Appendix 1.20: Demand Management Strategy

Regulatory proposal for the ACT electricity distribution network 2024–29

Contents

Acronyms

ACT	Australian Capital Territory
ADMD	After Diversity Maximum Demand
ADMS	Advanced Distribution Management System
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AFLC	Audio Frequency Load Control
ANU	Australian National University
ARENA	Australian Renewable Energy Agency
BAU	Business As Usual
BESS	Battery Energy Storage System
C&I	Commercial and Industrial
CER	Customer Energy Resources
CIM	Common Information Model
CNG	Compressed Natural Gas
CSIP-AUS	Common Smart Inverter Profile Australia
DAPR	Distribution Annual Planning Report
DCSR	Demand Control Signal Receiver
DEIP	Distributed Energy Integration Program
DER	Distributed Energy Resources
DERMS	Distributed Energy Resource Management System
DM	Demand Management
DMIA	Demand Management Innovation Allowance
DMIS	Demand Management Incentive Scheme
DNSP	Distribution Network Service Provider
DOE	Dynamic Operating Envelope
DRED	Demand Response Enabled Device
DSES	Demand Side Engagement Strategy
DSO	Distribution System Operator
EEIS	Energy Efficiency Improvement Scheme
ENSMS	Electricity Network Safety Management System
EV	Electric Vehicle
ESB	Energy Security Board
EV	Electric Vehicle
FCAS	Frequency Control Ancillary Services

HEMS	Home Energy Management System
ICE	Internal Combustion Engine
ICT	Information and Communications Technology
IT	Information Technology
kV	Kilovolt
kW	Kilowatt
LOR	Lack of Reserve
LV	Low Voltage
MSL	Minimum System Load
MW	Megawatt
MWh	Megawatt hour
NCC	National Construction Code
NEM	National Electricity Market
NER	National Electricity Rules
NPV	Net Present Value
OEM	Original Equipment Manufacturer
OT	Operational Technology
PV	Photovoltaic
QoS	Quality of Supply
R&D	Research & Development
RCAC	Reverse Cycle Air Conditioner
REIF	Renewable Energy Innovation Fund
REVS	Realising Electric Vehicle-to-Grid Services
RIT-D	Regulatory Investment Test – Distribution
SMS	Short Messaging Service
SWOT	Strengths, Weaknesses, Opportunities, Threats
TCCS	Transport Canberra and City Services
V2G	Vehicle to Grid
VPP	Virtual Power Plant
ZEV	Zero Emissions Vehicle

Executive Summary

Significant investment in electricity networks will be required to support the current energy transition across Australia, placing upward pressure on energy costs. Demand Management (DM) is an important tool which can help Evoenergy avoid or defer investing in more network infrastructure. This can directly contribute to downward pressure on electricity prices for customers.

DM and the implementation of non-network solutions is a core obligation of planning and operating Evoenergy's electricity network under the National Electricity Rules to complement network investment where this delivers a lower cost outcome.

Historically, population growth has been one of the key drivers for electricity demand growth. Going forward, the following key macro drivers will impact the future demand placed on the Evoenergy network:

- **Private electric vehicle charging** which when uncontrolled, could create new super-peaks on the electricity network.
- **Electrification** and phasing out gas which is the ACT Government's preferred pathway to achieve net zero emissions by 2045.
- **Distributed solar** will continue to grow causing implications for managing reverse power flows and acceptable voltages to ensure quality of supply on the distribution network.
- **Climate change** may increase the intensity and frequency of hot days and cold days driving additional demand from air conditioners and network impacts along with increase in storms and local weather impact.
- **Urban intensification** due to the ACT's Planning Strategy 2018 is targeting 70% of new housing to be built within Canberra's existing urban footprint which will place additional locational pressure on the electricity network.
- **Public electric vehicle chargers** may drive locational network capacity limitations if left unmanaged.
- **Electric bus fleets** for the ACT Government's fleet of existing 380 diesel and 70 compressed natural gas buses being replaced after end of life with 100 electric buses expected by 2025.
- **Greenfields** developments that are all-electric will be the norm going forward with high penetrations of DER.

These demand drivers require planning by Evoenergy to ensure a strategic response which avoids reactive capex spending peaks and impacts to reliability of supply and customer electricity costs. To align with industry standard practice and community expectations, Evoenergy has established the following aspirational goal and objectives for DM:

> ## Aspirational Goal
> Deploy effective demand management solutions that are fit-for-purpose, scalable, customer-centric and proven to be credible alternatives to traditional network investment

DM Objective 1	DM Objective 2	DM Objective 3
Drive lower electricity costs	**Maximise customer value**	**Work existing assets smarter**
Meet the demand growth and electrification requirements of the ACT's growing electricity customer base in the most cost-effective way.	Maximise the flexibility and therefore value of the Evoenergy network from the point of view of customers.	Maximise network utilisation that makes best use of existing assets and network environmental footprint.

DM Objective 4	DM Objective 5	DM Objective 6
Support decarbonisation	**Community engagement**	**Best practice planning**
Support the ACT Government's legislated decarbonisation, electrification and net zero policies.	Actively engage and collaborate with the local community to shape the future direction for DM in the ACT to deliver lower costs for customers.	Develop maturity and capability for timely, efficient and effective DM assessment, decision, implementation and operations.

To meet our DM aspirations and objectives, Evoenergy is targeting to progressively increase flexible demand under contract from 13 MW currently to 34 MW by 2029 - this represents close to 5% of the highest peak demand ever recorded on our network (685 MW during the 2022 winter). Evoenergy will also revise this target as more information regarding load growth from fuel switch/electrification and EV charging comes into play over the coming years. The DM strategy is in line with Evoenergy's Network Development Plan (Appendix 1.16) as it enables the shifting of EV charging loads out of peak periods.
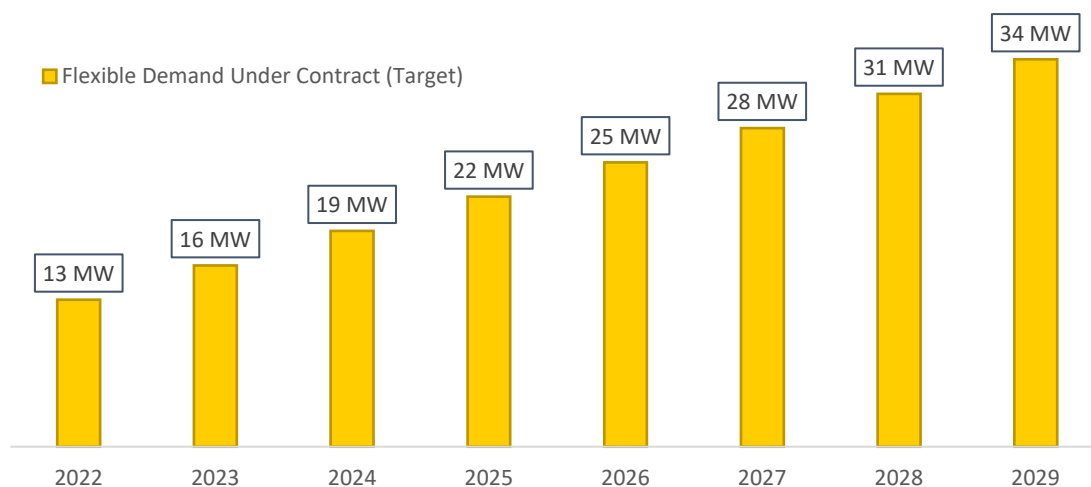
Distribution Network Service Providers (DNSPs) traditionally adopt various initiatives to alter end-user demand. These initiatives have varying levels of customer value potential, and this value needs to be considered against operational risk on the network. Additionally, initiatives can be characterised as proactive (where the DNSP has positioned and invested in the initiative ahead of the need) versus reactive, where the DNSP is responding to an imminent problem.

A framework characterising these philosophies is provided below. Although the collaborative approach is likely to be attractive to customers, a portfolio of initiatives across these quadrants is likely to be the preferred and practical approach. "Defensive" measures should be avoided where possible, in the interest of managing reputational risk, customer relationships and stakeholder management.
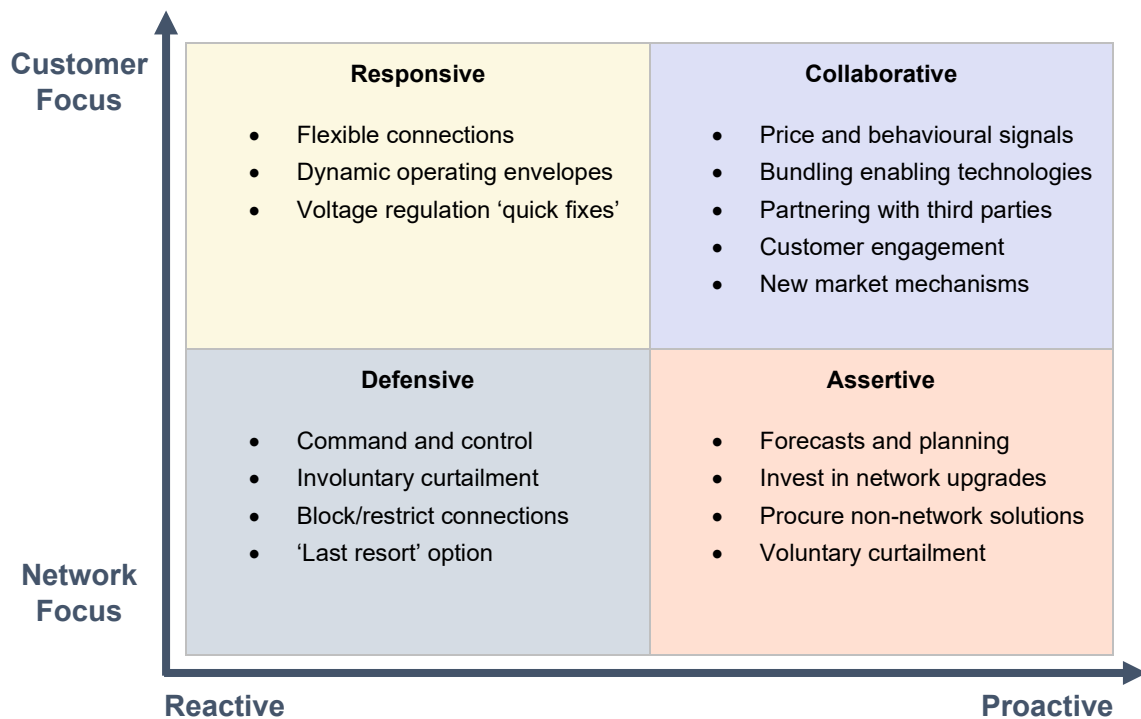
Based on the demand drivers and the potential initiatives described above, the following table describes the preferred strategic response for Evoenergy to meet its emerging demand drivers and the key DM solutions for deployment. It may also be beneficial to deploy any number of other DM solutions not listed in combination such as power factor correction and energy efficiency programs.

