Ergon Energy Demand Management Innovation Allowance Report 2014-15

2 November 2015

Figures and tables

1. Introduction

Purpose and compliance

Ergon Energy is pleased to present the Demand Management Innovation Allowance (DMIA) Report for the 2014-15 regulatory period. The purpose of this report is to allow the Australian Energy Regulator (AER) to:

- assess Ergon Energy's 2014-15 DMIA initiatives and Ergon Energy's entitlement to recover the expenditure under the Demand Management Incentive Scheme (DMIS)
- confirm Ergon Energy's compliance with the annual reporting requirements of the AER's Regulatory Information Notice (RIN) issued to Ergon Energy.

This report has been completed in accordance with:

- Clause 6.6.3 of the National Electricity Rules (NER), which allows the AER to develop and publish a DMIS that provides incentives for Distribution Network Service Providers (DNSP) to assess (potentially) efficient non-network alternatives or to manage the expected demand for standard control services in some other way
- Schedule 1, paragraph 6.1 (a)-(e) of the AER's RIN, which requires a DNSP to which the DMIS applies to submit an annual report to the AER on its expenditure under the DMIA.

The provision of information in this report demonstrates compliance with paragraph 6.1 of Schedule 1 of the RIN, the Notice issued (as amended) by the Australian Energy Regulator (AER) on 6 August 2014.

Furthermore, as noted by the AER in its issuance of this Notice to Ergon Energy, information provided in accordance with paragraph 6.1 of Schedule 1 of the RIN is considered to constitute the provision of an annual report for the 2014-15 regulatory period in accordance with paragraph 3.1.4.1 of the AER's *Demand Management Incentive Scheme for Energex, Ergon Energy and ETSA Utilities 2010-15*, October 2008.

This report and the information contained in the report is suitable for publication by the AER.

Table 1: Schedule 1, paragraph 6.1 – DMIA compliance

6.1	Requirement	Section
(a)	Provide an explanation of each demand management project or program for which approval is sought	Section 4
(b)	Explain, for each demand management project or program identified in the response to paragraph 6.1(a), how it complies with the DMIA criteria detailed at section 3.1.3 of the DMIS, with particular reference to:	
	(i) the nature and scope of each demand management project or program	Section 4
	(ii) the aims and expectations of each demand management project or program	Section 4
	(iii) the process by which each demand management project or program was selected, including the business case for the project and consideration of any alternatives	Section 2
	(iv) how each demand management project or program was/is to be implemented	Section 4
	(v) the implementation costs of the project or program	Section 3
	(vi) any identifiable benefits that have arisen from the project or program, including any off peak or peak demand reductions	Section 4
(c)	Provide an overview of developments in relation to projects or programs completed in previous years, and any results to date	Section 4
(d)	State whether the costs associated with each demand management project or program identified in the response to paragraph 6.1(a) are:	
	(i) not recoverable under any other jurisdictional incentive scheme	Section 3
	(ii) not recoverable under any other Commonwealth or state government scheme	Section 3
	(iii) not included in the forecast capital or operating expenditure approved; or any other incentive scheme applied by the 2010-15 Distribution determination	Section 3
(e)	provide the total amount of the DMIA spent in the previous regulatory year, and how this amount has been calculated.	Section 3

Submission summary

In the AER's *Final Decision, Queensland distribution determination 2010-11 to 2014-15*, (May 2010) an allowance of $5 million over the period was made for a Demand Management Innovation Allowance (DMIA) for Ergon Energy.

The DMIA is provided to investigate opportunities that are not yet commercial, in addition to any business-as-usual capital and operational expenditure allowances for demand management projects, approved in Ergon Energy's distribution determination. This provides a direct incentive for Distribution Network Service Providers (DNSPs) to assess emerging opportunities for potentially efficient non-network alternatives, or to manage the expected demand for standard control services in some other way than through network augmentation.

Ergon Energy's 2014-15 DMIA program comprised nine active projects. The total cost incurred for the DMIA initiatives during the 2014-15 period was $744,403. Table 2 summarises Ergon Energy's DMIA program expenditure recovery for the 2014-15 regulatory year.

Table 2: Ergon Energy DMIA program – 2014-15

Projects	Number	Expenditure 2014-15
Continuing	5	$270,957
New	3	$413,060
Closed	1	$63,266
Total	9	$747,283

Ergon Energy is seeking the AER's approval to recover the costs for the full amount of DMIA spent in the 2014-15 regulatory year.

In line with all Ergon Energy investments, the DMIA program follows Ergon Energy's three-tiered gated governance framework, with built-in review for prudency and efficiency at each gate, as the project moves through the investment lifecycle.

For the 2014-15 DMIA program, all nominated DMIA projects were subject to a screening and feasibility processes, consistent with the AER's DMIS, and a subsequent cost-benefit analysis to identify the highest value projects, based on factors including their ability to shape energy load profiles and gain community and customer acceptance.

