Decision

Approval of Demand Management Innovation Allowance (DMIA) expenditures by Victorian electricity distributors in 2020

September 2021

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
DER	distributed energy resource
DM	demand management
DMIA	demand management innovation allowance
DMIS	demand management incentive scheme
DNSP	distribution network service provider
LV	low voltage
MW	megawatt
NEL	national electricity law
NEM	national electricity market
NEO	national electricity objective
NER	national electricity rules
NNA	non-network alternatives
NSP	network service provider
opex	operating expenditure
PV	photovoltaic
VPP	virtual power plant

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 for electricity. It also aims to enhance industry knowledge of practical demand management projects and programs through the publication of annual project summary and expenditure reports. The DMIA is part of the Demand Management Incentive Scheme (DMIS) (before 2017) which has been applied to all DNSPs in the National Electricity Market (NEM).

This report presents our assessment of Victorian DNSPs' annual expenditure claims under the pre–2017 scheme, based on the distributors' DMIA reports for the regulatory year 2020 submitted in April 2021. We will publish a separate report for the 2019–20 reporting period of electricity distributors in NSW, ACT, QLD, SA, TAS and NT who reported projects under the new Demand Management Innovation Allowance Mechanism (DMIAM) (2017).

The five DNSPs in Victoria sought approval of expenditure totalling approximately $4.5 million for 14 projects. The AER has assessed that the projects have met the DMIA expenditure criteria and have therefore approved the expenditure for all the projects.

DMIA is provided to each DNSP in the form of a fixed allowance for each regulatory control period. We review and approve DNSPs' actual DMIA expenditures on demand management projects after the end of 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 control period, it will be required to return the underspent amount to customers in the form of a tariff reduction in the ensuing regulatory control period. However, any overspent or unapproved 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.

In December 2017, we established a new Demand Management Innovation Allowance Mechanism (DMIAM) to replace the current DMIA for the regulatory control periods of all DNSPs commencing after 2017. 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 expenditures covered by this decision relate to the pre–2017 scheme that applied to all DNSPs rather than the 2017 DMIAM scheme.

1.1. Extension of Victorian regulatory control period - Six-month variation final decision

On 28 October 2020, we released our final decision on the Victorian electricity distribution determination for the six-month extension of the 2016–20 regulatory control period. This extended the end of the Victorian regulatory period from 31 December 2020 to 30 June 2021.

This report does not include DMIA allowances and expenditures for the six-month extension period.

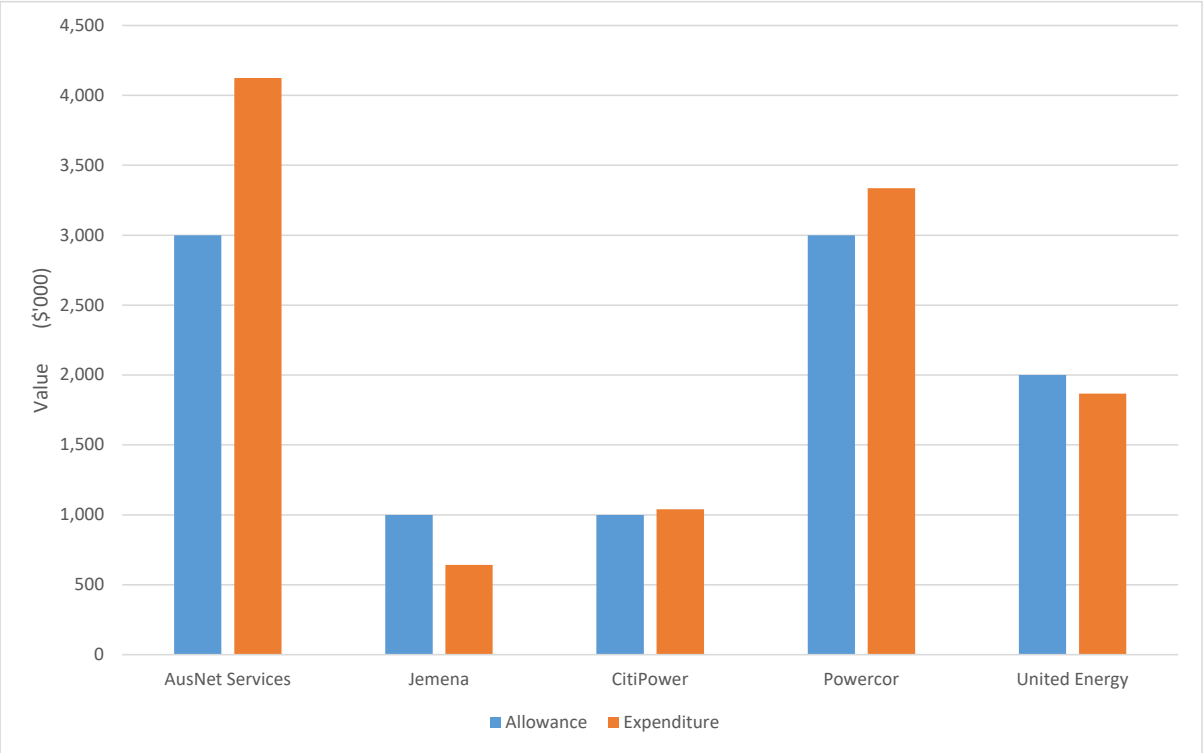
Since the 2016–20 regulatory period had been extended, the true-up calculation for any underspent DMIA amounts will be based on the five-and-a-half-year period 1 January 2016 to 30 June 2021.

