



Decision

Applications by Victorian and Tasmanian DNSPs for Demand Management Innovation Allowance and carry-over adjustments

2015 and 2014–15

July 2016

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Summary

The Demand Management Incentive Scheme (DMIS) 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 DMIS reports. The DMIS has been applied to all DNSPs in the NEM as part of our current distribution determinations.

The DMIS contains a Demand Management Innovation Allowance (DMIA) element. DMIA is provided to each DNSP in the form of a fixed allowance for each regulatory period. DNSPs are required to justify and seek our approval of their actual DMIA expenditures on demand management improvement projects.¹

If a DNSP has not spent its DMIA allowance in the regulatory period, it will be required to return the amount of any underspend or unapproved amounts to customers in the form of tariff reduction. However, any over-spend 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 of these claims against six criteria, listed in section 2 of this paper. While descriptive, the criteria enable a wide range of demand management project options.

DMIA reports for CitiPower, Powercor, Jemena Electricity Networks, AusNet Services and United Energy (the Victorian DNSPs) and TasNetworks were provided to us as part of their 2015 or 2014–15 RIN responses.²

The projects undertaken vary considerably in both their nature and scale. For example, the projects include tariff based measures designed to incentivise customers to reduce their usage at times of peak demand, such as the introduction of a pilot tariff to test customers' response to time-of-use tariffs designed to shift load off the peak demand period. 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, such as providing financial incentives to reduce usage during hot days
- improving the storage of renewable energy generated during non-peak times for subsequent use during peak periods, such as deployment of batteries to off-set peak demand.
- improving power factor correction to reduce the amount of energy losses
- load control options which result in shifting load to non-peak times, such as controlling the operation time of swimming pool pumps.

¹ The DMIS reports from each of the DNSPs are available on our website at www.aer.gov.au.

² TasNetworks and other Non-Victorian DNSPs' regulatory years align with financial years, whereas Victorian DNSPs regulatory years align with calendar years.

This report presents:

- our assessment findings of DNSPs' annual expenditure claims
- our determination of any under-expenditure by Victorian DNSPs that should be returned to the customers by way of network charge reduction in 2017.

We have approved all the DMIA expenditure claimed by all of the DNSPs as the expenditure complies with the DMIA criteria. Section 4 provides further details of each project for each DNSP that has been funded through the DMIA.

Summaries of each DNSP's DMIA expenditures are shown in the tables below.

In total, Victorian DNSPs reported around \$5.5 million DMIA expenditure for 2015 reporting period. Overall, Victorian DNSPs have spent about 110 percent of the DMIA allowance for the 2011 to 2015 regulatory period. Ausnet Services, CitiPower and Powercor over spent their respective DMIA allowances, while Jemena and United Energy under spent their respective allowance.

TasNetworks utilised about 13 percent of its total allowance after three years into the five year regulatory control period.

Table 1 Summaries of DMIA expenditures to date for VIC DNSPs for the 2011 to 2015 regulatory control period (\$' 000 nominal)

DNSP	DMIA approved for 2015	Total DMIA Allowance 2011-15	DMIA spent to date	DMIA remaining for the period (a)	Proportion of approved DMIA spent (%)
AusNet Services	533.8	3 180.6	3 727.0	NA	117%
CitiPower	599.0	1 060.2	1 122.1	NA	106%
Jemena	94.5	1 060.2	898.1	162.1	85%
Powercor	3 417.6	3 180.6	3 856.4	NA	121%
United Energy	890.7	2 120.4	1 972.8	147.6	93%
Total	5 535.7	10 602.0	11 576.4	309.7	109%

Source: AER analysis and DMIA reports submitted by DNSPs; numbers may not be exact due to rounding.

Note: (a) Numbers may not add up due to rounding. Figures represent the mathematic sum of all historical spending in nominal terms.

These figures are different to the carryover adjustments shown in Table 3, which represent the sum of the net present value of the individual year's over/under spends in 2017 dollar value.

