verification.”

### Community and industry groups

We engage with local business/ industry groups, local councils and other community leaders to find out their concerns. Our engagement includes presenting at industry forums on DM initiatives and participating on directorates and panels.

### Employees

Our 7,000 plus employees live and work across Queensland throughout our service area. They are both employees and end use customers. Many are also very active in their communities, appreciating the unique challenges faced by the many and diverse communities we serve. We have engaged with our employees and have even involved them as ‘friendly’ participants in some of our trials.



## 4.2.2 What our customers and stakeholders are telling us

End use customers are clearly telling us that affordability of electricity is their key concern. The following insights were identified from recent stakeholder engagement and customer research<sup>2</sup> (see Figure 8). Seven of these insights have direct relevance to the DM Program<sup>3</sup>.

<sup>2</sup> These customer insights are a summary of the recurring themes highlighted by customers in qualitative research conducted by external research agency Forethought from June to August 2015 for Ergon Energy

<sup>3</sup> After storm work to return power is not directly related to the DM Program



I am concerned about electricity prices (from either an affordability value or what the future holds perspective).



We depend on you being there ‘after the storm’ - getting the power back is key to community recovery.



Understand my needs - be friendly, easy to deal with, and accessible, how and when I want to ‘talk’.



I have specific needs as a business, industry partner or advocate - work with me to find the solutions.



Overall I’m relatively happy with the safety, security, reliability of my electricity - outages are managed well.



I want more choice around my energy solutions OR just make it easy as I really can’t be bothered.



Focus on innovations, renewable energy and other technologies that address affordability and sustainability.



You should do the right thing by the community - without it impacting significantly on my bill.

Figure 8: What our end use customers and stakeholders have expressed as of value or concern.

## 4.2.3 Feedback from our DM customers and industry partners

We regularly engage with our end use customer and industry partners participating in our DM programs. A summary of the key insights from this feedback is summarised in Figure 9. The insights gained from engaging with our stakeholders has shaped our strategy

### End use customers

“I support and recognise the importance of DM – it is an important community initiative.”

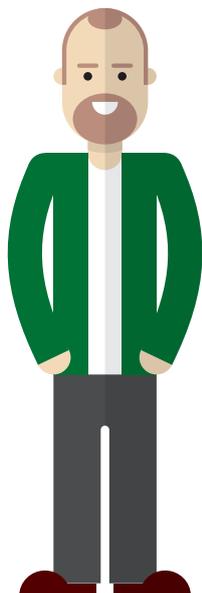
“I participated because I got an incentive – I prefer an upfront cashback.”

“I want a trusted adviser who can provide me with information on how to manage my demand.”

“I need information and advice to help understand the impacts of tariffs on my business.”

“When I put solar PV on my roof I moved my hot water and pool from control load tariff to the general tariff so they could use the solar.”

“I couldn't be bothered to claim my reward.”



### Industry partners

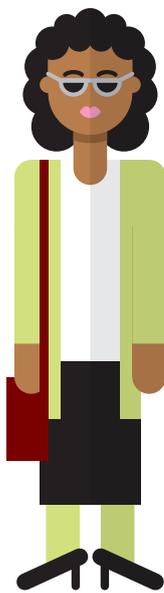
“I like the incentive maps - so I can easily see which areas and activities can receive incentives.”

“I promote PeakSmart every time I quote on an air-con install. Unfortunately I don't get paid to install the PeakSmart device.”

“The cashback helps to sell air-conditioner units and I believe everyone should do their bit for peak demand.”

“Make the claiming system easier for customers - it's too hard.”

“I don't put hot water systems or pool pumps on control load anymore due to the extra meter charge.”



## 4.3 Network characteristics

The electricity networks servicing South East Queensland and regional Queensland have different characteristics. These variances have developed over time due to the differences in physical environments, climates, economic activities and population densities and locations. Each network has its own legacy technologies and infrastructure used for direct load control.



Each network has its own legacy technologies and infrastructure used for direct load control.”



Figure 9: Feedback from our end use customers and stakeholders

### 4.3.1 South East Queensland

The Energex network area has a relatively high population density and the network has developed to be highly meshed. This means electricity can potentially be delivered to an end use customer through multiple paths. This allows for improved reliability of supply and sharing loads to minimise the need for costly network augmentation.

Direct load control of end use customer appliances is enabled by the Load Control System (LCS). This legacy LCS relies on manual schedule uploads and dedicated hardware. It is a mature system, built up over decades, which is able to broadcast signals across the network. While it can't target individual premises it is fast and reliable, realising demand response in seconds. The LCS sends a load control schedule to controllers located in zone sub-stations. The schedule specifies the demand response required (e.g. on/off for hot water systems and pool pumps or reduced consumption for air-conditioners) and duration. Audio Frequency Load Control (AFLC) units located in each zone sub-station then inject coded AFLC signals over the powerlines to all downstream connected homes and businesses. The AFLC signal is received by controlled appliances (e.g. hot water systems on a load control relay, air conditioners with a PeakSmart signal receiver installed) which then respond.

### 4.3.2 Regional Queensland

Regional Queensland has urbanised areas concentrated around regional centres, as well as, vast expanses of sparsely populated areas. Consequently, Ergon Energy's network is a radial network (hub and spoke). This design limits the number of pathways available to deliver electricity to an end use customer. Hence reliability of supply and the ability to share loads is reduced. Ergon Energy's network also includes over 62,000km of single-wire, earth return (SWER) network supplying 25,202 customers in remote areas. There are also 33 isolated networks (not grid connected) that have their own generation.

Ergon Energy also manages end use customer appliances using direct load control. Like the Energex LCS, Ergon Energy's is a mature system that can broadcast signals across the network. It too is fast and reliable. However, control is based on a dynamic control algorithm rather than an everyday schedule. Ergon Energy also uses AFLC as the communication protocol, but, unlike Energex there are six AFLC communications protocols. This means that relays and PeakSmart signal receivers have to be programmed to receive different AFLC signals in different parts of the network. Another difference is that AFLC signals are injected at network bulk supply points which control groups of zone substations.

## 4.4 Regulatory changes

Historically, distribution networks, and the regulatory arrangements that govern them, have been focused on distribution network businesses providing sufficient network capacity to meet increasing consumer demand while maintaining the safety, reliability and security of electricity supply. However, the growing numbers of distributed energy resources (such as solar PV and batteries) and the range of services these technologies are capable of providing has prompted Regulators to reform the regulatory framework governing the electricity market, revisiting the role of the distributor.