Budgets were also prepared in accordance with Ergon Energy's standard project methodology, detailing information including the projects' goals, deliverables, project milestones and resources required. Cost estimations were developed for the resources identified, as required for each phase of each project. These cost estimations drew upon various sources including the costs of similar projects undertaken by Ergon Energy, current preferred contractor panel contracts and market research. For projects with co-contributions from industry partners and research institutions, the total project budgets were inclusive of such amounts and assessed on this basis.

Ergon Energy's DMIA Program is delivering strongly against its DMIA objectives, with several of the projects moving to a business-as-usual operation.

2. DMIA program of work

Program development

Ergon Energy considers DMIA investments an important component of its commitment to delivering customer value over the longer term. The DMIA program complements our non-network alternative program, which is geared towards providing a more efficient solution to network augmentation. The DMIA initiatives have enabled Ergon Energy to investigate and test innovative approaches to a range of network issues, such as improvement of load factors, customer behaviours, renewable integration, capacity limitation solutions, customer and community engagement and power quality solutions. Our DMIA program has five focus areas detailed in Figure 1 to support the criteria of shifting reducing demand through non-network alternatives rather than increasing supply through network augmentation.

Figure 1: DMIA focus areas

Ergon Energy considers that over the longer term, innovation in the core DMIA focus areas highlighted above will aid in the reduction of network augmentation by addressing network constraint challenges through collaborative partnerships between networks and customers. This offers both customers and networks the opportunity to reduce costs through finding solutions that better fit all stakeholder needs. As such the diversity of initiatives across the DMIA program reflects this commitment to lowering capital investments through finding alternatives for limitations driving network investments.

Program cycle

Identifying innovation opportunities

The DMIA program has enabled Ergon Energy to place greater emphasis on the importance of innovation for demand management opportunities. By drawing on its own experience and examples of industry practice, Ergon Energy has developed an environment that characterises solutions beyond the traditional network solution.

To identify and increase the innovation opportunities, Ergon Energy's innovation environment comprises three key groups to funnel innovation ideas into the DMIA program, as illustrated in Figure 2: Ergon Energy innovation environment:

- the DMIA program team, providing opportunity for anybody in Ergon Energy to contribute;
- the Smart Network Reference Group, providing senior management representation and oversight from across the business;
- Co-contributions from external parties such as universities, research partners and industry partners.

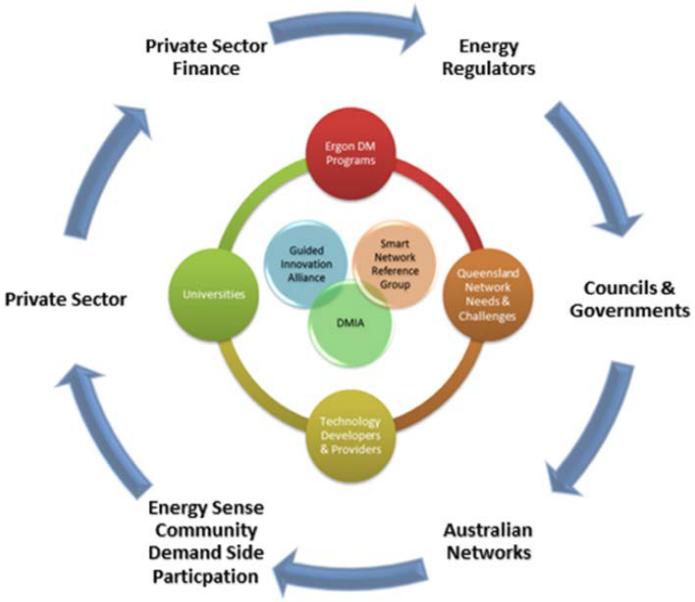


Figure 2: Ergon Energy innovation environment

Selection process

To ensure prudent investment choice and project delivery efficiency, all Ergon Energy investments adhere to a three-tiered gated governance framework. The DMIA projects follow the same methodology, with particular emphasis placed on meeting the DMIA criteria and objectives. Accordingly, once projects are identified and nominated through the above-mentioned innovation environment, the eligibility-screening process is performed on nominated projects as a high level assessment, to determine whether the projects meet the objectives of the DMIA. Specifically, this tests whether each potential project is in accordance with paragraph 3.1.3 of the AER's *Demand Management Incentive Scheme for Energex, Ergon Energy and ETSA Utilities 2010-15*, October 2008. Table 3: Ergon Energy DMIA project selection criteria outlines the criteria in detail.

Provided all the specified conditions are met, then the project proceeds to the feasibility assessment and approval stages, as per the gated governance framework. All Ergon Energy DMIA projects are selected and scoped to respond to current and emerging network limitation drivers. Information from the development activities undertaken enables implementation scheduling, milestone planning and confirmation of resources.

