Decision

Approval of Demand Management Innovation Allowance (DMIA) expenditures by non-Victorian electricity distributors in 2018–19

May 2020

AUSTRALIAN ENERGY REGULATOR

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Shortened forms

Shortened form	Extended form
ADMS	advanced distribution management system
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ARC	Australian Research Council
AREMI	Australian Renewable Energy Mapping Interface
ARENA	Australian Renewable Energy Agency
augex	augmentation expenditure
BESS	battery energy storage system
capex	capital expenditure
CESS	centralised energy storage system
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVR	conservation voltage reduction
DELC	dynamic export limit controller
DER	distributed energy resources
DM	demand management
DMIA	demand management innovation allowance
DMIAM	demand management innovation allowance mechanism
DMIS	demand management incentive scheme
DNSP	distribution network service provider
DRED	demand response enabled device
DTAPR	distribution and transmission annual planning report
DUoS	distribution use of system
HEMS	home energy management system
IPDRED	internet protocol demand response enabling

Shortened form	Extended form
	device
kWh	kilowatt hours
LoR	lack of reserve
LV	low voltage
MW	megawatt
NEL	national electricity law
NEM	national electricity market
NEO	national electricity objective
NER	national electricity rules
NNA	non-network alternatives
NSP	network service provider
opex	operating expenditure
PV	photovoltaic
QUT	Queensland University of Technology
RIN	regulatory information notice
RIT-D	regulatory investment test for distribution
SAPN	SA Power Networks
SAPS	stand alone power systems
SMS	short messaging service
SWER	single wire earth return
UQ	University of Queensland
VPP	virtual power plant
WACC	weighted average cost of capital

1. Summary

The Demand Management Innovation Allowance (DMIA) aims to provide incentives for electricity distributors to research and investigate innovative techniques for managing demand for electricity. It also aims to enhance industry knowledge of practical demand management projects and programs through the publication of annual project summary and expenditure reports. The DMIA is part of the previous Demand Management Incentive Scheme (DMIS)[1], which has been applied to all distributors in the national electricity market (NEM) as part of the distribution determinations we made before June 2019.

DMIA is provided to each distributor in the form of a fixed allowance for each regulatory control period. We review and approve distributors' actual DMIA expenditures on demand management projects each year.

If a distributor has not spent its total allowance in a regulatory control period, it will return the underspent amount to customers in the following regulatory control period, in the form of a tariff reduction. However, any overspent amount would be borne by the distributor.

This report presents our assessment of the eight non-Victorian electricity distributors' annual expenditure claims for 2018–19.[2] These distributors provided DMIA reports to us as part of their 2018–19 responses to our annual regulatory information notice (RIN). The eight distributors sought approval of DMIA expenditure in 2018–19 for a total of $3.7 million for 39 projects. We have assessed that the projects meet the DMIA expenditure criteria and we have therefore approved the expenditures for all of these projects.

The purpose of this report is to provide a high level summary of distributors' demand management initiatives and why we have approved the expenditures. Distributors' detailed reports on the DMIA projects are published alongside this summary report for stakeholders interested in finding out more detail about specific projects.

The individual 2018–29 DMIA reports for the eight electricity distributors accompany this AER report and can be found on our website at www.aer.gov.au.

How distributors have used the incentive allowances

Figure 1 compares the DMIA allowance against actual expenditure by distributors for their respective current regulatory control periods.

While the allowance is for the whole of the regulatory control period, the expenditure column gives expenditure to date in 2018–19. The comparison therefore is affected by the point in time where the distributor is in its regulatory control period —for example, fourth year versus the last year of a five-year period—which differs between distributors.

Distributors in Queensland and South Australia are in year 4 of their 2015–20 regulatory control period, while distributors in New South Wales and ACT are in the final year of their 2014–19 regulatory control period. The Tasmanian distributor is also in its final year of the 2017–19 regulatory control period.

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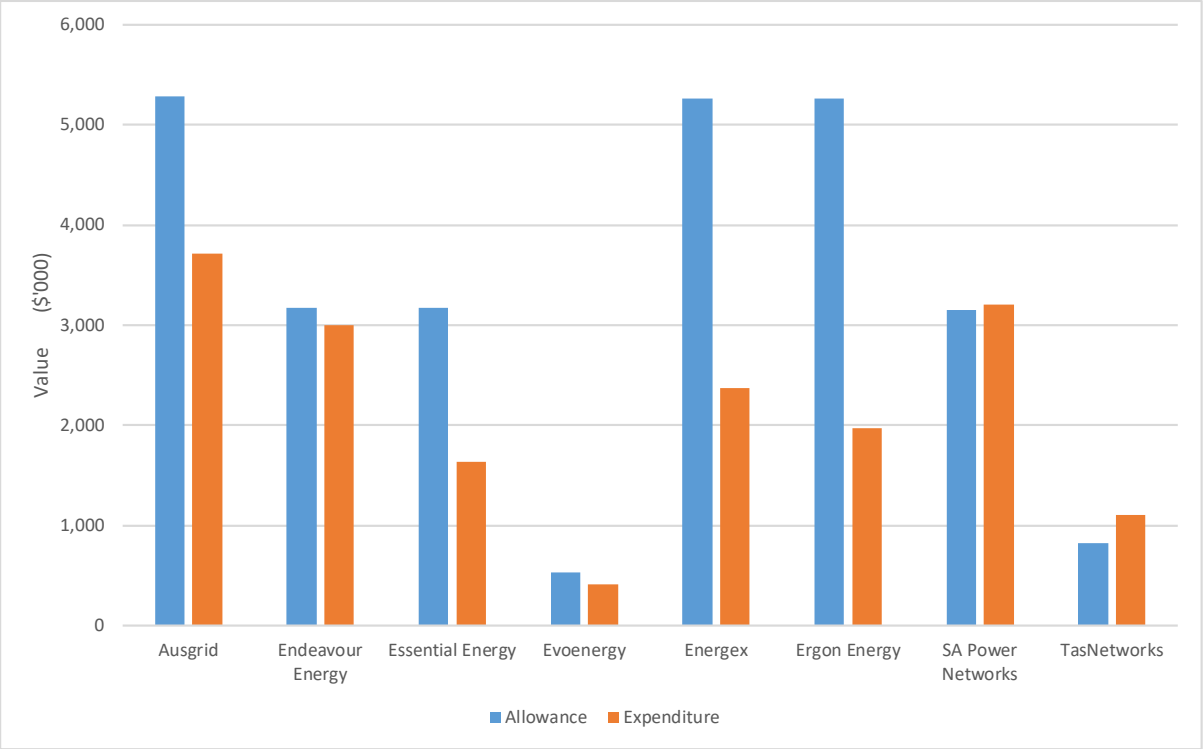
1 Before December 2017.

2 This report does not include the five distributors in Victoria, who are scheduled to provide their DMIA reports for financial year 2019 by 30 April 2020.

Figure 1 DMIA – comparison of regulatory period allowance vs expenditure to date



Source: AER analysis and DMIA reports submitted by electricity distributors.

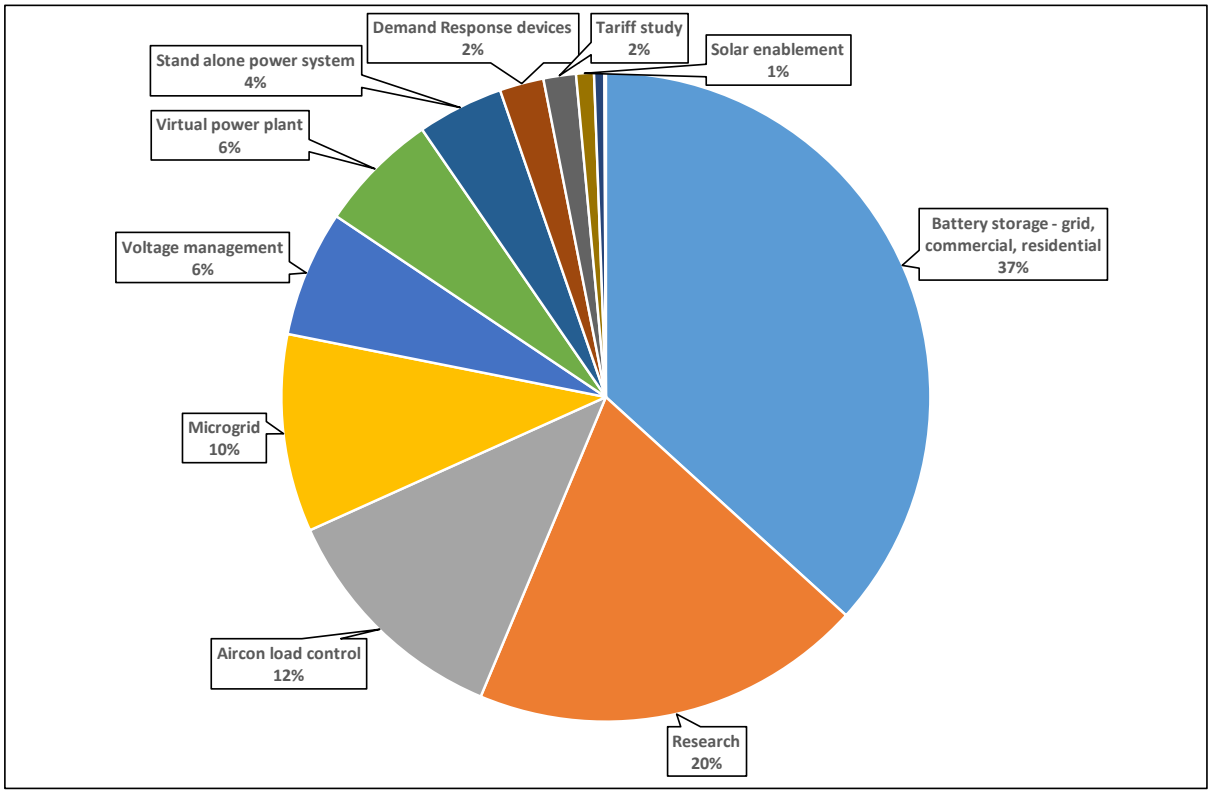
Of the eight distributors reviewed, TasNetworks and SA Power Networks have spent above their total DMIA allowance. Any overspend is funded by the business from its own revenue or from other project funders (such as the Australian Renewable Energy Agency or ARENA), rather than its customers. At the lower end of spending, Energex and Ergon Energy have underspent their DMIA allowance to date. These two distributors, however, still have one year to go in their current regulatory control periods.

