

Energex Demand Management Plan Performance Report 2017-18

August 2018



positive energy



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1. Executive summary

Energex's Demand Management (DM) program 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'.

In 2017-18 the Positive Payback Program provided financial incentives for over 28,000 connections to economy tariffs and PeakSmart installations to reduce energy use during network peak demand. In addition, 95 projects were completed for businesses to achieve energy efficiencies and reduce peak demand.

Energex set a target of 27 MVA through this program and achieved an actual peak load reduction of 30.3 MVA.

Additionally, the Demand Management program achieved its MVA target under the budgeted spend. The total spent was \$13.0 million compared to the budgeted spend of \$15.5 million. \$2.5 million remained unspent.

The underspend in operating expenditure is due to continued improvements to the PeakSmart air conditioning program and greater than anticipated demand reduction from the Business Program, combined with reduced labour costs. There was also a slight underspend in capital expenditure due to a reduced volume of PeakSmart devices purchased for the air-conditioning program.

In addition, the Australian Energy Regulator (AER) approved a \$5.0 million Demand Management Innovation Allowance (DMIA) to spend over the 2015-2020 regulatory period. The purpose is for Energex to invest in understanding future demand management issues. The budget for 2017-18 was \$956,000. In 2017-18 Energex spent \$1,123,433 on DMIA projects:

- Battery energy storage systems (BESS) trial
- Low voltage network power system static estimation project
- Solar enablement initiative.

2. Introduction

About Queensland

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 two electricity distribution network Energex in the south east and Ergon Energy regional Queensland. Both Energex and Ergon build, operate and maintain the 'poles and wires' that bring power to the end use customers' homes and business across Queensland.

Network	<p>The group includes two electricity distribution network Energex in the south east and Ergon Energy regional Queensland. Both Energex and Ergon build, operate and maintain the 'poles and wires' that bring power to the end use customers' homes and business across Queensland.</p> <p>Our network has:</p> <ul style="list-style-type: none">• 2.2 million connected customers• 220,000 km of powerlines• 1.7 million power poles• 498,500 solar energy systems connected delivering 1,388 MW of generation capacity• 34,482 GWh electricity delivered a year• Peak demand: 4,920 MW south east Queensland and 2,601 MW regional Queensland
Retail	<p>Our retailer (Ergon Energy Queensland Pty Ltd) buys electricity from the generators, through the market and direct negotiations, and on-sells it to our customers throughout regional Queensland.</p> <ul style="list-style-type: none">• Over 700,000 retail customers in regional Queensland.
Energy Services	<p>To ensure we are able to meet the unique and diverse needs of our communities and customers we are evolving our unregulated or contestable products and services in the market.</p> <ul style="list-style-type: none">• Metering Dynamics delivering multi-utility metering, information and energy measurement solutions.• Nexium Telecommunication supports the Groups' communication needs.• Energy Impact enables us to expand in a variety of ways beyond traditional electricity distribution and retail services through the use of distributed energy resources.

As a state wide service provider, our diverse network services the state's south east, with highly interconnected systems, and regional Queensland, with infrastructure that is largely radial in design.

Three quarters of our regional network is considered rural – traversing large distances between communities with only small numbers of customers for each kilometre of powerline.

About Energex

Energex builds, operates and maintains the electricity distribution network in the growing region of South East Queensland. Energex's network spans approximately 25,000 square kilometres and provides distribution services to almost 1.4 million residential and business connections servicing a population base of 3.4 million people in the region

Table 1: Overview of Energex network

Estimated population	Approximately 3.4 million people.
Customers	Approximately 1.4 million residential, commercial and industrial customers.
Network area	Approximately 53,000 kilometres of overhead and underground lines.
Energy delivered	21,239GWh
Summer peak demand	4,920 MW
Solar Photovoltaic (PV) connected to the network	Approximately 356,000 solar PV systems connected across South East Queensland with installed capacity of more than 1,338 MW.
Battery energy storage systems	Currently there are over 1,200 batteries installed on the Energex network, mainly with residential customers located in rural areas.
Electric Vehicles (EVs)	It is estimated that approximately 1,356 full electric vehicles and plug in electrical vehicles are being charged on the network.

About Energex's Demand management

Demand management 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'.

Each year Energex publishes a Demand Management Plan to engage and inform our stakeholders of our activities and strategies for demand management. The Demand Management Plan for 2017-18 outlined the following programs which would be delivered:

- Residential Program;
- Business Program;
- Network planning/non network options;
- Demand Management development; and
- Innovation using the Demand Management Innovation Allowance (DMIA).