Evoenergy demand driver	Evoenergy impact	Strategic response	Key DM solution
Private EV charging	High	**Collaborative**: collaborate and partner with customers, retailers and aggregators on tariffs and DM reward incentive schemes	• EV smart charging and/or direct load control combined with off-peak and 'solar-soak' tariffs
Electrification	High	**Collaborative**: collaborate with the ACT Government and partner with customers, retailers, aggregators, OEMs and installers on DM schemes, hot water tariffs and incentives schemes to support efficient electrification	• Hot water direct load control via smart meter and/or HEMS combined with off-peak and 'solar-soak' tariffs • RCAC direct load control via smart thermostat and/or HEMS
Distributed solar	High	**Responsive**: deploy flexible connections and leverage existing VPPs to maximise ability for solar PV to counteract peak demand whilst also delivering extra value for customers	• Flexible connection contracts and dynamic operating envelopes • Export pricing • 'Solar-soak' tariff • Battery VPPs, including community batteries

Evoenergy demand driver	Evoenergy impact	Strategic response	Key DM solution
Climate change	Medium	**Assertive**: Network Resilience and Sustainability Plan ensures impacts of increasing weather events are incorporated into reliability targets and programs	• RCAC direct load control via smart thermostat and/or HEMS • Battery VPPs • Major customer DM contracts (e.g. backup diesel generators)
Urban intensification	Medium	**Responsive**: deploy DM technology solutions as part of new buildout and partner with developers	• EV smart charging and/or direct load control combined with off-peak and 'solar-soak' tariffs • Incentives/policies to discourage instantaneous electric hot water
Public EV chargers	Medium	**Responsive**: deploy DM technology solutions as part of new buildout	• EV smart charging and/or direct load control combined with off-peak and 'solar-soak' tariffs
Electric bus fleets	Low	**Responsive**: deploy DM technology solutions as part of new buildout	• EV smart charging and/or direct load control combined with off-peak and 'solar-soak' tariffs where applicable
Greenfields	Low	**Responsive**: deploy DM technology solutions as part of new buildout and partner with developers	• All of the above

Evoenergy's plan for executing the DM Strategy is broken down into the following:

• DM deployment using both broad based and targeted DM programs
• DM deployment using network connection and other application triggers
• Strategic initiatives to ensure Evoenergy achieves its DM aspirational vision and objectives (see below)

Four strategic initiatives will be executed, each have various focus areas as summarised below. Each strategic initiative is mapped to the relevant DM objective to provide line of sight between strategic aspirations and execution.

Strategic Initiatives	Focus Areas	DM Objective Line of Sight					
		DM 1	DM 2	DM 3	DM 4	DM 5	DM 6
Stakeholder & Community Engagement	Customers	✓			✓	✓	
	ACT Government				✓	✓	✓
	Energy Retailers and Aggregators	✓			✓	✓	
	Developers	✓			✓	✓	✓
	OEMs & Installers	✓			✓	✓	
	Research Partners					✓	✓

Category	Initiative	DM 1	DM 2	DM 3	DM 4	DM 5	DM 6
Innovation	External Innovations				✓		**✓**
	Innovation Trials	✓	✓	✓	✓	✓	**✓**
	Grant Funding	**✓**					
	Innovation Evaluation						**✓**
Capability Uplift	Broad Based DM Program	**✓**	**✓**	**✓**	**✓**	✓	✓
	Forecasting and Network Visibility	✓					**✓**
	Network Planning and Investment	✓					**✓**
	DM Procurement	**✓**	**✓**	**✓**	**✓**	✓	✓
	DERMS	✓	✓	✓	✓	✓	**✓**
DM Marketplace	DSES Refresh					**✓**	✓
	DSO Preparation	**✓**	**✓**	**✓**	**✓**	✓	✓
	DM Accreditation Scheme					✓	**✓**
	DM Partnerships	**✓**	**✓**	**✓**	**✓**	✓	✓
	DM Contracts	**✓**					**✓**

DM 1: Drive lower electricity costs   *DM 2: Maximise customer value*

DM 3: Work existing assets harder   *DM 4: Support decarbonisation*

DM 5: Community engagement   *DM 6: Best practice planning*

✓ Directly aligned with DM objective   ✓ Supports DM objective

Current State

The current state of demand management within Evoenergy
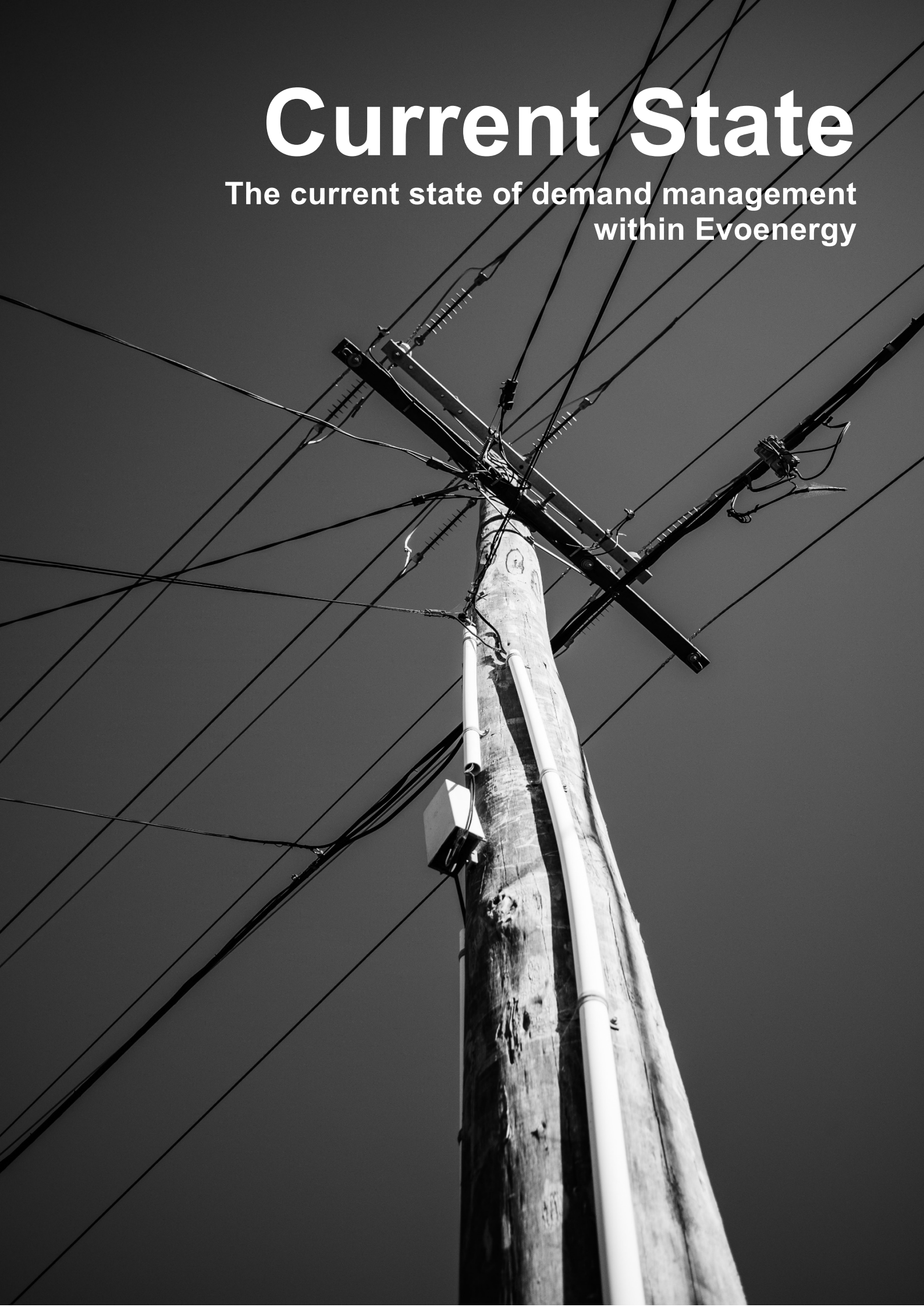
1.   Current State

1.1   Introduction

Australia's National Electricity Market (NEM) is currently undergoing a significant and sustained transition in response to decarbonation initiatives driven by energy consumers, government and industry. Distribution Network Service Providers (DNSPs) are rapidly adapting and adjusting operating models to account for new technology, changing consumer behaviour, changing usage and demand patterns, high penetration of Distributed Energy Resources (DER),[1] regulatory and market reforms. With inflation and interest rates on the rise and stagnant wage growth, cost of living is now front and centre for Australian households with particular attention on electricity prices. Multiple media sources indicate electricity prices are forecast to increase materially over the near term.