Table 3: Ergon Energy DMIA project selection criteria

Selection criteria
• Reduces, shifts or manages electricity demand through non-network or projects or programs designed to build demand management capability and capacity and explore potentially efficient demand-management mechanisms, including but not limited to new or original concepts that support a reduction in network risk through means other than network augmentation. • Has costs which are not recoverable under any other jurisdictional incentive scheme • Has costs which are not recoverable under any other state or Commonwealth Government scheme • Has costs which are not included in Ergon Energy's forecast capital or operating expenditure approved in the AER's distribution determination for the regulatory control period under which the scheme applies, or under any other incentive scheme in that determination • Is technically feasible (based on whether, in Ergon Energy's assessment, the project is suitable for its intended application and whether it can be theoretically and physically integrated with Ergon Energy's infrastructure).

3. Budget management

DMIA program expenditure

Ergon Energy's DMIA total expenditure for 2014-15 was $747,283. The costs incurred on the DMIA program for the year were all operational expenditure with no capital expenditure. Ergon Energy is seeking the AER's approval to recover the costs for the full amount detailed in the 2014-15 expenditure column from Table 4. These costs are all Ergon's contribution to the projects and are over an above any external funding received from industry or government grants.

For the year, the DMIA program comprised of nine projects, with six continuing projects from 2013-14 and three new projects. All projects were developed and managed in accordance with Ergon Energy's established program-management framework as outlined in the previous section.

Table 4 summarises the actual expenditure for the 2014-15 Ergon Energy DMIA program, along with the total approved budget costs, actual annual costs, program-to-date incurred costs, and any applicable comments.

Table 4: Ergon Energy DMIA program expenditure 2014-15

Project	Budget ($)		2014-15 expenditure ($)		Project to date expenditure ($)		Comment
	Total Project Budget	Ergon Energy Project Budget	Capital	Operational	Capital	Operational	
GUSS Phase 2	490,025	490,025	-	48,284	-	447,013	Closed
Large LV Statcom	348,640	348,640	-	27,802	-	320,964	Finalisation
Urban LV Statcom	318,570	318,570	-	73,825	-	311,531	Continuing

Project	Budget ($)		2014-15 expenditure ($)		Project to date expenditure ($)		Comment
	Total Project Budget	Ergon Energy Project Budget	Capital	Operational	Capital	Operational	
Solar Energy Management Systems	593,830	146,255[1]	-	30,163	-	125,656	Finalisation
Customer PV Voltage Control Project	230,000	230,000	-	63,266	-	198,246	Closed
LED Streetlight System (DMIA funded)	450,000	134,000	-	90,883[2]	-	108,785	Finalisation
LED Streetlight removing barriers	182,000	182,000		164,682		164,682	New
Centralised Energy Storage	450,000	450,000		207,283		207,283	New
Demand response integration	50,000	41,095		41,095		41,095	New
Total	2,168,716	2,168,716	0	747,283	0	1,689,679	

Of note, Ergon Energy costs associated with each of the DMIA projects, as identified in Table 4, are not:

- recoverable under any other jurisdictional incentive scheme
- recoverable under any other state or Commonwealth Government scheme
- included in the forecast capital or operating expenditure approved in the AER's 2010-15 distribution determination for the current regulatory control period under which the DMIS applies or under any other incentive scheme in that determination.

Of the seven projects, one reached completion being the customer PV voltage regulation project was closed during 2013-14 and a summary of the key findings presented in the Appendix section.

Longer term trends

Ergon Energy's DMIA program has progressed well over the regulatory period to date, and has provided some valuable insights and knowledge as well as creating the opportunity to move innovation from concept to business as usual. The DMIA program continues to collaborate with innovation partners who are willing to contribute to DMIA projects and trials. Ergon Energy has found co-contributions are a useful way to lower Ergon Energy's innovation costs, share risks and identify collaboration opportunities, share knowledge and capabilities, and gain valuable insights into emerging markets.

[1] Ergon Energy's financial budget is $146,255. However Ergon Energy's contribution includes other non-financial contributions such as data and expert advice bringing Ergon Energy's total contribution value to $200,000

[2] This represents the project costs being claimed under DMIA, additional Ergon Energy costs have occurred on the project that are not being claimed under DMIA expenditure

Table 5: Ergon Energy DMIA co-contributions presents a summary of co-contributions into Ergon Energy DMIA funded projects. It shows that Ergon Energy has lowered its 2014-15 DMIA costs by $1,010,514 through levering industry capabilities and experience, and is conducting research that promotes research from industry and the research community. Importantly, the parties value these projects or programs as they are willing to make contributions towards these costs. The costs Ergon Energy is seeking to recover does not include the co-contributions received for the project.