Consequently, in this report we will not yet calculate the DMIA carry-over adjustments (true-up calculation) for any underspent DMIA allowances. We will do this when the actual total DMIA expenditures of the DNSPs are available in November 2021 to include the six-month extension period.

1.2. How distributors used the DMIA

Distributors have different approaches for utilising the DMIA funding. Figure 1 and Table 1 compare the total allowance with actual expenditure by the Victorian distributors for the current 2016–2021 regulatory period (not including the 2021 first half extension period).

Figure 1 Victorian DNSPs' DMIA allowance vs expenditure to date for the 2016–2021 regulatory control period (not including the 2021 first half extension) ($nominal)



Source: AER analysis and DMIA reports submitted by DNSPs. Expenditure to date refers to the period 1 January 2016 to 30 December 2020, compared to the corresponding DMIA allowance.

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

The figures in Table 1 below refer to the five-year regulatory period from January 2016 to December 2020 and do not include the 2021 first half extension period. Of the five distributors reviewed, AusNet Services, Powercor and CitiPower have spent more than their total DMIA allowance in DM research and development. Any overspend is met by the business from its existing budget or other external funding, rather than from its customers.

The other two distributors, Jemena and United Energy, have underspent their allowances to date. All underspent allowances or unapproved expenditure will be returned to consumers.

Overall, the five distributors by their fifth year (by the end of December 2020) have spent an average of 110 per cent of their DMIA allowances.

Table 1 Victorian DNSPs' DMIA expenditures for the 2016–2021 regulatory control period (not including the 2021 first half extension) ($'000, nominal)

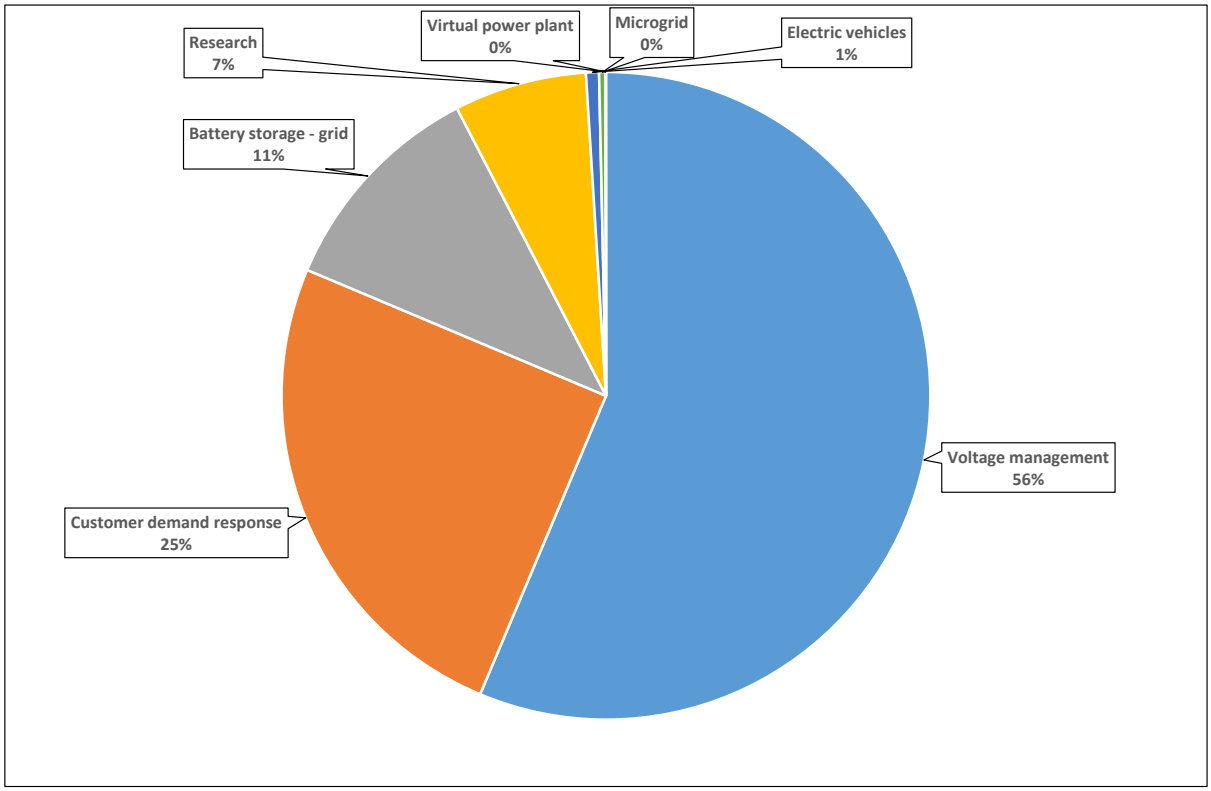
DNSP	DMIA approved 2016	DMIA approved 2017	DMIA approved 2018	DMIA approved 2019	DMIA approved 2020	Total DMIA approved	Total DMIA allowance for period	DMIA remaining for period	Per cent of DMIA spent
AusNet Services	1,499	861	794	286	684	4,124	3,000	-1,124	137%
Jemena	111	200	238	25	68	641	1,000	359	64%
CitiPower	0	26	0	0	1,013	1,039	1,000	-39	104%
Powercor	0	26	624	323	2,364	3,337	3,000	-337	111%
United Energy	505	350	211	385	416	1,867	2,000	133	93%
TOTAL	2,115	1,463	1,867	1,018	4,546	11,008	10,000	-1,008	110%