Table 2 Summaries of DMIA expenditures to date for TAS DNSP for the 2012–17 regulatory control period (\$' 000, nominal)

DNSP	DMIA approved for 2014–15	Total DMIA Allowance	DMIA spent to date	DMIA remaining for the period	Proportion of approved DMIA spent (%) (a)
TasNetworks	91.0	2 114.9	277.8	1 837.1	13%
Total	91.0	2 114.9	277.8	1 837.1	13%

Source: AER analysis and DMIA reports submitted by DNSPs; numbers may not be exact due to rounding.

Note: (a) A lower than the annual average level of initial expenditures in the early years does not necessarily imply an overall under expenditure at the end of the regulatory period.

In this 2016 DMIA determination the AER is required to calculate a carryover amount adjustment for the Victorian electricity distributors. A similar carryover adjustment had been calculated for the ACT/NSW/SA earlier in 2016, and will be calculated Tasmanian electricity distributors in the 2018–19 regulatory control years, when data on their total DMIA expenditure over this regulatory period are available.

We calculated the carryover adjustment to be applied in the VIC distributors' 2016–20 regulatory control period. Those carryover adjustments are set out in the table below:

Table 3 Carryover adjustment: Vic distributors (\$'000 nominal)

	\$'000 nominal (a)
AusNet Services	0.0
CitiPower	0.0
Jemena	-91.3
Powercor	0.0
United Energy	-480.2

Source: AER analysis and DMIA reports submitted by DNSPs;

Note: (a) the final carryover amounts will be subject to the final adjustment when the WACC is updated when DNSPs submit the annual pricing proposals.

1 Background

The Demand Management Incentive Scheme (DMIS) is a research and development fund which aims to provide incentives for Distribution Network Service Providers (DNSPs) to conduct research and investigation into innovative techniques for managing demand. The AER published its DMIS for the non-Victorian DNSPs (in October and November 2008) and Victorian DNSPs (in April 2009) in accordance with clause 6.6.3 of the National Electricity Rules (NER).

The Demand Management Innovation Allowance (DMIA) is part A of the DMIS. DMIA is provided to a DNSP in the form of a fixed amount of additional revenue at the commencement of each year of the regulatory period. As part of its distribution determination the AER has previously approved the allowances in accordance with Part A of the DMIS.

In the second year of the next regulatory control period, when results for all years of the current regulatory control period are known, a single adjustment will be made to return the amount of any underspends 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.

Part B of the DMIS relates to foregone revenue. It allows the DNSPs to recover foregone revenue in a regulatory control period resulting from a reduction in the quantity of energy sold directly attributable to demand management projects or programs approved under Part A of the scheme.

A key objective of the DMIS is to assist in enhancing industry knowledge of practical demand management projects and programs through the annual publication of DMIS reports from DNSPs. As such, the DMIS sets out annual reporting requirements for DNSPs for the regulatory control period. DNSPs are required to submit a report to the AER on their DMIS expenditure shortly after the end of each regulatory year. The information provided in a DNSP's annual DMIS report is used in the AER's assessment of a DNSP's compliance with the DMIA criteria and entitlement to recover expenditure under the DMIA.

Chapter 2 provides the criteria contained in the DMIS, against which the AER is required to assess claims for the DMIA each year.

Chapter 3 provides a summary of our annual DMIA compliance assessment results of all DNSPs' DMIA reports and supporting information. It also provides a carryover amount adjustment for Victorian electricity distributors, which will be included in setting the 2017 Victorian distribution network charges.

Chapters 4 to 9 of the report provide the detailed assessment of all Victorian/Tasmanian DNSPs' DMIA expenditure claims against the criteria contained in the DMIS.

2 Demand Management Incentive Scheme Criteria

The AER is required to assess claims for the DMIA against the criteria contained in the DMIS each year. 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.