Table 5: Ergon Energy DMIA co-contributions

DMIA Project	Funding Source	Co-contributions ($)	Co-contributions Total ($)	Ergon Energy Project Budget ($)	Project Total Amount ($)
Solar Energy Management Systems	CSIRO	163,830	393,830	146,255	593,830
	GWA	230,000			
	Ergon Energy	200,000[3]			
LED Streetlight system trial	CTIP	316,000	316,000	134,000	450,000
	Ergon Energy	134,000			
Total		**843,830**	**709,830**	**280,255**	**1,043,830**

[3] Includes financial contribution and non-financial in kind contributions, such as access to data and expert advice.

4. Program delivery progress

Program delivery

This section of the report details the status of Ergon Energy's DMIA projects in 2014-15 by describing each project's objectives, progress and findings to date. Each project has a high level summary of project scope, aims, progress and a short summary of the project to date. In 2013-14 the QUT Super conductor project was listed as continuing, the project was completed in 2013-14 and it was anticipated at the time the project would continue with further financial investigations into the technology. The project did not continue however there is the possibility that the financial modelling phase of the super conducting project may commence in 2015-16.

GUSS Phase 2 (REGUSS)

Nature and scope

The goal of the project is to further develop the Grid Utility Support System (GUSS) – medium scale storage, grid interface inverter, system control and monitoring – to allow for the connection of renewable energy systems, in particular photovoltaics (PV), in such a way as to optimise the value the renewables can present, both to the network and to the customer. Appropriate integration will allow generated renewable energy to be stored, when it is not of value, and released at times of need.

Automated operation, to manage the system and support the network in the most effective way, is a key objective that will benefit all future energy storage products for the SWER networks (Single Wire Earth Return).

The REGUSS project specifically addresses integration of PV into our SWER networks and enables the generation of PV energy to be stored and shifted to peak demand and network need times.

Project phase

Indicates current phase

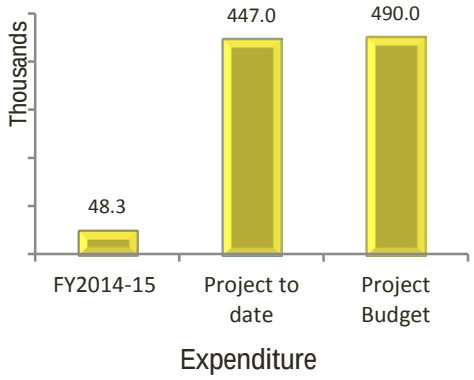
Benefits and outcomes

- Project completed, system removed and final report written.
- Successful reduction of peak demand on SWER and voltage support
- Leanings around coupling energy storage and photovoltaic
- Positive energy storage learnings – provided into GUSS Deployment project

Aims and expectations

The aims and expectations of this project are to:

- improve the value renewable energy can provide to the distribution network and low voltage connection points
- reduce the impact peak demand has on specific network constrained areas through the combined use of renewable energy and storage
- develop and integrate an automatic operating algorithm that effectively manages the system and supports the network without the need for upstream communication
- ensure the equipment is grid ready, and there are processes to support their connection to the network.



Implementation progress

1. Factory acceptance testing complete
2. Installation at trial site and site acceptance testing
3. Trial monitoring and evaluation
4. Final reporting

Update summary

The REGUSS project has been closed. It successfully reduced peak demand and provided voltage support to the SWER. The learnings were crucial for the roll out of the GUSS deployment project. Experience was also gained around integrating energy storage and photovoltaics.

Urban Statcom

Nature and scope

The increasing prevalence of residential photovoltaic (PV) systems and non-linear loads is starting to have a significant impact on our network and customer supply.

These impacts include over-voltage and voltage swings on the low voltage network, affecting customer loads, causing PV systems to trip off (reducing output) and necessitating (partially effective and expensive) network augmentation and potential restriction of PV system connection.

Ergon Energy has placed a high priority on identifying solutions and products to mitigate these problems including lower cost, more effective alternatives to network augmentation.

Aims and expectations

This project, laboratory tests and field trials two different products from different manufacturers.

Product 1 is a single phase 10kVAR capacitive only type of unit. For this product, the distribution transformer would be tapped down then the unit would supply capacitive VARs to boost the voltage when needed. This system can address out-of-balance voltages.

Product 2 is a three phase 20kVAR Statcom that can act as both a capacitor and inductor. Although the product is a three-phase unit, it does not address out-of-balance issues on the network.

Field trials will be undertaken in Townsville on a low voltage network that suffers from voltage fluctuations, as a result of both high load and high PV. This will allow practical assessment of the capability of LV Statcoms to mitigate PV related voltage issues in a real situation.