Regulation and ring fencing of distributor's regulated services is proceeding to enable greater market competition and customer choice, as well as, improvements to reliability and security of electricity services. Changes to regulation are also underway to provide a way of buying and selling energy and related services at the distribution level in a more dynamic way. In the future this will mean that if end use customers want to use the electricity from their solar panels or batteries for their own use they can. However, if they do not need it, or value the income from selling it more, then they can sell it to whoever values it the most at a particular point in time. The evolution of this market will bring into play new and increasingly active energy service participants, and place an increased emphasis on distribution networks' role in system and market operation.



# 5. Our plan

## 5.1 Overview

We have developed our DM Plan based on the factors outlined in Section 4. We have formed our plan around what our end use customers and stakeholders (refer Figure 6) are saying. Our strategies are based on the seven end use customer insights relevant to DM (see Table 5). An overview of our Plan is shown in Table 6. Our strategies are our planned approach for the next seven years. The programs are shown in bold text. These are the initiatives that will be implemented in the 2018-19 financial year. Further details on each of these are provided in the subsequent sections. Refer Appendix A to see the applicable end use customers for each of our programs and initiatives.



### Customer insights

DM Strategies							
	Affordable	Reliability	Choice and control	Innovation	Approachable	Tailored	Community focused
Ensure efficient and well planned investment and infrastructure	●					●	●
Maintain reliable supply of electricity for all end use customers		●				●	●
Maximise power system security and reliability particularly during summer		●					●
Inform and engage our end use customers and stakeholders			●		●	●	
Activate the demand response market			●	●			
Support our program by investment in innovation				●		●	

Table 5: Our DM Strategies respond to end use customer insights



## Our Plan: What we will do

### Our strategies

### Our programs/initiatives

Ensure efficient and well planned investment and infrastructure

- **Target Area Incentives** to encourage demand reductions where they are required
- Facilitate **Non-Network Alternative Projects** where it is cost-efficient to do so
- Continue to pilot and develop the Smart **ADMD Tool** for use in greenfield residential developments
- **Review Strategic Network Planning Processes** to identify opportunities to increase Non-Network Alternative projects delivered.
- Work with developers and industry to **integrate DM into urban development rating tools**

Maintain reliable supply of electricity for all end use customers.

- Reward end use customers who enroll in the **PeakSmart air conditioning program**
- Reward end use customers who move their hot water, pool pump or other loads to **load control tariffs**
- Work with the Queensland Government to deliver their annual **Summer Preparedness Plan**

Maximise power system security and reliability particularly during summer

- **Enable DR orchestration** through an intelligent grid platform
- Explore **alternative models for delivering demand response**
- Start transition to procuring **reliability services from the market**

Inform and engage our end use customers and stakeholders

- Provide simple **DM advice** to end use customers
- **Raise awareness of demand tariffs**
- Publish **incentive maps** that show where demand reductions are required
- Develop a **PeakSmart air conditioner reward app** for installers to use to apply for incentives

Activate the demand response market

- Provide simple **electric vehicle connection advice**
- Support development of demand response Standards

Innovate to deliver better value to our customers.

- **Build capability and undertake innovative initiatives and projects** to test and validate DM products and processes

Table 6: DM Plan overview



## 5.2. Our Principles

Our six guiding principles that underpin the DM Plan and are based on the Energy Network Transformation Roadmap (ENTR) balanced scorecard. These principles have been used to prioritise our programs. See Figure 10.