3 DMIA Assessment

3.1 Annual DMIA Assessment

We conducted our DMIA compliance assessments based on the DMIA reports (for the 2014–15 financial year or 2014 calendar year as applicable) and responses to further information requests received from the following DNSPs:

- CitiPower (for 2015 calendar year)
- Jemena Electricity Networks (for 2015 calendar year)
- Powercor (for 2015 calendar year)
- AusNet Services (for 2015 calendar year)
- United Energy (for 2015 calendar year)
- TasNetworks (for 2014–15 financial year)

In total, Victorian DNSPs reported around \$5.5 million DMIA expenditure for 2015 reporting period. Overall, Victorian DNSPs have spent about 110 percent of the DMIA allowance for the 2011 to 2015 regulatory period. AusNet Services, CitiPower and Powercor over spent their respective DMIA allowances, while Jemena and United Energy under spent their respective allowance.

TasNetworks utilised about 13 percent of its total allowance so far after three years into the five year regulatory control period.

Table 4 Summaries of DMIA expenditures to date for VIC DNSPs for the 2011 to 2015 regulatory control period (\$' 000 nominal)

DNISP	DMIA approved for 2015	Total DMIA Allowance	DMIA spent to date	DMIA remaining for the period (a)	Proportion of approved DMIA spent (%)
AusNet Services	533.8	3 180.6	3 727.0	NA	117%
CitiPower	599.0	1 060.2	1 122.1	NA	106%
Jemena	94.5	1 060.2	898.1	162.1	85%
Powercor	3 417.6	3 180.6	3 856.4	NA	121%
United Energy	890.7	2 120.4	1 972.8	147.6	93%
Total	5 535.7	10 602.0	11 576.4	309.7	109%

Source: AER analysis and DMIA reports submitted by DNSPs; numbers may not be exact due to rounding.

Note: (a) Numbers may not add up due to rounding. Figures represent the mathematic sum of all historical spending in nominal terms.

These figures are different to the carryover adjustments shown in Tables 6 to 11, which represent the sum of the net present value of the individual year's over/under spends in 2017 dollar value.

Table 5 Summaries of DMIA expenditures to date for TAS DNSP for the 2012–17 regulatory control period (\$' 000, nominal)

DNSP	DMIA approved for 2014–15	Total DMIA Allowance	DMIA spent to date	DMIA remaining for the period	Proportion of approved DMIA spent (%)
TasNetworks	91.0	2 114.9	277.8	1 837.1	13%
Total	91.0	2 114.9	277.8	1 837.1	13%

Source: AER analysis and DMIA reports submitted by DNSPs; numbers may not be exact due to rounding.

3.2 Carryover adjustment

3.2.1 Background

In this 2016 DMIA determination the AER is required to calculate a carryover amount adjustment for the Victorian electricity distributors. A similar carryover adjustment will be calculated for the Tasmanian electricity distributors in the 2017–18 regulatory control years, when data on their total DMIA expenditure over the current regulatory period are available.

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. Where a business has over-spent its allowance, however, it bears the additional costs and this cannot be passed through as higher charges 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'.³

³ AER, *Demand management incentive scheme for the ACT and NSW 2009 distribution determinations: Demand management innovation allowance scheme*, November 2008, p. 17.

The carryover adjustment operates between regulatory periods. For example, in the case of the Victorian electricity distributors any under-expenditure in their 2011–15 regulatory control period will be "trued-up" by applying the carryover adjustment in the 2016–20 regulatory control period.

3.2.2 Calculation of carryover adjustment

When calculating the carryover adjustment to be applied to the 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 = the cumulative carryover balance for year "t" calculated in the dollars of the second year of the subsequent regulatory period

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.

Using the DMIA scheme carryover formula, we calculated the carryover adjustment to be applied to each Victorian electricity distributor. Our calculations using each distributor's DMIA ex ante allowance and our ex post review of DMIA expenditure are set out in Table 6 to Table 10. The actual carryover adjustment which we will apply to each distributor is specified in section 3.2.3 below.