Project phase

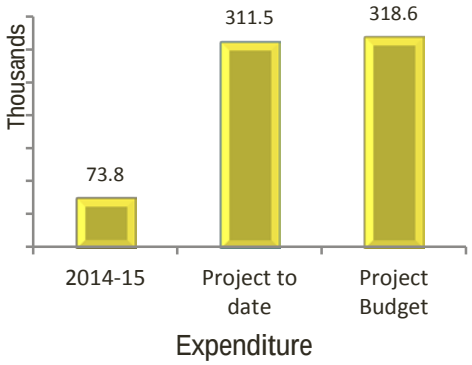
Indicates current phase

Benefits and outcomes

- Improved low voltage supply quality
- Allows for increasing amount of PV without the need for network augmentation
- Can be installed in brownfield sites that do not have customer VAR inverters but are experiencing low voltage network issues

Issues

- One of the products on order does not address out-of-balance issues. While not impacting the project, having this feature (as they are further developed) would provide better network outcomes



Implementation progress (as at July 2014)

1. Statcom units supplied from suppliers
2. Laboratory testing
3. Field trial installation and commissioning

Update summary

Products have been purchased from Varentec and ZBB. Both products have been laboratory tested and installed in the field as part of the field trial evaluation. Project is currently collecting data. Final report is due at the end of October 2014.

Large Statcom

Nature and scope

Ergon Energy has extensive networks of long rural and remote feeders that are being stressed by the increasing demands placed on them by modern customer electricity needs, and by the increasing prevalence of distributed generation, particularly residential PV.

The Large LV Statcom project will trial a three-phase 300kVAR unit on the Ergon Energy network. The main application is to support the voltage on a long medium voltage rural feeder with voltage regulation issues, partially due to higher penetration of PV, and avoid the conventional network upgrade, which may otherwise be required.

Aims and expectations

Distributed LV Statcoms are low voltage power electronic products that have the ability to inject both capacitive and inductive reactive power into the electricity network. Project expectations are:

- confirmation (or not) of the learning hypothesis
- identification of the control methodology for large LV Statcom to optimise voltage profile while avoiding deleterious impacts such as inter-unit hunting
- broad brush investigation of optimal placement of these devices
- evaluation of product capability to provide the desired performance
- comparison of the value of large LV Statcoms coupled to the MV, versus small distributed LV Statcoms in LV networks.

Progress achieved (as at July 2015)

1. Factory acceptance and laboratory testing completed
2. System delivered
3. Trial installation and commissioning

Project phase

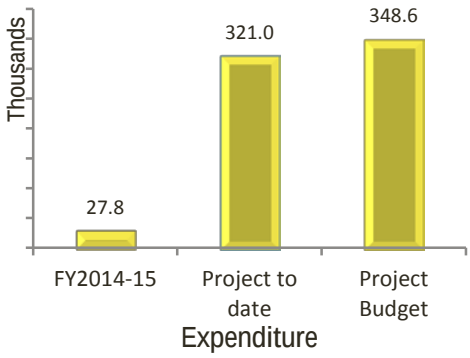
Indicates current phase

Benefits and outcomes

- Project closed. Final report and technical paper completed.
- Successful management of residential solar where approximately twice as much solar has connected since the trial began.
- Very effective provided adequate upstream reactance at:
  - Voltage regulation
  - Voltage unbalance correction
  - Dynamic voltage support
- Nominated for Premier's sustainability award

Issues

There are no current issues in the project



Update summary

The Large Statcom project is finalised. The final report and a technical paper have been completed. The STATCOM successfully resolved PV driven voltage constraints as well as improving voltage unbalance and providing dynamic voltage support. Since the trial began, approximately twice as much solar has connected to the network and the STATCOM is continuing to manage network voltages in relation to this. Without the STATCOM, network augmentation would now be required.

Solar Energy Management system

Nature and scope

This project represents development of a world-first firm solar system with a Solar Energy Management (SEM) controller that is capable of continuous operation, overcoming solar intermittency, displacement of electrical consumption, increasing the penetration of cost-effective renewable energy technology, and providing reliable renewable energy.

As a utility energy management tool the system is capable of simultaneously satisfying both renewable energy supply and electricity network demand management objectives.

This project will develop, prototype and evaluate this firm solar system through the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in collaboration with Ergon Energy and heating and cooling manufacturer GWA Group.

Aims and expectations

The expectation is that an operating model is produced that shows the demand reduction and energy-related benefits to both the customer and Ergon Energy of the SEM system. In effect it will assist in determining the opportunity to develop a solution for residential air conditioning that removes the electrical demand from the distribution network when needed.

Ergon Energy being involved in such an activity will allow a significant opportunity for improving both its community standing both in the electricity industry and the residential market.

Implementation progress (as at July 2015)

All milestones have been met in delivery of this project, with a project final report delivered.