In the 2017-18 year the Energex and Ergon Energy Demand Management Programs were merged. Consequently this will be the last time the DM programs will be reported separately.

3. Compliance and regulation

This is Energex's report on its performance against Energex's Demand Management Plan 2017-18 (the Report).

Energex's 2017-18 Demand Management Plan was submitted to the Department of Energy and Water Supply (the Regulator, DEWS), now known as the Department of Natural Resources, Mines and Energy (DNRME) on 28 April 2017 to comply with section 127C(4) of the Electricity Regulation 2006 (the Regulation).

In accordance with section 127D of the Regulation, DEWS approved Energex's 2017-18 Demand Management Plan on 31 May 2017.

The Report has been drafted to ensure compliance with the Electricity Regulation 2006. Under section 127H of the Regulation, Energex, as the holder of a Distribution Authority is required to submit to the Queensland Energy Regulator, Department of Natural Resources, Mines and Energy an annual report comparing details of the following:

- The proposed initiatives stated in the entity's approved Demand Management Plan for the prior year.
- The actual initiatives the entity carried out in the year.

The Report satisfies all the requirements specified in the Regulation. The table below sets out where each requirement has been met in the Report.

Table 2: Regulation requirements

Section	Compliance obligation	Compliance
127G	The distribution entity must use its best endeavours to comply with its approved Demand Management Plan.	Requirement met. This is set out throughout the Report.
127H(1)	Energex must, for each financial year, prepare a report comparing: a) The proposed initiatives stated in the entity's Demand Management Plan. b) The actual initiatives carried out in each year.	Requirement met. The submission of this Report satisfies section 127H(1).
127H(2)	Energex must provide a copy of the report on or before 31 August in the following financial year.	Requirement met through lodgement with DNRME by 31 August 2017.

4. 2017-18 performance

Energex is delivering the yearly DM targets at a lower cost than originally budgeted. In 2017-18 Energex budgeted to spend \$15.5 million, comprising of operating expenditure of \$12.1million and capital expenditure of \$3.4 million, to deliver a peak load reduction of 27 MVA.

Peak load reduction

Energex has successfully exceeded its peak load reduction target of 27 MVA for the Demand Management program in 2017-18. The actual peak load reduction achieved for 2017-18 is 30.3 MVA. A breakdown of the indicative target and actual MVA delivered are included in Table 3. The MVA target for the Business program was reduced from the 2016-17 year target due to the limited opportunities within the targeted areas.

Table 3: MVA reduction for 2017-18 Demand Management program

Program	Indicative target MVA	Actual MVA
Residential program	25.5	27.7
Business program	1.5	2.6
Demand Management Development	n/a	n/a
Total for DM program	27.0	30.3

Operating expenditure

The operating expenditure budget for the Demand Management program was \$12.1 million compared with actual spend of \$9.7 million for 2017-18. The breakdown of operating expenditure by program is detailed in Table 4.

Table 4: Operating expenditure for 2017-18 Demand Management program (including overheads)

Program	Budget (\$,000)	Actual (\$,000)
Residential program	7,596.3	6,268
Business program	922.9	917
Bromelton	967.4	961
Demand Management Development	2,641.7	1,512
Total for DM program	12,128.3	9,658

Capital expenditure

For 2017-18, the capital expenditure budget for the Demand Management program was \$3.4 million compared with an actual spend of \$3.3 million. This capital spend has tracked to budget and has enabled the purchase of PeakSmart devices / Demand Response Enabling Devices (DRED).

Cost to serve

The costs to serve for Energex's Demand Management Programs are shown in Table 5.

The Residential Demand Management program for 2017-18 was delivered efficiently at a lower cost to serve than the budgeted target. This was due to a number of factors including:

- A greater number of claims than anticipated by residential customers for installation of PeakSmart air-conditioners resulting in a greater load reduction than originally forecast for 2017-18;
- A greater proportion of claims for larger sized PeakSmart air conditioners, which provided greater load reductions;
- A greater number of claims from builders and developers, which has enabled greater efficiencies in program delivery.
- Contracts with developers for large volumes of PeakSmart air conditioners incentivised at negotiated rates; and
- Reduced labour costs.

The Business Program was delivered at a lower cost to serve due for a number of reasons including:

- Expenditure for the Business program was within budget combined with the achievement of a higher demand reduction than anticipated; and
- Reduced labour costs.