By the final year of their regulatory control periods, the NSW distributors had spent 72 per cent (on average) of their total-period allowance, the ACT distributor 78 per cent, and the Tasmanian distributor 134 per cent. In comparison, by year 4 of their regulatory control periods, the Queensland distributors have spent 41 per cent (on average) of their total-period allowance, and the South Australian distributor 102 per cent.

DMIA expenditure by activity types

Figure 2 and Table 1 summarise the 2018–19 DMIA expenditure by types of projects undertaken by the electricity distributors. These projects vary in both their nature and scale.

Figure 2 DMIA expenditure by project type, 2018–19



Source: AER analysis and DMIA reports submitted by electricity distributors.

Table 1 DMIA expenditure by project type, 2018–19

Project type	Expenditure ($ nominal)	% of total
Battery storage - grid, commercial, residential	1,367,285	37%
Research	728,273	20%
Aircon load control	445,491	12%
Microgrid	366,421	10%
Voltage management	233,955	6%
Virtual power plant	223,929	6%
Stand alone power system	159,908	4%
Demand Response devices	81,741	2%
Tariff study	60,247	2%
Solar enablement	33,009	1%
Customer demand response	19,087	1%
DM contracts - customers	2,640	0.1%
Total	**3,721,986**	**100%**

Note: numbers may not add up due to rounding.

A large proportion of 2018–19 expenditure (37 per cent of total) was related to projects exploring battery storage for the grid or for commercial and residential demand management. Examples of these projects include:

- Endeavour Energy's grid connected battery energy storage system

- Energex's battery energy storage system trial, and
- Ausgrid's community battery feasibility study.

Research projects make up the second largest expenditure, and air conditioner load control the third largest (20 per cent and 12 per cent, respectively). Research projects include a diverse set of projects including laboratory testing of devices, making algorithms, looking into the future grid or electric vehicle demand, and scholarship studies. These include:

- Ausgrid's Power2U DM for replacement needs
- Energex's solar enablement project, and
- Ergon's western grid lab testing and product development.

The load control project was conducted by Endeavour Energy, with its air conditioner control trial using 3G demand response enabling devices.

The rest of the projects investigated:

- micro-grids
- voltage management
- virtual power plants
- stand alone power systems
- demand response devices
- tariff studies, and
- solar enablement.

The 2018–19 expenditures are composed of spending for new projects and for ongoing projects approved in previous years:

- new projects: $2.2 million (58 per cent of total)
- ongoing projects: $1.5 million (42 per cent of total).

DMIA carry-over adjustments

As the distributors in NSW, ACT and TAS have reached the end of their regulatory control periods, we are required to calculate DMIA carry-over adjustments for any underspent dollars.

DMIA carry-over adjustments are for the purpose of returning any underspent allowance or unapproved DMIA spending to customers. This is to ensure that distributors appropriately utilise the DMIA funding. The adjustment is applied to the distributor's revenue in the subsequent regulatory control period. The carry-over adjustment is discussed further in section 4.2 below.

Structure of this report

The remainder of this report is structured as follows:

Chapter 2 provides background information on the DMIS and DMIA.

Chapter 3 provides the criteria set out in the DMIA scheme, against which we are required to assess the electricity distributors' claims.

Chapter 4 summarises the results of our assessment of distributors' DMIA reports and supporting information.

Chapters 5 to 12 provide our assessment of distributors' DMIA expenditure claims against the DMIA criteria.

2. Background

The Demand Management Innovation Allowance (DMIA) aims to provide incentives for electricity distributors to research and investigate innovative techniques for managing demand. The DMIA is a part of the previous Demand Management Incentive Scheme (DMIS)[3], which has been applied to all electricity distributors in the national electricity market (NEM) as part of our current distribution determinations.

A key objective of the DMIA is to assist in enhancing industry knowledge of practical demand management projects through the annual publication of DMIA activity reports from electricity distributors. As such, we set out annual reporting requirements for distributors for the regulatory control period. Distributors are required to submit a report to the AER on their DMIA expenditure shortly after the end of each regulatory year, providing details of the projects they have undertaken.

We use the information provided in a distributor's annual DMIA report in assessing a distributor's expenditure claims against the DMIA criteria. The distributor's report also provides information to stakeholders more broadly on the nature of the DMIA projects that may ultimately be progressed to operating activities or more mature investments. The information may also facilitate the participation of non-network service providers in projects that go beyond the research or testing phase.

To ensure that distributors appropriately utilise the DMIA funding, there is an overall expenditure true-up process at the end of a regulatory control period. After the results for the final year of a regulatory control period are known, and there is any amount of underspent or unapproved DMIA, a single carry-over adjustment will be made to return this amount to customers. This adjustment is applied to the distributor's revenue in the second year of the following regulatory control period.

The AER established a new and improved Demand Management Innovation Allowance Mechanism (DMIAM) in December 2017 to replace the DMIA for regulatory control periods commencing after 30 June 2019. We also reviewed the DMIS and enhanced the scheme significantly. Details of the new DMIAM and DMIS are available from our web site at: Demand management incentive scheme and innovation allowance mechanism.

[3] Before December 2017.

3. Demand Management Incentive Scheme criteria

Each year we are required to assess claims for the demand management incentive allowance against the criteria contained in the DMIS. The criteria are set out below.

Criteria #1: Demand management projects or programs are measures undertaken by a DNSP to meet customer demand by shifting or reducing demand for standard control services through non-network alternatives, or the management of demand in some other way rather than increasing supply through network augmentation.

Criteria #2: Demand management projects or programs may be:

a. broad-based demand management projects or programs — which aim to reduce demand for standard control services across a DNSP's network, rather than at a specific point in the network. These may be projects targeted at particular network users, such as residential or commercial customers, and may include energy efficiency programs; and/or

b. peak demand management projects or programs — which aim to address specific network constraints by reducing demand on the network at the location and time of the constraint.

Criteria #3: Demand management projects or programs may be innovative, and designed to build demand management capability and capacity and explore potentially efficient demand management mechanisms including, but not limited to, new or original concepts.

Criteria #4: Recoverable projects and programs may be tariff or non-tariff based.

Criteria #5: Costs recovered under this scheme:

a. must not be recoverable under any other jurisdictional incentive scheme

b. must not be recoverable under any other state or Australian Government scheme

c. must not be included in forecast capital or operating expenditure approved in the distribution determination for the regulatory control period under which the scheme applies, or under any other incentive scheme in that determination.

Criteria #6: Expenditure under the DMIA can be in the nature of capex or opex.

4. DMIA assessment

4.1. Annual DMIA assessment

We conducted our 2018–19 DMIA expenditure assessment based on the DMIA reports from the following electricity distributors:

- Ausgrid (final year of the regulatory control period)
- Endeavour Energy (final year of the regulatory control period)
- Essential Energy (final year of the regulatory control period)
- Evoenergy (final year of the regulatory control period)
- TasNetworks (final year of the regulatory control period).
- Energex (year 4 of the regulatory control period)
- Ergon Energy (year 4 of the regulatory control period)
- SA Power Networks (year 4 of the regulatory control period)[4]

Distributors had different approaches for utilising the DMIA funding. Summaries of each distributor's DMIA expenditures are shown in the tables 2 to 4 below, covering each of their respective regulatory control periods.

