Decision

Approval of Demand Management Innovation Allowance (DMIA) expenditures by distributors in 2016–17 and 2017

- **QLD, ACT, NSW, SA and Tasmania** in 2016–17 Financial Year
- **Victoria** in 2017 Calendar Year

July 2018

AUSTRALIAN ENERGY REGULATOR

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Shortened forms

Shortened form	Extended form
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ARC	Australian Research Council
ARENA	Australian Renewable Energy Agency
augex	augmentation expenditure
capex	capital expenditure
CVR	conservation voltage reduction
DER	distributed energy resource
DM	demand management
DMIA	demand management innovation allowance
DMIS	demand management incentive scheme
DNSP	distribution network service provider
DUoS	distribution use of system
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
QUT	Queensland University of Technology
SWER	single wire earth return

1. Summary

The Demand Management Innovation Allowance (DMIA) aims to provide incentives for Distribution Network Service Providers (DNSPs) to conduct research and investigation into innovative techniques for managing demand. 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 a part of the previous Demand Management Incentive Scheme (DMIS), which has been applied to all DNSPs in the national electricity market (NEM) as part of our current distribution determinations.

A new Demand Management Innovation Allowance Mechanism (DMIAM) was established in December 2017 to replace the current DMIA in the forthcoming regulatory control periods of all DNSPs. We also undertook a review of the DMIS and made significant enhancement to the scheme. Details of the new DMIAM and DMIS are available from our web site at https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/demand-management-incentive-scheme-and-innovation-allowance-mechanism.

The DMIA schemes for the current regulatory control periods were published:

- in April 2009 (updated in November 2014) for Victorian DNSPs
- in October and November 2008 for the non-Victorian DNSPs.

This report relates to the operation of the existing DMIA scheme only.

DMIA is provided to each DNSP in the form of a fixed allowance for each regulatory period. We review and approve DNSPs' actual DMIA expenditures on demand management improvement projects each year. We will reject any DMIA expenditures that do not meet the requirements of the DMIA scheme.

If a DNSP has not spent its total DMIA allowance amount in the regulatory period, it will be required to return the underspent amount to customers in the form of tariff reduction in the ensuring regulatory period. However, any over-spent amount would be borne by the DNSP.

DNSPs are required to report their DMIA expenditures and activities to us each regulatory year. We approve or reject DNSPs' claims based on our assessment against the six criteria listed in section 3 of this paper. While descriptive, the criteria enable a wide range of demand management project options.

This report presents our assessment and findings of DNSPs' annual expenditure claims. All 13 electricity distributors provided DMIA reports to us as part of their 2016–17 and 2017 responses to our regulatory information notice (RIN).[1]

How distributors used the DMIA

Distributors had different approaches for utilising the DMIA funding.

[1] Victorian DNSPs reported on their 2017 financial year and non-Victorian DNSPs on their 2016–17 financial year.

Figure 1 compares our total allowance with actual expenditure by distributors for their respective current regulatory periods.[2] Summaries of each DNSP's DMIA expenditures are shown in the tables 1- 4 below covering each of their respective regulatory periods, by jurisdiction.

The expenditure of the distributors, compared to their DMIA allowances, varied widely. This is set out in the tables below and illustrated in

[2] We have approved all the DMIA expenditure claimed by the DNSPs, as the expenditures comply with the DMIA criteria.

Figure 1. While the allowance is for the whole of the regulatory period, the expenditure column gives expenditure to date in the relevant period. Therefore, the comparison is affected by the point in time—for example, first year versus the last year of a five-year period—where the DNSP is in its regulatory period, which differs between DNSPs.

Most distributors are only two or three years into their five-year regulatory control period, so comparisons with their total allocations should be treated cautiously. However, of the 13 distributors reviewed, SA Power Networks and AusNet Services have claimed above their proportional allowance to date, while TasNetworks spent four per cent more than the original DMIA allocation for its five-year regulatory period covered by this report.[3]

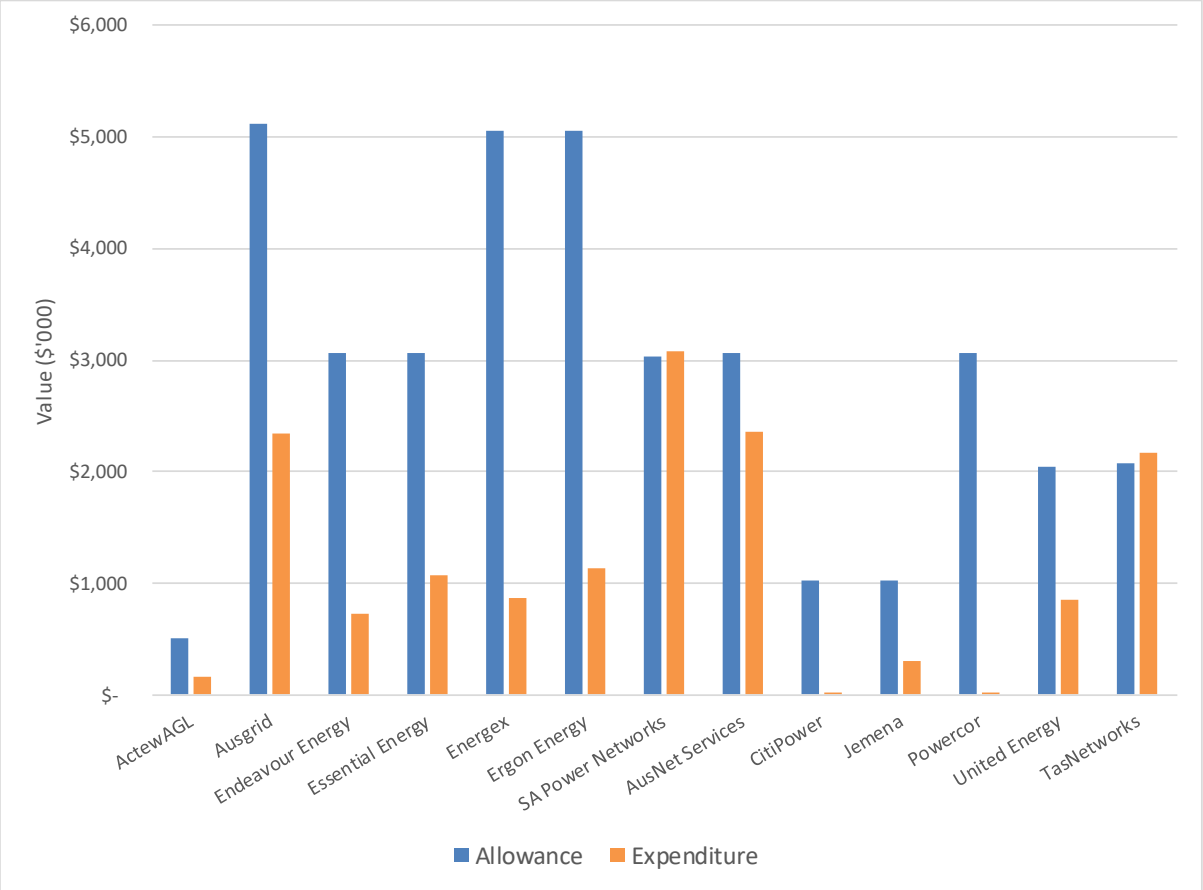
Overall, however, NSW/ACT distributors by their third year have spent an average of 37 per cent of their allowances, Queensland distributors by their second year have spent an average of nearly 20 per cent of their allowances, SAPN by its second year more than 100 per cent of its allowance, and Victorian distributors by their second year an average of 35 per cent of their allowances.

What this pattern also shows is that, rather than spreading out the DMIA project works evenly across the regulatory period, some distributors completed the majority of their DMIA allowance within the two last years of the regulatory control period. Other distributors spent none of their allowance in some years, for example, CitiPower and Powercor spent none of their allowance in 2016, their first regulatory year, and only 3 per cent and 1 per cent, respectively, for the most recent period covered by this report.

Further, the majority of these projects (71 per cent of expenditure in 2016–17 and 2017) were approved in previous years and are continuing into the current period, while 29 per cent of expenditure relates to new projects.

[3] TasNetworks Distribution is currently in its 2017–19 regulatory period, but its DMIA report covered by this decision refers to 2016–17 which is the final year of its previous regulatory period of 2012–17.