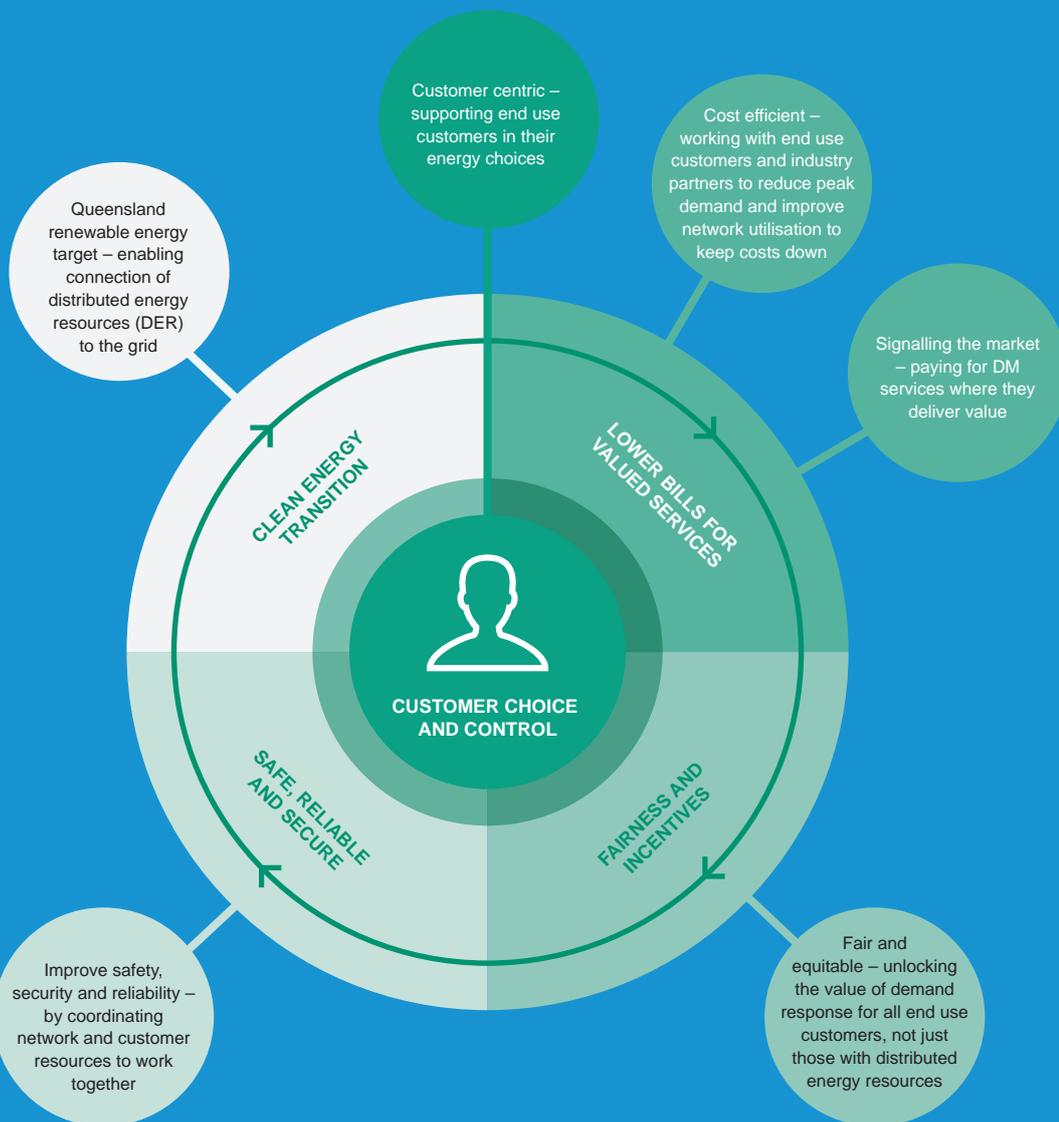


Figure 10: Our Principles. Adapted from diagram in ENTR final report.

## 5.3 Our strategies

Our Plan is made up of four strategies which link to the seven end use customer insights relevant to DM (see Table 5).

## 5.4 Strategy 1: Efficient and well planned investment and expenditure

We understand that as cost of living pressures increase for many Queenslanders, prudent investment in our network is required in order to maintain a reliable network and minimise operating and capital costs, whilst still providing customers with choice and control.

To ensure efficient, well planned investment and expenditure, Energex and Ergon Energy will work proactively with industry partners and end use customers<sup>4</sup> to reduce demand in locations with emerging network limitations, so as to defer the need for network build projects.

### Target Areas Incentives

DM programs are a cost effective means of optimising network expenditure. However, they typically need a number of years to recruit and secure demand reductions. Using load forecasts<sup>5</sup> and end use customer insights, Target Area Incentives will be activated in areas with future constraints. These will typically be identified five to ten years ahead to provide sufficient time for end use customers and industry partners to participate (refer Figure 12). The incentives offered at this early stage will be low to balance the uncertainty of forecast load growth. Energex and Ergon Energy will publish incentive maps showing the location, incentive value (\$/kVA) and demand response required (e.g. summer, 4-9 pm). Refer Figure 11. See Appendix B for current Target Areas.

<sup>4</sup> Typically customers will be business customers. However, our industry partners could include 'Aggregators' that provide demand reductions from many residential customers.

<sup>5</sup> Forecasts for constrained feeders based on forward demand growth, feeder capacity and an assumed incentive take-up model.