Significant investment in electricity networks will likely be required to support the energy transition currently underway across Australia, placing upward pressure on energy costs. Demand Management (DM) is an important tool which can help DNSPs like Evoenergy avoid or defer investing in more network infrastructure. This can directly contribute to downward pressure on electricity prices for customers.

DM is a core obligation of planning and operating Evoenergy's electricity network. Evoenergy is required under the National Electricity Rules (NER) to actively implement non-network solutions to replace or complement network investment where this delivers a lower cost outcome. Key DM regulations and incentives are summarised in Table 1.

Table 1: DM regulations and incentives for DNSPs

Regulation	Description
NER Clause 5.13.1	Section 5.13.1 of the NER requires Evoenergy to: • Develop a strategy for considering non-network options for addressing system limitations (this document). • Develop and publish a strategy for engaging with non-network providers (Demand Side Engagement Strategy). • Establish and maintain a register of interested parties who wish to be notified of developments relating to distribution network planning and expansion.
NER Clause 5.17.3	Additionally, clause 5.17.3 of the NER relates to the Regulatory Investment Test – Distribution (RIT-D). The RIT-D framework is a cost-benefit process to ensure DNSPs identify the most credible network options for major network investments, which maximise value to customers in the NEM. The RIT-D process requires DNSPs to consider DM options such as load curtailment. This DM Strategy supports the planning process when examining non-network options.

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[1] Also increasingly referred to as Customer Energy Resources or CER, typically includes rooftop solar PV, batteries, EV charging and other smart flexible loads such as hot water.

Regulation	Description
ACT regulation	The ACT Government's Gas Transition Utility Impact Statement[2] states in addition to current regulatory requirements, Evoenergy will be asked to develop lead indicators to monitor and track system performance to predict potential problems before they have an impact and report on non-network solutions to address areas where solar PV output curtailment is likely to be occurring. It is anticipated that these reporting requirements will be formalised through updates to current annual utility licence reporting requirements, legislative instruments or technical codes.
AER DMIS & DMIA	The AER's Demand Management Incentive Scheme (DMIS) and Demand Management Innovation Allowance (DMIA) provides DNSPs with an incentive to undertake efficient expenditure on non-network options relating to DM.[3]

1.2   Purpose of this document

Evoenergy requires a DM Strategy as part of the Distribution Annual Planning process. This DM Strategy will replace the Peak Demand Reduction Strategy. The DM Strategy will be implemented through the DM Operational Plan. This document satisfies the needs for Evoenergy to have a strategy for considering DM as per the NER 5.13.1(e)(2).

The DM Strategy provides the focus and strategic intent for incorporating DM into Evoenergy's network planning, options development, investment decision making and innovation. Executing this DM Strategy is expected to contribute to the following outcomes:

- Provide credible alternatives to investment in network assets leading to capital expenditure avoidance or deferral.
- Place downward pressure on costs for consumers through reducing capital expenditure.
- Improved integration of new technologies and DER which have the potential to drive growth in peak demand.
- Providing improved flexibility and opportunity for customers who wish to connect their DER into the Evoenergy network, allowing customers to reduce costs and emissions without inconvenience.

1.3   National Electricity Market

The NER was initially drafted to facilitate and manage wholesale market operation within the NEM. The energy transition and emergence of DER and two-way flow of electricity through the distribution network has challenged the implicit assumptions underpinning the rules.

Successive rule changes have recognised the role of DER aggregators in the market, streamlined the arrangements for connecting small generators and in 2021 established access, pricing and incentive arrangements for DER, imposing obligations on DNSPs to support more DER connecting to the distribution network. Additionally increasing volatility in the NEM from minimum demand related issues and wholesale market suspensions (as evidenced in June 2022) further give credence to the need for DNSPs to have effective strategies to mitigate these challenges in the coming years.

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[2] ACT Government Utility Impact Statement - Gas Transition
[3] AER demand management incentive scheme and innovation allowance mechanism

The development and implementation of effective DM solutions will now be critical for DNPS to effectively plan, operate and invest in their networks to successfully integrate the increased uptake of DER while minimising costs for consumers.

1.4   ACT Government policy context

Decarbonisation is a dominant theme in the ACT's policy objectives. The *Climate Change and Greenhouse Gas Reduction Act 2010* sets a target for the ACT to reduce greenhouse gas emissions in the ACT to zero net emissions by 30 June 2045. The *ACT Climate Change Strategy 2019-2025* sets the initial pathway for the Territory to achieve this objective. In August 2022, the ACT Government released its *Powering Canberra: Our pathway to electrification* which confirms the ACT Government's preferred pathway to achieve net zero emissions by 2045 is through electrification and the phasing out of gas. Electrification will place significant pressure on Evoenergy's electricity network.

The ACT Government has already achieved net zero for electricity consumed within the ACT through its 100% renewable target achieved in 2020 underpinned by contracts established with wind and solar farms. Subsequently, the main emissions sources across the ACT economy are now transport (64%) and natural gas combustion (22%). The current ACT Government's position is to electrify and decarbonise these energy systems which will place significant pressure on Evoenergy's electricity network over the next 20 years due to new demand from electrification and EV charging.

Key ACT Government policies and programs that will have the potential to drive electricity demand growth in the future include:

- **Gas transition activities**[4] including encouraging ACT households and business to transition to full-electric setups and abolishing gas connections, new suburbs no longer require a gas connection and regulation to prevent new gas connections to commence in 2023.
- **Zero Emissions Vehicles (ZEV) Strategy**[5] for making Electric Vehicles (EVs) more affordable, expanding the ACT public EV charging network, transitioning the ACT Government fleet to EVs and banning the sale of new internal combustion engine (ICE) light vehicles from 2035.
- **Electrification of the ACT bus fleet**[6] and developing zero emissions depots for bus fleet charging by 2040 (upgrades to Woden, Belconnen and Tuggeranong depots and one new depot).
- The **ACT Government's Sustainable Household Scheme**[7] provides zero-interest loans of up to $15,000 to eligible households, to help with the upfront costs of investing in rooftop solar, battery storage, electric heat pumps, electric cooktops, EV chargers and EVs. This will reduce the barrier associated with upfront cost which is the biggest barrier reported by 60% of ACT households for transitioning to all-electric setups and DER take-up.
- **Next Gen Energy Storage Program**[8] provides rebates for eligible ACT homes and businesses to purchase a battery. This program is currently fully subscribed as of January 2023.
- The **ACT's Planning Strategy 2018**[9] targeting 70% of new housing to be built within Canberra's existing urban footprint.

1.5   Alignment with Evoenergy's existing strategies

This DM Strategy supports and is aligned to the Evoenergy Business Strategy and other sub-strategies including the DER Integration Strategy and Quality of Supply (QoS) Strategy. An overview of how the DM Strategy aligns with these other existing strategies is presented in Table 2.

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[4] ACT Government - our pathway to electrification
[5] ACT's Zero Emissions Vehicles Strategy 2022-30
[6] ACT Government Zero Emission Transition Plan for Transport Canberra
[7] ACT Sustainable Household Scheme
[8] Next Gen Energy Storage Program
[9] ACT Planning Strategy

Table 2: DM Strategy alignment with other Evoenergy strategies

Strategy	Description	Objectives / Goals	DM Strategy Alignment
Evoenergy Business Strategy	The Evoenergy Business Strategy outlines strategic pillars and initiatives for Evoenergy	- Build our zero-carbon future - Elevate customer experiences - Optimise our assets and networks - Efficient and targeted investment	- DM can help reduce peak demand, improve feasibility of electrification as part of the ACT's net zero ambitions - DM may provide opportunity to build trust and provide positive customer experiences - DM flattens the demand profile to better utilise existing network assets
DER Integration Strategy	Evoenergy's approach for enabling two-way energy flows and facilitate increased demand side participation in the NEM.	- Manage the integration of DER while maintaining core service obligations - Leverage DER to support network functions	- DM is a critical enabler for facilitating increased DER uptake - DM is a key requirement to implement the DSO model in an economically and technically feasible manner.
Quality of Supply (QoS) Strategy	Outlines Evoenergy's approach to managing QoS.	Maintain QoS performance	DM initiatives may contribute to improved voltage management of the network, particularly in relation to solar PV uptake.
Stakeholder Engagement Strategy	Outlines Evoenergy's future path for engaging with its stakeholders covering industry, government, business partners, consumers, regulators, media and internal stakeholders	- Good engagement becomes business as usual - Our customer focus continues to grow - Our work acknowledges our stakeholder interests	- The DM Strategy has a strong focus on stakeholder and community engagement focused on customers, ACT Government, energy retailers and aggregators, developers, OEMs & installers, and research partners. - The associated Demand Side Engagement Strategy (DSES) is focused on engaging with the DM sector for non-network solutions.