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



Source: AER analysis and DMIA reports submitted by DNSPs

Table 1 ACT and NSW DNSPs DMIA expenditure for the 2014–15 to 2018–19 regulatory control period ($'000 nominal)

DNSP	DMIA approved for 2014–15	DMIA approved for 2015–16	DMIA approved for 2016-17	Total DMIA allowance for the period	Total DMIA approved to date	DMIA remaining for the period	Proportion of approved DMIA spent
ActewAGL	72.8	37.6	55.9	511.3	166.3	345.0	33%
Ausgrid	1 363.0	599.7	373.2	5 112.8	2 335.9	2 776.9	46%
Endeavour Energy	378.8	30.6	318.9	3 067.7	728.3	2 339.4	24%
Essential Energy	502.7	266.8	301.4	3 067.7	1 070.9	1 996.8	35%
TOTAL	**2 317.3**	**934.7**	**1 049.4**	**11 759.5**	**4 301.4**	**7 458.1**	**37%**

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

Table 2 QLD and SA DNSPs DMIA expenditures for the 2015–16 to 2019–20 regulatory control period ($' 000 nominal)

DNSP	DMIA approved for 2015–16	DMIA approved for 2016-17	Total DMIA allowance for the period	Total DMIA approved to date	DMIA remaining for the period	Proportion of approved DMIA spent
Energex	427.4	440.2	5 059.2	867.6	4 191.6	17%
Ergon Energy	337.7	794.7	5 059.2	1 132.4	3 926.8	22%
SA Power Networks	1 955.7	1 120.4	3 035.5	3 076.1	-40.6	101%
TOTAL	**2 720.8**	**2 355.3**	**13 153.9**	**5 076.1**	**8 077.8**	**39%**

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

Table 3 TasNetworks DMIA expenditures for the 2012–13 to 2016–17 regulatory control period ($' 000, nominal)

DMIA approved for 2012-13	DMIA approved for 2013-14	DMIA approved for 2014-15	DMIA approved for 2015-16	DMIA approved for 2016-17	Total DMIA allowance	DMIA approved to date	DMIA remaining for the period	Proportion of approved DMIA spent
137.1	49.7	91.0	237.0	1 659.1	2 083.2	2 173.9	NA [a]	104%

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

a: The actual expenditure is more than the allowance;

Table 4 VIC DNSPs DMIA expenditures for the 2016–2020 regulatory control period ($’ 000 nominal)

DNSP	DMIA approved for 2016	DMIA approved for 2017	Total DMIA allowance	DMIA approved to date	DMIA remaining for the period	Proportion of approved DMIA spent
AusNet Services	1 498.7	860.7	3 063.7	2 359.4	704.3	77%
CitiPower	-	28.5	1 021.2	28.5	992.8	3%
Jemena	110.6	200.0	1 021.2	310.6	710.6	30%
Powercor	-	28.5	3 063.7	28.5	3 035.3	1%
United Energy	505.5	350.3	2,042.5	855.7	1 186.7	42%
TOTAL	**2 114.8**	**1 467.8**	**10 212.4**	**3 582.6**	**6 629.8**	**35%**

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

Carryover adjustments under this report

In this 2017 DMIA expenditures determination, we need to calculate a carryover amount adjustment for the Tasmanian electricity distributor. Given that TasNetworks has overspent its DMIA allowance during the 2012-17 regulatory period, there will be no carryover adjustment to be applied in TasNetworks' 2017–19 regulatory control period. That is, TasNetworks' shareholders must fund the over-expenditure, rather than its customers.

DNSPs' DMIA expenditures by activity types

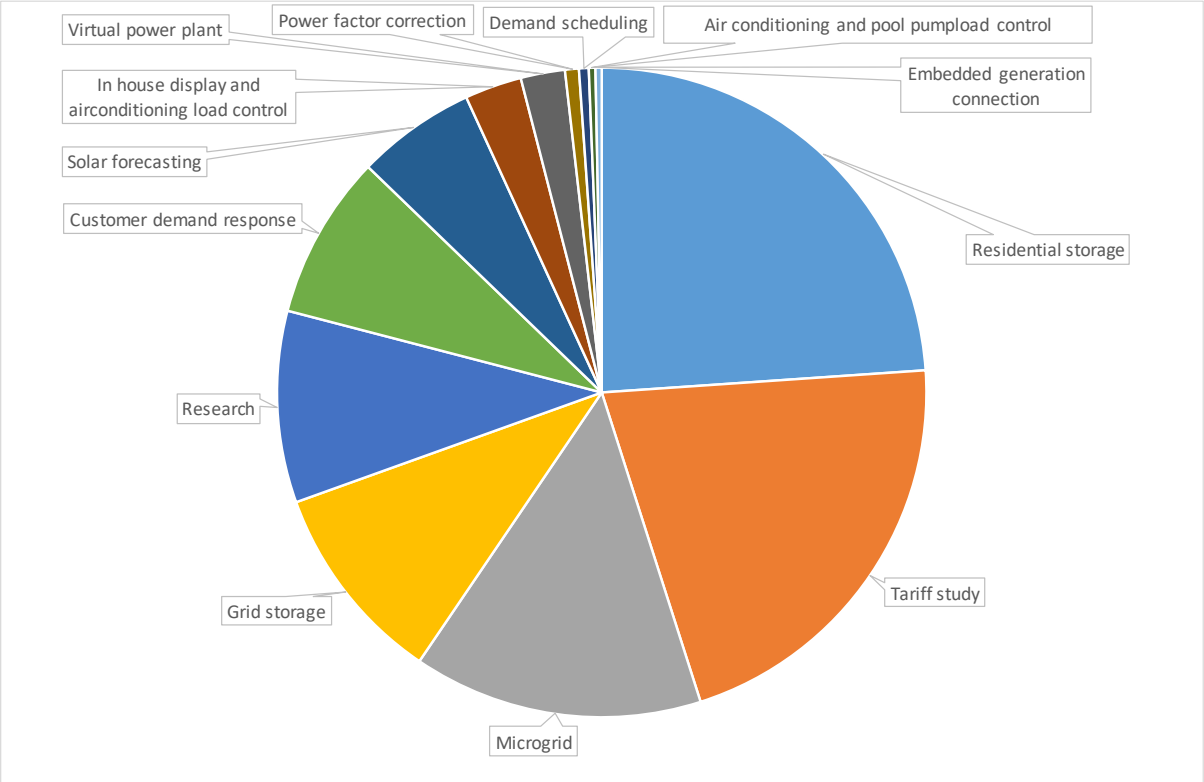
Figure 2 summarises the expenditure by types of projects provided under the DMIA. The projects undertaken vary considerably in both their nature and scale. For example, a large proportion of expenditure was related to two tariff-based projects below designed to incentivise customers to reduce (or shift) their usage at times of peak demand.

- Real time Tariff Study Project - Energex
- emPOWERing You Trial (Tariff Trial Project) - TasNetworks

However, the majority of the projects were non-tariff based. These projects included:

- various trials of technologies with the potential to reduce and/or shift demand through equipment/device control
- improving the storage of renewable energy generated during non-peak times for subsequent use during peak periods
- studies to enable more uptakes of power factor improvement to reduce the feeder load current
- load control options which result in shifting load to non-peak times.

Figure 2 DMIA expenditure by project type, 2016–17 and 2017



Source: AER analysis and DMIA reports submitted by DNSPs

Table 5 DMIA expenditure by project type, 2016–17 and 2017

Project type	Expenditure ($'000 nominal)
Residential storage	1 562
Tariff study	1 382
Microgrid	942
Grid storage	655
Research	623
Customer demand response	533
Solar forecasting	387
In-house display and air-conditioning load control	185
Virtual power plant	144
Power factor correction	45
Demand scheduling	32
Air conditioning and pool pump load control	22
Embedded generation connection	20
TOTAL	6 532

Note: numbers may not add up due to rounding.

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 contained in the DMIS, against which we are required to assess the service providers' claims for the DMIA each year.

Chapter 4 summarises the results of our compliance assessment of service providers' DMIA reports and supporting information.

Chapters 5 to 17 provide our detailed assessment of service providers' DMIA expenditure claims against the criteria contained in the DMIS.