While the allowance is for the whole of the regulatory control period, the expenditure columns of Tables 2 to 4 give expenditures to date in the relevant period. For example, one distributor might be reporting to date for year 4 of its regulatory control period while another distributor is reporting to date for year 5. Therefore, the comparison is affected by the point in time where the distributor is in its regulatory control period.

Of the eight distributors reviewed, TasNetworks and SA Power Networks have spent more than their total DMIA allowance. Ergon Energy and Energex have the lowest spending against their allowance to date (although we note that these distributors have one year still remaining in their regulatory control periods).

The NSW and ACT distributors by their fifth year have spent an average of 72 per cent of their allowances. By their fourth year, Queensland distributors have spent an average of 41 per cent of their allowances, and SAPN has spent 102 per cent of its allowance.

[4] The distributors' respective regulatory control periods were: NSW and ACT 2014–15 to 2018–19, TAS 2017–18 to 2018–2019, and QLD and SA 2015–16 to 2019–2020.

Table 2 NSW and ACT electricity distributors' DMIA expenditure for the 2014–15 to 2018–19 regulatory control period ($'000, nominal)

DNSP	DMIA approved 2014-15	DMIA approved 2015-16	DMIA approved 2016-17	DMIA approved 2017-18	DMIA approved 2018-19	Total DMIA approved	Total DMIA allowance for period	DMIA remaining for period	Per cent of DMIA spent
Ausgrid	1,363	600	373	456	926	3,718	5,288	1,570	70%
Endeavour Energy	379	31	319	877	1,394	3,000	3,173	173	95%
Essential Energy	503	267	301	393	171	1,635	3,173	1,538	52%
Evoenergy	73	38	56	116	128	410	529	119	78%
TOTAL	**2,317**	**935**	**1,049**	**1,842**	**2,620**	**8,763**	**12,162**	**3,399**	**72%**

Source: AER analysis and DMIA reports submitted by distributors. Numbers may not add up due to rounding.

Table 3 TasNetworks DMIA expenditure for the 2017–18 to 2018–19 regulatory control period ($'000, nominal)

DNSP				DMIA approved 2017-18	DMIA approved 2018-19	Total DMIA approved	Total DMIA allowance for period	DMIA remaining for period	Per cent of DMIA spent
TasNetworks				1,059	43	1,103	821	-282	134%

Source: AER analysis and DMIA reports submitted by TasNetworks.

Table 4 QLD and SA electricity distributors' DMIA expenditure for the 2015–16 to 2019–20 period ($'000, nominal)

DNSP	DMIA approved 2015-16	DMIA approved 2016-17	DMIA approved 2017-18	DMIA approved 2018-19	DMIA approved 2019-20	Total DMIA approved	Total DMIA allowance for period	DMIA remaining for period	Per cent of DMIA spent
Energex	338	440	1,123	475		2,375	5,260	2,884	45%
Ergon Energy	472	795	262	441		1,971	5,260	3,289	37%
SA Power	1,955	1,120	-13	143		3,205	3,156	-49	102%
TOTAL	**2,765**	**2,355**	**1,372**	**1,059**		**7,551**	**13,676**	**6,125**	**55%**

Source: AER analysis and DMIA reports submitted by distributors. Numbers may not add up due to rounding.

4.2. Carry-over adjustment

The purpose of the carry-over adjustment is to return to customers the portion of a distributor's DMIA allowance that was not spent within a regulatory control period. It also returns to customers any DMIA expenditure incurred by a distributor but not approved by the AER.

When calculating the carry-over adjustment to be applied to the electricity distributor's total revenue in its next regulatory control period, we are required to use the formula set out in the DMIA scheme.

This formula calculates the carry-over adjustment on a cumulative basis. That is, any under– or overspend in one year is rolled over to the following year within the regulatory control period. The formula also includes an adjustment for the weighted average cost of capital (WACC). With the WACC adjustment, a distributor would be indifferent, in NPV terms, to the

timing of its DMIA spending over a regulatory control period. The DMIA carry-over formula states:

$$C_t = C_{t-1} - \left[\frac{(R_t - A_t)}{(1+i)} \times (1+i)^n(1+i^*)^2\right]$$

where:

C_t = cumulative carry-over balance

R_t = *ex ante* revenue allowance under the scheme for regulatory year *t*

A_t = *ex post* expenditure approved under the scheme for the regulatory year *t*

i = nominal vanilla WACC as set in the distribution determination for the regulatory control period in which the expenditure is incurred

n = the number of years remaining in the regulatory control period in which the expenditure is incurred

i^* = nominal vanilla WACC as set in the distribution determination for the regulatory control period in which the carry-over adjustment is made.

Using the DMIA scheme carry-over formula, we calculated the carry-over adjustments to be applied to electricity distributors in NSW, ACT and TAS as they have completed the final year of their control period. Our calculations using each distributor's DMIA *ex ante* allowance and our *ex post* review of DMIA expenditure are set out in Tables 5 to 9. The actual carry-over adjustment which we will apply to each distributor is specified in section 4.2.1 below.

Table 5 Ausgrid: carry-over amount calculation ($'000 nominal)

	2014-15	2015-16	2016-17	2017-18	2018-19
Ex ante allowance	1,025	1,040	1,054	1,074	1,095
Ex post expenditure	1,363	600	373	456	926
Cumulative carryover balance	486	-108	-968	-1,702	-1,890

Source: AER analysis and DMIA reports submitted by the electricity distributor. Numbers may not add up due to rounding.

Table 6 Endeavour Energy: carry-over amount calculation ($'000 nominal)

	2014-15	2015-16	2016-17	2017-18	2018-19
Ex ante allowance	615	624	632	645	657
Ex post expenditure	379	31	319	877	1,394
Cumulative carryover balance	-339	-1,139	-1,535	-1,259	-436

Source: AER analysis and DMIA reports submitted by the electricity distributor. Numbers may not add up due to rounding.

Table 7 Essential Energy: carry-over amount calculation ($'000 nominal)

	2014-15	2015-16	2016-17	2017-18	2018-19
Ex ante allowance	615	624	632	645	657
Ex post expenditure	503	267	301	393	171
Cumulative carryover balance	-161	-643	-1,062	-1,361	-1,903

Source: AER analysis and DMIA reports submitted by the electricity distributor. Numbers may not add up due to rounding.

Table 8 Evoenergy: carry-over amount calculation ($'000 nominal)

	2014-15	2015-16	2016-17	2017-18	2018-19
Ex ante allowance	102	104	105	107	109
Ex post expenditure	73	38	56	116	128
Cumulative carryover balance	-42	-131	-193	-183	-162

Source: AER analysis and DMIA reports submitted by the electricity distributor. Numbers may not add up due to rounding.

Table 9 TasNetworks: carry-over amount calculation ($'000 nominal)

				2017-18	2018-19
Ex ante allowance				408	413
Ex post expenditure				1,059	43
Cumulative carryover balance				768	359

Source: AER analysis and DMIA reports submitted by the electricity distributor. Numbers may not add up due to rounding.

Given that TasNetworks overspent its DMIA allowance during the 2017–19 regulatory control period, there will be no carry-over adjustment to be applied in TasNetworks' 2020–21 annual tariff process. TasNetworks' own budget or other project funders would have funded the over-spending.

4.2.1. AER determination of carry-over adjustments

Using the calculations in section 4.2 above, we calculated the carry-over adjustments to be applied in the 2019–24 regulatory control period for Ausgrid, Endeavour Energy, Essential Energy, Evoenergy and TasNetworks.

Table 10 Carry-over adjustments: NSW, ACT and TAS electricity distributors ($ nominal)

	$ nominal
Ausgrid	-1,889,631
Endeavour Energy	-436,254
Essential Energy	-1,903,058
Evoenergy	-162,345
TasNetworks	nil

Source: AER analysis.

The negative dollar amount per distributor means that this amount will be deducted from the distributor's revenue for Year 2 of the 2019–24 regulatory control period (i.e. 2020–21). This deduction results in the distributor returning its unspent DMIA allowance to its customers.

5. Ausgrid 2018–19

We approve Ausgrid's DMIA expenditure of $926,368 in 2018–19 for nine projects because these meet the DMIA criteria. The following section sets out our assessment of the individual projects. Detailed information about these projects is available in Ausgrid's 2018–19 DMIA report which is published separately on the AER website at Networks & pipelines - Compliance reporting – Demand management incentive scheme report.

New Projects

5.1. Distribution and Transmission Annual Planning Report (DTAPR) mapping platform

5.1.1. Project overview

The project involved Ausgrid providing information to the Australian Renewable Energy Mapping Interface (AREMI) map. The AREMI map was developed by a partnership between the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Clean Energy Council, and is funded by ARENA. The AREMI map is a mapping platform covering the national electricity market and provides information including population attributes, infrastructure, environment and topography.