Source: AER analysis and DMIA reports submitted by DNSPs. Numbers may not add up due to rounding. Approved DMIA expenditures and allowances refer to the period 1 January 2016 to 30 December 2020.

1.3. DNSPs' DMIA expenditures by activity types

Figure 2 and Table 2 summarise the expenditure by types of projects conducted under the DMIA scheme. The projects undertaken vary in both their nature and scale.

Figure 2 DMIA expenditure by project type – Victorian DNSPs – calendar year 2020



Source: AER analysis and DMIA reports submitted by DNSPs.

A large proportion of expenditure in reporting year 2020 was related to projects exploring voltage management (56 per cent) and customer demand response (25 per cent). Eleven per cent of all DMIA expenditure was for grid-side battery storage trials.

Table 2 DMIA expenditure by project type – Victorian DNSPs – calendar year 2020

Project type	Expenditure ($000 nominal)	% of total
Voltage management	2,561	56%
Customer demand response	1,137	25%
Battery storage - grid	502	11%
Research	300	7%
Electric vehicles	29	1%
Microgrid	15	0.33%
Virtual power plant	1	0.01%
Total	**4,546**	**100%**

Source:AER analysis and DMIA reports submitted by DNSPs.

1.4. 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 9 provide our 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 for electricity. The DMIA is a part of the pre–2017 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 on the nature of the DMIA projects that may ultimately be progressed to operating or business-as-usual activities. The information may also facilitate the participation of non-network providers on potential types of project options that may be viable.

In December 2017, we established a new and improved Demand Management Innovation Allowance Mechanism (DMIAM) to replace the DMIA for regulatory control periods commencing after 30 June 2019. 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.

This report relates to the operation of the current DMIA scheme (before the December 2017 version). Also, this report includes only the five DNSPs in Victoria, who provided their DMIA reports for calendar year 2020.

3. Demand Management Incentive Scheme criteria

Each year we are required to assess claims for the innovation allowance against the DMIA criteria. 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 received from:

- AusNet Services
- Jemena
- CitiPower
- Powercor
- United Energy

for the 2020 calendar year.

Distributors have different approaches for utilising the DMIA funding. Summaries of each DNSP's DMIA expenditures are shown in Table 3 below.

The allowance is for the 2016 to 2021 regulatory period to date[1] (column H) and the expenditure columns give the expenditure for each year of the regulatory period to date[2] (columns B to F).

Of the five distributors reviewed, AusNet Services, Powercor and CitiPower have claimed above their total DMIA allowance. The other two DNSPs have underspent their allowance to date.

Table 3 Victorian DNSPs' DMIA expenditure for the 2016–2021 regulatory control period (not including the 2021 first half extension) ($'000, nominal)

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
DNSP	DMIA approved 2016	DMIA approved 2017	DMIA approved 2018	DMIA approved 2019	DMIA approved 2020	Total DMIA approved	Total DMIA allowance for period	DMIA remaining for period	Per cent of DMIA spent
AusNet Services	1,499	861	794	286	684	4,124	3,000	-1,124	137%
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United Energy	505	350	211	385	416	1,867	2,000	133	93%
TOTAL	2,115	1,463	1,867	1,018	4,546	11,008	10,000	-1,008	110%

Source: AER analysis and DMIA reports submitted by DNSPs. Numbers may not add up due to rounding. Approved DMIA expenditures and allowances refer to the period 1 January 2016 to 30 December 2020.

4.2. DNSPs' DMIA expenditures by activity types

Table 4 summarises the expenditure by types of projects provided under the DMIA. The projects undertaken vary in both their nature and scale.

[1] From 1 January 2016 to 31 December 2020.

[2] From 1 January 2016 to 31 December 2020.

A large proportion of expenditure in year 2020 was related to projects exploring voltage management (56 per cent) and customer demand response (25 per cent). Eleven per cent of all DMIA expenditure was for grid-side battery storage trials.