Table 5: Cost to serve for 2017-18 Demand Management program

Program	Target \$/kVA	Actual \$/kVA
Residential program	\$432	226.27
Business program	\$615	352.55
Total program cost		286.99

5. Residential program

The Residential program rewards households that connect energy hungry appliances (e.g. electric hot water systems and pool pumps) to an economy tariff or install technologies that reduce demand during peak periods (e.g. PeakSmart air-conditioners).



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.

Initiative	Description	Appliances incentivised in 2017-18 year	Load under control obtained during 2017-18 year (MVA)
PeakSmart air-conditioning	On days of extreme demand, PeakSmart air conditioners can be signalled by the network operator to reduce their energy consumption	Over 93,000 ¹ installed on Energex's network, with 27,939 incentivised in the 2017-18 year.	27.8
Control load tariff – hot water and pool pumps	Hot water systems and pool pump connected to control load tariffs are switched on and off to ensure they operate outside of peak demand periods.	Approximately 703,000 residential customers with hot water connected to a controlled load economy tariff, with 310 incentivised in the 2017-18 year.	0.2

The success of the Residential Program can be attributed to the continued growth in the PeakSmart air-conditioning initiative, which grew grown by approximately 28% in 2017-18

The initiative is part of business as usual for Energex. Energex has continued to deliver this initiative through:

- Expanding the network of industry partners that promote, wholesale, sell and install Energex PeakSmart Air Conditioning. Distribution partners and wholesale channels expanded approximately 41%.
- Partnering with Builder and Developers to delivery PeakSmart Air Conditioning into high density dwellings, delivering pockets of concentrated load under control for the network.
- Signalling to the market the prominence of PeakSmart Air Conditioning and its importance by highlighting Ergon Energy's expansion of its regional PeakSmart Program into a broad based initiative. This expansion signalled to the market that PeakSmart was now a 'state wide' program.
- Leveraging off State Governments "4 Star Energy Efficient Appliance Rebate" to increase the savings made on the capital purchase of a PeakSmart compliant appliance.

¹ Not all customers who install a PeakSmart air-conditioner claim a reward. This figure reflects the number of reward claims processed.

6. Business program

The Business program offers funding to businesses that are located in an eligible area for the installation or upgrade of equipment/appliances that reduce onsite peak electricity demand.



These programs offers incentives to small, medium and large businesses 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).

Initiative	Description	Installations incentivised in 2017-18 year	Load under control gained during 2017-18 year (MVA)
Power factor correction (PFC)	Power factor correction equipment is installed to improve energy supply inefficiencies and reduce peak demand.	Approximately 606 power factor correction installations, with 37 installations incentivised in the 2017-18 year	1.4
Energy efficiency	Peak demand reduction through replacement/upgrade of lighting, motors, refrigeration and building management systems.	Approximately 267 installations or upgrades that lowered onsite peak electricity demand, with 31 installations incentivised in the 2017-18 year.	1.2

The success of the Business Program can be credited to the:

- Close working relationships with prominent energy efficiency and power factor correction suppliers that continue to promote Energex business programs. As these initiatives have been running in the same areas for a number of years now, industry suppliers can confidently promote Energex rewards for the uptake of permanent demand reductions;
- Additional work done with lighting suppliers to promote energy efficient lighting upgrades on large scale projects. The number of energy efficiency projects increased by 14 % in 2017/18 with the average value of each project approximately 63% larger than projects completed in 2016/17; and
- Continued rewards to customers for Power Factor Correction, which remained stable to deliverables from 2016/17.

7. Network planning / non-network options

Energex has processes in place to ensure all significant capital works are only undertaken when no non-network alternative would present a lower cost option.

The assessment of non-network alternatives forms part of our business as usual approach which includes the:

- publication each year of the Distribution Annual Planning Report (DAPR) detailing future network limitations (up to five years away); and
- rigorous non network assessments using the Regulatory Investment Test for Distribution (RIT-D) for augmentation and replacement projects with forecast capital costs over \$5M

During 2017-18 Energex commenced the review of planning processes to identify network forecast scenarios and enable 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.

The operating spend on non-network alternatives has tracked to budget, with Energex continuing the existing contract for network support at Bromelton. The continuation of this contract for a non-network option, initially identified in 2006, has enabled deferral of reinforcement of 110 kV supply to the Beaudesert Bulk Supply Substation until at least 2019. The Bromelton generation facility consists of 15 individual LV diesel generators that can provide network support for up to 23.1 MVA. Generators at Bromelton were not dispatched for network support purposes during 2017-18.