2. Background

The Demand Management Innovation Allowance (DMIA) aims to provide incentives for Distribution Network Service Providers (DNSPs) to conduct research and investigation into innovative techniques for managing demand. 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 a part of the previous Demand Management Incentive Scheme (DMIS), which has been applied to all DNSPs 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 DNSPs. As such, we set out annual reporting requirements for DNSPs for the regulatory control period. DNSPs 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 initiatives they have introduced. We use the information provided in a DNSP's annual DMIA report in our assessment of a DNSP's compliance with the DMIA criteria and entitlement to recover expenditure under the DMIA. The DNSP's report also provides information to stakeholders more broadly on the nature of the DMIA projects that may ultimately be progressed to more mature investments. The information may also facilitate the participation of non-network providers for those projects that go beyond the research or testing phase.

A new Demand Management Innovation Allowance Mechanism (DMIAM) was established in December 2017 to replace the current DMIA in the forthcoming regulatory control periods of all DNSPs. We also undertook a review of the DMIS and made significant enhancement to the scheme. Details of the new DMIAM and DMIS are available from our web site at https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/demand-management-incentive-scheme-and-innovation-allowance-mechanism.

The DMIA schemes for the current regulatory control periods were published:

- in April 2009 (updated in November 2014) for Victorian DNSPs
- in October and November 2008 for the non-Victorian DNSPs.

This report relates to the operation of the existing DMIA scheme only.

To ensure that DNSPs appropriately utilise the DMIA funding, there is an overall expenditure true-up process in the second year of the next regulatory control period. After the results for the five years of the current regulatory control period are known, a single adjustment will be made to return the amount of any underspent or unapproved DMIA amounts to customers. This ensures that the scheme remains neutral in terms of the expenditure profile which the DNSP adopts during the regulatory control period.

3. Demand Management Incentive Scheme criteria

Each year we are required to assess claims for the DMIA against the criteria contained in the DMIS. The DMIA criteria are:

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 DMIA compliance assessments based on the DMIA reports from the following DNSPs:

For the 2016–17 financial year:

- ActewAGL (year 3 of the regulatory period)
- Ausgrid (year 3 of the regulatory period)
- Endeavour Energy (year 3 of the regulatory period)
- Essential Energy (year 3 of the regulatory period))
- Ergon Energy (year 2 of the regulatory period)
- Energex (year 2 of the regulatory period)
- SA Power Networks (year 2 of the regulatory period)
- TasNetworks (final year of the regulatory period).

For the 2017 calendar year:

- AusNet Services (year 2 of the regulatory period)
- CitiPower (year 2 of the regulatory period)
- Jemena (year 2 of the regulatory period)
- Powercor (year 2 of the regulatory period)
- United Energy (year 2 of the regulatory period).

The expenditure of the distributors, compared to their DMIA allowances, varied widely. This is set out in the tables below and illustrated in figure 1. While the allowance is for the whole of the regulatory period, the expenditure column gives expenditure to date in the relevant period. Therefore, the comparison is affected by where the DNSP is in the regulatory period, which differs between DNSPs.

Our observation also shows that, rather than spreading out the DMIA project works evenly across the regulatory period, some distributors completed the majority of their DMIA allowance within the two last years of the regulatory control period. Other distributors spent none of their allowance in some years, for example, CitiPower and Powercor spent none of their allowance in 2016, their first regulatory year that is covered by this report.

Of the 13 distributors reviewed, Ausgrid, AusNet Services and SA Power Networks are on track to spend their allowance. We, however, cannot discount the possibility that the DNSPs will be able to fully utilise the DMIA funding by the end of their respective regulatory period.

TasNetworks spent more than its allocation by the time of the final year of its five year regulatory period that is covered by this report.[4]

Table 6 ACT and NSW DNSPs DMIA expenditure for the 2014–15 to 2018–19 regulatory control period ($'000 nominal)

DNSP	DMIA approved for 2014–15	DMIA approved for 2015–16	DMIA approved for 2016-17	Total DMIA allowance for the period	Total DMIA approved to date	DMIA remaining for the period	Proportion of approved DMIA spent
ActewAGL	72.8	37.6	55.9	511.3	166.3	345.0	33%
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Essential Energy	502.7	266.8	301.4	3 067.7	1 070.9	1 996.8	35%
TOTAL	**2 317.3**	**934.7**	**1 049.4**	**11 759.5**	**4 301.4**	**7 458.1**	**37%**

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

Table 7 QLD and SA DNSPs DMIA expenditures for the 2015–16 to 2019–20 regulatory control period ($' 000 nominal)

DNSP	DMIA approved for 2015–16	DMIA approved for 2016-17	Total DMIA allowance for the period	Total DMIA approved to date	DMIA remaining for the period	Proportion of approved DMIA spent
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SA Power Networks	1 955.7	1 120.4	3 035.5	3 076.1	-40.6	101%
TOTAL	**2 720.8**	**2 355.3**	**13 153.9**	**5 076.1**	**8 077.8**	**39%**

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

Table 8 TAS DNSP DMIA expenditures for the 2012–13 to 2016–17 regulatory control period ($' 000, nominal)

DNSP	DMIA approved for 2012-13	DMIA approved for 2013-14	DMIA approved for 2014-15	DMIA approved for 2015-16	DMIA approved for 2016-17	Total DMIA allowance	DMIA approved to date	DMIA remaining for the period	Proportion of approved DMIA spent
TasNetworks	137.1	49.7	91.0	237.0	1 659.1	2 083.2	2 173.9	NA [a]	104%

[4] TasNetworks distribution is now in its first year of the new regulatory period, but the report relates to year 5 of its previous regulatory period.

a: The actual expenditure is more than the allowance

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

Table 9 VIC DNSPs DMIA expenditures for the 2016–2020 regulatory control period ($' 000 nominal)

DNSP	DMIA approved for 2016	DMIA approved for 2017	Total DMIA allowance	DMIA approved to date	DMIA remaining for the period	Proportion of approved DMIA spent
AusNet Services	1 498.7	860.7	3 063.7	2 359.4	704.3	77%
CitiPower	-	28.5	1 021.2	28.5	992.8	3%
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Powercor	-	28.5	3 063.7	28.5	3 035.3	1%
United Energy	505.5	350.3	2 042.5	855.7	1 186.7	42%
TOTAL	2 114.8	1 467.8	10 212.4	3 582.6	6 629.8	35%

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

4.2. Carryover adjustment

4.2.1. Background

In this 2016-17 DMIA determination the AER is required to calculate a carryover amount adjustment for TasNetworks.

Under the DMIA scheme, distribution network businesses are given an allowance for demand management projects. The allowance forms part of their regulated revenue requirement for a regulatory control period.

The distribution network businesses do not have to spend the allowance they are given and may decide to only spend some, or none, of it. Factoring this in, the DMIA scheme provides that the AER must calculate a carryover adjustment. The purpose of the carryover adjustment is to return to customers the proportion of an electricity network distributor's DMIA allowance that has not been spent. It also returns to customers any expenditure incurred by an electricity network distributor, but not approved by the AER. In that regard, the carryover adjustment is a "true–up" between an electricity network distributor's ex ante DMIA allowance for a regulatory control period and the AER's ex post review of any under–expenditure, with the difference returned to customers.

Additionally, the carryover adjustment must be calculated in a way that distribution network businesses will be indifferent in net present value (NPV) terms to its DMIA expenditure

profile over the regulatory control period. The purpose of this is to 'remove any incentive for distribution network businesses to defer or advance expenditure'.[5]

The carryover adjustment operates between regulatory periods. For example, in the case of the TasNetworks any under–expenditure in their 2012–17 regulatory control period will be "trued–up" by applying the carryover adjustment in the 2017–19 regulatory control period.

4.2.2. Calculation of carryover adjustment

When calculating the carryover adjustment to be applied to the non–Victorian distributors revenues in their current regulatory control periods, we are required to use the formula set out in the DMIA scheme.

This formula calculates the carryover adjustment on a cumulative basis. That is, any under– or over–expenditure in one year is rolled over to the following year. It also includes a weighted average cost of capital (WACC) adjustment. By making this WACC adjustment, a distributor is indifferent in NPV terms to when it spends its DMIA allowance over a regulatory control period. The DMIA scheme carryover 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 carryover 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 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 carryover adjustment is made.