Table 4 DMIA expenditure by project type – Victorian DNSPs – calendar year 2020

Project type	Expenditure ($000 nominal)	% of total
Voltage management	2,561	56%
Customer demand response	1,137	25%
Battery storage - grid	502	11%
Research	300	7%
Electric vehicles	29	1%
Microgrid	15	0.33%
Virtual power plant	1	0.01%
Total	**4,546**	**100%**

Source: AER analysis and DMIA reports submitted by DNSPs

5. AusNet Services 2020

We approve AusNet Services' DMIA expenditure of $684,384 in 2020 for five projects because these meet the DMIA criteria. This approved amount does not include any amount AusNet Services overspent above its 2016–20 DMIA allowance. The following section sets out our assessment of the individual projects. Detailed information about these projects is available in AusNet Services' 2020 DMIA report[3] which is published separately on the AER website.[4]

Continuing Projects

5.1. Grid Energy Storage System (GESS) Trial

5.1.1. Project overview

AusNet Services started in 2012 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 in network management. The GESS will shift demand on a particular feeder from peak to off-peak times by discharging during feeder peaks and recharging overnight when the feeder demand is low. The GESS is suited to addressing a specific network constraint and is containerised to allow portability to different locations as required.

During 2018 AusNet Services' GESS trial continued, with the potential relocation of the GESS being developed. AusNet Services reported that, with the trial, the business gained confidence regarding system operability and reliability. The project to relocate the facility was initiated within the 'business as usual' environment and served to embed the learnings from the trial into the network engineering and field engineering functions of the business. In 2019, costs were incurred for the ongoing operation of the facility and upgrades to the GESS to enable it to be relocated to an area needing power supply reliability.

In 2020, DMIA expenditure was $86,833, primarily for ongoing operation such as site maintenance, site office rental, fuel/energy charges, and project management.[5]

5.1.2. Assessment against DMIA criteria

Criteria #1 Using large-scale storage connected at grid level would enable 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. This trial will also help to establish whether battery storage is a credible non-network solution to managing demand.

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3 AusNet Electricity Services Pty Ltd, *Demand Management Innovation Allowance Annual Report 2020*, April 2021.

4 AER, https://www.aer.gov.au/networks-pipelines/compliance-reporting?f%5B0%5D=field_accc_aer_report_type%3A1203.

5 AusNet Electricity Services Pty Ltd, *Demand Management Innovation Allowance Annual Report 2020*, April 2021, p. 21.

Further, the trial will help set the parameters on when GESS can be economically deployed for the benefit of energy consumers.

Criteria #4 The project is not tariff based.

Criteria #5 AusNet Services stated that its DMIA 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 The DMIA expenditure is operating expenditure.

5.2. Mooroolbark Community Mini-Grid Trial

5.2.1. Project overview

This project involves the design, build and operation of a mini-grid of 18 residential houses in Mooroolbark, Victoria. The mini-grid is 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 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 initiatives such as renewable energy projects and micro grids in a way that is efficient and beneficial to the network.

The project also tests the performance of DER systems in providing backup supply to individual customers in case of network outage, and the ability for the mini-grid 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.

In 2018 the Mooroolbark community mini-grid trial progressed into Stage 2 to focus on voltage control. The battery equipment for all the trial customers were removed and decommissioned. Designs were explored for a new powerline communication for the solar PV systems. The stabiliser functionality was upgraded to enhance its capability to better manage voltage on the network. In 2019, AusNet Services initiated, installed and commissioned upgrades to the stabiliser.

In 2020, AusNet claimed DMIA expenditure of $14,940 for further functional upgrades to the stabiliser.

Assessment against DMIA criteria

Criteria #1 Coordinated DER 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 the above stated benefits (in Criteria #1), test customers' appetite and acceptance, and evaluate the economic viability of different structures of mini-grids and community energy projects. The lessons from the project will help build AusNet Services' toolkit for delivery of non-network and demand-side solutions. If the services provided were unregulated (not classified as standard control or alternative services), AusNet Services would need to provide these whilst complying with ring-fencing requirements.

Criteria #4 The project is not tariff based.

Criteria #5 AusNet Services stated that its DMIA 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 The DMIA expenditure is capital expenditure.

New Projects

5.3. Good Grid

5.3.1. Project overview

This project stemmed from AusNet Services' 'Peak Partners' trial (DMIA project in 2018 and 2019). Peak Partners, which commenced in the 2017–18 summer, is a residential demand response (DR) project, targeting a 22kV distribution feeder in the urban growth corridor around Clyde North, Victoria. It was a small-scale proof-of-concept project for different types of demand response:

- behavioural response to a Critical Peak Rebate incentive, with advanced metering infrastructure (AMI) data portal;
- behavioural response to a Critical Peak Rebate incentive, with real-time data portal;
- air-conditioning load control via a demand response enabling device;
- supply capacity control via the AMI smart meter.

AusNet Services reported the Peak Partners trial as successful in proving a strong customer demand response during DR events, and an overall positive customer experience. The Good Grid program continues the Peak Partner trial's objectives and scope.

AusNet Services claimed DMIA expenditure of $186,436 in 2020 for the Good Grid project.

5.3.2. Assessment against DMIA criteria

Criteria #1 Peak demand on AusNet Services' network is driven primarily by residential customers and, in particular, residential summer air-conditioning. The project is designed to reduce the network peak demand, thereby reducing the level of energy at risk on the network, potentially deferring network augmentation, reducing the network costs ultimately borne by customers, and improving network reliability and quality of supply for customers.

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

Criteria #3 The project would add to AusNet Services' demand management capability.

Criteria #4 The program is not based on tariffs.

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

Criteria #6 The DMIA expenditure consists of operating (75 per cent) and capital (25 per cent) expenditure.