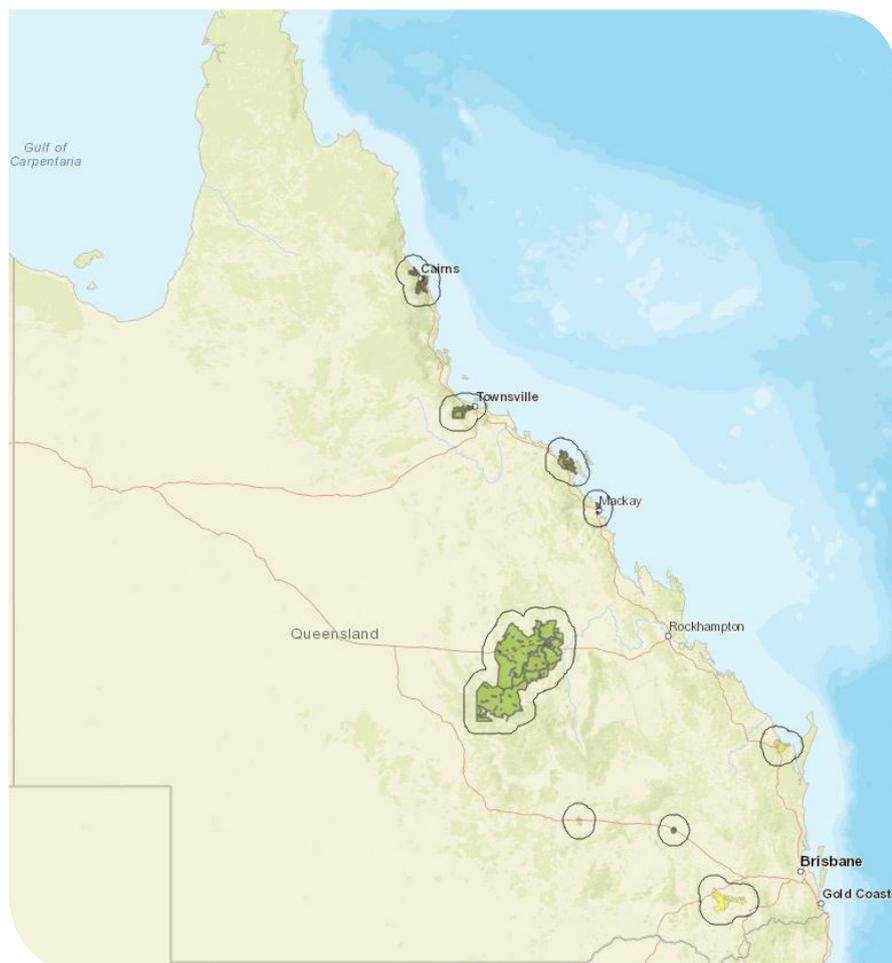


Figure 11: Energex and Ergon Energy will produce incentive maps

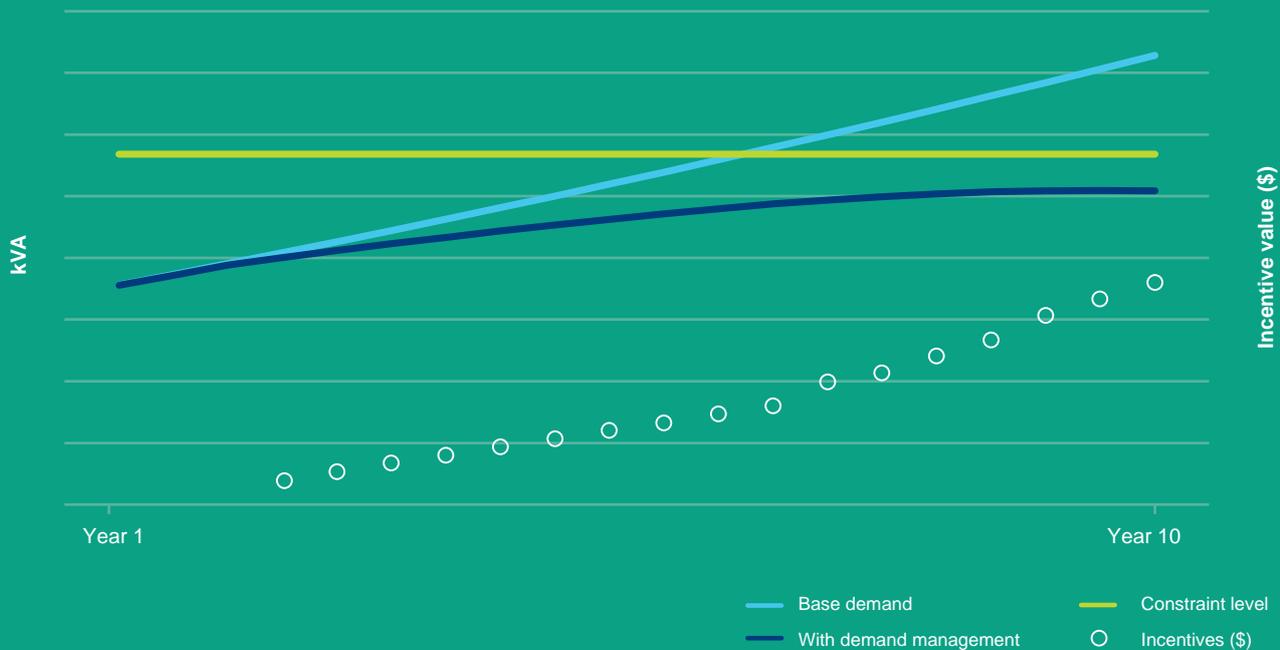


Figure 12: Early market activation enables network build projects to be deferred

## Non-Network Alternative (NNA) projects

Each year, Energex and Ergon Energy will identify future network limitations (up to five years away) and publish these in the Distribution Annual Planning Report (DAPR). Augmentation and replacement projects with forecast capital costs over \$5M will be subjected to rigorous Regulatory Investment Test for Distribution (RIT-D) assessments. As part of RIT-D assessment, market responses will be sought for non-network alternatives (NNA). Energex and Ergon Energy will regularly engage with our industry partners<sup>6</sup> to ensure competitive NNA solutions are received during our RIT-D assessments.

Energex and Ergon Energy will continue to manage existing contracts for NNA projects. The majority of these contracts allow for the network to request support from large embedded end use customer generators when required. See Appendix C for the list of current contracts.

<sup>6</sup> In accordance with EQL's Demand Side Engagement Strategy, EQL will maintain a *Demand Side Engagement Register* which is list of industry partners interested in responding to tenders for non-network alternatives.

## Smart ADMD tool

After Diversity Maximum Demand (ADMD) is the nominal maximum demand assumed for each premise in a new subdivision. It is used to determine the total demand for a subdivision and network capacity required. Typically between 4 to 5kVA of demand is assumed for each dwelling. A reduced ADMD results in less network infrastructure being constructed.

We will continue to work collaboratively with industry partners to further develop and test the Smart ADMD tool. A prototype of the tool has been developed by Ergon Energy that estimates the impact on ADMD for a premise based on a number of smart design attributes (e.g. solar PV control, DM solutions in place, electric vehicles, energy efficiency rating). The benefits of adopting lower ADMD standards needs to be balanced against the risk that network assets will be undersized.

## Review Strategic Network Planning Processes

Continue review of planning processes to identify network forecast scenarios and subsequently provide earlier identification of emerging network constraints. This will be used to inform and support a lowest cost approach to constraint mitigation, including working with industry partners to deliver Non Network Alternative projects.

## Integrate demand management into urban development rating tools

Rating tools are widely used in the planning, design and development process to facilitate sustainable outcomes in buildings and subdivisions. Energex and Ergon Energy will continue to work collaboratively with governments and industry bodies to ensure these rating tools include criteria that encourage and recognise buildings and developments that reduce peak demand on the network.

## 5.5 Strategy 2: Maintain reliable supply of electricity for all customers AND maximise power system security

We understand that our end use customers want us to maintain a secure and reliable supply of electricity year round to their homes and businesses. Most of these customers are saying they do not want any change in the balance between electricity costs and reliability<sup>7</sup>.

Energex and Ergon Energy have successfully undertaken hot water and pool pump load control (termed direct load control) for many years. This control is enabled via each network's Load Control System (LCS), AFLC communication protocol and relays or demand response enabled devices (DREDs) connected to the appliance. Refer to Section 4.3.1 and 4.3.2 for further details. Direct load control provides a low cost and proven<sup>8</sup> method of managing load across the network. AFLC has provided a robust and secure communication protocol since the 1950s to communicate with end use customer appliances.

Summer is the period of highest energy use in Queensland<sup>9</sup>. It is also the season that storms and cyclones are more likely. To maintain a reliable supply of electricity, Energex and Ergon Energy will continue to optimise their LCS and provide incentives to end use customers across Queensland who enrol in our PeakSmart air conditioning program or connect their hot water, pool pump or other appliances to load control tariffs. These programs deliver demand reductions that can be called upon during periods of extreme demand or emergency response. By managing these loads Energex and Ergon Energy can help maintain electricity supply to our end use customers and communities during times of extreme demand or weather, preventing area problems and network outages.<sup>10</sup>

By working together as a community to reduce our electricity use during peak times, we can help maintain electricity supply for everyone.

<sup>7</sup> Queensland Energy Household Survey, 2018

<sup>8</sup> Energex and Ergon have active monitoring and verification programs in place to verify demand reductions.

<sup>9</sup> AEMO Summer Readiness Report

<sup>10</sup> The Australian Energy Market Operator (AEMO) releases a summer readiness report to ensure reliability and security of the electricity network during peak demand periods. If AEMO forecasts identify risks of supply falling short of demand in extreme but foreseeable conditions, they work with market participants, Commonwealth and State governments to secure sufficient resources to be summer-ready. Energex and Ergon's demand response portfolio provides significant capability for AEMO to call on if required.