Ausgrid's project objective is to improve the accessibility, quality and timeliness of published planning information. This would improve the transparency and provision of information on network investments and constraints to non-network service providers.

Ausgrid claimed DMIA expenditure of $6,844 for this project in 2018–19. Activities undertaken in 2018–19 (Phase 1 of 2) included initially investigating mapping platforms, selecting an approach, and uploading information to the 2018 DTAPR. Phase 2 will consider options for improvements such as enhancing information based on stakeholder feedback.

5.1.2. Assessment against DMIA criteria

Criteria #1 By providing network planning information to the AREMI map, Ausgrid's project will assist non-network proponents in proposing alternatives to network augmentation by shifting or reducing demand.

Criteria #2 This is a broad-based demand management project which aims to reduce demand for standard control services across a DNSP's network rather than at a specific point in the network. It is targeted at proponents of non-network solutions.

Criteria #3 This project is designed to build demand management capability and capacity by assisting non-network proponents in proposing alternative solutions to defer network upgrades and to inform interested parties.

Criteria #4 The project is non-tariff based.

Criteria #5 Ausgrid states that the expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

5.2. Peak time rebate (Retailer demand response)

5.2.1. Project overview

With this project, Ausgrid will assess whether offering peak time rebates in local areas of its network on peak demand days will be cost effective. The project will test whether these rebates can be used to address location-specific, short-term constraints in the network instead of network upgrades.

Ausgrid claimed DMIA expenditure of $19,087 for this project in 2018–19. Activities undertaken in 2018–19 were in research and development only, with implementation scheduled for 2019–20.

5.2.2. Assessment against DMIA criteria

Criteria #1 This project aims to understand the cost effectiveness of a non-network alternative, that is, peak time rebates in specific locations in Ausgrid's network.

Criteria #2 This is a peak demand management project which aims to address specific network constraints by reducing demand on the network at the location and time of the constraint.

Criteria #3 This project is designed to build Ausgrid's demand management capability through understanding customer behaviour on peak event days and in specific geographic locations.

Criteria #4 The project is non-tariff based.

Criteria #5 Ausgrid states that the expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

5.3. Stand alone power systems (SAPS)

5.3.1. Project overview

The project aims to improve the techniques by which Ausgrid can assess SAPS as non-network options in regulatory investment tests (RIT-D) and demand management investigations.

Ausgrid will undertake the project over two years (2018–19 and 2019–20) and in two phases. Phase 1 will involve developing a cost-benefit assessment tool for SAPS and Phase 2 will identify case studies and engage customers.

Ausgrid claimed DMIA expenditure of $51,893 for this project in 2018–19.

5.3.2. Assessment against DMIA criteria

Criteria #1 This project seeks to improve tools for comparing network solutions to non-network solutions, which could meet customer demand by shifting or reducing demand for standard control services.

Criteria #2 This is a broad-based demand management project which aims to reduce demand for standard control services across a DNSP's network.

Criteria #3 This project is designed to build demand management capability by developing tools to assess a non-network solution (i.e. stand alone power systems) against credible network solutions.

Criteria #4 The project is non-tariff based.

Criteria #5 Ausgrid states that the expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

5.4. Electric vehicle demand research

5.4.1. Project overview

The project will explore the impact of electric vehicle charging on the Ausgrid network and customer response to demand management. Over two years, Phase 1 will involve supporting an ARENA-funded project on electric vehicles, and Phase 2 will take learnings from the first phase to trial viable DM options for electric vehicle charging.

Ausgrid claimed DMIA expenditure of $99,244 for this project in 2018–19.

5.4.2. Assessment against DMIA criteria

Criteria #1 This project is researching options for DM interventions using electric vehicle chargers to shift or reduce demand during peak demand times.

Criteria #2 This is a broad-based demand management project which aims to reduce demand for standard control services across a DNSP's network, rather than at a specific point in the network. It is targeted at residential and commercial customers with electric vehicles.

Criteria #3 This project is designed to build demand management capability and capacity and explore new or original concepts.

Criteria #4 The project is non-tariff based.

Criteria #5 Ausgrid states that its share of expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

5.5. Digital energy futures

5.5.1. Project overview

The project objective is to understand and forecast changing digital lifestyle trends and their impact on future household electricity demand, including at peak times. The three-year research project is led by Monash University and partly funded by the Australian Research Council. Ausgrid is a project co-funder and contributor.

Ausgrid claimed DMIA expenditure of $13,042 for this project in 2018–19.

5.5.2. Assessment against DMIA criteria

Criteria #1 This project aims to understand how Australian household electricity uses are changing and likely to change with emerging digital technologies. This will help Ausgrid in selecting non-network alternatives to shift or reduce consumer demand for electricity.

Criteria #2 This is a broad-based demand management project which aims to reduce demand for standard control services across a DNSP's network. It is targeted at residential customers.

Criteria #3 This project is designed to build demand management capability and capacity and explore new or original concepts.

Criteria #4 The project is non-tariff based.

Criteria #5 Ausgrid states that its share of expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

5.6. Cost reflective network pricing research

5.6.1. Project overview

The project objective is to quantify peak demand reduction from introducing cost reflective network pricing to residential and small business customers. This will help assess the effectiveness of these pricing structures as a demand management tool. The pricing structures include seasonal time of use and monthly demand. The two-year project will involve customer research and surveying (Phase 1) and demand reduction study and analysis (Phase 2).

Ausgrid claimed DMIA expenditure of $58,671 for this project in 2018–19.

5.6.2. Assessment against DMIA criteria

Criteria #1 This project aims to better understand and quantify the impact of cost reflective network pricing on reducing electricity demand at peak times.

Criteria #2 This is a broad-based demand management project which aims to reduce demand for standard control services across a DNSP's network. It is targeted at residential and small business customers.

Criteria #3 This project is designed to build demand management capability and capacity by understanding the effect of tariff structures on customer demand and behaviour.

Criteria #4 The project is tariff based.

Criteria #5 Ausgrid states that the expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

5.7. Community battery feasibility study

5.7.1. Project overview

Ausgrid will undertake a feasibility study and develop a model business case for community batteries as a potential solution for network constraints. Over two years (2018–19 and 2019–20) Ausgrid will conduct the feasibility study and model business case (Phase 1), possible follow up work (Phase 2), and a community battery pilot project (Phase 3).

Ausgrid claimed DMIA expenditure of $158,977 for this project in 2018–19.

5.7.2. Assessment against DMIA criteria

Criteria #1 This project is investigating the potential for community batteries as a non-network alternative to shift or reduce electricity demand.

Criteria #2 This is a broad-based demand management project which aims to reduce demand for standard control services across a DNSP's network, rather than at a specific point in the network.

Criteria #3 This project is designed to build demand management capability and capacity via a feasibility study, model business case, and a pilot project.

Criteria #4 The project is non-tariff based.

Criteria #5 Ausgrid states that the expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

Continuing Projects

5.8. Demand management for replacement needs (Power2U)

5.8.1. Project overview

The project aims to test the viability of using non-network options to defer or manage the load at risk associated with network investments that involve retiring or replacing aged assets. The project proposes to leverage the capability of market participants, including electricity retailers, solar installers, energy efficiency providers and other key market participants.

The project consists of two independent project components to be conducted by market providers:

Part A – An incentives program to encourage permanent demand reductions (e.g. additional solar power systems and energy efficiency activity) in a defined geographical area.
Part B – Feasibility studies on the use of traditional demand response solutions for a network equipment failure scenario which can result in unserved customer demand (supply outage).

Ausgrid claimed DMIA expenditure of $370,323 for this project in 2018–19.

5.8.2. Assessment against DMIA criteria

Criteria #1 Around 80 per cent of Ausgrid's capital investment expenditure over the next five to 10 years is related to the retirement or replacement of aged assets. This project will help demand management capability.

Criteria #2 This is a peak demand management project that aims to address specific network constraints by reducing demand on the network at the location and time of the constraint.

Criteria #3 Using non-network solutions to manage risk from replacement-driven investments differs from typical overload risk. This requires an innovative approach to build a portfolio of permanent and temporary load reductions across the daily profile.

Criteria #4 The project is non-tariff based.

Criteria #5 Ausgrid states that the expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

5.9. Battery demand response (virtual power plant) trial

5.9.1. Project overview

With this project, Ausgrid is investigating the use of residential solar battery systems for network support services. In particular, Ausgrid will test whether customer battery systems offer a technically and commercially viable demand management option, test customer take-up of a network support offer, and test the integration of the battery management platform within Ausgrid's Advanced Distribution Management System (ADMS).

The project consists of three phases:

- Phase 1 – Battery customer market research

This phase will involve collation and analysis of information of battery systems connected to Ausgrid's network and an exploration of possible offers and contractual arrangements with market providers such as battery suppliers, aggregators and energy service providers. Thereafter, Ausgrid will propose formal arrangements with one or more market providers to provide network support services.