Table 6 AusNet Services: carryover amount calculation (\$'000)

	2011	2012	2013	2014	2015	Total
Ex ante allowance	610.4	622.6	636.1	650.8	660.6	3,180.5 (b)
Ex post expenditure	10.7	188.8	359.8	2,633.9	533.8	3,727.0 (b)
Cumulative carryover balance (a)	-983	-1,632	-2,008	452	0	0

Source: AER analysis and DMIA reports submitted by DNSPs; numbers may not be exact due to rounding.

Note: (a) Figures in net present values terms in 2017 dollar value. The final carryover amounts will be subject to the final adjustment when the WACC is updated when DNSPs submit the annual pricing proposals. Figure for each year represents the cumulative over/under spent of that year and the cumulative effect of the previous years.

Note: (b) Numbers may not add up due to rounding. Figures represent the mathematic sum of all historical spending in nominal terms.

Table 7 CitiPower: carryover amount calculation (\$'000)

	2011	2012	2013	2014	2015	Total
Ex ante allowance	203.5	207.5	212.0	216.9	220.2	1,060.2 (b)
Ex post expenditure	73.8	45.3	-	403.9	599.0	1,122.1 (b)
Cumulative carryover balance (a)	-210	-450	-736	-505	0	0

Source: AER analysis and DMIA reports submitted by DNSPs; numbers may not be exact due to rounding.

Note: (a) Figures in net present values terms in 2017 dollar value. The final carryover amounts will be subject to the final adjustment when the WACC is updated when DNSPs submit the annual pricing proposals. Figure for each year represents the cumulative over/under spent of that year and the cumulative effect of the previous years.

Note: (b) Numbers may not add up due to rounding. Figures represent the mathematic sum of all historical spending in nominal terms.

Table 8 Jemena: carryover amount calculation (\$'000)

	2011	2012	2013	2014	2015	Total
Ex ante allowance	203.5	207.5	212.0	216.9	220.2	1,060.2 (b)
Ex post expenditure	467.4	223.9	48.4	63.9	94.5	898.1 (b)
Cumulative carryover balance (a)	443	467	242	51	-91.3	-91.3

Source: AER analysis and DMIA reports submitted by DNSPs; numbers may not be exact due to rounding.

Note: (a) Figures in net present values terms in 2017 dollar value. The final carryover amounts will be subject to the final adjustment when the WACC is updated when DNSPs submit the annual pricing proposals. Figure for each year represents the cumulative over/under spent of that year and the cumulative effect of the previous years.

Note: (b) Numbers may not add up due to rounding. Figures represent the mathematic sum of all historical spending in nominal terms.

Table 9 Powercor: carryover amount calculation (\$'000)

	2011	2012	2013	2014	2015	Total
Ex ante allowance	610.4	622.6	636.1	650.8	660.6	3,180.5 (b)
Ex post expenditure	-	19.2	189.0	230.6	3,417.6	3,856.4 (b)
Cumulative carryover balance (a)	-988	-1,879	-2,483	-3,001	0	0

Source: AER analysis and DMIA reports submitted by DNSPs; numbers may not be exact due to rounding.

Note: (a) Figures in net present values terms in 2017 dollar value. The final carryover amounts will be subject to the final adjustment when the WACC is updated when DNSPs submit the annual pricing proposals. Figure for each year represents the cumulative over/under spent of that year and the cumulative effect of the previous years.

Note: (b) Numbers may not add up due to rounding. Figures represent the mathematic sum of all historical spending in nominal terms.

Table 10 United Energy: carryover amount calculation (\$'000)

	2011	2012	2013	2014	2015	total
Ex ante allowance	407.0	415.1	424.1	433.9	440.4	2,120.4 (b)
Ex post expenditure	-	87.4	333.0	661.7	890.7	1,972.8 (b)
Cumulative carryover balance (a)	-662	-1,149	-1,272	-990	-480.2	-480.2

Source: AER analysis and DMIA reports submitted by DNSPs; numbers may not be exact due to rounding.