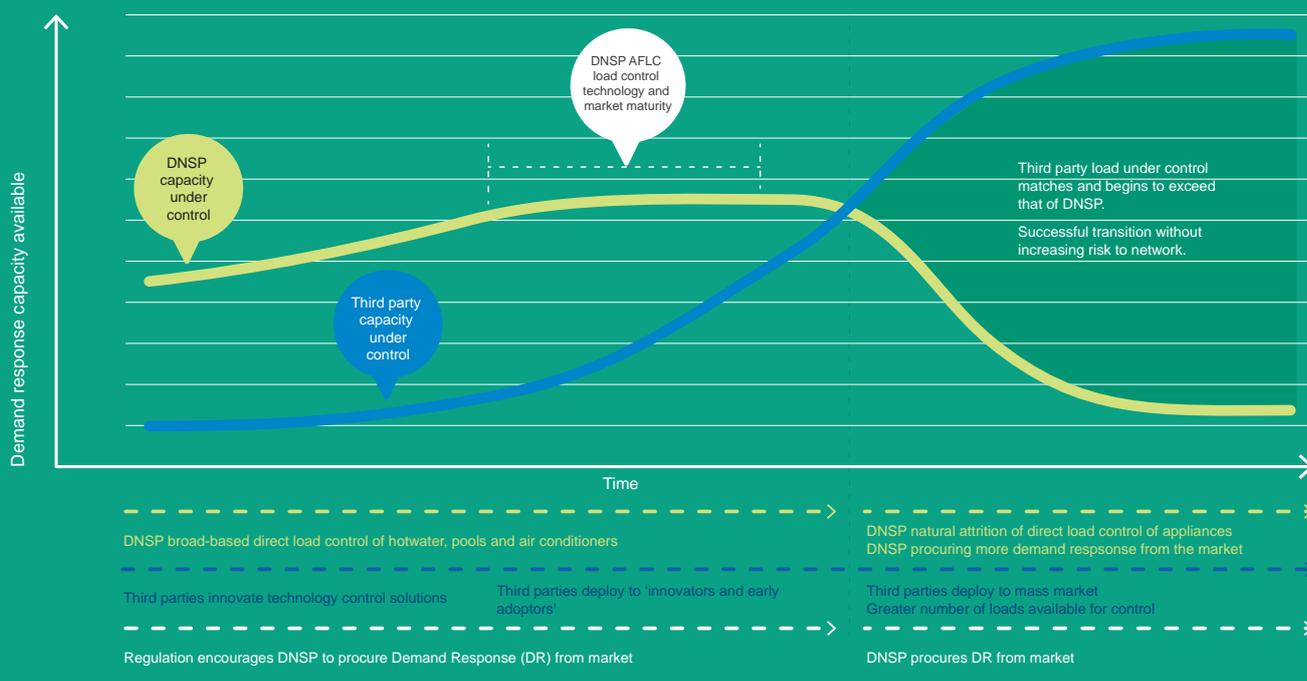


Figure 13: Transition of Distribution Network Service Provider (DNSP) demand response portfolio



## PeakSmart air conditioning

The PeakSmart air conditioning program will continue to be delivered across Queensland. Incentives will be offered to end use customers who install demand responsive air conditioners<sup>11</sup>, which can be called upon to reduce demand during peak periods.

Changes will be made to the business model to improve data quality on installs and increase uptake. These will deliver overall program cost savings. Refer to the initiative PeakSmart air conditioning app for installers in Section 5.6.

## Control load tariffs

Incentives will continue to be provided to end use customers that connect their hot water and/or pool pump to a control load (sometimes referred to off-peak, economy, Tariff 31 or Tariff 33) tariff.

Direct load control of hot water systems currently provide the bulk of our demand management capability. We will continue to optimise switching schedules of hot water systems, where feasible, to allow increased penetration of solar PV connected on the network.

<sup>11</sup> Demand responsive air conditioners are compliant with AS/NZS 4755.3.1 and connected to a PeakSmart signal receiver compliant with AS/NZS 4755.1.

## 5.5.1 Load control in the future

In the short to medium term, direct load control will continue to form part of our toolkit to respond to peaks in demand, such as those experienced during heatwave events.

Increasingly, DER such as solar PV, batteries and home energy management systems will provide reliability services to the network.

Recently, a number of applications or platforms have been released to the market that enables aggregation of demand response and other services from DER. In the future, networks such as Energex and Ergon Energy can provide market signals to end use customers via these platforms to provide demand response where it is required. Over time, these services will make up a growing proportion of Energex and Ergon Energy's demand response portfolio. Refer Figure 13.

As part of this transition, Energex and Ergon Energy will upgrade the functionality of their Distribution Managements Systems (DMS) to Advanced Distribution Management Systems (ADMS) and implement alternative communication systems to AFLC.

### Enable DR orchestration

Energex and Ergon Energy will undertake a range of initiatives to enable coordination of network and customer DR. These include investigating alternatives to AFLC, scoping distributed energy resources management system (DERMS) and upgrading functionality of DMS.

### Alternative models for delivering demand response

Energex and Ergon Energy will investigate alternative models for delivering demand response programs. Options that will be investigated include different ways of rewarding participating end use customers such as earning rewards for your community group or school, and not receiving a financial incentive. Such demand response programs have been successfully trialled in other States. This is consistent with findings reported by the Energy Consumers Australia that "Around half of those surveyed (residential and small business customers) say they are prepared to lower their energy use to help avoid an outage on hot summer days without a reward and another quarter would do so for a small financial reward."<sup>12</sup>

### Procure reliability services from the market

This initiative will explore the potential for reliable, cost effective demand response using end use customer installed appliances and systems (such as air conditioners, batteries, hot water systems and home energy management systems). Demand response purchased from a third party aggregator will be explored. This will be delivered in conjunction with a Demand Management Innovation Allowance (DMIA) funded innovation project.

<sup>12</sup> Energy Consumer Sentiment Survey Findings: December 2017 available on Energy Consumers Australia website



investigated. The app would make it easy for air conditioning installers to provide details of PeakSmart air conditioner installations and submit their reward application.

### Electric vehicle connection advice

Customer interest in electric vehicles is growing and it is anticipated that an increasing numbers of vehicles will be connecting to the network, as the price of these vehicles fall. It is important for Energex and Ergon Energy to 'get ahead of the curve' and provide consistent advice on electric vehicle connection. Energex and Ergon Energy will work with electric vehicle manufacturers and retailers to investigate cost-effective charging and management options.

### Support development of demand response Standards (AS/NZS 4755.2)

Energex and Ergon Energy have taken a lead role in advocating for the demand response Standards. The PeakSmart air-conditioning program and recent battery trials are based on AS/NZS 4755 framework. This suite of Standards cover demand response from multiple appliances including hot water systems, air conditioners, pool pumps, electric vehicles and electrical energy storage systems. Demand response Standards are key to enabling multiple appliances and manufacturers to participate in the future demand response market.