8. Demand Management Development

There are a number of functions within the business which support the Demand Management programs. This is incorporated into Demand Management Development.

Demand Management Development encompasses the management and optimisation of the load control system, continued work into the coordination of load on the network, development of strategies and the report obligations to DNRME and the AER.

Energex has continued its lead role in advocating for demand response standards. The PeakSmart air conditioning program and recent battery trials are based on the AS/NZS4755 framework, which covers demand response from multiple appliances. During the 2017-18 year, Energex became a member of the Australian Standards working group for the AS/NZS4755.2 standard. This new standard will provide for alternative means to communicate demand response modes to appliances without the need for a physical DRED. It is expected that this Standard will increase the adoption of standardised demand response by appliance manufacturers, aggregators and networks.

During 2016-17 Energex developed the PeakSmart measurement program to collect data from customers with PeakSmart air-conditioners installed to their premises. The data collected will be used to estimate the impact of managing peak load on Energex's network. In 2017-18 the PeakSmart measurement program was completed with 289 customers participating in the program. Energex is now able to monitor how these customers respond when there is a peak demand event.

The underspend in operating expenditure is due to lower labour costs as a result of the merge and restructure within Energy Queensland.

9. Innovation

Energex will continue to invest in understanding future demand management issues. Innovation projects will be funded through the Demand Management Innovation Allowance (DMIA).

The AER approved an allowance of \$5 million for the 2015-2020 regulatory period, which equates to around \$1 million per year. DMIA Projects have separate funding to Energex's Demand Management program.

Below is a snapshot of the innovation activities planned for the coming years. These will help develop our demand and energy management capabilities and will inform future initiatives.

DMIA projects

A number of projects were scoped, developed and received endorsement by Energex's Investment Review Committee. Table 6 provides a description of the DMIA projects that have been approved and are currently in progress.

Table 6: Approved DMIA projects

Project	Description	Progress	Expenditure (\$,000) Actuals
Battery energy storage systems (BESS) trial	<p>The objectives of this trial are focused on:</p> <ul style="list-style-type: none">Gaining a better understanding of the customer value proposition and expectations from the electricity network in taking up BESSHow Energex can leverage off the load control system and existing tariffs to benefit both Energex and the customerHow the BESS technology will integrate with the electricity network	<p>For the market based battery trial 15 BESS have been operational. A Preliminary Findings Report was released in December 2017 and consultation undertaken on the next phase of the trial.</p> <p>At the Rocklea demonstration site functionality testing was completed.</p> <p>The commercial BESS and solar PV located at Eagle Farm DC has been constructed and is in the process of final commissioning to enable key objectives to be tested</p>	1,022
Real time tariff study	<p>The objective of this project is to research the impact of the new demand tariffs and complimentary load control tariffs on small, low voltage customers. This research will be conducted through partnerships with retailers, customer representatives, market participants</p>	<p>The tariff study project has been closed due to the commencement of the 2020-25 Tariff Structure Statement and tariff reform work underway</p>	--

Project	Description	Progress	Expenditure (\$,000) Actuals
	and the Queensland Government.		
Low voltage network power system static-state estimation project	This is a joint project between Energex, Ergon Energy and the University of Queensland. The project objective is to provide timely control inputs to a number of low voltage connected devices to improve the efficiency of the network, improve dispatch of distributed energy resources, improve DM response and minimise future network investment.	State Estimation based on real-time field measurements complemented with static data has been tested. The estimator is running on the DNSPs operational platform. Control over battery and/or STATCOM devices installed on the Mitchelton trial network is planned over the next 6 months.	33
Solar enablement initiative	The solar enablement initiative will provide improved visibility and understanding of electricity network performance on seven medium voltage feeders in Queensland, Tasmania and Victoria. The initiative aims to reduce restrictions being placed on the capacity of new solar PV installations and their export into the Australian grid, thereby enabling an increase in the percentage of renewable energy connected to the grid. This is a joint project with ten partnerships including University of Queensland and Queensland University of Technology.	The SEI project is currently in Phase 3 having completed the first two ARENA milestones. Technical progress has been good with the estimator tested on a feeder in each of the three partner DNSPs. Phase 3 will focus on the development of a semi-automated network analysis tool which will complement the PV assessment process for medium sized systems. A real-time trial of dynamic export limits for a customer PV system, based on the improved network visibility provided by the estimator, is also in development.	69
TOTAL Expenditure			1,123

If you have any questions about this report,
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