Project phase

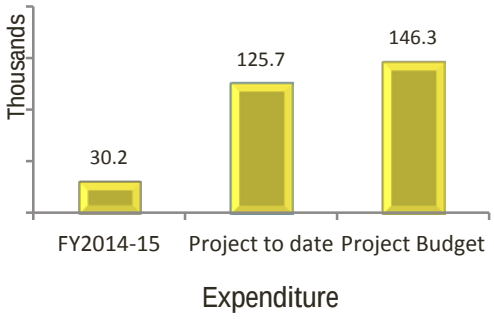
☆ Indicates current phase

Benefits and outcomes

- ▲ Competition of field testing and data analysis.
- ▲ Installation testing and evaluation completed
- ▲ DRED system control testing completed.

Issues

- ▼ Prototype solution had some teething issues with the technology that impacted system reliability.
- ▼ Longevity of testing is required to deliver conclusive results, but there is clear evidence the product does have potential.
- ▼ GWA are yet to commit to full-scale production of a first generation system.



Update summary

From the few results stated by CSIRO the COP should be around 21 which is seven times higher than a normal Split system. This result showed the potential of the technology and despite the setbacks in the project this could be a future technology which would benefitting our network and also reduce the energy bill of our customers. The systems did not work reliably and further work needs to be undertaken to develop a functioning reliable consumer device. However, product has great potential and could offer a significant alternative for a future in air-conditioning.

LED Streetlight System (DMIA funded)

Nature and scope

The Adaptive LED Streetlight Systems project will validate 'smart' lighting system performance in both laboratory and field conditions.

The project has received Australian Government funding under the Clean Technology Innovation Program (CTIP). It is collaboration between the Guided Innovation Alliance (Ergon Energy as project lead, with QUT and Smart Grid as partners), LED Roadway Lighting, and three site hosts – Townsville City Council, Ipswich City Council, and Brisbane Airport Corporation.

This Adaptive LED Streetlight Systems project will validate their performance and builds off previous and recent trials. Successful completion of the project will lead to a deployable product that provides benefit to public lighting customers and Ergon Energy.

Project phase

Indicates current phase

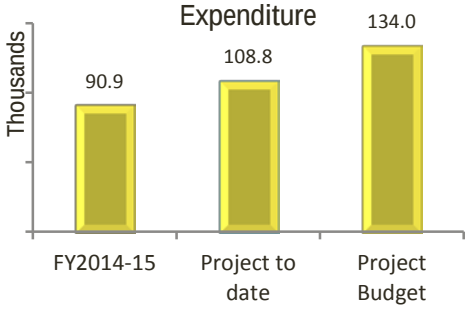
Benefits and outcomes

- Demonstrate the performance ability of adaptive LED technology in relation to demand savings
- Demonstrate the performance of an adaptive streetlight technology
- Confirmation on the ability to reduce demand by 60% with LED technology and over 80% with adaptive control.

Aims and expectations

The project aims to:

- laboratory and field test the Adaptive LED Streetlight technology
- measure the energy performance of P and V Class LED luminaires compared with existing HID light (Mercury Vapour and High Pressure Sodium)
- demonstrate the enhanced LED light control systems ability to further increase energy and demand savings, from 60% with its current LED luminaire to 80% with the adaptive light control system.



Implementation progress (as at July 2015)

1. Laboratory testing of lights
2. Site installations
3. Interim report
4. Field testing of photometric performance

Final report of results All major aspects of the project are complete with the final stages of reporting and closeout due to be completed in the coming months.

Update summary

The project installations occurred slightly behind schedule but the project outcomes were able to be delivered within target timeframes.target timeframes.

Centralised Energy Storage System

Nature and scope

Distributed storage has an increasingly significant role on our electricity networks as energy storage technology improves and price falls. Ergon Energy and Energex have a range of applications for larger-scale distributed energy storage, particularly for micro-grid applications, network support and also off-grid applications (mainly for Ergon). This project is a joint Ergon-Energex project to develop these applications.

This project will initially develop and evaluate a 100kW/200kWh CESS. The CESS will be installed at the Cairns, Hartley St depot as a test platform to enable further development. The system will be tested, trialled and integrated in a controlled, generation test environment in the workshops to develop functionality and verify its effectiveness and reliability. It is anticipated that the CESS project will seed other projects to develop advanced control systems to enable higher penetrations of customer-owned renewable generation and also develop micro-gridding functionality.