A new standard AS/NZS4755.2 is being developed by Standards Australia. This Standard will provide for alternative means to communicate demand response modes (or operational instructions (OIs)) to appliances, without the need for a physical Demand Response Enabled Device (DRED). It is expected that this Standard will increase adoption of standardised demand response by appliance manufacturers, aggregators and networks.

## 5.6 Strategy 3: Inform and engage our customers AND activate the demand response market

We understand that our end use customers want more choice and control around their energy solutions. They want simple solutions to support their lifestyle choices and value a proactive and easy to engage with energy partner. Our large commercial and industrial customers also value tailored advice and energy solutions. To ensure our end use customers are informed, Energex and Ergon Energy will continue to actively engage with them on how to reduce demand, available incentives and demand tariffs.

We understand that our end use customers want to realise additional value from their investments in energy solutions (like solar PV and batteries) and that our industry partners want to assist in managing network demand and deliver value (cost savings) to end use customers. To ensure multiple players can participate in delivering demand response, Energex and Ergon Energy will support the development of demand response Standards and provide easy to access information of where and when DM solutions are required.

### Demand management advice

We will provide simple and impartial advice to our end use customers and industry partners about how they can reduce demand on the network to their benefit. Information will be provided through website content, videos and case studies.

### Raise awareness of demand tariffs

Energex and Ergon Energy are both reforming their network tariffs to deliver a sustainable, affordable electricity supply for Queensland into the future. Over the next seven years, we will be introducing more cost reflective network tariffs that better signal customers. We will raise awareness of demand tariffs to ensure that end use customers have the necessary technology, information, education and knowledge to respond effectively. Our activities will be supported by our findings from tariff trials (refer to DMIA project in Section 5.7).

### Incentive maps

Energex and Ergon Energy will publish incentive maps showing the location, incentive value (\$/kVA) and demand response required (e.g. kVA, summer, 4-9pm). These maps will assist to stimulate the emerging aggregator market.

### Develop PeakSmart air conditioning reward app for installers

Currently around one third of all end use customers installing a PeakSmart air conditioner don't claim their reward as they consider the application process too much hassle. To address this issue and improve the accuracy of our records on the location of PeakSmart air conditioners, the development of an app will be

## 5.7 Strategy 4: Support our programs by investment in innovation

Energex and Ergon Energy will continue to invest in understanding future DM technologies and capabilities. We will build capability and undertake innovative projects and initiatives to test and validate DM products and processes. Dedicated projects are funded through the Demand Management Innovation Allowance (DMIA) approved by Australian Energy Regulator (AER). These have to meet strict criteria

including the project being based on new technologies or concepts not implemented before in similar situations. Our innovation initiatives also include those activities that may not meet DMIA criteria, but are still needed to enable and develop such innovative capabilities in Queensland. Our DM Development budget includes funds for such situations.

While DMIA projects are reported on separately, we are presenting a snapshot of the innovation activities (see Table 7), as planned for the coming years. These will help develop our demand and energy management capabilities and will inform future programs.

In Market Activities	Lead	Scope
<b>Market Based Battery Trial Stage 1</b>	Energex	15 batteries installed in residential homes. Demand response capable batteries compatible with existing DM programs and systems.
<b>Rocklea Residential Battery Pilot</b>	Energex	3 residential batteries and 1 solar PV system, exploring new ways of communicating between Energex DMS and third party applications
<b>Eagle Farm Commercial Battery Trial</b>	Energex	A large scale battery (250 kW, 500 kWh) and solar array, developing and researching demand response capability using AS/NZS 4755.3.5
<b>State Estimation Project for use at distribution level</b>	Energex	Application of a proven state estimation technique (SEA) that generates an estimate of the networks' operational conditions to help assess the connection of additional end use customer photovoltaic (PV) systems to the network.
<b>IPDRS</b>	Ergon	Develop functional specification of an Internet Protocol Demand Response System.
<b>Centralised Energy Storage</b>	Ergon Energy	To develop the integrated network control systems and to test and validate those control systems for utilising network connected large scale energy storage integrated with renewable energy systems.
<b>Tariff Trials</b>	Energex and Ergon Energy	To trial new network tariffs and understand customer behaviours and impacts to assist with broader roll out. Investigate impact of demand tariffs on end use customer electricity bill and demand.
<b>Demand Response opportunities– medium to large businesses</b>	Energex and Ergon Energy	To investigate opportunities for demand response, including the use of large commercial batteries which are AS/NZ 4755.3.5 compliant.
<b>Home energy management system (HEM)</b>	Energex and Ergon Energy	To examine demand response on the network of a household controlled by a HEMs connected to a demand response enabled device.

Planned Activities	Lead	Scope
<b>Market Based Battery Trial Stage 2</b>	Energex	To investigate impact of alternative tariff (demand tariff) on battery behaviour. Also look at sending competing demand response modes to provide insights into market rules.
<b>Rocklea Residential Battery Pilot Stage 2</b>	Energex	To develop business requirements for an Application Programming Interface (API) that can be used to dispatch demand response modes to third party aggregators.
<b>State Estimation Project for use at distribution level and coordination of demand response</b>	Energex	Linking state estimation project and coordination of DR from end use customer and network devices
<b>Procuring demand response from the market</b>	Energex	Market scan and procurement of DR to deliver broad based residential load available for control when needed
<b>Tariff trials</b>	Energex and Ergon Energy	Continuation and evolution of trials.
<b>SWER energy storage</b>	Ergon Energy	Assessing suitable network and end use customer solutions on SWER networks to reduce network costs and improve customer reliability of supply.
<b>Demand Management opportunities in isolated or edge of grid situations</b>	Ergon Energy	To investigate opportunities for implementing demand response and energy efficiency initiatives in isolated or edge of grid situations.
<b>IPDRS</b>	Ergon Energy	Develop prototype DRS compliant with AS4755.2
<b>Smart ADMD Tool</b>	Ergon Energy	Evaluate After Diversity Maximum/Minimum Demand (ADMD) as a tool for its accuracy in representing Demand, its ability to support developers in estate and housing design to integrate DM and DER into the building envelope.
<b>Electric Vehicles</b>	Ergon Energy	Undertake activity to understand the impact of different EV charging and control options (look at end use customer and network impacts).
<b>Residential Energy Storage</b>	Ergon Energy	To test the price uptake points and the ability for energy storage to deliver network, consumer and retail benefits.
<b>Solar Education</b>	Ergon Energy	Test using a customer education approach to maximise customer use of the energy generated during the day from solar rather than exporting back to the grid.
<b>Integrated Customer Network Control</b>	Ergon Energy	To develop and validate control algorithms for controlling network performance on a localised basis and protecting against voltage and capacity excursions.
<b>Customer Islanding Modelling</b>	Ergon Energy	To model the ability to island and re-join customers from the network in order to ensure network stability. The project will investigate both singular and micro-grid scenarios.
<b>Advanced Communications</b>	Ergon Energy	To test the use of emerging internet based low costs communications systems for demand and energy management systems and to validate the cost benefit of such systems.
<b>Direct Inverter Control</b>	Ergon Energy	To develop a control method and business model for interfacing to customer inverters in order to manage network security and stability.