5.4. DER Marketplace (EDGE project)

5.4.1. Project overview

This project, Energy Demand and Generation Exchange (EDGE), aims to trial a functioning marketplace that efficiently operates distributed energy resources (DER) to provide grid services within a security constrained distribution grid and create a replicable model that can be used elsewhere in the national electricity market (NEM). This brings together new capabilities from AusNet Services as a smart distribution system operator, Mondo as an aggregator of DER services, and the Australian Energy Market Operator (AEMO) as the central independent market operator.[6]

The project aims to support the management of power system security and effectively integrate DER.

AusNet Services claimed DMIA expenditure of $300,434 in 2020 for this project, for program set up and initial design and planning.

The EDGE project is partially funded by the Australian Renewable Energy Agency (ARENA). AusNet Services' share of expenditure for the project is claimed under DMIA and not from ARENA.

5.4.2. Assessment against DMIA criteria

Criteria #1 This project will allow AusNet Services and other participants to design market mechanisms to effectively aggregate and dispatch DER. In the long term, this will provide DNSPs with options to manage network constraints without network augmentation.

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

Criteria #3 This project's benefits relate to future outcomes for energy consumers, i.e., enabling consumers to have more choices in investing in DER.

Criteria #4 The project was not based on tariffs.

Criteria #5 AusNet Services states that its DMIA expenditure for this project was not recovered from ARENA, nor 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 The DMIA expenditure is capital expenditure.

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[6] AusNet Electricity Services Pty Ltd, *Demand Management Innovation Allowance Annual Report 2020*, April 2021, p. 6.

5.5. Dynamic LV Phase Balancing Trial

5.5.1. Project overview

This project demonstrates two innovative technologies to increase customer uptake of solar PV by dynamically balancing load and generation on the low voltage (LV) network. AusNet Services undertook a two-year trial in partnership with Jemena (lead partner), the University of New South Wales, and XJ Group (State Grid of China). The project commenced in 2019 and will be completed in early 2021.[7] The two technologies being tested are a smart inverter which can dynamically balance the three phases on the LV side, and a phase switching device located at the customer's service pole.

This project is partially funded by ARENA. AusNet Services' share of expenditure for the project is claimed under DMIA and not from ARENA.

AusNet Services claimed DMIA expenditure of $95,741 in 2020 for this project, for the purchase of hardware, installation, commissioning and testing costs.

5.5.2. Assessment against DMIA criteria

Criteria #1 The project aims to improve customer supply voltage compliance by deploying new dynamic network devices, and to improve DER hosting capacity. In the long term, implementing these measures could defer network augmentation.

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

Criteria #3 The deployment of new dynamic devices to improve customer supply voltage compliance is innovative.

Criteria #4 The project is not based on tariffs.

Criteria #5 AusNet Services stated that its DMIA expenditure for this project was not recovered from ARENA, nor 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 The DMIA expenditure is capital expenditure.

[7] AusNet Electricity Services Pty Ltd, *Demand Management Innovation Allowance Annual Report 2020*, April 2021, p. 9.

6. Jemena 2020

We approve Jemena's DMIA expenditure of $67,855 in 2020 for three new projects because these meet the DMIA criteria. The following section sets out our assessment of the individual projects. Detailed information about these projects is available in Jemena's 2020 DMIA report[8] which is published separately on the AER website.[9]

New Projects

6.1. Behavioural Demand Response Trial (Residential) in collaboration with Energy Retailer Energy Australia

6.1.1. Project overview

This project explores how retailers and distributors can work together to deliver a demand response (DR) program, with the partnership expected to reduce program costs and avoid duplication of DR programs for customers. Jemena claims this is an Australian-first trial.[10] The project involved a combined effort by Jemena and Energy Australia (an electricity retailer), participation of 96 retail customers in north and west Melbourne, four DR events called, and two customer surveys completed.[11]

Jemena claimed DMIA expenditure in 2020 of $25,834 for this project.

6.1.2. Assessment against DMIA criteria

Criteria #1 This project is a trial to explore how retailers and distributors can develop a partnership to deliver a demand response program.

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

Criteria #3 The key objective of the project is to demonstrate the value of network and market incentives to reward customers who reduce their energy consumption in DR events. Jemena claims this is an Australian first for a retailer-distributor partnership in a DR program.

Criteria #4 The project is not based on tariffs.

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

Criteria #6 Expenditure is in the nature of opex.

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8 Jemena Electricity Networks (Vic) Ltd, *Response to the Annual Regulatory Information Notice issued 3 February 2016 for the 2020 Regulatory Year*, 30 April 2021.

9 AER, https://www.aer.gov.au/networks-pipelines/compliance-reporting?f%5B0%5D=field_accc_aer_report_type%3A1203.

10 Jemena Electricity Networks (Vic) Ltd, *Response to the Annual Regulatory Information Notice issued 3 February 2016 for the 2020 Regulatory Year*, 30 April 2021, p. 23.

11 Jemena Electricity Networks (Vic) Ltd, *Response to the Annual Regulatory Information Notice issued 3 February 2016 for the 2020 Regulatory Year*, 30 April 2021, p. 24.