Project phase

Indicates current phase

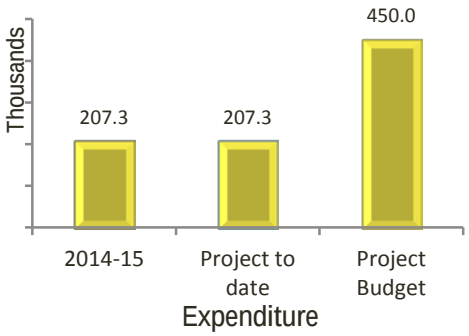
Benefits and outcomes

- Enable higher penetrations of PV on the network using centralised energy storage
- Investigate micro-gridding functions to seamlessly transition between on and off grid.
- Provide a test platform for further development of advanced control systems

Aims and expectations

The project aims to:

- Develop integration strategies for traditional generation, energy storage and renewable energy
- Enable higher penetrations of renewable energy using centralised energy storage systems
- Understand the how to achieve seamless transitions between on-grid and off-grid, and the ability of centralised storage to support islanding (micro-grids)
- Understand how energy storage, diesel generation and renewable energy can be used to mitigate peak demand, improve power quality and reliability, and defer capital expenditure.



Implementation progress (as at July 2015)

1. Manufacture and factory testing of the battery system (100kW/200kWh) – In progress
2. Installation and workshop testing & evaluation
3. Quarterly reports on system development and evaluation

Demand Response System

Nature and scope

This was a capability enablement project to take the findings from previous Automated Demand Response project and develop the business as usual approach for applying the learnings.

The project sought to establish, at a minimum the tendering and purchasing of a demand response system and was funded via DIMA under the category of capability enablement. Once the procurement process was complete the project would continue to be funded via business as usual activities.

Project phase

☆ Indicates current phase

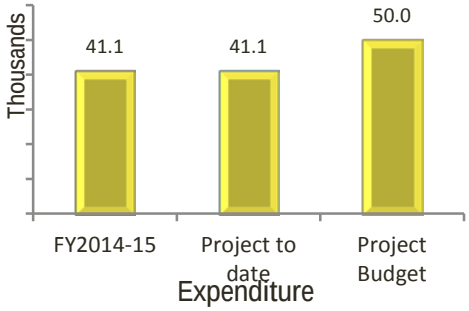
Benefits and outcomes

- Establish a demand response platform and commence business as usual application of the system

Aims and expectations

The project aims to:

- Establish the purchasing of a demand response platform.
- Commence integration into BAU activities



Progress

The project completed the aims in 2015 with the completion of a tender and the ongoing integration of a demand response system, the project will now be closed.

Update summary

The project was successful in establishing a business as usual project for the purchasing and integration of a demand response system which is being funded under normal business as usual activities, as such the budgeted expenditure for the project will not be utilised freeing up DMIA funds for other projects.

LED Streetlight Removing Barriers

Nature and scope

This project seeks to take an innovative approach by identifying actions focused on mitigating the financial, regulatory and technical barriers to large scale deployment. The project will enable effective markets and efficient services by developing solutions to enable Ergon Energy to significantly reduce cost, peak demand, network constraints, increased infrastructure requirements, energy use and carbon emissions from the provision of street lighting, which can in turn provide value to Ergon Energy's street lighting customers; the Department of Transport and Main Roads and 70 Local Government Authorities

Aims and expectations

The project aims to:

Develop technical guidelines to support a specification for the procurement of LED streetlights under contract.

Develop a guide to deployment for LED streetlights.

Develop an Engagement Plan and communications package to support a program for the pilot deployment of LED streetlights

Deliver a high level Market Analysis report.

Development of a high level outline of a commercial and financial structure for LED streetlights.

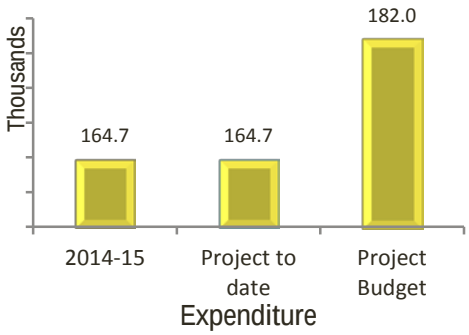
- Deliver a final report of outcomes.

Project phase

Indicates current phase

Benefits and outcomes

- Establish opportunity for demand reduction through enabling the use of LED streetlights.
- Identification of capability for LGA's and TMR to increase energy efficiency in lighting.
- Technical specification used for a tender for LED streetlights to be used for pilot program and as an option for gifted streetlight for councils.
- Identification of potential business opportunities for future ownership and operational capabilities presented by advancing technical solutions in the streetlight space.



Implementation progress (as at July 2015)

1. Project Management PlanProject Management Plan
2. Identify barriers
3. Support business solutions
4. Final report
5. Project Management Plan
6. Identify barriers

Update summary

The project was delivered successfully to provide support Ergon Energy's LED Streetlight Strategy. While there are many barriers to LED streetlight deployment the current price of the technology is the biggest barrier. As the price of the technology reduces, transition to the technology will become a very attractive choice for Local Government Authorities (LGAs) and Transport and Main Roads (TMR) when looking to reduce costs and energy consumption. Ergon Energy's preparation works under this project to identify, reduce and remove barriers to large scale deployment will contribute to a structured and smooth transition to the advanced technology and create business opportunities for future asset management models.