- Phase 2 – Customer trial over 2 to 3 summer seasons

Under Phase 2 there will be customer battery system dispatch and further development of aggregator partnerships.

- Phase 3 – Distributed Energy Resource integration with the ADMS—This phase will involve integration of network support dispatch and constraint management into the DER platform of Ausgrid's ADMS.

Ausgrid claimed DMIA expenditure of $148,288 for this project in 2018–19.

5.9.2. Assessment against DMIA criteria

Criteria #1 Ausgrid is investigating the potential for network support contracts for demand management with customers with battery storage systems. It is also testing the integration of the battery management platform within its ADMS.

Criteria #2 This is a broad-based demand management project which aims to reduce demand for standard control services across a DNSP's network, rather than at a specific point in the network. It is targeted at residential and commercial customers with battery storage systems.

Criteria #3 This project is designed to build demand management capability and capacity via the execution of contract arrangements between battery storage system owners and market providers, which will in turn provide network support to Ausgrid.

Criteria #4 The project is non-tariff based.

Criteria #5 Ausgrid states that expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

6. Endeavour Energy 2018–19

We approve Endeavour Energy's DMIA expenditure of $1,394,192 in 2018–19 for five projects because these meet the DMIA criteria. The following section sets out our assessment of the individual projects. Detailed information about these projects is available in Endeavour Energy's 2018–19 DMIA report which is published separately on the AER website at Networks & pipelines - Compliance reporting – Demand management incentive scheme report.

New Projects

6.1. Residential Inverter Control Trial

6.1.1. Project overview

The project is conducted by Endeavour Energy and Reposit Power, with the support of the NSW Government's Clean Energy Knowledge Sharing Initiative. The objective is to trial reactive power control and determine whether residential solar systems can assist in reducing fluctuations in voltage in Endeavour Energy's network. The results of the trial will

be used to guide future decisions about procuring network support services from customer assets by offering incentives based on the value of these services to Endeavour Energy.

Endeavour Energy claimed $45,000 DMIA expenditure for this project in 2018–19.

6.1.2. Assessment against DMIA criteria

Criteria #1 This project is investigating DM non-network alternatives, in particular reactive power control and controlling residential solar inverters to reduce voltage fluctuations.

Criteria #2 This is a broad-based demand management project which aims to reduce demand for standard control services across a DNSP's network, rather than at a specific point in the network. It is targeted at residential customers with solar PV systems.

Criteria #3 This project is designed to build demand management capability and capacity.

Criteria #4 The project is non-tariff based.

Criteria #5 Endeavour Energy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

6.2. Low Voltage Static Var Compensator Trial

6.2.1. Project overview

This trial aims to test the benefits of low voltage Static Var compensators (Statcoms) to improve customer voltages and manage LV network constraints. Low voltage Statcoms are a viable alternative to network augmentation and can help to defer or avoid network investment in edge-of-grid applications.

Endeavour Energy claimed $188,955 DMIA expenditure for this project in 2018–19.

6.2.2. Assessment against DMIA criteria

Criteria #1 This project is investigating voltage improvement as an alternative to network augmentation.

Criteria #2 This is a peak demand management project which aims to reduce demand for standard control services at specific points in the network where voltage regulation is poor.

Criteria #3 This project is designed to build demand management capacity through the use of mechanisms to improve customer voltages.

Criteria #4 The project is non-tariff based.

Criteria #5 Endeavour Energy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of capex.

Continuing Projects

6.3. Air Conditioner Control Trial using 3G Demand Response Enabling Device (DRED)

6.3.1. Project overview

This project objective is to quantify the network demand reduction potential from controlling air conditioners using 3G Demand Response Enabling Device (DRED) technology and testing the performance of the DRED and the reliability of using 3G mobile communications in performing demand response functions. The project will also assess the willingness of customers to accept some level of external control of their air conditioner compared to previous trials and the possibility of implementing this technology as a cost effective broad-based program.

Endeavour Energy claimed $445,491 DMIA expenditure for this project in 2018–19. This consists of operating expenditure of $320,210 and capital expenditure of $125,281.

6.3.2. Assessment against DMIA criteria

Criteria #1 This project aims to quantify the reduction in network demand that is achievable by controlling air conditioners using 3G DRED technology in residential premises. It will also assess the willingness of customers to allow external control of their air conditioner.

Criteria #2 This project is a peak demand management project.

Criteria #3 This trial aims to understand DRED technology and how Endeavour Energy can utilise it for peak demand reduction and deferral of capital expenditure.

Criteria #4 The project is non-tariff based.

Criteria #5 Endeavour Energy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex and capex.

6.4. Grid Connected Battery Energy Storage System Trial

6.4.1. Project overview

This project is to test grid-connected storage to explore the benefits of battery storage for peak shaving, reliability support, and quality of supply improvement, and to better understand the operational impacts of their application to the Endeavour Energy network.

The DMIA-funded component of the Grid Connected Battery Energy Storage System (BESS) trial has an estimated cost of $300,000 for 2017–18 to 2018–19. This is the cost for the engineering development and testing associated with deploying this new technology on the network. It is planned that the BESS will be onsite at the West Dapto zone substation, connected and commissioned in time for summer 2018–2019.

Endeavour Energy claimed $700,629 of DMIA expenditure for this project in 2018–19.

6.4.2. Assessment against DMIA criteria

Criteria #1 This project aims to report on the feasibility of deferring zone substation construction by installing a battery energy storage system.

Criteria #2 This project is a peak demand management project.

Criteria #3 This trial aims to pilot grid connected storage to explore the potential benefits including peak shaving, reliability support, quality of supply improvement, and better understand the operational impacts of its application to the network.

Criteria #4 The project is non-tariff based.

Criteria #5 Endeavour Energy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of capex.

6.5. Residential Battery Energy Storage Trial

6.5.1. Project overview

This project is focused on investigating how Endeavour Energy can use small-scale battery storage technology at residential level to reduce peak demand, improve power quality, and defer or avoid capital investment.

The trial commenced in December 2016 and is planned to run for three summer periods. The DMIA-funded component of the trial has an estimated cost of $1.174 million for 2016–17 to 2018–19.

Endeavour Energy claimed $14,117 of DMIA expenditure for this project in 2018–19.

6.5.2. Assessment against DMIA criteria

Criteria #1 This project aims to report on the network demand reduction that can be reliably achieved by installing battery energy storage systems in residential premises and validating the average demand reduction per customer.

Criteria #2 This project is a peak demand management project.

Criteria #3 This trial aims to understand energy storage technology and how Endeavour Energy can utilise it to understand peak demand reduction, power quality issues, and deferral of capital expenditure.

Criteria #4 The project is non-tariff based.

Criteria #5 Endeavour Energy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

7. Energex 2018–19

We approve Energex's DMIA expenditure of $474,540 in 2018–19 for seven projects because these meet the DMIA criteria. The following section sets out our assessment of the individual projects. Detailed information about these projects is available in Energex's 2018–19 DMIA report which is published separately on the AER website at Networks & pipelines - Compliance reporting – Demand management incentive scheme report.

New Project

7.1. Tesla Eagle Farm Distribution Centre

7.1.1. Project overview

This solar PV and battery energy storage system (BESS) trial represents an operational commercial scale system compliant with Australian standard AS4755.3.5, with functionality for demand response enabled devices (DRED) and off-grid operation. The system has the ability to disconnect completely from the distribution network and operate in island mode for short durations, and the ability to inject or export energy for grid support.

Energex claimed DMIA expenditure in 2018–19 of $15,377.

7.1.2. Assessment against DMIA criteria

Criteria #1 This project investigates a system (large scale battery system and integrated solar PV) that can be a potentially efficient mechanism to manage demand.

Criteria #2 This is a broad-based demand management program.

Criteria #3 The project is innovative and designed to build Energex's demand management capability.

Criteria #4 The project is not tariff based.

Criteria #5 Energex states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

Continuing Projects

7.2. Battery Energy Storage Systems (BESS) Pilot/ Trial

7.2.1. Project overview

This project involves Energex conducting BESS trials over four years to better understand the impact of BESS on the network and how BESS can enable a higher penetration of solar PV. The data obtained from these trials will assist in developing systems to manage new technologies (including battery systems) and provide cost-effective outcomes for Queenslanders.

The three BESS installed at Rocklea were used for educational purposes and testing of load control capabilities and general operation. The commercial BESS and solar PV located at the Energex Eagle Farm Distribution Centre has been constructed and is in the process of final commissioning to enable key project objectives to be tested.

Energex claimed DMIA expenditure in 2018–19 of $208,434 for this project.