1.6   Strategy location within existing hierarchy

The DM Strategy is classified as an operational strategy as per the existing Evoenergy document hierarchy presented in Figure 1. The full DM suite contains additional artifacts including the Demand Side Engagement Strategy (DSES), DM Operational Plan and supporting DM templates and tools.
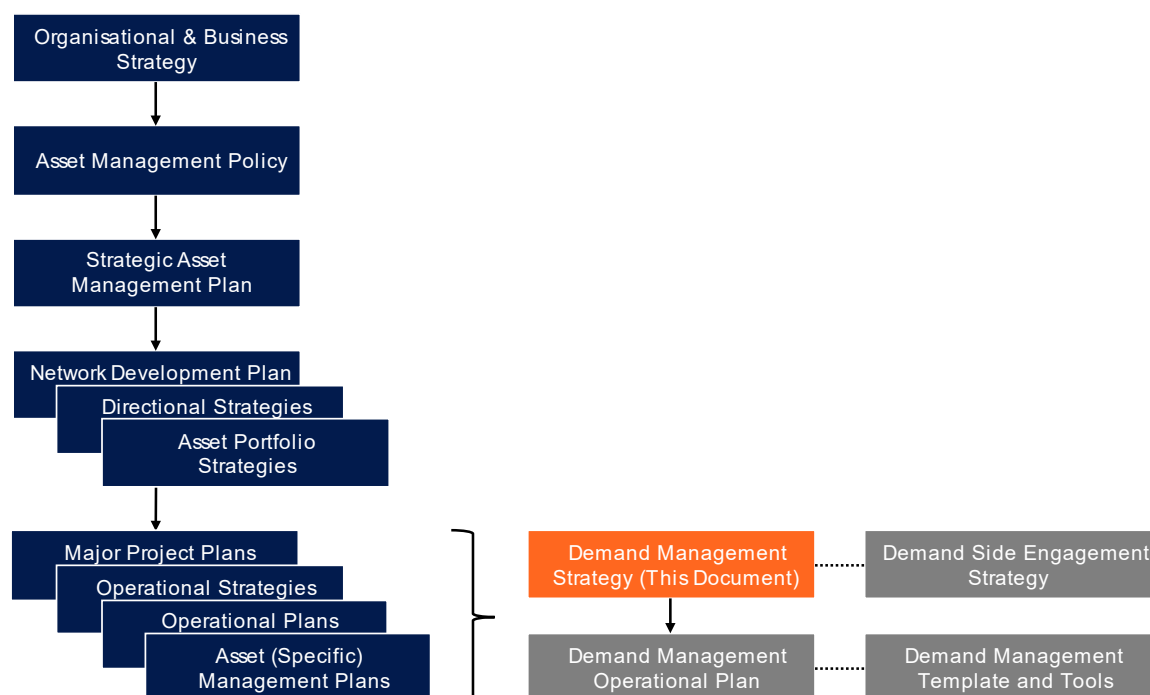
Figure 1: Evoenergy's asset management system document hierarchy

1.7 Demand management

Definition of demand management

DM is the deliberate action taken by network operators to better utilise existing network capacity by reducing or shifting demand for electricity, as an alternative to increasing network capacity to meet that demand. In the modern context, DM may also theoretically unlock more rooftop solar PV, other DER or new services (e.g. batteries/VPPs, EVs, energy markets, etc) and provide improved flexibility to customers. It can therefore be considered a planning and operational approach which ultimately facilitates the Distribution System Operator (DSO) paradigm, where DNSPs provide a customer-centric "platform" for energy services adding value to customers through cost reduction, emissions reduction and flexibility.

In the context of the NER investment funding regulations, DM traditionally represents operational expenditure for network businesses who contract for, and otherwise support, DER and other non-network solutions as an alternative to investing capital in new or augmented network infrastructure. However, as regulation evolves and technology matures and reduces in price, DM may be provided by economical and regulatory compliant capex options such as batteries to shift demand peaks.

DM is an important part of efficient and sustainable network operations. Effective use of DM reduces the cost to maintain the network and helps lower electricity charges for the customer base.

Evoenergy's demand management opportunity

Three areas of demand are of relevance for the Evoenergy network:

1. Sub-transmission network demand (e.g.: 132kV feeders, 132/11kV transformers)

2. Distribution network demand (e.g.: 11kV and LV feeders and transformers)

3. Localised Minimum operational demand
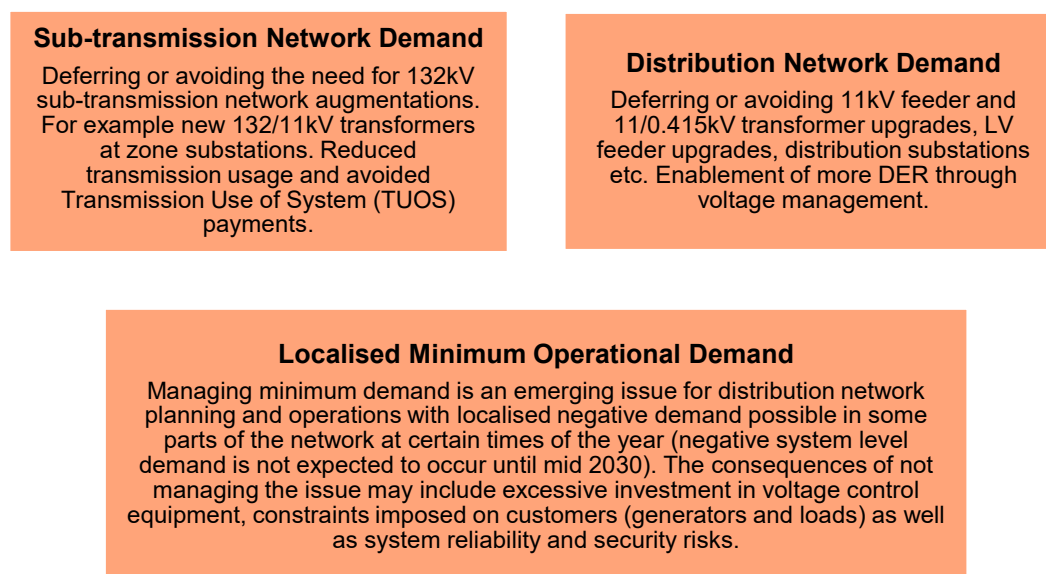
These are described in more detail in Figure 2.

<table>
<tr>
<td>
Sub-transmission Network Demand

Deferring or avoiding the need for 132kV sub-transmission network augmentations. For example new 132/11kV transformers at zone substations. Reduced transmission usage and avoided Transmission Use of System (TUOS) payments.
</td>
<td>
Distribution Network Demand

Deferring or avoiding 11kV feeder and 11/0.415kV transformer upgrades, LV feeder upgrades, distribution substations etc. Enablement of more DER through voltage management.
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</table>

Localised Minimum Operational Demand

Managing minimum demand is an emerging issue for distribution network planning and operations with localised negative demand possible in some parts of the network at certain times of the year (negative system level demand is not expected to occur until mid 2030). The consequences of not managing the issue may include excessive investment in voltage control equipment, constraints imposed on customers (generators and loads) as well as system reliability and security risks.

Figure 2: DM opportunities on the Evoenergy network

1.8   Drivers of future demand in the ACT

During 2022, Evoenergy's system wide maximum demand reached 440MW during summer and 685MW during winter respectively. The highest historical summer system wide peak demand recorded was 657MW (2018/19) and the highest winter peak demand was this past year of 685MW (2022). This winter peak was a new whole of network maximum demand record.

The historical winter maximum demand has been less variable than summer maximum demand due to less variability in weather conditions. To date, summer loading conditions (when the ambient temperatures are higher and network equipment ratings lower) have been the major driver behind emerging network constraints. The 2022 maximum demand for winter was approximately a 1 in 10-year event.

Table 3 presents key macro drivers impacting the future demand for the Evoenergy network. These demand drivers require planning by Evoenergy to ensure a strategic response which avoids reactive capex spending peaks and impacts to reliability of supply and customer electricity costs.

Population growth is one of the key drivers for electricity demand growth. The ACT population in 2021 was 454,000 up from 397,000 in 2016 (14.4% population growth).[10] By 2030, the ACT population is expected to reach 504,000[11] (an additional 11% growth). Demand growth driven by population growth is captured under the 'Urban Intensification' and 'Greenfields' demand drivers in Table 3. Going forward, new drivers for electricity demand growth will emerge including electrification, EV charging, increased uptake of distributed solar (and other DER), and climate change.

Demand drivers have been qualitatively ranked in terms of their expected 'impact rating' based on the relative magnitude as a capex driver, network security impact and timing.