Note: (a) Figures in net present values terms in 2017 dollar value. The final carryover amounts will be subject to the final adjustment when the WACC is updated when DNSPs submit the annual pricing proposals. Figure for each year represents the cumulative over/under spent of that year and the cumulative effect of the previous years.

Note: (b) Numbers may not add up due to rounding. Figures represent the mathematic sum of all historical spending in nominal terms.

3.2.3 AER's determination of carryover adjustment

Using the calculations in section 3.2.2 above, we calculated the carryover adjustment to be applied in the Victorian distributors' 2016–20 regulatory control period. Table 11 sets out those carryover adjustments.

Table 11 Carryover adjustment: Vic DNSPs (\$'000)

	\$'000 nominal (a)
AusNet Services	0.0
CitiPower	0.0
Jemena	-91.3
Powercor	0.0
United Energy	-480.2

Source: AER analysis and DMIA reports submitted by DNSPs;

Note: (a) the final carryover amounts will be subject to the final adjustment when the WACC is updated when DNSPs submit the annual pricing proposals.

4 CitiPower

CitiPower is claiming 2015 DMIA expenditure for two demand management projects totalling \$ 599 047. We approve this expenditure as it meets 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 CitiPower's 2015 DMIA report.

4.1 CitiPower residential storage trial

4.1.1 Project Overview

The project involved the deployment of 20 residential battery units with aggregation software in targeted areas within the network. The project aims to better understand the impacts of battery storage to the network and customer including: residential battery potential to support constrained or high solar areas of the network; centralised grid storage benefits vs distributed customer storage benefits; and value of residential demand management control software from a network and customer perspective. CitiPower claimed DMIA expenditure in 2015 of \$468 652 for this project.

4.1.2 Assessment against DMIA criteria

Criteria #1 This is met because it is non-network in nature through investing in supply options for customers that reduces peak demand on the upstream network.

Criteria #2 This is met because it addresses peak demand management through trialling the use of battery aggregation software platforms to reduce peak network demand.

Criteria #3 This is met because this project builds knowledge and capability to efficiently deploy residential storage to reduce peak demand on the network.

Criteria #4 Non-tariff based.

Criteria #5 This criteria 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 Capex.

4.2 Storage Investment Framework Design and Analysis

4.2.1 Project Overview

This project involved three main development areas for application of energy storage for demand management:

- End-user off gridding
- Cold thermal energy storage
- Grid Level energy storage on the grid

The scope of this project was to develop new ideas, challenge existing technical solutions and business models through global benchmarking to:

- investigate alternative supply options for customers, load shifting and peak curtailment
- provide alternative means of meeting demand
- address peak and more broad based demand management through identifying best cases for the application of thermal storage, off-gridding and network based storage
- build knowledge and capability to efficiently deploy demand management solutions relevant to CitiPower's network.

CitiPower claimed DMIA expenditure in 2015 of \$130 395 for this project.

4.2.2 Assessment against DMIA criteria

Criteria #1 Non-network in nature through investigating alternative supply options for suitable customers, load shifting and peak curtailment providing alternative means of meeting demand.

Criteria #2 Program addresses peak demand management and broad-based demand management through identifying best cases for the application of thermal storage, off gridding and network based storage.

Criteria #3 The project builds knowledge and capability to efficiently deploy demand management solutions relevant to the network.

Criteria #4 Program is non-tariff based.

Criteria #5 This criteria 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 Opex

5 Jemena Electricity Networks

Jemena is claiming 2015 DMIA expenditure for four demand management projects totalling \$94 494. We approve this expenditure as it meets 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 Jemena's 2014 DMIA report.

5.1 Demand Response Field Trial _ Phase 1

5.1.1 Project Overview

Jemena has initiated a Demand Response Field Trial (DRFT) project to develop its understanding of the benefits, costs, pricing / commercial arrangements and operational structures of customer controlled demand response (DR) programs. Phase 1 of the trial includes model development and desktop analysis and was completed in January 2015. Jemena claimed DMIA expenditure in 2015 of \$26 325 for this project.