Table 7: In market and planned innovation projects

## 6. Our plan for 2018-19

The DM Plan for 2018-19 sets out how we will continue to work with our end use customers and industry partners over the coming year (refer Appendix D). Our plan is ultimately about reducing network costs through implementing effective and efficient DM programs. We will build on our existing successful programs and deliver on our goal of providing a secure and reliable network. We will continue to listen to our end use customers and industry partners and strive to innovate to future proof our programs.

## 6.1 Energex forecast expenditure and targets

The forecast expenditure to implement Energex's DM program for 2018-19 is estimated at \$16.7 million, as show in Table 8. This comprises \$12.6 million in operating expenditure and \$4.2 million in capital expenditure. The

table also provides the breakdown of performance targets for each program. For the 2018-19 year our performance targets are based on delivering programs at a prescribed cost to serve expressed as \$ per kVA.

The indicative MVA targets will only be achieved if they can be delivered for less than the \$ per kVA target. Future year MVA targets may change year to year dependent on program focus and customer uptake of new technologies.

Initiative	Operating expenditure (\$'000)	Capital expenditure (\$'000)	Total expenditure (\$'000)	Demand reduction (MVA)	\$/kVA
Broad based program	7,975.4	4,166.7	12,142.1	30.1	\$403
Target areas program	1,031.0	0	1,031.0	2.5	\$412
NNA generation	1,001.2	0	1,001.2	23.1	n/a
DM Development	2,565.7	0	2,565.7	n/a	n/a
<b>Total for DM Program</b>	<b>12,573.3</b>	<b>4,166.7</b>	<b>16,740.0</b>	<b>55.7*</b>	<b>n/a</b>
DMIA	1,000.0	0	1,000.0 <sup>#</sup>	n/a	n/a

Table 8: Energex Program budget (including overheads)

\* NNA generation MVA contracted and accounted for in previous determination period now included to align reporting with Ergon Energy.

<sup>#</sup> For 2015-2020 period

## 6.2 Ergon Energy forecast expenditure and targets

The forecast expenditure to implement Ergon Energy's DM program for 2018-19 is estimated at \$5 million, as show in Table 9. The table also provides the breakdown of performance targets for

each program. For the 2018-19 year our performance targets are based on delivering programs at a prescribed cost to serve expressed as \$ per kVA. The indicative MVA targets will only be

achieved if they can be delivered for less than the \$ per kVA target. Future year MVA targets may change year to year dependent on program focus and customer uptake of new technologies.

Initiative	Operating expenditure (\$'000)	Capital expenditure (\$'000)	Total expenditure (\$'000)	Demand reduction (MVA)	\$/kVA
Broad based program	1,411.0	0	1,411.0	3.2	\$441*
Targeted areas program	1,300.0	0	1,300.0	2.7	\$482
NNA generation	1,843.7	0	1,843.7	25.7	\$72
DM Development	432.9	0	432.9	n/a	n/a
<b>Total for DM Program</b>	<b>4,987.6</b>	<b>0</b>	<b>4,987.6</b>	<b>31.6</b>	<b>n/a</b>
DMIA	1,000.0	0	1,000.0 <sup>#</sup>	n/a	n/a

Table 9: Ergon Energy budget

\* Newly launched in December 2017, still in early adopter phase

<sup>#</sup> For 2015-2020 period

# Appendix A – Relevant end use customers for each DM program and initiative

The following table provides a list of the programs and initiatives to be delivered under the DM Plan and the applicable end use customers.

Program/initiative	End use customer segment
Target area incentives	<ul style="list-style-type: none"> <li>Residential and small business</li> <li>Medium to large business</li> <li>Major customer</li> </ul>
Non-network alternatives	<ul style="list-style-type: none"> <li>Small business</li> <li>Medium to large business</li> <li>Major customer</li> </ul>
Smart ADMD tool	<ul style="list-style-type: none"> <li>Medium to large business</li> </ul>
Integrate DM into rating tools	<ul style="list-style-type: none"> <li>Medium to large business</li> </ul>
Review strategic network planning processes	<ul style="list-style-type: none"> <li>Medium to large business</li> <li>Major customer</li> </ul>
PeakSmart air conditioning	<ul style="list-style-type: none"> <li>Residential and small business</li> <li>Medium to large business</li> </ul>
Load control tariffs	<ul style="list-style-type: none"> <li>Residential and small business</li> </ul>
Enable DR orchestration	<ul style="list-style-type: none"> <li>Residential and small business</li> <li>Medium to large business</li> <li>Major customer</li> </ul>
Alternative model for demand response	<ul style="list-style-type: none"> <li>Residential and small business</li> </ul>
Procuring reliability services from the market	<ul style="list-style-type: none"> <li>Small business</li> <li>Medium to large business</li> </ul>
DM advice	<ul style="list-style-type: none"> <li>Residential and small business</li> <li>Medium to large business</li> </ul>
Raise awareness of demand tariffs	<ul style="list-style-type: none"> <li>Residential and small business</li> <li>Medium to large business</li> </ul>
Incentive maps	<ul style="list-style-type: none"> <li>Residential and small business</li> <li>Medium to large business</li> <li>Major customer</li> </ul>
PeakSmart air conditioner reward app	<ul style="list-style-type: none"> <li>Small business</li> <li>Medium to large business</li> </ul>
Electric vehicle connection advice	<ul style="list-style-type: none"> <li>Residential and small business</li> <li>Medium to large business</li> </ul>
Support development of demand response standards	<ul style="list-style-type: none"> <li>Residential and small business</li> <li>Medium to large business</li> <li>Major customer</li> </ul>
Build capability and undertake innovative initiatives and projects	<ul style="list-style-type: none"> <li>Project specific</li> </ul>

## Appendix B – ‘In-market’ targeted area program

The current list of ‘in market’ locations eligible for Target Area Incentives are listed here in Appendix B. These are areas where there is an emerging constraint (5-10 years away) and incentives are offered for demand reductions so that network upgrades are deferred.