TasNetworks overspent its DMIA allowance during the 2012–17 regulatory period, therefore there will be no carryover adjustment to be applied in TasNetworks' 2017–19 regulatory control period. That is, TasNetworks' shareholders must fund the over-expenditure, rather than its customers.

[5] AER, *Demand management incentive scheme for the ACT and NSW 2009 distribution determinations: Demand management innovation allowance scheme*, November 2008, p. 17.

5. ActewAGL 2016–17

We have approved ActewAGL's DMIA expenditure of $55,871 for one project in 2016–17. The demand management project meets the DMIA criteria. The following section sets out our assessment of the project. Detailed information on the project is available in ActewAGL's 2016–17 DMIA report which is published separately on our website.

Continuing Project

5.1. Residential Battery Energy Storage

5.1.1. Project overview

This project involves the installation of 16 storage units in general public premises totalling 128kWh of available storage to explore potentially efficient demand management mechanisms through the use of distributed storage at a domestic scale. The project was implemented through a collaborative effort with the supplier and ActewAGL Retail. The technical phase of the project concluded in 2016–17. Project costs were spread over the 2014-15, 2015-16 and 2016-17 financial years. ActewAGL claimed DMIA expenditure of $55,871 in 2016-17.

5.1.2. Assessment against DMIA criteria

Criteria #1 This project assesses the impact on network load from customers and network management of battery storage distributed at a residential level. The project aims to quantify the shift in demand that can be obtained through the use of domestic batteries.

Criteria #2 This is a broad-based demand management project that targets domestic consumers.

Criteria #3 This project will explore potentially efficient demand management mechanisms through the use of distributed storage at a domestic scale.

Criteria #4 The project is non-tariff based.

Criteria #5 Expenditure for this project is not recoverable 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 The expenditure is in the nature of capex.

6. Ausgrid 2016–17

We approve DMIA expenditure of $373,186 in 2016–17 for eight projects because these meet the DMIA criteria. These projects consist of one new project and seven ongoing projects. One of the ongoing projects have no expenditure for 2016–17. The following section sets out our assessment of the individual projects. Detailed information about these projects is available in Ausgrid's 2016–17 DMIA report which is published separately on our website.

New Project

6.1. Demand Management for Replacement Needs

6.1.1. Project overview

This 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 will consist 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(s).
Part B – Feasibility studies into 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 $5,552 for this project in 2016–17.

6.1.2. 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 and this will be an important project in building demand management capability for this type of application.

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 markedly from typical overload risk and 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 This criterion is met because 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

6.2. AS4755 Air Conditioner and Pool Pump Load Control

6.2.1. Project overview

This project explores the potentially cost-effective method of controlling residential air conditioners and pool pumps using AS4755[6] compliant devices and how this solution could form a component of demand management programs.

The project scope is considered to be complementary to existing and proposed trials by other Australian DNSPs.

Ausgrid claimed DMIA expenditure of $21,518 for this project in 2016–17.

6.2.2. Assessment against DMIA criteria

Criteria #1 Direct load control of air conditioners and pool pumps can help lower summer peak demand. The results from this customer trial will help facilitate the take-up of direct load control options.

Criteria #2 This is a peak demand management project.

Criteria #3 This research improves Ausgrid's capacity to effectively deploy these technologies that enable peak demand reductions.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

6.3. Cool Saver Maitland Program

6.3.1. Project overview

This project sought to identify a trial area to investigate an alternative approach that aims to leverage the initial purchase and installation of new AS4755-compliant air conditioners and to lower the cost of customer acquisition and participation, whilst simplifying the process for customers.

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[6] The AS4755 standard is a framework for demand response capabilities and supporting technology for electrical products. (Ausgrid, *Demand Management Allowance Submission 2016/17*, September 2017, p. 6.)

This project is projected to be completed in 2017–18.

Ausgrid claimed DMIA expenditure of $92,321 for this project in 2016–17.

6.3.2. Assessment against DMIA criteria

Criteria #1 The project explored whether a previously trialled low-cost method for obtaining residential customer/air conditioner participation is effective in a limited metropolitan area.

Criteria #2 This is a peak demand management project.

Criteria #3 This project satisfies this condition as it explores the market potential for a low-cost demand management mechanism which uses technology known to be effective.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

6.4. Customer Power Factor Correction

6.4.1. Project overview

This project aims to explore ways to clear the range of barriers to investment in more energy efficient equipment so as to improve the effectiveness and efficiency of future power factor correction programs for network deferral projects.

Ausgrid claimed DMIA expenditure of $45,042 for this project in 2016–17.

6.4.2. Assessment against DMIA criteria

Criteria #1 By correcting the customer's power factor, the kVA demand from customers is reduced.

Criteria #2 This project can be useful in managing peak demand (a peak demand management project) as Ausgrid is proposing to target customers in areas that have network constraints, as well as improve energy efficiency overall.

Criteria #3 Encouraging power factor correction is a useful tool to manage demand.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.[7]

Criteria #6 Expenditure is in the nature of opex.

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[7] Ausgrid, *Demand Management Allowance Submission 2016/17*, September 2017, p. 2.

6.5. Winter Air Conditioner Load Control

6.5.1. Project overview

This project involved making a winter air conditioner load control offer to existing demand management trial participants who took part in the Central Coast Cool Saver trial.[8] This leveraged previous DMIA project activities and load control equipment already in place for these customers. An offer was made to participants in June 2016 and the trial period ran during winter 2016. The main rationale of the project was to test the viability of a residential winter peak demand reduction program focused at reducing the electrical load from air conditioners used for heating.

Ausgrid claimed DMIA expenditure of $ 36,070 for this project in 2016-17.

6.5.2. Assessment against DMIA criteria

Criteria #1 The project investigates the viability of a residential winter peak demand reduction program focused at reducing the electrical load from air conditioners used for heating. This may help reduce the winter peak demand affecting 20 per cent of Ausgrid's zone substations.

Criteria #2 This is a peak demand management project.

Criteria #3 This project satisfies this condition as it explores a potentially efficient demand management mechanism.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

6.6. DMIA Stakeholder Engagement

6.6.1. Project overview

This project will formally consult with demand management (DM) stakeholders to identify new and innovative DM solutions for potential Ausgrid DMIA projects.

While informal discussions with electricity networks, key DM providers and stakeholders have provided important input into Ausgrid’s DMIA program to date, there has been no formal engagement with DM stakeholders on the DMIA. To canvas the views of a broad range of stakeholders, it was proposed to engage with them through a formal consultation process.

Ausgrid claimed DMIA expenditure of $37,700 for this project in 2016–17.

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[8] Part of Ausgrid’s AS4755 air conditioner and pool pump load control DMIA project

6.6.2. Assessment against DMIA criteria

Criteria #1 The project aims, through formal consultation with DM stakeholders, to discover new and innovative DM solutions which might form potential cost effective demand management solutions for deferral of network investment.

Criteria #2 This is a peak demand management project.

Criteria #3 This project satisfies this condition as it builds demand management capability.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

6.7. Solar and Battery Customer Research

6.7.1. Project overview

This project involves approaching a large sample (10,000 to 20,000) of Ausgrid customers to participate in a survey about solar and battery systems to understand the purchasing motivations and potential future uptake of solar and battery systems. Both residential and non-residential customers will be invited to participate in the survey as well as existing solar and non-solar customers.

Ausgrid claimed DMIA expenditure of $134,983 for this project in 2016–17.

6.7.2. Assessment against DMIA criteria

Criteria #1 The project investigates customer interest in and likely take up of battery systems. Installation of battery systems may help reduce summer peak demand, and hence the need for network augmentation.

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 This project satisfies this condition as it explores the potential take-up of a technology that may be used as a demand management mechanism.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

6.8. CBD Embedded Generator Connection (Phase 2)

6.8.1. Project overview

The aim of the project is to develop, design and test an alternative embedded generator connection in the Sydney CBD that is cost effective and addresses the potential fault level issues which are currently a barrier to their widespread uptake in these types of network locations.

Further, the proposed solution should be applicable to typical generator sizes in the majority of CBD locations and be substantially less expensive than current solutions.

Phase 2 of this project involves the identification of suitable site and installation of alternative embedded generator connection including detailed connection design. It further involves monitoring and verification of connection to verify utility of the generators as a demand management resource.