5.1.2 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 Non-tariff based

Criteria #5 This criteria 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 Opex

5.2 Demand Response Trial Project on 22kV Feeder BD-13 (Phase 1)

5.2.1 Project Overview

In 2015 JEN undertook a desktop study of controlling the demand of commercial and industrial customers on one of their 22kV feeders (BD-13) as a Demand Response initiative. The desktop study included high level customer screening tests, developing a

draft customer DR questionnaire, network constraint analysis, hardware requirements, Information Technology (IT) requirements and training JEN staff in customer acquisition. Jemena claimed DMIA expenditure in 2015 of \$ 10 955 for this project

5.2.2 Assessment against DMIA criteria

Criteria #1 The project is aimed at developing JEN'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 JEN for various elements of customer controlled demand response programs as an effective and efficient demand management solution.

Criteria #4 Non-tariff based

Criteria #5 This criteria 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 Opex

5.3 Demand Management Constraint Analysis Tool (CAT)

5.3.1 Project Overview

JEN initiated the development of a Demand Management Constraint Analysis Tool (CAT) in 2015. The software tool allows network planning engineers to undertake a consistent and objective cost benefit analysis of multiple network and non-network options. Development of the tool, which comes with advanced modelling features, continued into the 2016 Regulatory Year. Jemena claimed DMIA expenditure in 2015 of \$ 10 955 for this project.

5.3.2 Assessment against DMIA criteria

Criteria #1 The tool allows network planning engineers apply a consistent approach in analysing and comparing multiple network and non-network options.

Criteria #2 The project is a broad based Demand Management cost-benefit analysis initiative, and is not aimed at a specific location on the network.

Criteria #3 The project deliverable is a software tool which can be used to develop and enhance JEN's capability in comparing and analysing multiple network and non-network options. In return to the upfront capital contribution and co-development effort,

JEN can subscribe to the use of the software tool at a discounted price for the next two years after the completion of the development..

Criteria #4 Non-tariff based

Criteria #5 This criteria 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 Opex

5.4 Grid Battery Energy Storage System Feasibility and Concept Design Study

5.4.1 Project Overview

JEN undertook a feasibility study into deploying a Grid Battery Energy Storage System (GESS) as a peak shaving technology and assessed its capability in economically addressing capacity constraints in a selected part of JEN. The project, which includes model development and desktop analysis, was completed in January 2016. Jemena claimed DMIA expenditure in 2015 of \$ 27 400 for this project.

5.4.2 Assessment against DMIA criteria

Criteria #1 The project is aimed at developing JEN's capabilities to reduce peak demand in constrained parts of the network, 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 develop JEN's capability in deploying GESS as an effective, economic and efficient peak demand management solution. The primary objectives of the GESS feasibility and design study was to develop load data analysis and battery control simulation tools which enable JEN to do high level design and assessment of GESSs as part of BAU planning processes.

Criteria #4 Non-tariff based

Criteria #5 This criteria 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 Opex

6 Powercor

Powercor is claiming 2015 DMIA expenditure for five demand management projects totalling \$3 417 623. We approve this expenditure as it meets 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 Powercor's 2015 DMIA report.

6.1 Demand management storage project (DMSP)

6.1.1 Project Overview

The scope of the project includes the procurement of a 2MW battery which will provide targeted demand management relief for Ballarat South (BAS) and defer augmentation for the 22kV BAS feeder. The intent is battery storage will reduce stress on the local network and may deliver benefits including capital deferment, two way power flow management (improving renewable integration capability), improve reliability and provide reactive power and voltage stability support.

Powercor claimed DMIA expenditure in 2015 of \$ 3 287 228 for this project.

6.1.2 Assessment against DMIA criteria

Criteria #1 This project allowed Powercor to more efficiently manage customer demand in a way other than increasing supply through network augmentation (by supplying stored electricity during periods of high demand).