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[10] ABS, population snapshot for the ACT, released 28/06/2022, https://www.abs.gov.au/articles/snapshot-act-2021
[11] ACT Government population forecast

Table 3: Snapshot of key drivers of future demand

Demand Driver		Key Points	Capex Driver[12]	Network Impact ● localised ●●● system wide			Impact Rating
				<2 years	2-5 years	>5 years	
Private EV Charging		The ACT leads the nation in EV uptake with 9.5% of new car sales being EVs. The current barriers to EV adoption[13] are temporary. Mass-market EV adoption will occur over the medium term with the number of EVs registered in the ACT expected to reach 42,000 in 2030[14]. Around 70% of EVs in the ACT are expected to be charged using private chargers. Uncontrolled EV charging could create new super-peaks on the electricity network.	$$$	●	●●	●●●	**HIGH**
Electrification		Two-thirds of ACT households are connected to gas with heating and hot water consuming 77% and 22% of household gas respectively. ACT Government policy to phase out gas and recent sharp increases in gas prices are creating strong drivers for transitioning from gas to all-electric setups for households. P50 peak winter demand is expected to increase 40 MW by 2025 and up to 180 MW by 2045.[15]	$$$	●	●	●●●	**HIGH**
Distributed Solar		One-quarter of Canberra households have rooftop solar with around 250 MW of embedded solar capacity already installed. Generation output from embedded solar is expected to grow by 300% on current levels by 2045[16]. This has implications for managing reverse power flows and acceptable voltages to ensure QoS on the distribution network.	$$	●	●●	●●●	**HIGH**

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[12] Capex drivers for 'urban densification', 'public EV chargers', 'electric bus fleets' and 'greenfields' are rated 'Low' as they generally attract capital contributions, therefore the costs are not passed onto Evoenergy's broader customer base.
[13] ACT's Zero Emissions Vehicles Strategy 2022-30
[14] ACT Government EV Charging Outlook for the ACT, December 2021
[15] ACT Government Utility Impact Statement - Gas Transition
[16] ACT Government Utility Impact Statement - Gas Transition

Demand Driver		Key Points	Capex Driver[12]	Network Impact ● localised ●●● system wide			Impact Rating
Climate Change		Historically summer loading conditions have been the major driver behind network constraints. Climate change may increase the intensity and frequency of hot days driving additional demand from air conditioners and network impacts. This will create ongoing challenges with maintaining system security, particularly during LOR events issued by AEMO.	$	●●	●●	●●	MED
Urban Intensification		70% of new housing will be built within Canberra's existing urban footprint concentrated around transit corridors and commercial hubs. Urban intensification will place additional locational pressure on the existing electricity network. Capital contributions will help alleviate costs borne by the broader customer base, however, DM can play a key role to alleviate costs in all-electric multi-unit developments with individual EV chargers. The National Construction Code (NCC) 2022 also specifies new requirements for electrical distribution boards to support EV charging in multi-unit residential and commercial building carparks.[17]	$	●●	●●	●●	MED
Public EV Chargers		Around 30% of EVs are expected to be charged using public chargers, mostly from EV owners living in multi-unit developments who do not have access to a private charger. By 2030, the ACT Government expects there will be a need for at least 580 to 1,000 public EV chargers[18]. This represents an upper charging capacity limit of 50 MW by 2030 (assuming 1,000 EV x 50 kW EV chargers) which, unmanaged may drive locational network capacity limitations.	$	●	●	●●	MED
Electric Bus Fleets		The ACT Government operates a fleet of 380 diesel and 70 Compressed Natural Gas (CNG) buses which will be transitioned to electric buses. Geographic concentration of fleet charging of battery electric buses at depots may cause localised capacity constraints requiring network upgrades and smart charging solutions.	$	●	●	●	LOW

[17] NCC 2022, Volume 1, Section J Energy Efficiency, Part J9 Energy monitoring and on-site DER, J9D4 Facilities for EV charging equipment
[18] ACT Government EV Charging Outlook for the ACT, December 2021

Demand Driver		Key Points	Capex Driver[12]	Network Impact ● localised ●●● system wide			Impact Rating
Greenfields		All-electric greenfield developments will be the norm going forward with developers offering solar (mandated in some cases), battery, EV charging and Home Energy Management System (HEMS) packages. This will change the way the electricity network is designed and operated for maintaining network reliability and QoS while ensuring expenditure remains efficient and prudent.	$	●	●	●	**LOW**

1.9 SWOT analysis in the demand management context

Based on a review of the Evoenergy's existing strategies and plans, available technologies, existing pilot projects, partnerships, and demand drivers, Evoenergy's current state in relation to DM is summarised in the Strengths, Weaknesses, Opportunity, and Threats (SWOT) analysis in Table 4 below. In summary,

- **Strengths** include existing established strategies and plans including processes for rigorous capital planning and investment, customer engagement and tariff development. Evoenergy also has an existing 'future energy' team, various major customers on DM contracts and operational systems are present for load shedding. Evoenergy has participated in various innovation trials and its network control platforms (ADMS) has been upgraded with baseline DER management capability (DERMS) including being an early adopter with access to VPPs for network purposes.
- **Weaknesses** include a lack of historical and existing customer level demand control capability such as hot water ripple control and Demand Response Enabled Devices (DRED).
- **Opportunities** include the outcomes of various technology trials and innovation projects, including specific opportunities for combining appliances with direct control technologies and tariffs. The extent to which these can be leveraged going forward is likely to provide material value to ACT energy consumers. Opportunities exist to leverage various third parties as a channel to the customer. Customers are engaged and Evoenergy is generally perceived as trustworthy. Further, the ACT Government is willing to collaborate with Evoenergy on electrification and other initiatives.
- **Threats** are largely as per the demand drivers in Table 3 and various QoS issues, but rising electricity prices are also a concern. The NCC 2022 requires electrical distribution boards to support EV charging in multi-unit residential and commercial building carparks which has the potential to cause demand issues and cost imposts. There is also uncertainty with DER interoperability and communication protocols, and the ESB's post-2025 market design outcomes, which will require Evoenergy to keep its real options open to prepare for a range of possible futures.

Table 4: Evoenergy DM current state SWOT analysis

S — Strengths

- Various plans and strategies in place including DER Integration Strategy, QoS Strategy and Net Zero strategy. - Demand Side Engagement Strategy (DSES). - Existing 'future energy' team within Evoenergy focused on DM and DER integration. - Mature asset management strategies and plans. - Mature processes for rigorous capital planning and investment, customer engagement and tariff proposal development. - An Electricity Network Safety Management System (ENSMS) is in place along with an emergency load shedding system. - Various major customers on contract (availability and performance payment) for load shedding and/or running backup generators.	- New Schneider ADMS version 3.8 installed with baseline DERMS capability. - Access to VPP via Reposit. - Lesson learnt from various innovation trials. - Household EnergyShare SMS trial for reducing demand. - ARENA Project Converge – DER demonstration pilot using the CSIP-AUS protocol and with a focus on "Shaped Operating Envelopes". - ARENA EV Grid trial- for managed and controllable EV chargers in residential settings. - DERMS has been trialled as part of ARENA innovation project.

W — Weaknesses

- No powerline ripple or limited off-peak timeclock control technologies rolled out circa 30-50 years ago which was common at the time with other DNSPs to control hot water loads, pool pumps, etc.
- Some major customers with backup generators don't want an external party to have operational control over critical assets (but some are happy to provide DM services on a 'good will' basis).

- No DREDs installed.
- Limited engagement with DM market.
- Existing VPP needs to be manually deployed on an as-needs basis using a third-party web platform, so its use is limited to LOR events with AEMO load shed instructions.
- DM is largely reactionary and is not a fully agile in its engagement and deployment.

O
Opportunities

- ACT Government open willingness to work together, partner and collaborate with Evoenergy on electrification and other initiatives such as the Canberra Big Battery, public EV chargers and bus fleet electrification.
- ACT Government public housing efficiency and electrification upgrades (opportunity for innovation trials).
- ACT energy consumers are engaged and are generally positive about the 'future grid'. Evoenergy is seen as a trustworthy source.[19] This is a significant opportunity for Evoenergy to leverage.
- Converting 'good will' customers to DM contracts through education and incentives.

- Existing ACT Government DER incentive schemes as a channel to the customer.
- Leveraging energy retailers/aggregators, OEMs, installers, developers and appliance retailers as a channel to the customer.
- Existing VPPs offered by retailers and aggregators.
- Tarff trials and reforms to encourage load shifting to off-peak or excess solar periods e.g., 'solar-soak' tariff
- Hot water direct load control via smart meter and/or HEMS combined with off-peak/solar soak tariffs.
- Combining appliances with direct load control technologies and tariffs to incentivise customer DM take-up at the point of appliance sale / installation. This can create mutual benefits and value propositions across the value chain.

T
Threats

- System-wide demand growth due to private EV charging, electrification (gas hot water and space heating to electric heat pumps and appliances).
- Localised demand growth centred around commercial and employment hubs due to urban intensification, public EV chargers and ACT Government bus fleet electrification.
- Demand growth in greenfield developments with all-electric setups and high penetrations of DER including solar, batteries and EV charging.
- Growing penetration of distributed solar and the implications regarding reverse flows, voltage regulation and system level security.
- NCC 2022 requirements for electrical distribution boards to support EV charging in multi-unit residential and commercial building carparks (EV charging control systems need to be installed which provides an opportunity to manage this threat).[20]

- Instantaneous electric hot water (no ability to load shift to manage peak demand), particularly in multi-unit settings.
- QoS is a significant threat with increasing levels of DER penetration. QoS implications include reverse power flows, voltage regulation, DER phase balancing, power factor, harmonics, etc.
- Cost of living pressures and rising electricity prices creating community hardship and discontent. 2 in 3 households are concerned the 'future grid' means higher costs.[21]
- Uncertain DER interoperability and communication protocols to be adopted across industry.
- Uncertainty with the ESB's post-2025 market design outcomes (e.g., will DM be a service procured from a third-party or will DNSPs have to implement new DM technologies and control schemes).

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[19] Pollinate, Project Grid – Overall Report, April 2022
[20] Key issues include developers wanting EV charging capacity but do not want to pay through capital contributions, EV charging capacity won't be fully utilised initially creating revenue risk for Evoenergy, and who pays when the marginal EV charger installed by a tenant or landlord triggers a network upgrade (developer, landlord, tenant or Evoenergy).
[21] Pollinate, Project Grid – Overall Report, April 2022

2. Aspirational State

2.1 Demand management best practice

Based on the current state analysis of Evoenergy's context and demand drivers, this section describes what DM best practice looks like and Evoenergy's aspirational state for DM as a goal of the DM Strategy. Cost reduction and advancement of information and communications technology (ICT) has provided new opportunities for DM beyond traditional approaches[22], including:

- Two-way addressable control and communication enabling the targeted real-time measurement and verification of DM activities.
- Integrating the DM capabilities with network electrical connectivity and capacity models facilitates full automation of DM actions for emergency, reliability, and improved performance of equipment.
- Complementing DM with the Common Information Model (CIM) representation of the electrical network.