Ausgrid did not claim any DMIA expenditure for this project Phase 2 in 2016–17. It forecasts an expenditure of $40,000 in 2017–18.

6.8.2. Assessment against DMIA criteria

Criteria #1 The project can enable greater levels of embedded generation in the Sydney CBD which can help alleviate pressure on CBD electricity demand.

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 Better integration of embedded generation can be used as part of an effective demand management strategy.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

7. AusNet Services 2017

AusNet Services is claiming DMIA expenditure for two demand management projects totalling $860,657 for 2017. We approve this expenditure as the projects meet the DMIA criteria. The following section sets out our assessment of the individual projects. For more detailed information about these projects, including any identifiable benefits derived from the projects, please refer to AusNet Services' 2017 DMIA report published separately on AER's website.

Continuing Projects

7.1. Mooroolbark Community Mini Grid Trial

7.1.1. Project Overview

The project encompasses the design, build and operation of an 18-house mini grid in Mooroolbark that will be monitored and controlled by a cloud-based mini grid control system that can implement Distribution System Operator (DSO) control functions and algorithms. The project aims to:

- understand the full value potential of concentrated and controllable distributed energy resources (DER) in providing demand management and network support, as well as the techniques to achieve this
- develop strategies to manage an increasing level of customer-driven DER
- learn how to facilitate community driven energy initiatives such as renewable energy projects and micro grids in a way that is not only efficient, but is beneficial to the network.

The project will also test the performance of DER systems in providing backup supply to individual customers in case of network outage, and also the ability for the mini-grid as a whole to operate as an island (grid-separated mode) for short periods of time, with sharing of power between customers in order to maintain system stability and longevity.

AusNet Services claimed DMIA expenditure in 2017 of $600,100 for this project. Further DMIA costs are expected in 2018 to finalise the project. The final phase will involve completing operational function development and trials, data analysis and reporting.

7.1.2. Assessment against DMIA criteria

Criteria #1 Coordinated distributed energy resources will reduce network peak demand, reduce energy at risk, potentially defer asset augmentation, and increase supply reliability by providing islanded supply to customers during outages.

Criteria #2 This is a peak demand management program.

Criteria #3 The trial project will test the technical viability of the mini-grid to demonstrate these benefits, test the customer appetite and acceptance, and evaluate the economic viability of different structures of mini-grids and community energy projects. The lessons from the project will ultimately help build AusNet Services' toolkit for delivery of non-network

and demand-side solutions. However, if the services provided were unregulated at commercial scale, AusNet Services would need to provide these whilst complying with ring-fencing requirements.

Criteria #4 The project is non-tariff based.

Criteria #5 This criteria is met because 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 capex.

7.2. Grid Energy Storage System (GESS) Trial

7.2.1. Project Overview

In 2012, AusNet Services initiated a Grid-scale Energy Storage System (GESS) project to trial the use of a large battery storage system to defer asset augmentation by managing peak demand and explore other benefits of storage systems to network management. The GESS will shift demand on a particular feeder from peak to off-peak times by discharging during feeder peaks and re-charging overnight when the feeder demand is low. In practice, the GESS is suited to addressing a specific network constraint and is containerised to allow portability to different locations as required.

AusNet Services claimed DMIA expenditure of $260,557 for this project in 2017, and stated that there will be further DMIA costs in 2018 for this project. Further costs are for completing system performance enhancements and preliminary design work.

7.2.2. Assessment against DMIA criteria

Criteria #1 Using large-scale storage connected at grid-level enables AusNet Services to defer asset augmentation, reduce the risk of asset overloads, improve power quality and mitigate the risk of customer outages.

Criteria #2 This is a peak demand management program.

Criteria #3 The trial will provide AusNet Services practical experience to better understand and assess the level of network value of grid-scale energy storage. Further, this trial will help to establish whether battery storage is a credible non-network solution to managing demand and to set the parameters around when it can be economically deployed for the benefit of energy consumers.

Criteria #4 The project is non-tariff based.

Criteria #5 This criteria is met because 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. CitiPower 2017

CitiPower did not report any DMIA project in 2017 nor claimed an innovation allowance for this period.

However, its associate DNSP, Powercor, made a DMIA claim in 2017 for an amount of $56,903 for an air conditioning demand analytics tool. Powercor reported that as this tool will be used across both CitiPower and Powercor networks, the cost will be split evenly between the allowance for the two networks (or $28,451.50 for each DNSP).

See section 14 below for discussion of Powercor's DMIA claim.

9. Endeavour Energy 2016–17

We approve DMIA expenditure of $318,937 for one project in 2016-17 because it meets the DMIA criteria. The following section sets out our assessment of the project. For more detailed information about the project, please refer to Endeavour Energy's 2016-17 DMIA report which is published separately on the AER's website.

New Project

9.1. Residential Battery Energy Storage Trial

9.1.1. Project overview

This project is focused on investigating how Endeavour Energy can use battery storage technology to reduce peak demand, improve power quality and defer or avoid capital investment in terms of technical viability and financial attractiveness to both the customer and the company.

Parklea Zone Substation has been chosen for the trial as the area has an existing high penetration of PV systems with the potential to maximise the energy storage benefits for customers. The site is also identified as a future network constraint due to the increased growth from re-zoning and developments along the North Wet Rail corridor.

9.1.2. 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 This criteria is met because 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.

10. Essential Energy 2016–17

Essential Energy is claiming 2016–17 DMIA expenditure of $301,375 for five demand management projects. We approve this expenditure as the projects meet the DMIA criteria. The following section sets out our assessment of the individual projects. For detailed information about these projects, please refer to Essential Energy's 2016-17 DMIA report published separately on the AER's website.

New Projects

10.1. Networks Renewed

10.1.1. Project overview

This project is an ARENA part-funded industry project with the Institute of Sustainable Futures, Reposit Power, SMA[9], United Energy, and New South Wales and Victorian Governments to connect over 1MW of customer and network owned solar systems and battery storage systems. As part of the project around 200 households or equivalent businesses will have a combination of solar and energy storage installed to support the distribution network by storing excess electricity and reducing peak demand on the network. Potentially up to half of the specified households and installed capacity may be connected to Essential Energy's network across two locations.

Essential Energy claimed its share of cost contribution to this project of $81,796 in 2016–17.

10.1.2. 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 This criterion is met because funding via the DMIA is complementary to ARENA and other stakeholders' funding for the project. The distributor is claiming its own cost hence complying with this criterion.

Criteria #6 Expenditure is in the nature of opex.

[9] SMA Solar Technology AG is a solar energy equipment supplier with headquarters in Germany.

10.2. Demand and Energy – Technology and Environment Paper

10.2.1. Project overview

Under this project, Essential engaged a consultant to report on customer and utility scale technologies, trials and related environmental changes that are likely to impact electricity demand and energy use within a series of defined periods.

Essential Energy claimed $154,071 DMIA expenditure for this project in 2016–17.

10.2.2. Assessment against DMIA criteria

Criteria #1 The objective for the scope of works is a critical assessment of the potential and likely impacts on Essential Energy's electricity demand, energy usage and customer base within 5, 10 and 20-year time horizons as a result of changing technologies and related environmental conditions, specifically: new and emerging technologies and technology usage trends; technology impact potential and cost pathways; pilots, trials and related announcements from other utilities in Australia and around world; and related regulatory changes underway.

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

Criteria #3 The project aimed to identify, assess, forecast and report on customer and utility scale technologies, trials and related environmental changes that are likely to impact electricity demand and energy use within a series of defined periods. Quantifying such impacts will help Essential Energy optimise internal strategies whilst also drive change within the broader energy market for the long-term interest of customers within the NEM.

Criteria #4 The project is not tariff based.

Criteria #5 This criterion is met because expenditure for this project cannot be 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.

10.3. Demand Management (DM) Best Practice Paper

10.3.1. Project overview

Essential Energy engaged a consultant to critically assess worldwide best practice processes, information and technology in electricity non-network alternatives analysis and selection with an understanding of the regulatory frameworks and incentives. The assessment included case studies on four distribution network business selected from around the world.

Essential Energy claimed DMIA expenditure of $57,509 in 2016-17 for this project.

10.3.2. Assessment against DMIA criteria

Criteria #1 The project will allow Essential Energy to identify ways to improve its resource and methodological approaches for identifying and analysing the potential benefits and costs of demand management and other non-network alternatives.