Criteria #2 This project aimed at managing peak demand at a specific network constraint in Ballarat South.

Criteria #3 This project builds capability and capacity to explore other locations where battery storage could potentially deliver efficient demand management mechanisms.

Criteria #4 Non-tariff based.

Criteria #5 This criteria 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 both opex and capex.

6.2 Storage Investment Framework Design and Analysis

6.2.1 Project Overview

This project:

- investigates alternative supply options for customers, load shifting and peak curtailment providing alternative means of meeting demand;
- addresses peak and more broad based demand management through identifying best cases for the application of thermal storage, off-gridding and network based storage;
- builds knowledge and capability to efficiently deploy demand management solutions relevant to Powercor's network;

The specific scope of this project was to develop new ideas, challenge existing technical solutions and business models through global benchmarking and the study of best in (storage) class countries.

For each storage development area the scope was to identify:

- suitable technologies (pure storage or hybrid with generation);
- design, sizing and initial cost estimate;
- improvement through complementary solutions (energy efficiency, demand side management etc.)
- role of involved stakeholders, regulatory status, revenue sources; and
- construction of a full business case for a standard example of each case.

Powercor's current forecasts are for storage technologies to reduce in cost over the next 5-10 years, with increased storage penetration into the grid to help manage peak load and intermittent/renewable generation.

Powercor claimed DMIA expenditure in 2015 of \$ 130 395 for this project.

6.2.2 Assessment against DMIA criteria

Criteria #1 Non-network in nature through investigating alternative supply options for suitable customers, load shifting and peak curtailment providing alternative means of meeting demand.

Criteria #2 Program addresses peak demand management and broad-based demand management through identifying best cases for the application of thermal storage, off gridding and network based storage.

Criteria #3 The project builds knowledge and capability to efficiently deploy demand management solutions relevant to the network.

Criteria #4 Non-tariff based.

Criteria #5 This criteria 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 Opex

7 AusNet Services

AusNet Services is claiming 2015 DMIA expenditure for two demand management projects totalling \$ 533 782. We approve this expenditure as it meets 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' 2015 DMIA report.

7.1 Residential Battery Storage Trial

7.1.1 Project Overview

AusNet Services' Residential Battery Storage Trial investigates the capability of battery and inverter systems connected to consumer homes to reduce residential peak demand. The systems are fully programmable and can be remotely controlled by AusNet Services.

The battery systems are capable of shifting customer demand from peak to off-peak times by discharging whenever the customer's instantaneous demand is high, and by re-charging overnight when the customer's demand is low, or recharging using excess solar generation. The flexibility provided by the programmable inverter makes this type of system capable of both addressing specific network constraints and providing broad-based demand management across the network if rolled-out in sufficiently large numbers. AusNet Services claimed DMIA expenditure in 2015 of \$48 652 for this project.

7.1.2 Assessment against DMIA criteria

Criteria #1 The battery systems are intended to shift customer demand from peak to off-peak times by discharging whenever the customer's instantaneous demand is high, and by re-charging overnight when the customer's demand is low.

Criteria #2 This is a peak demand management program.

Criteria #3 This trial will explore how battery storage at the residential level can be used for peak demand management to defer network augmentation as well as developing key insights into how electric vehicles may interact with the network in the future.

Criteria #4 Non-tariff based

Criteria #5 This criteria 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 Opex

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 in 2015 of \$485 130 for this project.

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. This trial will help to establish whether battery storage is a credible non network solution to managing demand and set the parameters around when it can be economically deployed for the benefit of energy consumers.

Criteria #4 Non-tariff based

Criteria #5 This criteria 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 Opex

8 United Energy

United Energy is claiming 2015 DMIA expenditure for two demand management projects totalling \$ 890 734. We approve this expenditure as it meets 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 United Energy's 2015 DMIA report.