Program	Network	Sub-programs	2017-18	2018-19
Target Area Incentives	Ergon Energy	<b>Cairns North</b> Peak demand period: 4pm - 9:30pm, Mon to Fri, November to March Up to \$290 per kVA	Active	Active
		<b>Cairns South</b> Peak demand period: 4pm - 9:30pm, Mon to Fri, November to March Up to \$272 per kVA	Active	Active
		<b>Cannonvale</b> Peak demand period: 12pm - 8pm, Mon to Fri, November to April Up to \$350 per kVA	Active	Active
		<b>Chinchilla</b> Peak demand period: 9am - 8pm, Mon to Sat, November to April Up to \$200 per kVA	Active	Active
		<b>Emerald</b> Peak demand period: 1pm - 9pm, Mon to Sun, November to March Up to \$225 per kVA	Active	Active
		<b>Hervey Bay (Point Vernon)</b>	Pending	Pending
		<b>Mackay Northern Beaches</b> Peak demand period: 4pm - 8pm, Mon to Sun, November to April Up to \$300 per kVA	Active	Active
		<b>Mackay South</b> Peak demand period: 10am - 2pm, Mon to Fri, October to April Up to \$200 per kV	Active	Active
		<b>Roma</b>	Pending	Pending
		<b>Townsville North-West 1</b> Peak demand period: 8am - 5pm, Mon to Fri, November to April Up to \$350 per kVA	Active	Active
<b>Townsville North-West 2</b> Peak demand period: 4pm - 9pm, Mon to Fri, November to April Up to \$350 per kVA	Active	Active		

Program	Network	Sub-programs	2017-18	2018-19
Target Area Incentives	Energex	<b>Jimboomba West Substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>West End substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Wellington Road substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Makerson Street substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Sunrise Hill substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>West Maroochydore substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Caboolture substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Springfield substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Coomera substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Holleywell substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Hope Island substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Molendinar substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Goodna substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Beenleigh substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
		<b>Brendale substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending
<b>Larapinta substation area</b> Up to \$185 per kVA; Up to \$41 per kVAR	Active	Pending		

## Appendix C – Non network alternative (NNA) projects

Energex and Ergon Energy have existing contracts with an end use customer or aggregator to provide non network alternative projects that serve to defer network upgrades. Active contracts are listed in the table below.

Program	Network	Description	Objective	Target (MVA)
<b>Gordonvale</b>	Ergon Energy	Contracted demand at the sugar mill in the Gordonvale-Mt Peter area to support peak demand and load growth in the southern Cairns growth corridor.	Maintain availability	2.47
<b>Dingo</b>	Ergon Energy	Support of voltage constraints on the Dingo network derived from customer contracted embedded generation.	Maintain availability	0.07
<b>Mt Isa</b>	Ergon Energy	Network support for the Mt Isa network derived from customer and network embedded generators (Irish Club and airport)	Maintain availability	1.74
<b>Alpha</b>	Ergon Energy	The Alpha network from Barcaldine has voltage constraints and is supported by an integrated network embedded generator.	Maintain availability	1.00
<b>Malanda</b>	Ergon Energy	Customer embedded generator contracted to support the reduction of load in the Malanda area for network contingency requirements.	Maintain availability	1.40
<b>Barcaldine</b>	Ergon Energy	Network embedded generator enabled to support the Barcaldine area during network outages.	Maintain availability	20.00
<b>Dajarra</b>	Ergon Energy	Network embedded generator in the Dajarra area for supporting voltage and outages.	Maintain availability	0.25
<b>Kajabbi</b>	Ergon Energy	Network embedded generator in the Kajabbi area for supporting voltage and outages.	Maintain availability	0.10
<b>Bromelton</b>	Energex	Contracted embedded generators for network support enabling the deferral of the Beaudesert Bulk Supply Substation	Maintain availability	23.10
<b>Total network support available for risk mitigation</b>				<b>50.13</b>

# Appendix D – Broadbased and DM development programs

The following table provides a list of the residential and DM development programs to be delivered under the DM Plan.

Program	Network	Description	2017-18	2018-19	2020-25
<b>Broadbased programs</b>					
PeakSmart air conditioning	Energex and Ergon Energy	Provision of incentives to end use customers who participate in the PeakSmart air conditioning program to air conditioning program	Active	Active	Pending
Load control tariffs	Energex and Ergon Energy	Provision of incentives to end use customers for connecting appliances to load control tariffs	Active	Active	Active
Procure reliability services from the market	Energex and Ergon Energy	Investigate feasibility and effectiveness of procuring reliability services from the market		New	Active
Alternative models for delivering demand response	Energex and Ergon Energy	Investigate feasibility and effectiveness of voluntary demand response program		New	Pending
Summer preparedness plan	Energex and Ergon Energy	Work with Queensland government to develop annual plan	Active	Active	Active
<b>Demand management development programs</b>					
Smart ADMD Tool	Energex and Ergon Energy	Continue to pilot and develop tool for use in greenfield residential developments	Prototype developed	Active	Active
Integrate DM into urban development rating tools	Energex and Ergon Energy	Work with developers and industry		New	Active
Provide simple DM advice	Energex and Ergon Energy	Provide simple DM advice to end use customers on how to reduce demand	Active	Active	Active
Raise awareness of demand tariffs	Energex and Ergon Energy	Raise awareness of demand tariffs	Active	Active	Active
Incentive maps	Energex	Publish incentive maps of Target Incentive areas		New	Active
	Ergon Energy	Publish incentive maps of Target Incentive areas	Active	Active	Active
PeakSmart air conditioner reward app	Energex	Develop app for installers to use to provide details of PeakSmart air conditioner installations and to apply for incentives		New	Pending
Electric vehicle connection advice	Energex and Ergon Energy	Provide simple and consistent electric vehicle connection advice	Active	Active	Active
Support development of demand response Standards	Energex and Ergon Energy	Support development of AS/NZS 4755.2	Active	Active	Active

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