6.2. C&I Customer Demand Response Trial (Testing Demand Response Service Provider Market Response)

6.2.1. Project overview

Jemena states it has had limited opportunities to test the capability of commercial and industrial (C&I) customers to provide demand reduction during periods of network stress. There has been an increased demand management activity in the market with some retailers offering demand response (DR) services to C&I and residential customers. The management of DR contracts with residential customers is relatively costly and resource intensive. Jemena therefore undertook a feasibility exercise to develop internal capability in managing a C&I DR in partnership with aggregators, prior to the introduction of wholesale DR market rule changes.

Jemena contacted potential DR aggregators to establish the trial.[12] Following negotiations with some aggregators, Jemena developed term sheets. However, the aggregators were unable to identify customers with DR capabilities in the target location.[13]

Jemena claimed DMIA expenditure in 2020 of $12,606 for this project.

6.2.2. Assessment against DMIA criteria

Criteria #1 The project aims to explore the effectiveness of energy retailers or aggregators to attract DR participants by promoting DR benefits.

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

Criteria #3 This project aims to build Jemena's DM capability and experience in managing a commercial/industrial customer response in partnership with aggregators.

Criteria #4 The project is not tariff based.

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

Criteria #6 Expenditure is in the nature of opex.

6.3. Dynamic Electric Vehicle Charging Trial (Project Establishment)

6.3.1. Project overview

This trial on managed residential charging of electric vehicles (EV) aims to understand the impact of EVs on the electricity system and consumer willingness for third-party control, and to demonstrate electricity distributors' role in managing residential EV charging. Project delivery includes obtaining charging data for 176 privately-owned EVs, demonstration of control boxes and smart chargers to manage charging of Tesla cars and other EV types, and

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[12] Jemena Electricity Networks (Vic) Ltd, *Response to the Annual Regulatory Information Notice issued 3 February 2016 for the 2020 Regulatory Year*, 30 April 2021, pp. 26-27.

[13] Jemena Electricity Networks (Vic) Ltd, *Response to the Annual Regulatory Information Notice issued 3 February 2016 for the 2020 Regulatory Year*, 30 April 2021, p. 27.

demonstration of an aggregator as an intermediary between electricity distributors and charge points to coordinate EV charging.[14]

The project is a collaboration between five electricity distributors[15] and an EV charging installer called JET Charge, who leads the consortium. The consortium prepared a project proposal to obtain funding from the Australian Renewable Energy Agency (ARENA).

Jemena claimed DMIA expenditure in 2020 of $29,415 for its share in establishing the project consortium and payment for an external contractor in preparing the project proposal. The costs of establishing the project or completing the proposal are not included in ARENA funding.

6.3.2. Assessment against DMIA criteria

Criteria #1 The project aims to prove the concept of dynamically managing EV charging load, with a real-time assessment of available network capacity to accommodate more EVs without the need for network augmentation.

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

Criteria #3 This project adds to Jemena's previous DMIA projects to develop its capability to manage demand and to deploy non-network solutions in response to network constraints.

Criteria #4 The project is not tariff based.

Criteria #5 Jemena states that its DMIA expenditure for this project is not recovered through ARENA funding, nor 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.

[14] Jemena Electricity Networks (Vic) Ltd, *Response to the Annual Regulatory Information Notice issued 3 February 2016 for the 2020 Regulatory Year*, 30 April 2021, pp. 28-29.

[15] Jemena, AusNet Services, United Energy, TasNetworks, and EvoEnergy

7. CitiPower 2020

We approve CitiPower's DMIA expenditure of $1,013,189[16] in calendar year 2020 for two new projects because these meet the DMIA criteria. These projects are undertaken jointly with its affiliate company, Powercor. The approved DMIA amount does not include any amount CitiPower overspent above its 2016–20 DMIA allowance. The following section sets out our assessment of the projects. Detailed information about these projects is available in CitiPower's 2020 DMIA report[17] published separately on the AER website.[18]

The two projects discussed below are joint undertakings by CitiPower and Powercor as they operate the same systems and the projects will benefit customers across both networks.[19]

New Projects

7.1. Energy Partner Program (DER Integration)

7.1.1. Project overview

For this project, CitiPower joined Powercor in 2020 after Powercor commenced it in 2019. The two distributors implemented the project in their respective networks.

In 2019, Powercor commenced this DMIA project after it identified highly variable load at risk in certain locations in its distribution network. To address this, Powercor designed the Energy Partner Program (EPP) to identify air-conditioner demand response initiatives to support the network or possibly defer future network augmentation. The program incentivised customers for demand response by directly controlling customers' air-conditioners for a short period of time (around three hours) using a smart device. This device allowed Powercor to coordinate the temperature set points of more than 900 air-conditioners in the network-constrained area.

Following the introduction of the EPP in 2019, during 2020 Powercor extended the program to target customers who are directly attached to distribution substations where peak demand is expected to exceed maximum capacity. Powercor also enhanced the EPP by using technology and techniques different from those applied in 2019.

CitiPower claimed DMIA expenditure of around $273,561 in calendar year 2020 for this project.

7.1.2. Assessment against DMIA criteria

Criteria #1 The project is aimed at reducing residential demand during demand response events in locations where highly variable load at risk was identified. Customers are incentivised to allow CitiPower to coordinate temperature set points on their air-conditioners for a period of time.