Criteria #2 The project relates to broad based demand management.

Criteria #3 The project will assist Essential Energy to build its demand management capability. Quantifying the impacts of new and emerging technologies under different tariffs, regulations and operating models within a road map to the future network will help Essential Energy optimise internal strategies to achieve a best practice business in performance, efficiency, offering value to customers while maintaining downward pressure on network charges. Such knowledge will also help Essential Energy drive the required change within the broader energy market, that may include technology and non-technology based initiatives, for the long-term interest of customers within the NEM.

Criteria #4 The project is not tariff based.

Criteria #5 This criterion is met because expenditure for this project cannot be 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

10.4. Switched Reactors

10.4.1. Project overview

This project has been developed to reduce reactive power demands in single wire earth return (SWER) systems thereby reducing the network voltage swing, reducing losses, reducing the need for larger isolation transformers, deferring or removing the need for augmentation and lowering the cost of supply to customers.

Essential Energy claimed DMIA expenditure in 2016-17 of $2,663 for this project.

10.4.2. Assessment against the DMIA criteria

Criteria #1 The development of switched reactors may allow Essential Energy to better manage voltage swings, which in turn can defer augmentation on SWER lines.

Criteria #2 The technology explored in this project can be used in broad-based demand management.

Criteria #3 This project will improve demand management capability and explore potentially efficient demand management mechanisms on SWER lines.

Criteria #4 The project is non–tariff based.

Criteria #5 This criterion is met because 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 capex.

10.5. Conservation Voltage Reduction through Low Voltage Regulators

10.5.1. Project overview

This project has been developed in order to: evaluate the technical requirements and performance characteristics of conservation voltage reduction (CVR) in the Essential Energy network; build Essential Energy's technical knowledge for further development in the areas of power quality rectification, remote control, CVR and small-scale generation; and evaluate the reliability, usability and functionality of three phase low voltage regulators.

Essential Energy claimed DMIA expenditure $5,335 in 2016-17 for this project.

10.5.2. Assessment against the DMIA criteria

Criteria #1 CVR is a lowering of voltage at the customer connection point in order to increase end use efficiency, lower peak demand, lower energy use and decrease losses without adversely power quality.

Criteria #2. The project is about broad based demand management.

Criteria #3 The project aims to test CVR at low voltage in order to allow a separation between HV and LV voltages. Longer term, if successful, the completion of this project will allow Essential Energy to provide the business case for CVR at low voltage and develop programs for the conservation of energy where economically viable, and defer network augmentation through either the reduction of demand through the use of CVR or the implementation of low voltage regulators to support the voltage at times of peak demand, with energy conservation as the secondary benefit.

Criteria #4 The project is non–tariff based.

Criteria #5 This criterion is met because 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 and capex.

11. Energex 2016–17

Energex is claiming DMIA expenditure of $440 211 in 2016–17 for four demand management projects. We approve this expenditure as the projects meet the DMIA criteria. The following section sets out our assessment of the individual projects. For more information about these projects, please refer to Energex's 2016–17 DMIA report published separately on AER's website.

New Projects

11.1. Battery Energy Storage Systems (BESS) Pilot

11.1.1. 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.

Energex claimed DMIA expenditure in 2016–17 of $352,634 for this project, broken down into opex ($316 572) and capex ($36 062).

11.1.2. 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 This criterion is met because 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 and capex.

11.2. Real Time Tariff Study

11.2.1. Project overview

Energex introduced new electricity tariffs on 1 July 2016 which are demand based, have a time-of-use structure and will encourage emerging technologies such as battery storage to

connect to the electricity network. The Real Time Tariff Study's scope is to research the impact of the new demand tariffs and complementary Smart Control tariffs on small, low voltage customers, and how educational and promotional materials can be used to increase demand tariff adoption.

Energex claimed DMIA expenditure in 2016–17 of $85,623 for this project.

11.2.2. Assessment against DMIA criteria

Criteria #1 This project aimed to research the impact of the new demand tariff and complementary Smart Control tariff on small, low voltage customers, and how educational and promotional materials can be used to increase demand tariff adoption.

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 tariff based.

Criteria #5 This criterion is met because 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.

11.3. Low Voltage Network Power System Static-State Estimation

11.3.1. 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 2016-17 of $1,659 for this project.

11.3.2. 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 This criterion is met because 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.[10]

Criteria #6 Expenditure is in the nature of opex

11.4. Solar Enablement Initiative

11.4.1. 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 2016-17 of $296 for this project.

11.4.2. 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 This criterion is met because 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.[11]

Criteria #6 Expenditure is in the nature of opex.

[10] Energex, *2016–17 DMIA RIN Report - Demand management*, 31 August 2017, p. 11.

[11] Energex, *2016–17 DMIA RIN Report - Demand management*, 31 August 2017, p. 11.

12. Ergon Energy 2016–17

Ergon Energy is claiming $794,735 DMIA expenditure for nine demand management projects for 2016–17.

We approve these expenditures as the projects meet the DMIA criteria. Four projects were continuing from 2015-16 and five are new projects. The following section sets out our assessment of the individual projects. For detailed information about these projects, please refer to Ergon Energy's 2016-17 DMIA report which is published separately on the AER's website.

New Projects

12.1. Feeder of the Future Baselining – probe reads and connected meters (two projects)

12.1.1. Project overview

This project seeks to obtain network and load profile data to enable detailed baselining and modelling of the network for supporting future projects and the Feeder of the Future research. The project will develop the data from the Hervey Bay area which has some of the highest penetrations of residential solar systems in Australia.

The first phase of the project was to probe read all meters that have data storage capabilities to capture historic data. The second phase was to install a range of connected meters to enable continuous data collection for future network modelling. The installation of connected meters also enables future anticipated projects.

The project has completed the two components, probe reads and installation of connected meters, and is continuing to collect data for network modelling purposes.

Ergon Energy claimed combined DMIA expenditure of $387,466 in 2016-17 for this project, $35,187 for probe reads and $352,279 for connected meters.

12.1.2. Assessment against DMIA criteria

Criteria #1 For a residential area of very high penetration levels of solar PV, the project will establish a baseline data set for complex network modelling, and enable other technology-based trials delivered through market mechanisms

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

Criteria #3 The project (1) provides a baseline set of data for network modelling to determine the most efficient combination of network side and demand side technologies to manage future network risks, (2) removes barriers for customer adoption of cost reflective tariffs and with a historic baseline the demand impacts of cost reflective tariffs can be modelled, and (3) provides a baseline data set which can be used for determining the demand impacts of emerging customer technologies, Home Energy Management Systems and Energy Storage, which may form part of future trials in this area.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

12.2. Grid Advocacy

12.2.1. Project overview

This project tests 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 aims 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 are used in the field trial.

Ergon Energy claimed DMIA expenditure of $175,887 in 2016-17 for this project.

12.2.2. 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 Cost-reflective tariffs and demand side technology can reduce peak demand and network risks, and it is important to gain a better understanding of this. The uptake or not 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 This criterion is met because 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.

12.3. After Diversity Maximum Demand (ADMD) Calculator Pilot

12.3.1. Project overview

This project piloted and assessed the utility and acceptance of the After Diversity Maximum Demand (ADMD) Calculator with developers in order to assess any product improvements to

enable developers to accept the modelling tool, the likely uptake of demand side initiatives by developers, and commence integration into business as usual activities if appropriate.

This project is now complete and was considered to be accepted as a significant opportunity in guiding, informing and educating developers and their consulting electrical engineers as to the interventions in greenfield homes to improve costs and network outcomes.

Ergon Energy claimed DMIA expenditure of $29,653 in 2016–17 for this project.

12.3.2. Assessment against DMIA criteria

Criteria #1 The project establishes a methodology to dynamically calculating demand, and can potentially support construction of housing stock with lower demand profiles, in turn supporting emerging cost-reflective tariffs.

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

Criteria #3 An ADMD calculator provides developers a defined methodology to determining the value of a demand side intervention, such as energy storage or controllable loads. This tool if accepted may provide developers a methodology for building low-demand housing stock, which in the longer term will support cost-reflective tariffs, lower network infrastructure and reduce the pressure on electricity prices.

Criteria #4 This project is non-tariff based.

Criteria #5 This criterion is met because 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.