These advancements in ICT combined with customer DER uptake, government net zero targets, regulations and a move towards customer centricity has created a paradigm shift on what best practice DM looks like for DNSPs across the key domains summarised in Table 5 below. Evoenergy will use Table 5 to provide the guiding principles when implementing this DM Strategy.

Table 5: What best practice DM looks like for DNSPs

Domain	What does best practice DM look like?
ICT Platform	• **Open standards** provide secure, open, non-proprietary, industry-approved, flexible, platform-independent, interoperable, and transparent end-to-end technologies communications and control infrastructure. • **Scalable architecture** implementation facilitates the addition of numerous and new devices connecting. • **Continuous, secure, and reliable communication** endpoints at the end-use site receive and acknowledge the receipt of DM signals from the energy service providers. • **Automation** through pre-programmed DM strategies determined and controlled by the end-use participant. • **Accurate model representation** of electrical connectivity to indicate the network infrastructure present state, and telemetry to show real or near-real time status.
Network Planning	• **Mature broad based** DM solutions deployed to provide system-level DM responses which are particularly useful during LOR events. • **Targeted approaches** using load forecasts, end use customer insights and DER visibility to identify target areas and the potential magnitude of peak demand reductions available for activating DM in areas with emerging constraints. • **Case-by-case assessments** to determine the 'portfolios' of possible DM solutions that may be deployed, each able to meet the requirements of the DM opportunity. • **Robust asset investment decision making framework** using financial analysis, processes, and tools to accurately calculate the financial benefits of DM solutions with costs offset against DM benefits. • **Complementary network tariffs** trialled and deployed with DM solutions (e.g. tariffs to incentivise behaviours for 'solar soak', off-peak consumption, EV charging and network BESSs, etc) • **Sufficient lead time** is provided for customers and industry partners to participate in DM solutions.

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[22] Early DM schemes broadcast a signal to interact with customer devices connected on a separate electrical circuit (e.g., ripple control). These devices were primarily "hidden" loads such as hot water units or pool pumps which could be switched on and off as required by the DNSP with minimal impact to the customer. Customers are then rewarded with a cheaper electricity tariff for the energy consumed.

Domain	What does best practice DM look like?
	• **Established DM program start and end dates** to leverage business investment cycles, provide sufficient time for market partners to gear up and allow customers sufficient time to reach decisions on investment and participation. • **DM measurement and verification** procedures are well defined to simplify program administration and provide a feedback loop for continuous improvement.
Innovation	• **DM innovation programs** are fully costed, take advantage of new developments in markets and technology, and equip DNSPs to bring fresh, valuable, and cost-effective service offerings to customers. • **Trialling, developing, and scaling** new DM technologies and capabilities empowers DNSPs to develop the right customer offerings, at the right time. Multiple 'small bets' are placed to keep all real options open allowing DNSPs prepare for a range of possible futures in an uncertain environment. • **Optimised DM innovation spending** that brings to life the most impactful and required solutions first, with timing a key factor, i.e. when the solutions are mature enough for scaled deployment but before customers need them. • **Access to DM innovation grants and incentives** including the AER DMIS/DMIA, ARENA and other jurisdictional based schemes. • **Partnering with research institutions and third parties** to leverage external capabilities and share the research burden. • **DM innovation initiatives are owned and delivered** by a wide range of BAU teams as the ones with the requisite capabilities. • **Continuous market scanning** to identify critical triggers and tipping points for DM innovation based on customer, market, and technological developments to ensure optimal deployment of innovation and avoiding the risk of stranded investments.
DM Marketplace & Procurement	• **Demand Side Engagement Strategy** drives strong engagement with non-network solution providers, are readily accessible and are supported by other engagement methods such as a register of interested parties, website page, newsletters, links to other useful resources, etc. • **Publish network constraint and incentive maps** that show the location, amount and timing of the required demand reductions, and the value of incentives. • **Accessing existing DM programs** that are already developed (or in development) by the market can provide a more cost-effective option for DNSPs. • **Leverage multiple benefits** by contributing to the development mature DM products developed by market participants. • **Leverage energy retailers, aggregators, OEMs and installers** as a channel to access a large set of customers at a lower cost. • **Establishing an accreditation scheme** for the DM market to build trust, set standards, and opening the DM program up to any providers who satisfy accreditation requirements. • **Adopting market-driven approaches** for procuring multiple DM providers to achieve diversity in suppliers and to manage overall program deliverability risk.
Customer Engagement & Incentives	• **Provide simple advice** to customers on DM opportunities and connections. • **Provide incentives** (not penalties) for a customer's DM participation and performance. • **Simplify customer access** to DM solutions and incentives. • **General marketing** that provides credibility to the program and creates a sense of partnering with the network/community. • **Raise customer awareness** of demand tariffs, pricing incentives and the benefits of DM for individuals and broader community. • **Align with existing incentives and subsidy schemes** wherever possible (e.g. ACT Government Sustainable Household Scheme) to reduce confusion and complexity. • **Provide DM as a default** wherever possible (e.g. new appliance purchase) with an opt-out option for the customer.

2.2 Lessons learned from peers

Lessons learned from the trials and successful DM solutions can be broken down into two key broad categories: 1) The DNSP perspective, and 2) Customer's perspective, as outlined in Table 6. Learning from past challenges increases the probability of success for execution of Evoenergy's DM Strategy.

Table 6: Lessons learned from peers

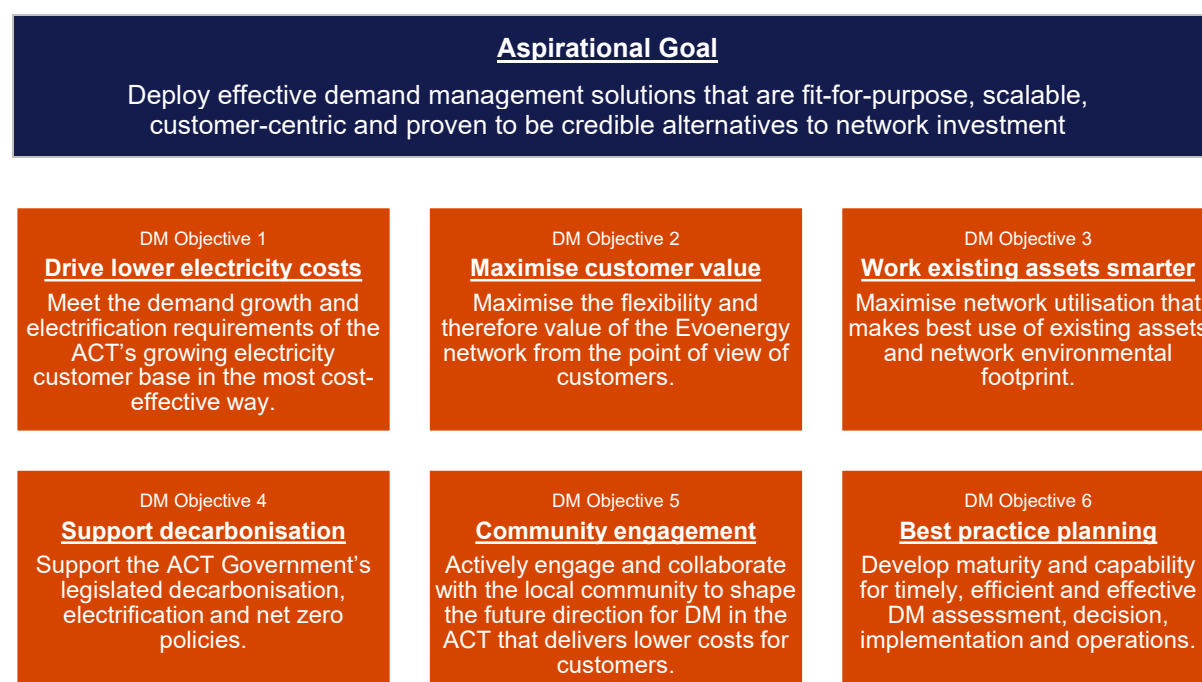| Challenges	Lesson learned	Preferred approach
DNSP perspective		
Bespoke DM programs	Setting up a network-led DM program can be costly and challenging.	• Strategic approach for DM • Track progress, adjust and pivot as required • Leverage third parties as a channel to market
Timing	It can take several years to recruit and secure demand reductions.	• Early identification of emerging network constraints • Network visibility of flexible demand and generation
Diverse DM and DER ecosystem	DNSP's often need to establish bespoke technical solutions with a myriad of suppliers (no clear winners) resulting in cost and complexity. DER interoperability is also an issue.	• Prepare for DSO and the creation of a new competitive market for aggregated DER services • Develop commercial relationships with DER traders and aggregators for DM procurement • Develop DERMS capability over time and integrate with existing IT/OT platforms
Uncertain future	DM often requires novel approaches and new technologies however uncertainty in future technologies, standards and regulatory environment creates risk of stranded investments.	• Carefully designed and targeted innovation trials • Place multiple 'small bets' to keep real options open to prepare for a range of possible futures • Scale up and incorporate new capability over time once there is a clear need, maturity and business case • Keep a watching brief on the ESB post 2025 market design and AEMC smart metering review.
Cost-benefit	Costs are heavily scrutinised by regulators while it can be challenging to quantify the financial benefits with DM.	• Apply for DM grant funding and other incentives • Robust asset investment decision framework • Measure and verify demand reductions
Ringfencing	DNSPs are ringfenced from accessing energy markets, limiting the value proposition for DM.	• Partner with a range of energy retailers and aggregators as a channel to the customer and 'value-stacking' DM via retailer/aggregator access to energy markets
Customer perspective		
Inclusion and equity	Customers are diverse and have different motivations, abilities and opportunities to access DM.	• Use a range of methodologies to engage with and understand customers • Consider the practicalities of DM participation as well as socio-economic segmentation approaches
Incentives and nudges	Customers may be inclined to stick with the status quo unless they see value in DM.	• Offer more compelling incentives which cover the full range of financial and non-financial values (e.g. community and environmental benefits) • Incentives work best when complemented by information, tools and customer support
Communication	DM can be too complex or confusing or not compelling in terms of value and benefits.	• Communicate benefits in terms that are relevant to the way customers live their lives and support their communities.
Trust	Trust in the sector is not high, and consumers may seek to retain higher levels of personal control.	• Trust can be earned through simplicity, using trusted channels and voices, marketing, adopting inclusive approaches to design and transparency