8.1 Virtual Power Plant (VPP) Project

8.1.1 Project Overview

The aim of the project is to validate or otherwise, the use of a VPP to manage embedded generation and storage in a residential setting for the provision of efficient and prudent non-network augmentation.

The VPP integrates the operation of both supply and demand-side assets to meet customer demand for energy services in both the short and long-term. To match short-interval load fluctuations, the VPP is intended to make extensive and sophisticated use of information technology, advanced metering, automated control capabilities, and electricity storage. United Energy claimed DMIA expenditure in 2014 of \$363 564 for this project.

8.1.2 Assessment against DMIA criteria

Criteria #1 The VPP project attempts to combine the capabilities of solar PV generation and battery storage to flatten out the demand profile by charging the battery during the middle of the day when solar PV generation is at its maximum and discharging the battery during the early evening when residential demand is at its maximum. Aggregating VPP units will provide a system that can be dispatched to manage network capacity constraints.

Criteria #2 The VPP aims to address specific network constraints by reducing demand on the network at the location and time of the constraint. If the VPP concept is proven, it is intended to locate such units in areas where there are identified network constraints. In the first instance, this is likely to be in areas where there are significant distribution transformer constraints by clustering the VPP units in localised areas. Ultimately the goal is to alleviate constraints higher up in the network such as at the distribution feeder or zone substation level.

Criteria #3 The VPP offers a new solution for a constrained network area, particularly where load growth is low, uncertain or is expected to plateau in future. The ability to provide incremental amounts of capacity through combining renewable generation and storage to meet the demand as it materialises could be economic against a more traditional network solution that provides significant step increases in capacity at higher cost. The VPP is intended to test this concept.

Criteria #4 Non-tariff based.

Criteria #5 This criteria 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 Opex

8.2 Summer Saver (Demand Response) Trial

8.2.1 Project Overview

The Summer Saver Trial 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 investigates demand management options. The outcomes of this trial will enable 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.

UE launched the trial in February 2014 targeting 6,500 customers on four Bulleen zone substation feeders. Customers were offered \$25 if they reduced their load during the UE nominated three hour event period. UE anticipated calling on average four events per summer with the customer having the opportunity to earn \$100 for the summer if they participated in all events.

UE expanded the trial for this summer to include 13,000 more customers in areas of the network that are likely to experience an interruption. On top of the pool pump load control and supply capacity limiting options, the new option of load control of air-conditioners was added to this summer's service offerings. United Energy claimed DMIA expenditure in 2014 of \$51,470 for this project.

8.2.2 Assessment against DMIA criteria

Criteria #1 The Summer Saver Trial seeks to incentivise customers to reduce their load during peak times. Customers are rewarded \$25 per event for reducing their load during the UE nominated three hour event period.

Criteria #2 The Summer Saver Trial seeks to address specific network constraints and is therefore targeted at customers directly impacted by those constraints. The trial targets approximately 6,000 customers on four Bulleen feeders that were close to capacity as well as about 4,000 customers in areas of the network which are likely to suffer an interruption this summer.

Criteria #3 Since UE's network is predominantly metropolitan demand management such as demonstrated by this trial is a crucial option to be explored.

Criteria #4 Non-tariff based.

Criteria #5 This criteria 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 Opex

9 TasNetworks

TasNetworks is claiming 2015 DMIA expenditure for one demand management project totalling \$ 90 952. We approve this expenditure as it meets the DMIA criteria. The following section sets out our assessment of the individual project. For more detailed information about these projects, including any identifiable benefits derived from the projects, please refer to TasNetworks' 2015 DMIA report.

9.1 Commercial and industrial peak demand reduction

9.1.1 Project overview

This project involved a survey of medium and larger commercial and industrial customers in Tasmania to determine the amount of network support which is available. This package of work is now complete and its outcomes have been used to inform other work packages such as the embedded generator network support trial. TasNetworks claimed DMIA expenditure in 2014–15 of \$90 952 for this project.

9.1.2 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 is a peak 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 Non-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 Opex