7.2.2. Assessment against DMIA criteria

Criteria #1 This project aims to gain a better understanding of the customer value proposition and expectations from the electricity network in taking up BESS; how Energex can leverage off the existing load control system with direct load control and tariffs to benefit both Energex and the customer; and will investigate how the BESS technology will integrate with the electricity network, which could potentially be used for peak load management.

Criteria #2 This is a broad-based demand management program.

Criteria #3 By testing the capabilities and characteristics of BESS, Energex can investigate its demand management effectiveness that may help avoid network augmentation.

Criteria #4 The project is not tariff based.

Criteria #5 Energex states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex and capex.

7.3. Solar Enablement Project

7.3.1 Project overview

This project proposes to develop, implement and test an innovative state estimation algorithm for monitoring high-voltage electricity distribution networks by running a trial on seven feeders across three distribution network service providers. The aim is to provide an improved understanding of electricity network behaviour to maximise 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 two-year project is run by the University of Queensland (UQ) in partnership with nine stakeholders including Energex.

Energex claimed DMIA expenditure in 2018–19 of $108,544 for this project.

7.3.2 Assessment against DMIA criteria

Criteria #1 This project aims to help Energex to better manage the distribution networks, including the optimisation of Distributed Energy Resources with particular emphasis on maximising PV connection and export to the grid.

Criteria #2 This is a broad-based demand management program.

Criteria #3 The objectives of the project include improving the dispatch of Distributed Energy Resources, improving the demand management response, and minimising future network investment.

Criteria #4 The project is not tariff based.

Criteria #5 Energex states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

7.4. Low Voltage Network Power System Static-State Estimation

7.4.1. Project overview

The proposed project is to develop, implement and test an innovative state estimation algorithm for monitoring low-voltage electricity distribution networks. This algorithm will form the basis for coordinating demand and distributed generation with respect to operational limits of local network segments. A 'static state estimator' can provide a basis for an autonomous low-voltage network management and monitoring system. This project is a joint project between Energex, Ergon Energy and the University of Queensland (UQ) for a period of three years.

Energex claimed DMIA expenditure in 2018–19 of $8,640 for this project.

7.4.2. Assessment against DMIA criteria

Criteria #1 The project aims to produce improved data and information through the application of an estimator, which can then be used to improve the benefits of demand management and coordination of Distributed Generation across the low voltage network.

Criteria #2 This is a broad-based demand management program.

Criteria #3 This project aimed to improve and increase the adoption of the demand tariff, which may help in peak load management and so avoid network augmentation.

Criteria #4 The project is not tariff based.

Criteria #5 Energex states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

7.5. Large Commercial Battery Energy Storage System (BESS)

7.5.1. Project overview

This project involves integration of a 150 kW solar PV and 250 kW BESS, development of a proprietary control platform to run both island/off-grid modes and DRED DM operation of a commercial scale BESS, and the installation of a fault level protection scheme when the system is operating in island/off-grid mode.

The aim of the project is to gain a better understanding of:

- the commercial customer value proposition and expectations from the electricity network in taking up BESS

- how Energex can leverage off the existing load control system with direct load control and tariffs to benefit both Energex and the customer, and
- how the BESS technology will integrate with the electricity network.

Energex claimed DMIA expenditure in 2018–19 of $100,535 for this project.

7.5.2. Assessment against DMIA criteria

Criteria #1 The project will investigate the BESS system as a non-network alternative to network augmentation.

Criteria #2 This is a broad-based demand management program.

Criteria #3 This project aims to build Energex's demand management capability.

Criteria #4 The project is not tariff based.

Criteria #5 Energex states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

7.6. Enabling Dynamic Export Limits

7.6.1. Project overview

This is a trial to demonstrate the benefits to customers and networks of moving from zero export limits to dynamic export limits. The scope of the trial includes the installation of a commercially available 50 kW, 3 phase solar PV system complete with a dynamic export limit controller (DELC) that enables the solar inverter to respond to near real-time network demand support requests.

The purpose of this trial is to investigate the viability of enabling energy flow from renewable sources rather than the typical zero export connection agreements for small to medium commercial solar PV customers.

Energex claimed DMIA expenditure in 2018–19 of $33,008 for this project.

7.6.2. Assessment against DMIA criteria

Criteria #1 This project aims to help Energex to better manage the distribution networks through dynamic export of solar PV.

Criteria #2 This is a broad-based demand management program.

Criteria #3 The objective of the project is to investigate the viability of enabling energy flow from renewable sources (solar PV).

Criteria #4 The project is not tariff based.

Criteria #5 Energex states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

7.7. Springfield Net Zero

7.7.1. Project overview

Energex stated that this project will commence in 2019–20. There has been no expense in 2018–19.

This project will involve a partnership with a developer of a master planned community to examine the electrical infrastructure impacts of a "net zero" community. (Net zero refers to the total amount of energy used in the community every year being equal to the renewable energy created on the site.)

8. Ergon Energy 2018–19

We approve Ergon Energy's DMIA expenditure of $441,477 in 2018–19 for seven projects because these meet the DMIA criteria. The following section sets out our assessment of the individual projects. Detailed information about these projects is available in Ergon Energy's 2018–19 DMIA report which is published separately on the AER website at Networks & pipelines - Compliance reporting – Demand management incentive scheme report.

New Projects

8.1. Solar Analytics Customer Devices Enabling

8.1.1. Project overview

This project tested home energy management system (HEMS) devices to test their ability to deliver customer and network benefits. These benefits include outage notifications for load control, PV export limits, and increased visibility of the low voltage network. The devices and customer data were provided by Solar Analytics.

Ergon Energy claimed DMIA expenditure of $42,950 in 2018–19 for this project.

8.1.2. Assessment against DMIA criteria

Criteria #1 The project enabled Ergon to better understand how customer-owned energy monitoring devices can be used effectively for demand management.

Criteria #2 This is a broad-based demand management program.

Criteria #3 The project will help build Ergon's demand management capability and explore potentially efficient DM mechanisms.

Criteria #4 The program is non-tariff based.

Criteria #5 Ergon Energy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

8.2. Western Grid Lab Testing & Product Development

8.2.1. Project overview

This project involved laboratory trials of several devices that could potentially improve the capacity and quality of supply to customers at the fringe of the grid. The project scope includes:

- battery storage systems for SWER customers
- isolated transformer balancing for SWER customers
- customer-side devices for load control.

Ergon Energy claimed DMIA expenditure of $105,410 in 2018–19 for this project.

8.2.2. Assessment against DMIA criteria

Criteria #1 The testing of several devices that could potentially be used for non-network alternatives will assist Ergon in managing electricity demand.

Criteria #2 This is a broad-based demand management program.

Criteria #3 The project would add to Ergon's demand management capability.

Criteria #4 The program is non-tariff based.

Criteria #5 Ergon Energy states that its expenditure for this project is not being recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

8.3. Alternate Supply Bustard Head

8.3.1. Project overview

This project involved replacing a remote SWER line with a stand-alone power system as a lower cost alternative to network replacement. The SWER line is in a remote coastal location servicing a single customer.

Ergon Energy claimed DMIA expenditure of $88,392 in 2018–19 for this project.

8.3.2. Assessment against DMIA criteria

Criteria #1 The project objective is to meet demand by a remotely located customer in a way other than network augmentation.

Criteria #2 This is a broad-based demand management program.

Criteria #3 The project seeks to examine a potentially cost efficient mechanism in managing demand.

Criteria #4 The program is non-tariff based.

Criteria #5 Ergon Energy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

Continuing Projects

8.4. Centralised Energy Storage System (CESS)

8.4.1. Project overview

This project is a joint Ergon-Energex project to develop and evaluate a 100kW/200kWh energy storage system. The CESS is a test platform to enable further control systems 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.

Work on this project during 2018–19 involved continued development of control algorithms and simulation models, and engagement with the original manufacturer to help expand device functionality.

Ergon Energy claimed DMIA expenditure of $159,208 in 2018–19 for this project.

8.4.2. Assessment against DMIA criteria

Criteria #1 This project enables higher penetration of customer-owned renewable generation and also develops micro-grid functionality.

Criteria #2 This is a broad-based demand management program.

Criteria #3 This project enables higher penetration of PV on the network using centralised energy storage.

Criteria #4 The project is non-tariff based.

Criteria #5 Ergon Energy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

8.5. Lakeland Solar Storage

8.5.1. Project overview

This project seeks to explore the use of large-scale solar PV and battery storage to service fringe-of-grid networks, to demonstrate PV supporting modes to improve power quality and manage demand, and to demonstrate micro-grid function on MV distribution networks. The

Lakeland Solar & Storage (LSS) is a 10.8MW solar farm with 1.4MW/5.3MWh battery energy storage, located adjacent to 132/66/22kV Lakeland substation.

Ergon Energy claimed DMIA expenditure of $4,244 in 2018–19 for this project.

8.5.2. Assessment against DMIA criteria

Criteria #1 For a fringe area of the network, the project will seek to demonstrate large-scale solar PV and battery storage solutions to improve power quality and manage demand.