2.3   Case studies

Many DNSP DM case studies exist in Australia and internationally. Three case studies have been selected and summarised in Table 12 to Table 14 in Appendix 1.20.A showcasing DM achievements and priorities for two Australian DNSPs and one international DNSP (United States). These case studies (and the many others) provide useful insights on possible DM strategies and initiatives for Evoenergy.

2.4   Evoenergy's winning aspiration

Evoenergy's aspirational goal, objectives and targets for DM are presented in Figure 3 below. Evoenergy is targeting to progressively increase flexible demand under contract from 13 MW currently to 34 MW by 2029 – this represents close to 5% of the highest peak demand ever recorded on our network (685 MW during the 2022 winter).

Evoenergy will also revise this target as more information regarding load growth from fuel switch/electrification and EV charging comes into play over the coming years with increased DER and EV chargers along with grid connected batteries available for aggregating for DM opportunities. ACT Government forecasts for behind-the-meter battery energy storage capacity will reach 60 MW by 2029. The DM strategy is in line with Evoenergy's Network Development Plan (Appendix 1.16) as it enables the shifting of EV charging loads out of peak periods.
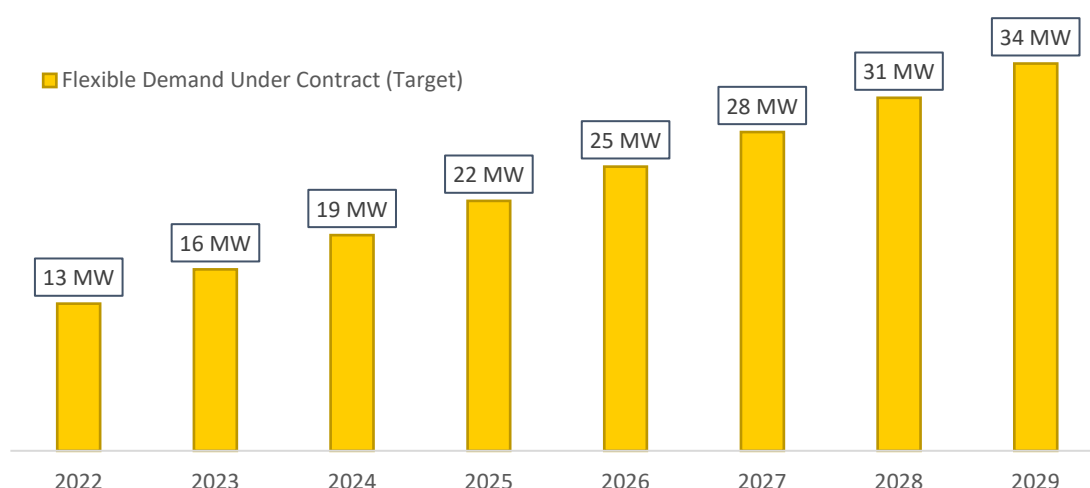
Aspirational Goal

Deploy effective demand management solutions that are fit-for-purpose, scalable, customer-centric and proven to be credible alternatives to network investment

DM Objective 1
Drive lower electricity costs
Meet the demand growth and electrification requirements of the ACT's growing electricity customer base in the most cost-effective way.

DM Objective 2
Maximise customer value
Maximise the flexibility and therefore value of the Evoenergy network from the point of view of customers.

DM Objective 3
Work existing assets smarter
Maximise network utilisation that makes best use of existing assets and network environmental footprint.

DM Objective 4
Support decarbonisation
Support the ACT Government's legislated decarbonisation, electrification and net zero policies.

DM Objective 5
Community engagement
Actively engage and collaborate with the local community to shape the future direction for DM in the ACT that delivers lower costs for customers.

DM Objective 6
Best practice planning
Develop maturity and capability for timely, efficient and effective DM assessment, decision, implementation and operations.

Figure 3: Evoenergy's aspirational vision and objectives for DM

2.5   Outcomes for Evoenergy and customers

Based on Evoenergy's aspirational vision, DM objectives and targets, the following are specific examples of how these aspirations and objectives flow through to changes on Evoenergy's network and corresponding customer outcomes.

Table 7: Aspiration examples of demand management applications

Network level	Planning action	Network benefits	Customer benefits
Transmission (330kV)	Management of demand driven constraints at 330kV bulk supply points and adjacent 330kV network.	Contribute to limiting upstream (330kV) capacity constraints as part of joint planning with Transgrid. Avoid constraints on renewable generation in the ACT region or unlock more renewable generation capacity in the region.	• Greater penetration of renewable energy • Lowest cost generation operating without curtailment (lower wholesale prices) • Costly augmentations avoided or deferred.
Sub-transmission (132kV)	Management of demand driven constraints at 132kV zone substations and adjacent 132kV network	Potential deferral of avoidance of power transformer additions at existing zone substations, for example Gold Creek or future planned substations. Reduced TUOS payments to Transgrid from existing embedded generation and DM options.	• Capex deferral or avoidance resulting in reduced pressure on electricity prices.
Distribution Network (11kV, LV)	Address localised demand driven limitations on 11kV and LV network including feeders and distribution transformers.	Avoid or defer need the need for network upgrades, e.g.: LV conductors and distribution transformer hitting capacity limits on specific street with multiple residents installing 2x EVs per household.	• Lower costs for consumers • Greater flexibility of DER connection and energy usage.

Network level	Planning action	Network benefits	Customer benefits
Project specific	New assets (greenfield)	For example, new 1000 lot subdivision of mixed C&I and residential load being developed with higher After Diversity Maximum Demand (ADMD) expected due to zero gas policy and affluent residents with 1-2 EVs per residence; DM can reduce size of or remove requirement for additional network infrastructure.	• Decarbonised supply solutions for developments. • DER flexibility and modern electricity supply solutions.

Strategy

Meeting our customer's needs

3. Demand Management Strategy

3.1 Demand management strategic choices framework

DNSPs traditionally adopt various initiatives to alter end-user demand. These initiatives have varying levels of customer value potential, and this value needs to be considered against operational risk of the network. Additionally, initiatives can be characterised as proactive (where the DNSP has positioned and invested in the initiative ahead of the need) versus reactive, where the DNSP is responding to an imminent problem.

A framework characterising these philosophies is provided in Figure 4. We consider there is no "right answer" in the approach. The appropriate pathway or pathways depends on many factors such as regulatory requirements, available funding, cost, customer strategy, technology and market maturity, operational risk, internal capability, etc.

Explaining this model further:

Responsive:

- The DM initiative drives value for customers through choice, flexibility, and new services rather than purely protecting the network from reliability issues, load-at-risk or non-compliance with operational requirements (e.g.: voltage limits). The initiative is in direct response to an emerging issue e.g.: over-voltages due to rooftop PV.

Defensive:

- The DM initiative is "damage control" to avoid a system security issue that would otherwise eventuate from something the customer wants to do. The DNSP was not aware that the customer had an aspiration or need until they were approached directly (e.g.: through a connection enquiry).

Collaborative:

- The DNSP has identified an emerging problem or opportunity on the distant horizon and is engaging with customers to create mutual value. Customers are engaged in the problem definition and the potential solutions are co-designed with customers. Partners and other third parties may be involved, and the feasibility and relationships and technical solutions have been established well ahead of the timing of the need with feasibility mutually understood.