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16 Based on CitiPower/Powercor DMIA reports.

17 CitiPower, *2020 AER Annual RIN – CitiPower Schedule 1 Final Response*, April 2021, p. 8.

18 AER, https://www.aer.gov.au/networks-pipelines/compliance-reporting?f%5B0%5D=field_accc_aer_report_type%3A1203.

19 CitiPower, *2020 AER Annual RIN – Powercor Schedule 1 Final Response*, April 2021, p. 8.

Criteria #2 This is a peak-demand management project, addressing specific network constraints on CitiPower's most highly utilised distribution substations.

Criteria #3 The project is designed to reduce the peak load on network constrained areas, thereby avoiding augmentation costs or increased load risk.

Criteria #4 The project is not tariff-based.

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

Criteria #6 Expenditure is in the nature of operating expenditure.

7.2. Dynamic Management of HV Generation

7.2.1. Project overview

CitiPower/Powercor state that they have many non-scheduled high-voltage (HV) generation connections that export electricity directly into their distribution networks.

They explain that the extent of non-scheduled HV generation on their networks, together with changing demand and generation profiles of end customers, is increasing the risk of network constraints caused by reverse power flow at times of minimum demand.[20]

Network augmentation to address this reverse power flow could be costly. CitiPower/Powercor therefore aim to introduce a system which will offer a dynamic operating model for HV-connected generation. This will ensure supply is balanced with network demand and capability.

This could be achieved by introducing a new analytics module that performs load balancing and electricity quality calculations in real time, offering dynamic management of generation. The software uses advanced forecasting of operating envelopes to automatically reduce generation output at times of low demand. The software platform being trialled is provided by a third party and the trial will run until June 2021.

The software platform – a high voltage distributed energy resources management system (HV DERMS) – aims to address issues related to reverse power flows:

- *thermal capacity*: The capacity of distributor generator connections are currently determined on the basis of worst case conditions. With a HV DERMS for HV generators, the distributor could better control its existing/new HV generators in order to manage reverse power flows dynamically. This could unlock more generator connections and energy generation without major network upgrades.
- *voltage control*: Distributors have observed more instances of higher network voltages resulting from increasing penetration of distributed generation. With a HV DERMS, a distributor could better control network voltages by reducing HV generation when required to arrest high voltages.

[20] That is, lower energy demand—due to, for example, energy efficiency and increased solar PV use, or a downstream fault resulting in an outage—could result in periods when electricity in the distribution network may be forced back upstream, rather than being used locally.

- *under frequency load shedding*: AEMO and distributors currently coordinate to ensure that a portion of load/demand could be shed to address worst case events of under frequency. This has been increasingly difficult to implement in periods of low demand and high generation export. With a HV DERMS, the distributor could better control non-scheduled HV generation that would otherwise be generating in periods of low demand.

CitiPower claimed DMIA expenditure of around $739,629 in calendar year 2020 for this project.

7.2.2. Assessment against DMIA criteria

Criteria #1 The project aims to test an analytics module's ability to dynamically manage the output of HV generators, thus reducing the need for network solutions.

Criteria #2 This is a broad-based demand management program because it potentially avoids augmentation across CitiPower/Powercor's distribution networks.

Criteria #3 The system being trialled uses real-time calculations of demand, generation and constraints to monitor the state of the network and control the injection of independently generated electricity into the network. This allows the network to be balanced to maximise network utilisation. CitiPower/Powercor state they are not aware of such a system being implemented previously in Australia.[21]

Criteria #4 The project is not tariff-based.

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

Criteria #6 Expenditure is in the nature of operating expenditure.

[21] CitiPower, *2020 AER Annual RIN – CitiPower Schedule 1 Final Response*, April 2021, p.12.

8. Powercor 2020

We approve Powercor's DMIA expenditure of $2,364,109[22] in calendar year 2020 for two projects because these meet the DMIA criteria. This approved amount does not include any amount Powercor overspent above its 2016–20 DMIA allowance. The following section sets out our assessment of the projects. Detailed information about the projects is available in Powercor's 2020 DMIA report[23] published separately on the AER website.[24]

Continuing Project

8.1. Energy Partner Program (DER Integration)

8.1.1. Project overview

Powercor identified highly variable load at risk in its high-voltage feeder network and two zone substations on the Bellarine Peninsula (Victoria). To address this, Powercor designed the Energy Partner Program (EPP) to identify air-conditioner demand response initiatives to support the network or possibly defer future network augmentation. The program incentivised customers for demand response by directly controlling customers' air-conditioners for a short period of time (around three hours) using a smart device. This device allowed Powercor to coordinate the temperature set points of more than 900 air-conditioners in the Bellarine Peninsula.

Following the introduction of the EPP in 2019, during 2020 Powercor extended the program to target customers who are directly attached to distribution substations where peak demand is expected to exceed maximum capacity. Powercor also enhanced the EPP by using technology and techniques different from those applied in 2019.

Powercor claimed DMIA expenditure of around $638,310 in calendar year 2020 for this project.