Criteria #2 This is a broad-based demand management program.

Criteria #3 The project (a) provides technical assistance for the Lakeland Solar & Storage project and (b) facilitates a battery test plan, to demonstrate additional network services through the combination of solar and battery, in fringe-of-grid areas.

Criteria #4 The project is non-tariff based.

Criteria #5 Ergon Energy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

Completed Projects

8.6. Grid Advocacy

8.6.1. Project overview

This project tested in a real world environment the customer impacts of cost-reflective tariffs with the addition of emerging technologies such as battery energy storage systems (BESS), home energy management systems (HEMS) and solar PV systems.

The project aimed to enable learnings that set directions that will inform BESS connection requirements, determine additional BESS operational opportunities with respect to demand management, and determine levels of customer engagement and support for such devices. Commercially available BESS, HEMS and solar PV systems were used in the field trial.

Ergon Energy claimed DMIA expenditure of $35,964 in 2018–19 for this project.

Ergon Energy carried out its final analysis and reporting. The project was completed in 2018–19.

8.6.2. Assessment against DMIA criteria

Criteria #1 Testing the customer impacts of cost-reflective tariffs when combined with energy storage and solar PV systems would lead to better understanding of demand management.

Criteria #2 This is a broad-based demand management program.

Criteria #3 The project enabled Ergon to gain a better understanding of how cost-reflective tariffs and demand side technology can reduce peak demand and network risks. The level of

uptake of cost-reflective tariffs can alter the forward network risk profiles and change the need and types for demand management.

Criteria #4 The program is non-tariff based.

Criteria #5 Ergon Energy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

8.7. Internet Protocol Demand Response Enabling Device (IPDRED) development

8.7.1. Project overview

This project aimed to develop a functional specification for a third-party delivered IPDRED. This is to enable management of network and end-customer loads, directly or indirectly, on a third-party platform.

The IPDRED functional specification covered the areas of two-way communication, individual addressability and consumption data, whilst also supporting demand management delivery using AS4755.3 suite of standards.

The final stage involved releasing the functional specification and undertaking a review of solution provider responses.

This project was completed in 2018–19 and Ergon Energy claimed DMIA expenditure of $5,305 in the final year.

8.7.2. Assessment against DMIA criteria

Criteria #1 The project sought to identify third-party demand management solution providers of a complete energy management platform. The platform and IPDRED devices could increase the amount of load under management (i.e. more appliances and improved geographic coverage) and improve the ability to control loads.

Criteria #2 This is a broad-based demand management program.

Criteria #3 This project will allow network and end-customer management of customer loads, directly or indirectly, via a third party platform.

Criteria #4 This project is non-tariff based.

Criteria #5 Ergon Energy stated that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

9. Essential Energy 2018–19

We approve Essential Energy's DMIA expenditure of $171,248 in 2018–19 for one project because this meets the DMIA criteria. The following section sets out our assessment of the project. Detailed information about this project is available in Essential Energy's 2018–19 DMIA report which is published separately on the AER website at Networks & pipelines - Compliance reporting – Demand management incentive scheme report.

Continuing Project

9.1. Networks Renewed

9.1.1. Project overview

Networks Renewed is a joint industry project by the Institute of Sustainable Futures, Reposit Power, Fronius and AusNet Services, and the New South Wales and Victorian Governments. Aimed at connecting over 1MW of customer and network-owned solar systems and battery storage systems, it is partly funded by ARENA. As part of the project, a combination of solar and energy storage will be installed at around 200 households or equivalent businesses. Electricity generated in excess of premises needs will be stored and subsequently used to reduce peak demand on the network. Potentially up to half of the specified premises and installed capacity may be connected to Essential Energy's network across two locations.

9.1.2. Assessment against DMIA criteria

Criteria #1 The project will assess the potential of battery storage systems and advanced solar inverters with eligible customers in a two-year trial to help better manage demand for network capacity.

Criteria #2 This is a peak demand management project.

Criteria #3 Undertaking the project will facilitate the development of a set of guidelines for future uptake to ensure such technology is optimally integrated and does not result in costly network expenditure. The project will also permit exploration of the possible value such technology can provide on a least cost basis to address network constraints.

Criteria #4 The project is not tariff based.

Criteria #5 Essential Energy states that its share of expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

10. Evoenergy 2018–19

We approve Evoenergy's DMIA expenditure of $127,991 in 2018–19 for five projects because these meet the DMIA criteria. The following section sets out our assessment of the individual projects. Detailed information about these projects is available in Evoenergy's 2018–19 DMIA report which is published separately on the AER website at Networks & pipelines - Compliance reporting – Demand management incentive scheme report.

New Projects

10.1. Future Network Insights Study

10.1.1. Project overview

The project aimed to engage with ACT customers to understand the risks and opportunities that Evoenergy would be facing in the future as the uptake of distributed energy resources increases. This engagement through an online survey or focus groups/workshops will help the business tailor its DM programs (such as SMS messaging or direct subsidies) for residential battery uptake. This in turn will help Evoenergy improve its network planning decisions, in particular for new residential estates.

Evoenergy claimed DMIA expenditure of $3,024 in 2018–19.

10.1.2. Assessment against DMIA criteria

Criteria #1 The project will help Evoenergy to look at non-network alternatives to manage demand on its network.

Criteria #2 This is a peak demand management project or program.

Criteria #3 This project is designed to build Evoenergy's demand management capability and provide a new potentially efficient demand management mechanism.

Criteria #4 The project is non-tariff based.

Criteria #5 Evoenergy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of the opex.

Continuing Projects

10.2. Load Curtailment Contracts

10.2.1. Project overview

This project proposes trialling the establishment and implementation of load curtailment contracts with the 20 major customers in the ACT. The aim was to establish a standard operating model and contract and develop a pricing mechanism for the different customer categories. The project was driven by local demand management requirements and

preparing for AEMO-declared Lack of Reserve (LoR) events with possible load shedding events.

The 20 largest customers in the ACT were contacted about entering into a load curtailment contract. Three contracts were signed. Many customers rejected participation because it did not suit their operations. Evoenergy found that many customers do not have operations and assets that suit the application of demand management. The trial also demonstrated the pricing complexities and price levels that need to be offered in order to be financially attractive and viable for a large range of customers with a wide range of DM options from load reduction to alternative generation.

Evoenergy claimed DMIA expenditure of $2,640 in 2018–19. Evoenergy stated that, going forward, this project will be moved to its operating budget.

10.2.2. Assessment against DMIA criteria

Criteria #1: The project assesses the impact on network load from customer and network management of load curtailment contracts. The project aims to quantify the reductions in demand that can be obtained through the timely use of curtailment contracts with large customers.

Criteria #2: This is a broad based demand management project that targets commercial and industrial consumers.

Criteria #3: This project will explore potentially efficient demand management through the use of load curtailment contracts with large customers.

Criteria #4: This project is non-tariff based.

Criteria #5: Evoenergy states that its expenditure for this project is not recovered under any other jurisdictional incentive scheme, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6: Expenditure on this project is opex.

10.3. Energy Share SMS Trial

10.3.1. Project overview

This project targeted residents with smart meters (about 9,000 customers with type 4 meters). The trial plans to evaluate customer compliance with requests via SMS communication to reduce electricity use at home at short notice. The outcome would be to integrate the SMS participants into the peak demand reduction strategy in the event of any actual load shedding events. A residential SMS demand response program has the potential to offer both network-wide and targeted (geographic area or feeder specific) peak load reductions.

Evoenergy claimed DMIA expenditure of $33,485 in 2018–19.

This is a variation on the SMS Trial in 2017–18. The previous trial showed high engagement from registered participants but the level of demand was negligible or not observed on Evoenergy's low voltage network. This project aims to monitor the level of reduction in real time using the customers' smart meters.

10.3.2. Assessment against DMIA criteria

Criteria #1 The project sought to incentivise customers to reduce their load during peak times. An SMS trial was devised to assess the willingness of customers to reduce their electricity load at short notice during peak times.

Criteria #2 This is a peak demand management project or program.

Criteria #3 This project is designed to build demand management capability in Evoenergy's network and provide a new potentially efficient demand management mechanism.

Criteria #4 The project is non-tariff based.

Criteria #5 Evoenergy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

10.4. University of Wollongong – PhD scholarship for demand management

10.4.1. Project overview

This project is a three year PhD scholarship worth $10,000 per year plus overhead costs for a student at the University of Wollongong in order to gain insight into how smart grid technologies will interact with the greater network on a local and precinct level. The project will develop and test optimal control system for a smart residential house which optimises the consumption and storage of energy along with the operation of several controllable loads.