Appendices

Appendix A. Summary findings: completed and closed projects

Customer PV voltage regulation

Project scope

The rapid uptake of residential solar photovoltaic (PV) systems is having a significant impact on the Ergon Energy low voltage (LV) network, particularly on the quality of voltage that a customer will receive. Both over and under voltages are experienced, affecting customer appliances and potentially causing PV systems to trip (reducing output). This restricts PV system connection and can lead to expensive network upgrades.

New grid connected inverters are now becoming available on the market with advanced Reactive Power control functionality. A possible lowest cost option to avoid Voltage Rise issues is to use customer owned inverters with Reactive Power functionality to self-manage their voltage levels on the LV network.

The project aims to test and evaluate the suitability of using customer-owned inverters to self-manage their voltage levels on the LV network.

Appendix B. Abbreviations, definitions and units of measure

A, kA, MA	Amps, unit of measure of electrical current, kA 1000s of amps, MA 1,000,000 of amps
AER	Australian Energy Regulator
ARENA	Australian Renewable Energy Agency
ASI	Australian Solar Institute
ASL	Applied Superconductivity Lab
AUSTELA	Australian Solar Thermal Energy Association
AutoDR	Automated Demand Response – or another name for the commercial energy management system, which is the process of managing customer demand automatically
BAC	Brisbane Airport Corporation
CBD	Central Business District
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Constraint	A condition whereby a limit, that has been pre-set to a declared criteria, is exceeded.
CSP	Concentrated Solar Power
CST	Concentrating Solar Thermal
CTIP	Clean Technology Innovation Programme
CVR	Conservation Voltage Reduction
Demand (Maximum Demand MD)	The maximum electrical load over a set period of time. The figure may be for use with tariff calculations or load surveys and the units may be in either kVA, kW or amps.
Demand Side Management (DSM)	Demand Side Management is the design and implementation of programs designed to influence customer use of electricity in ways that will produce desired changed in system load shape.
DF	Distribution Feeder
DLC	Direct Load Control
DMIA	Demand Management Innovation Allowance
DMIS	Demand Management Incentive Scheme
DNSP	Distribution Network Service Provider
DR	Demand Reduction – amount of electrical load that can be removed for a period of time
DRED	Demand Response Enabling Device
GIA	Guided Innovation Alliance
GUSS	Grid Utility Support System
HID	High Energy Discharge Light usually Mercury Vapour or High Pressure Sodium
HTS	High Temperature Superconducting
ICC	Ipswich City Council
LCoE	Levelised Cost of Energy

LED	Light Emitting Diode
LRL	LED Roadway Lighting
LV	low voltage – 240V or the voltage used in residential houses
MD	Maximum or Peak Demand
NEM	National Electricity Market
NER	National Electricity Rules
NPV	Net Present Value
Network Limitations	A network limitation can be defined as a situation when the high voltage network is unable to supply electricity to the customer in accordance with the following supply standards. Network limitations which relate to system peak loading are: (i) Acceptable standards of reliability of supply cannot be maintained. (ii) Acceptable network voltage levels cannot be maintained. (iii) The thermal rating of plant and equipment is exceeded. (iv) The fault rating of equipment is exceeded. (v) The age, condition or specifications of equipment renders its continued use operationally unsafe, unreliable or uneconomic
PF	Power factor. The ratio of active power to apparent power. A unity power factor indicates no reactive power in the element.
PV	PV stands for photovoltaic, which is a technical term for solar power generation.
QUT	Queensland University of Technology
RAG	Red Amber Greed, project rating
RIN	Regulatory Information Notice
SEM	Solar Energy Management System
Statcom	Static VAR compensator
SVR	Smart Voltage regulator
SWER	Single Wire Earth Return. Distribution to customers using a single wire conductor with the greater mass of Earth as the return path.
TCC	Townsville City Council
UG	Underground electrical network construction.
V, kV, MV	Volts, kV kilo volts 1000s volts, MV mega volts 1,000,000s volts
VA, kVA, MVA	Volt amps, kVA kilo volt amps 1,000s volt amps, MVA mega volt amps 1,000,000 volt amps
VAR, kVAR, MVAR	Volt amps reactive, kVAR kilo volt amps reactive 1,000s VAR, MVAR mega volt amps reactive 1,000,000 VAR
W, kW, MW	Watts, kW kilo watts 1,000s watts, MW mega watt 1,000,000s watts
Wh, kWh, MWh	Watt hours, kWh kilo watt hours 1,000 watt hours, MWh mega watt 1,000,000s watt hours

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Ergon Energy Corporation Limited ABN 50 087 646 062
Ergon Energy Queensland Pty Ltd ABN 11 121 177 802

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