12.4. Home Energy Management Systems

12.4.1. Project overview

This project was to test next generation Home Energy Management Systems (HEMS) in a laboratory environment to determine: the capability of the market segment, the likely interface mechanisms for the network to interface and communicate to such systems, and potential barriers for consumer adoption.

The project has been completed with the successful installation and testing of a next generation HEMS in the Cairns Innovation Laboratory. The project has identified an improvement in the capabilities of HEMS technology and the requirement for a standard communication methodology for the network to interface with HEMS technology.

Ergon Energy claimed DMIA expenditure of $20,538 in 2016–17 for this project.

12.4.2. Assessment against DMIA criteria

Criteria #1 HEMS are expected to deliver value to consumers through the ability to manage appliances, minimising their energy costs. Understanding the HEMS capabilities and barriers to uptake can enable the network to develop product offerings for consumers.

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

Criteria #3 HEMS are expected to deliver value to consumers through the ability to manage appliances, minimising their energy costs. To date the HEMS market has been slow to gain traction with consumers. Understanding HEMS capabilities and barriers to uptake can enable the network to develop product offerings for consumers.

Criteria #4 The project is not tariff based.

Criteria #5 This criterion is met because 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

12.5. Feeder of the Future Research

12.5.1. Project overview

This project aims to gain a better understanding of customer loads and modelling based on individual customer metering data. To achieve this, the project will perform data analytics and machine learning techniques so that a model of customer load, based on variables such as house size, temperature and solar irradiance can be developed. This model will then be used to estimate the effect customer battery systems would have on overall feeder loads.

Ergon Energy claimed DMIA expenditure of $975 in 2016-17 for this project.

12.5.2. Assessment against DMIA criteria

Criteria #1 The modelling developed in this project will be used to gain a better understanding of aggregate customer load when battery systems and other modern devices are installed, which may in the future assist in the reduction of network peak demand..

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

Criteria #3 Enabling more accurate models of the consumer side technologies that may be leveraged for managing peak demand enables our demand management program to better quantify the benefits of a program and to develop products which consumers may adopt that support a reduction in peak demand.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

12.6. Centralised Energy Storage System (CESS)

12.6.1. 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.

Stage 1 of the project has been completed and involved the procurement and commissioning of an 83kVA/200kWh energy storage system as a flexible test and development platform.

This project is currently in Stage 2 which involves utilising the CESS platform for the development of advanced control algorithms for network and isolated applications.

Ergon Energy claimed DMIA expenditure of $20,663 in 2016-17 for this project.

12.6.2. Assessment against DMIA criteria

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

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

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

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

12.7. Internet of Things (IoT) Load Control

12.7.1. Project overview

This project aims to evaluate the suitability and applicability of a Low Power Wide Area Wireless Network, belonging to the family of IoT, to provide transport services for signalling (i.e. controlling) and reporting of consumers' demand response enabling devices (DRED). It also aims to develop an end-to-end solution and evaluate it in a proof of concept deployment.

Ergon Energy claimed DMIA expenditure of $114,398 in 2016-17 for this project.

12.7.2. Assessment against DMIA criteria

Criteria #1 This project will explore the emerging IoT technologies and validate the cost, operational and technical benefits for managing consumer side devices for reducing peak demand.

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

Criteria #3 This project will explore the emerging IoT technologies and validate the cost, operational and technical benefits for managing consumer side devices for reducing peak demand, which may lead to deferring network augmentation.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

12.8. Australian Research Council (ARC) Customer Response and Risk Management

12.8.1. Project overview

This project, a collaboration between the Australian Research Council (ARC) and the Queensland University of Technology (QUT), will research the customer response and risks associated with demand management, direct control of appliances and tariff signals.

This project will perform detailed research in Townsville, Northern Territory with existing customers to research the customers' tolerance to changes in utility service levels, enablement of the utility to directly control appliances in the home, the application of essential services circuits and the utilisation of efficient technologies in rental properties. This research will provide a platform for Ergon Energy's future development of demand management products and the integration of tariffs with technology.

Ergon Energy claimed its share of cost contribution to this project of $45,155 in 2016-17.

12.8.2. Assessment against DMIA criteria

Criteria #1 This project will research the customer response and risks associated with demand management via direct control of appliances and tariff signals.

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

Criteria #3 This project will research the customer response and risks associated with demand management via direct control of appliances and tariff signals, which may lead to future network demand management and the defer of network augmentation.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because funding via the DMIA is complementary to ARC funding for the project. The distributor is claiming its own cost hence complying with this criterion.[12]

Criteria #6 Expenditure is in the nature of opex.

[12] Ergon Energy, *Demand Management Innovation Allowance Report 2016–17*, 31 October 2017, p. 7.

13. Jemena 2017

Jemena is claiming DMIA expenditure of $200,000 for one demand management project in 2017. We approve this expenditure as the project meets the DMIA criteria, and our assessment of the project is set out below. For detailed information on this project, please refer to Jemena's 2017 DMIA report published separately on our website.

New Project

13.1. Residential Demand Response

13.1.1. Project Overview

This project was proposed in response to emerging capacity constraints in Jemena's network and enable deferral or avoidance of augmentation capex in residential areas. The trial was developed in 2017 and conducted over the 2017-18 summer period in constrained areas of the network (in six suburbs). The trial targeted recruitment of at least 600 households. The trial was designed to test the hypothesis that if customers are provided with easily actionable tips to reduce energy consumption, especially during times of network constraint, a fundamental shift in customer behaviour to the benefit of the network can be achieved. Jemena considered various options and recommended procuring a smart app with visual usage data, actionable tips and performance feedback to participants.

Jemena claimed DMIA expenditure in 2017 of $200,000 for this project.[13] The field component of the trial ran from 1 December 2017 to 31 March 2018, followed by analysis and reports.

13.1.2. Assessment against DMIA criteria

Criteria #1 The project is aimed at developing Jemena's capabilities to reduce peak demand through customer controlled demand response projects, rather than increasing supply capacity through network augmentation.

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

Criteria #3 The project deliverables are to prepare Jemena for various elements of customer controlled demand response programs as an effective and efficient demand management solution.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

[13] Jemena stated that the project's actual expenditure in the 2017 regulatory year was $479,641, with the rest of the expenditure funded by other sources.

Criteria #6 Expenditure is in the nature of opex.

14. Powercor 2017

Powercor is claiming DMIA expenditure of $56,903 for one demand management project in 2017. This cost is to be shared equally with its associate DNSP, CitiPower. We approve the total expenditure as the project meets the DMIA criteria. Our assessment of the project is set out below. More details of this project can be found in Powercor's 2017 DMIA report published separately on our website.

New Project

14.1. Air Conditioning (AC) Demand Analytics Project

14.1.1. Project Overview

The project created a data analytics tool that is able to detect customers with split system air conditioners and identify the proportion of their demand associated with the AC by analysing historical smart meter data. Powercor's initial investigations found there were no accurate data sources available for past and current AC penetrations in its network. This led Powercor to an opportunity to leverage its smart meter data and data analytics techniques to create a tool that can define the data set on an ongoing basis. The tool is intended to allow Powercor to target areas of its network for AC demand response initiatives to defer future augmentation and to feed into its forecasting and network planning processes.

Powercor claimed DMIA expenditure in 2017 of $56,903 (GST inclusive) for this project.

Powercor stated that, as this tool will be used across both Powercor and CitiPower networks and was built using training data from both networks, the cost will be split evenly between DMIAs for both networks (or $28,451.50 each).

14.1.2. Assessment against DMIA criteria

Criteria #1 The project is aimed at Powercor getting a better understanding of where AC drives peak demand and to what extent, so that Powercor can launch targeted demand response initiatives.

Criteria #2 This is a peak demand management project.

Criteria #3 The project is designed to explore a potentially efficient demand management mechanism (i.e. a tool for AC data analytics).

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

15. SA Power Networks 2016–17

We approve DMIA expenditure of $1,120,428 for three projects in 2016-17 because they meet the DMIA criteria. The following section sets out our assessment of the individual projects. For detailed information about these projects, please refer to SA Power Networks' 2016–17 DMIA report published separately on our website.

SAPN's projects form part of a package of investigations aimed at informing its approach to design, management and operation of the distribution network in response to increasing Distributed Energy Resource (DER) deployment on the network in order to cost-effectively manage the impacts and capture opportunities from DER.