Through the course of the project the PhD student will develop a small network model (based on Evoenergy network data) for experimental simulation. The student will also explore the benefits of model predictive control at a precinct level (including prediction of the spot price and how this can benefit utilities/retailers). Evoenergy will use this information for understanding, at a residential development level, peak demand management solutions, including shaving peak demand and remote home usage control. It will also provide information on what possible services, at a residential development level, are able to be offered back to the Evoenergy network.

Evoenergy claimed DMIA expenditure of $13,200 in 2018–19.

10.4.2. Assessment against DMIA criteria

Criteria #1 This project involved Evoenergy funding a PhD student at University of Wollongong to study the optimal demand response strategies for home energy management systems in smart grid to achieve net zero energy.

Criteria #2 This is a broad based demand management project.

Criteria #3 This project will enable Evoenergy gain a greater understanding of how demand management strategies assist in deferring capital investment while also reducing

peak demand within the network. It is designed to build demand management capability in Evoenergy's network and provide a new potentially efficient demand management solution for future estate developments in the ACT.

Criteria #4 The project is non-tariff based.

Criteria #5 Evoenergy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of the opex.

10.5. Virtual Power Plant

10.5.1. Project overview

In this project Evoenergy has partnered with Reposit Power to trial residential batteries aggregated as a virtual power plant (VPP). The objectives were to:

- prove that a VPP can be used to help reduce peak demand on the distribution network
- test if the Reposit Power's VPP Fleet system is capable of coordinating residential batteries to provide grid support. The engagement of the VPPs allows Evoenergy to plan for demand response activities in the event of load shedding, giving consumer's added reliability in keeping the network running during such days.
- observe the practicality of third-party service engagement for network support.

Evoenergy claimed DMIA expenditure of $75,642 for 2018–19.

10.5.2. Assessment against DMIA criteria

Criteria #1 The project attempts to control the capabilities of solar PV generation and battery storage to dispatch energy to meet demand requirements. Aggregating virtual power plant units (e.g. residential PV and batteries) will provide a system that can be dispatched to manage network capacity constraints.

Criteria #2 This is a peak demand management project.

Criteria #3 The project is an innovative trial where existing customer battery installations through the Reposit Power fleet are controlled by Evoenergy. This fleet would act as a virtual power plant with the novelty of being targeted at specific areas within the Evoenergy network.

Criteria #4 The project is non-tariff based.

Criteria #5 Evoenergy states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of the opex.

11. SA Power Networks 2018–19

We approve SA Power Network's DMIA expenditure of $142,828 in 2018–19 for three projects because these meet the DMIA criteria. The following section sets out our assessment of the individual projects. Detailed information about these projects is available in SA Power Network's 2018–19 DMIA report which is published separately on the AER website at Networks & pipelines - Compliance reporting – Demand management incentive scheme report.

Continuing Project

11.1. Residential Energy Storage

11.1.1. Project overview

This project will deploy 100 energy storage systems within a selected trial area to study the performance of energy storage systems across the likely applications for this technology as part of efficient distribution network operation and management.

This project was designed as a three-year trial commencing for each customer when their system was installed.

The project is now in the close out stage. SAPN claimed DMIA expenditure of $142,828 in 2018–19, with project costs to date amounting to $2.7 million.

11.1.2. Assessment against DMIA criteria

Criteria #1 The trial tests the applicability of residential energy storage systems to defer the building of new, or augmentation of existing, network infrastructure. Another objective is to understand the broader benefits and attractiveness of residential energy storage to customers with a view to informing the likely timing of larger scale take-up and the levels of subsidy required to facilitate take-up for network purposes.

Criteria #2 This is a broad-based demand management program.

Criteria #3 This project tests the applicability of residential energy storage systems to defer the building of new, or augmentation of existing, network infrastructure.

Criteria #4 The project is non-tariff based.

Criteria #5 SAPN states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is of the nature of opex.

Completed Projects

11.2. Grid Side Storage

11.2.1. Project overview

This is a practical research study, partly funded by ARENA and other parties, into the performance of energy storage systems across the likely applications within the distribution network. With the increasing amount of energy storage system technologies and their applications, this project will produce a mobile testing environment to further develop these technologies and to understand their use in Australian conditions. The project will create a knowledge base for industry and system developers whilst also providing for advanced training facilities on an operational system.

This project is now complete. SAPN reported total project cost of $444,000, with no cost recognised in the 2018–19 period.

11.2.2. Assessment against DMIA criteria

Criteria #1 This project provided insight into the suitability and performance of different storage technologies when utilised in the most likely scenarios for distribution network management and operation.

Criteria #2 This is a broad-based demand management program.

Criteria #3 This project provided a study into the performance of energy storage systems.

Criteria #4 The project is non-tariff based.

Criteria #5 SAPN states that its expenditure for this project was not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is of the nature of opex.

11.3. Future Network Modelling

This project is a comprehensive modelling project, designed to further understand energy storage impacts on the distribution network so as to allow network operations and design to accommodate these systems.

This project is now complete. SAPN reported total project cost of $610,000, with no cost recognised in the 2018–19 period.

11.3.1. Assessment against DMIA criteria

Criteria #1 This modelling aimed to provide insights into the rate of take up of distributed energy resources based on the costs of those resources and the economic returns to the customer. It also enabled insights into the likely impacts on network load profiles.

Criteria #2 This is a broad-based demand management program.

Criteria #3 This project provided a study into the impacts of energy storage systems, which would assist SA Power Networks in forecasting demand management.

Criteria #4 The project is non-tariff based.

Criteria #5 SAPN states that its expenditure for this project was not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is of the nature of opex.

12. TasNetworks 2018–19

We approve TasNetworks' DMIA expenditure of $43,340 in 2018–19 for three projects because these meet the DMIA criteria. The following section sets out our assessment of the individual projects. Detailed information about these projects is available in TasNetworks' 2018–19 DMIA report which is published separately on the AER website at Networks & pipelines - Compliance reporting – Demand management incentive scheme report.

Continuing Projects

12.1. emPOWERing You trial (Tariff trial project)

12.1.1. Project overview

The scope of this project is to gather data on customer usage patterns to improve models and planning using advanced metering technology, and to determine customers' response to new tariff designs and the effect it has on the load placed on the networks.

TasNetworks reports that this project will assist it in modelling customer behaviour and the effect of new tariff designs on network demand. It states that the benefits include: the collection of high quality customer consumption data which has improved planning processes; the provision of network performance data to allow improved identification of problem areas in the network; the provision of metering data for the development of better tariff and demand response products; and testing customer response to cost-reflective demand tariffs.

TasNetworks claimed a percentage of costs related to this project of $1,576 in 2018–19 with the balance funded from the distributor's own opex budget.

12.1.2. Assessment against DMIA criteria

Criteria #1. The purpose of this project is to both shift and reduce the demand for standard control services through a non-network alternative.

Criteria #2 This project is broad-based and not targeted at particular network users.

Criteria #3 This project is designed to build TasNetworks' demand management capability and provide a new potentially efficient demand management mechanism.

Criteria #4 The project is tariff based.

Criteria #5 TasNetworks states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

12.2. Battery Storage on Bruny Island

12.2.1. Project overview

The purpose of this project is to prove that distributed energy storage can be used to defer network investment. It involves the installation of customer energy storage systems on Bruny Island to manage peak load on the cable and reduce the use of diesel. It will also provide validation on the parameters of distributed storage as a solution to network issues.

The trial also includes a significant research component that will provide information and strategies that can be used to improve future use of battery storage.

TasNetworks claimed its share of cost contribution to this project of $41,764 in 2018–19.

12.2.2. Assessment against DMIA criteria

Criteria #1 This project meets the criteria because it seeks to better integrate non-network solutions to help address capacity constraints in the distribution network (rather than relying on network augmentation).

Criteria #2 This project is broad based and not targeted at a particular network user.

Criteria #3 This project is designed to build TasNetworks' demand management capability and provide a new potentially efficient demand management mechanism.

Criteria #4 The project is non-tariff based.

Criteria #5 TasNetworks states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.

12.3. Demand Management Processes

12.3.1. Project overview

This project aims to develop the internal systems required to use demand management to solve network constraints. The project objectives are to use network support to resolve network issues, determine the internal costs for using demand management, and investigate different levels of automation and type of network support.

TasNetworks reports that this project has enabled the development of processes that allow the operational management of network support and has enabled basic tools to be developed that allow TasNetworks to manage services from DER.

TasNetworks did not claim any DMIA expenditure in 2018–19 for this project.

12.3.2. Assessment against DMIA criteria

Criteria #1 The purpose of this project is to both shift and reduce the demand for standard control services through a non-network alternative.

Criteria #2 This project is a broad-based demand management project.

Criteria #3 This project is designed to build TasNetworks' demand management capability.

Criteria #4 The project is not tariff based.

Criteria #5 TasNetworks states that its expenditure for this project is not recovered through any other jurisdictional, state or Australian Government scheme, nor through any other part of the distribution determination for the current regulatory control period.

Criteria #6 Expenditure is in the nature of opex.