8.1.2. Assessment against DMIA criteria

Criteria #1 The project is aimed at reducing residential demand during demand response events on the Bellarine Peninsula where highly variable load at risk was identified. Customers are incentivised to allow Powercor to coordinate temperature set points on their air-conditioners for a period of time.

Criteria #2 This is a peak-demand management project, addressing specific network constraints on Powercor's most highly utilised distribution substations.

Criteria #3 The project is designed to reduce the peak load on the Bellarine Peninsula, thereby avoiding augmentation costs or increased load risk.

Criteria #4 The project is not tariff-based.

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22 Based on CitiPower/Powercor DMIA reports.

23 Powercor, *2020 AER Annual RIN – Powercor Schedule 1 Final Response*, April 2021.

24 AER, https://www.aer.gov.au/networks-pipelines/compliance-reporting?f%5B0%5D=field_accc_aer_report_type%3A1203.

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

Criteria #6 Expenditure is in the nature of capital expenditure (capex).

New Project

8.2. Dynamic Management of HV Generation

8.2.1. Project overview

This joint Powercor/CitiPower project is discussed in section 7.2 above.

Powercor claimed DMIA expenditure of around $1,725,800 in calendar year 2020 for this project.

8.2.2. Assessment against DMIA criteria

Criteria #1 The project aims to test a software platform's ability to help dynamically manage the output of HV generators, thus reducing the need for network augmentation.

Criteria #2 This is a broad-based demand management program because it potentially avoids augmentation across Powercor/CitiPower's distribution areas.

Criteria #3 This system uses real-time calculations of demand, generation and constraints to monitor the state of the network and control the injection of independently generated electricity into the network. This allows the system to be balanced to maximise network utilisation. Powercor/CitiPower state they are not aware of such a system being implemented previously in Australia.[25]

Criteria #4 The project is not tariff-based.

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

Criteria #6 Expenditure is in the nature of operating expenditure (opex).

[25] Powercor, *2020 AER Annual RIN – Powercor Schedule 1 Final Response*, April 2021, p.12.

9. United Energy 2020

We approve United Energy's DMIA expenditure of $415,976 in 2020 for one continuing project because this meets the DMIA criteria. The following section sets out our assessment of the project. Detailed information about this project is available in United Energy's 2020 DMIA report[26] which is published separately on the AER website.[27]

Continuing Project

9.1. Grid-side Battery Energy Storage Systems Pilot Project

9.1.1. Project overview

This project is the next stage of United Energy's virtual power plant (VPP) trial, which was conducted from 2013 to 2018.

United Energy tested the VPP concept and its ability to control peak demand through the dispatch of battery storage optimised against solar PV generation. A VPP can be defined as a cluster of grid-connected distributed generation and storage plants that are monitored and controlled by an operator for energy trading and grid benefits. When combined, the cluster can then be treated as a single power plant. United Energy's VPP trial used a combination of solar PV and battery storage technologies. The VPP Stage 1 consisted of a system of eight to 14 installations at residential sites totalling 50kW ('behind customer meters'). These sites were limited to United Energy employees and project team members within United Energy's distribution area. Following completion of its VPP Stage 1 trial in 2018, United Energy proceeded to the next stage in 2019 – to demonstrate the VPP concept on low voltage grid-side battery energy storage systems (BESS).[28] This stage aims to achieve the same outcomes as Stage 1, but implemented on the network side of the meter ('grid side'), and without solar PV.

In 2020, United Energy installed and commissioned two pole-mounted grid-connected BESS on the low voltage network of its distribution area, to manage the load on distribution transformers and low voltage circuits.[29]

The grid-side BESS pilot project is continuing, with United Energy claiming DMIA expenditure of $415,431 in 2020. United Energy also spent $545 to close the VPP Stage 1 trial, for a total of $415,976 DMIA expenditure in 2020.

9.1.2. Assessment against DMIA criteria

Criteria #1 The project aims to reduce the peak demand on United Energy's network by charging the battery during low demand periods when solar PV generation is at its maximum, and discharging the battery when demand on the United Energy network is at its maximum. The project is an extension to United Energy's VPP trial.

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[26] United Energy, *Demand Management Innovation Allowance Report - 2020*, 2 March 2021.

[27] AER, https://www.aer.gov.au/networks-pipelines/compliance-reporting?f%5B0%5D=field_accc_aer_report_type%3A1203.

[28] United Energy, *Demand Management Innovation Allowance Report - 2018*, p. 12.

[29] United Energy, *Demand Management Innovation Allowance Report - 2020*, pp. 6–7.

Criteria #2 This is a peak-demand management project aimed at certain locations in United Energy's network.

Criteria #3 The project involves pole-mounted BESS which, according to United Energy, is relatively new technology and the first pole-top BESS solution in Australia.

Criteria #4 The project is not tariff-based.

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

United Energy stated that the costs of $415,431 recovered under DMIA in 2020 include costs incurred in procuring and installing equipment in 2020. This amount is 82.5 per cent of total project costs in 2020, with the balance covered by United Energy's capital expenditure (capex) budget.

Criteria #6 DMIA expenditure covers operating expenditure only.[30]

[30] United Energy, *Demand Management Innovation Allowance Report - 2020*, p. 8.