Continuing Projects

15.1. Grid Side Storage

15.1.1. 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.

SAPN claimed its share of cost contribution to this project of $218,410 in 2016–17.

15.1.2. Assessment against DMIA criteria

Criteria #1 This project will provide 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 provides a study into the performance of energy storage systems.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because funding via the DMIA is complementary to ARENA and other stakeholders' funding for the project. The distributor is claiming its own cost hence complying with this criterion.

Criteria #6 Expenditure is of the nature of opex.

15.2. Future Network Modelling

15.2.1. Project overview

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.

SAPN claimed DMIA expenditure of $108,893 in 2016–17 for this project.

15.2.2. Assessment against DMIA criteria

Criteria #1 This modelling will 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 will also enable insights into the likely impacts on network load profiles.

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

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

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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 of the nature of opex.

15.3. Residential Energy Storage

15.3.1. 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.

SAPN claimed DMIA expenditure of $793,124 in 2016–17 for this project.

15.3.2. 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 This criterion is met because 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 of the nature of opex.

16. TasNetworks 2016–17

TasNetworks is claiming $1,659,066 for DMIA expenditure in 2016–17 for four demand management projects. This expenditure is for the fifth year of the previous 2012–17 regulatory control period. We approve this expenditure as the projects meet the DMIA criteria. The following section sets out our assessment of the individual projects. For more information about these projects, please refer to TasNetworks' 2016-17 DMIA report which is published separately on our website.

Continuing Projects

16.1. emPOWERing You Trial (Tariff Trial project)

16.1.1. 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 claimed a percentage of costs related to this project of $1,296,729 in 2016–17 with the balance funded from the distributor's own opex budget.

16.1.2. 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 demand management capability in TasNetworks and provide a new potentially efficient demand management mechanism.

Criteria #4 The project is tariff based.

Criteria #5 This criterion is met because funding via the DMIA is complementary to other funding for the project. The distributor is claiming a percentage of its own cost, hence complying with this criterion.[14]

Criteria #6 Expenditure is in the nature of opex.

16.2. Battery Storage on Bruny Island

16.2.1. 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.

[14] TasNetworks, *Distribution Annual Reporting RIN 2016–17 Basis of preparation*, p. 50.

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 $341,510 in 2016–17. ARENA funding was also used.

16.2.2. 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 demand management capability in TasNetworks and provide a new potentially efficient demand management mechanism.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because funding via the DMIA is complementary to ARENA funding for the project. The distributor is claiming its own cost hence complying with this criterion.[15]

Criteria #6 Expenditure is in the nature of opex.

16.3. Demonstration Energy Storage System

16.3.1. Project overview

This project aims to trial the network interface and control of a distributed energy storage system. It involves installing a residential scale energy storage device on a TasNetworks facility (with a solar system) and trialling dispatch through a device that TasNetworks owns.

TasNetworks claimed DMIA expenditure in 2016-17 of $20,082 for this project.

16.3.2. Assessment against DMIA criteria

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

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

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

Criteria #4 The project is not tariff based.

[15] TasNetworks, *Distribution Annual Reporting RIN 2016–17 Basis of preparation*, p. 50.

Criteria #5 This criterion is met because 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.

16.4. Demand Management Processes

16.4.1. Project overview

This project aims to develop the internal systems required to use demand management to solve network constraints. The aims of this work 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 claimed DMIA expenditure in 2016-17 of $743 for this project.

16.4.2. 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 demand management capability in TasNetworks

Criteria #4 The project is not tariff based.

Criteria #5 This criterion is met because 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.

17. United Energy 2017

United Energy (UE) is claiming DMIA expenditure of $350,267 for two demand management projects in 2017. We approve the total expenditure as the projects meet the DMIA criteria. Our assessment of the projects is set out below. More details of the projects can be found in United Energy's 2017 DMIA report published separately on our website.

Continuing Projects

17.1. Summer Saver (Demand Response) Trial

17.1.1. Project Overview

The project is an investigation of how effective and efficient customer demand response is as a non-network alternative at addressing demand at peak times. The trial investigated various demand management options. The outcomes of this trial have enabled UE to develop a demand management model that describes the best combination of mechanisms that will result in the biggest peak demand reduction at specific locations based on customer demographics and load profiles.

The majority of the costs incurred in 2017 were for the 2016/2017 summer of the trial. This was targeted at 10,000 customers in areas of identified network constraint in summer 2016/17.

The project has been trialling several new elements for demand management to assist with the transition to business-as-usual and the Smart Energy smart phone application. The program currently utilises the capabilities of the Advanced Metering Infrastructure to encourage customer participation and engagement whilst lowering implementation costs.

Costs recovered under the DMIA for the Summer Saver Trial are costs incurred by UE in marketing the trial, creating a registration website, customer participation incentives, and procuring and installing technology. In 2017, UE absorbed part of the project cost (for customer incentive payments) rather than under the DMIA.

United Energy claimed DMIA expenditure in 2017 of $288,192 for this project. This includes the costs of technology to support the Smart Energy application and the registration website, marketing, and participation incentives.

17.1.2. Assessment against DMIA criteria

Criteria #1 The project sought to incentivise customers to reduce their load during peak times. Voluntary trial customers were rewarded $5 per hour for reducing their load during the UE nominated three hour event period. Customers who reduced for all 3 hours were rewarded $25.

During the period of December 2016 to March 2017, three events were called on 28 December 2016, 7 January 2017 and 23 January 2017.

Criteria #2 This is a peak demand management project.

Criteria #3 The trial of residential demand management in an urban area such as metropolitan Melbourne is innovative. Other DNSPs in Australia and internationally have found success with demand management in regional areas. Since UE's network is predominantly metropolitan, demand management such as demonstrated by this trial is a crucial option to be explored.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because United Energy is claiming its own expenditure for this project, which 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.[16]

United Energy stated that the costs recovered under the DMIA include costs incurred in marketing the trial, creating a registration website, customer participation incentives, and procuring and installing technology, but exclude customer incentive payments in 2017 and UE employees' labour costs.[17]

Criteria #6 Expenditure is in the nature of opex.

17.2. Virtual Power Plant (VPP) Stage 1

17.2.1. Project Overview

With the falling prices of solar photovoltaic (PV) panels and battery storage systems, UE wanted to explore the use of PV and battery storage technology for addressing immediate capacity shortfalls, deferring traditional network augmentation solutions, and addressing the voltage issues on the UE network. By utilising the energy stored in batteries, UE can use VPP technology to shave peak load and defer augmentation projects in regions of the network where the future peak demand growth is uncertain and where the cost of adding capacity through traditional solutions is higher than average.

In 2017, UE aimed to transition this technology to business-as-usual and justify VPP on its own economic merits against traditional augmentation. UE decided to retest the market for pricing of battery technology. To test the least-cost product, UE set up the Burwood field depot to replicate a standard residential solar and battery installation in a test environment to identify the most technically suitable and least cost architecture.

United Energy claimed DMIA expenditure in 2017 of $62,074 for this project.

United Energy plans to wind down the pilot project in 2018.

17.2.2. Assessment against DMIA criteria

Criteria #1 The project attempts to combine the capabilities of solar PV generation and battery storage to flatten out the demand profile by charging the battery overnight from the network or from PV during the middle of the day when solar PV generation is at its

[16] United Energy, *Demand Management Incentive Scheme Report 2017*, 23 February 2018, p. 9.

[17] United Energy, *Demand Management Incentive Scheme Report 2017*, 23 February 2018, p. 9.

maximum, and discharging the battery during the early evening when energy demand requirements on the UE network are at their maximum. Aggregating VPP units 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 offers a new solution for a constrained network area, particularly where load growth is low or uncertain. The ability to provide incremental amounts of capacity through combining renewable generation and storage to meet the demand as it materialises could be more efficient than a traditional network solution that provides significant step increases in capacity at higher cost.

Criteria #4 The project is non-tariff based.

Criteria #5 This criterion is met because 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.

United Energy stated that the costs recovered under the DMIA include costs incurred in procuring consulting services, equipment and installation services, but exclude UE employees' labour costs allocated to the project.[18]

Criteria #6 Expenditure is in the nature of opex.

[18] United Energy, *Demand Management Incentive Scheme Report 2017*, 23 February 2018, pp. 7-8.