Assertive:

- The DNSP has identified the need on the distant horizon and developed its own solutions to the problem well ahead of the timing of the need. The DNSP will impose these solutions on the market within the constraints of its regulatory requirements and customers will adapt/live with the solutions proposed.
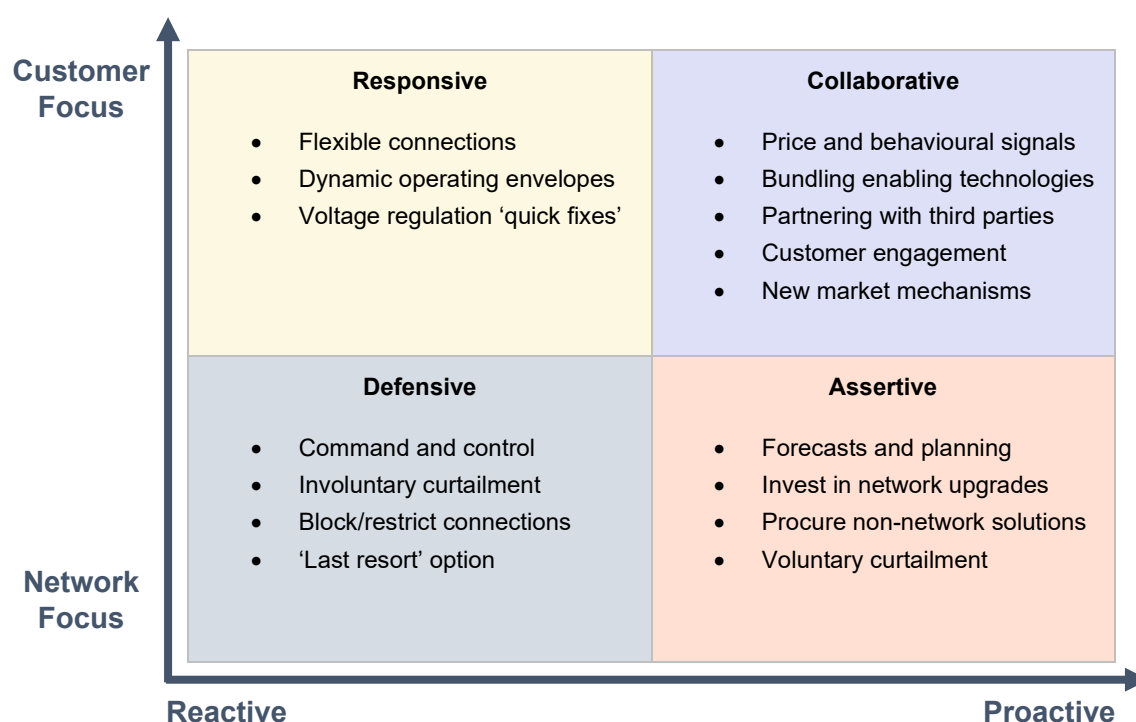
Figure 4: Strategic framework for DM initiatives

3.2   Preferred approach

Although the collaborative approach is likely to be attractive to customers, a portfolio of initiatives across these quadrants is likely to be the preferred and practical approach. "Defensive" measures should be avoided where possible, in the interest of managing reputational risk, customer relationships and stakeholder management.

3.3   Formulating a strategic response

Based on the demand drivers identified in Table 3 and the potential initiatives described in Figure 4, Table 8 overleaf describes the preferred strategic response[23] for Evoenergy and the key DM solutions for deployment. It may also be beneficial to deploy any number of other DM solutions not listed in combination such as power factor correction and energy efficiency programs.

3.4   Meeting the demand management aspiration

Evoenergy will develop a suitable toolkit of DM solutions available for implementation in the network planning process to deliver its strategic response.

The execution section of this strategy document details the alignment of actions against the high-level aspirational objectives.

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[23] In some cases, the strategic response adopted may differ to the preferred response presented in Figure 4 due to the unique characteristics of the demand problem or opportunity. Nonetheless, Figure 4 provides a usual default starting position.

Table 8: Strategic approach in relation to drivers

Evoenergy demand driver	Evoenergy impact	Strategic response	Key DM play
Private EV charging	High	**Collaborative**: collaborate and partner with customers, retailers and aggregators on tariffs and DM reward incentive schemes	• EV smart charging and/or direct load control combined with off-peak and 'solar-soak' tariffs
Electrification	High	**Collaborative**: collaborate with the ACT Government and partner with customers, retailers, aggregators, OEMs and installers on DM schemes, hot water tariffs and incentives schemes to support efficient electrification	• Hot water direct load control via smart meter and/or HEMS combined with off-peak and 'solar-soak' tariffs • RCAC direct load control via smart thermostat and/or HEMS
Distributed solar	High	**Responsive**: deploy flexible connections and leverage existing VPPs to maximise ability for solar PV to counteract peak demand whilst also delivering extra value for customers	• Flexible connection contracts and dynamic operating envelopes • Export pricing • 'Solar-soak' tariff • Battery VPPs, including community batteries
Climate change	Medium	**Assertive**: ensure impacts of increasing weather events are incorporated into reliability targets and programs	• RCAC direct load control via smart thermostat and/or HEMS • Battery VPPs • Major customer DM contracts (e.g. backup diesel generators) • Increased community education and awareness on DM needs and benefits
Urban intensification	Medium	**Responsive**: deploy DM technology solutions as part of new buildout and partner with developers	• EV smart charging and/or direct load control combined with off-peak and 'solar-soak' tariffs • Incentives/penalties to discourage instantaneous electric hot water
Public EV chargers	Medium	**Responsive**: deploy DM technology solutions as part of new buildout	• EV smart charging and/or direct load control combined with off-peak and 'solar-soak' tariffs
Electric bus fleets	Low	**Responsive**: deploy DM technology solutions as part of new buildout	• EV smart charging and/or direct load control combined with off-peak and 'solar-soak' tariffs
Greenfields	Low	**Responsive**: deploy DM technology solutions as part of new buildout and partner with developers	• All of the above

Execution

How Evoenergy will deliver its demand management strategy

4. Execution Plan

Evoenergy's plan for executing the DM Strategy is broken down into the following:

- DM deployment using both broad based and targeted DM programs
- DM deployment using network connection and other application triggers
- Strategic initiatives to ensure Evoenergy achieves its DM aspirational vision and objectives

4.1 Demand management programs

Non-network opportunities for DM generally fall into two broad categories:

1. broad based programs; or
2. targeted programs.

Targeted programs can be further categorised based on investment cost threshold, with projects:

- over $6 million being subject to the RIT-D process, and
- projects less than $6 million subject to Evoenergy's BAU approach.

Evoenergy's Demand Side Engagement Strategy (DSES) provides further information and the main engagement pathways used to engage with our stakeholders on DM or other non-network options.

Broad Based Programs

Broad based programs address network wide demand and supply quality issues and are therefore implemented network wide and can include the implementation of supporting tariffs which are available to customers with compliant metering in our network. Broad based DM programs are suitable for addressing the following future demand drivers:

- Private EV charging
- Electrification (hot water and RCAC electric heat pumps)
- Distributed solar
- Climate change (air conditioning / RCAC, pool pumps)

Broad based programs generally require trials to validate the business case and to develop maturity before scaling up and incorporating new capability into BAU.

Targeted Programs

Targeted non-network opportunities for DM seek to address network needs or opportunities specific to particular areas of our network. These are identified through our annual planning review, which identifies targeted network needs and opportunities likely to emerge over a five-year period. Results from our annual planning review are published in our Distribution Annual Planning Report (DAPR).

Targeted DM programs are suitable for addressing the following future demand drivers:

- Climate change (major customers on DM contracts)
- Urban intensification
- Public EV chargers
- Electric bus fleets
- Greenfields

Key information outlined in DAPR that can assist in the identification of possible non-network solutions include:

- Where there is a requirement to invest in **network capacity** in specific areas that will become constrained over the forward planning period

- Where there is a requirement to invest in **replacement** assets where our condition-based risk monitoring indicates that assets are reaching end of life and/or are likely to pose an unacceptable risk to safety, environment and/or reliability over the forecast period
- Where there is an opportunity to **de-rate** a network asset to reduce operational expenditure or risk of failure where the derating then results in a capacity constraint

For each identified network need and opportunity, preliminary investigations are conducted to determine economically and technically feasible solutions to specific identified constraints which may include:

- A **network option** (or supply side option) such as increasing the supply capacity into an area by constructing a network asset or replacing an ageing asset. These projects are generally capital intensive and financed internally by Evoenergy
- A **non-network option** which avoids the need for the network option completely
- Or a **combination of a network and non-network option** whereby the non-network option may defer the network option and/or reduce the risk to customers before the network investment can be made

All projects, except replacement projects less than $1 million, are screened for non-network options. Non-network options for replacement projects less than $1million will still be considered where options are presented to us by non-network providers. Projects over $6 million will be developed in accordance with the RIT-D requirements.

Evoenergy will develop a DM toolkit to assess the possible portfolio of DM solutions for non-network options as part of its network planning and screening process. Where a credible non-network solution has been assessed via our screening process as the option with the high net economic benefit, we will commence our procurement process for the non-network solution.

4.2   Connection and application triggers for demand management

Evoenergy will update its network connection and application framework to specify the triggers for capturing information on DER and opportunities for incorporating DM solutions. For external triggers, Evoenergy will partner with the relevant third party to develop a process to achieve the same result.

In addition, meter replacements with a smart meter will trigger an action to offer customer DM incentives and tariffs for smart meter direct load control of appliances such as electric heat pumps and pool pumps where applicable (once a suitable smart meter DM product is ready for scaled deployment).

Table 9: Connection and application drivers for DM

Evoenergy demand driver	Evoenergy impact	Trigger(s)	Action
Private EV charging	High	• Dedicated AC EV charger (Type 2) installation • ACT Government EV registration data • Connection upgrade application (e.g. single phase to three phase)	• Customer DM incentive for EV smart charger / load control and tariff in partnership with retailer or aggregator • EV charger recorded in DER register for network visibility in line with AEMC/ESB rule requirements
Electrification	High	• Gas meter abolishment application • Application for ACT Sustainable Household Scheme and/or EEIS	• Customer DM opt-in (default where possible) for new appliance and tariff (if applicable) in partnership with retailer, aggregator or OEM/installer (customer can choose to opt-out)

Evoenergy demand driver	Evoenergy impact	Trigger(s)	Action
Distributed solar	High	• Embedded generator connection application	• Solar and/or battery recorded in DER register for network visibility • DM offer for VPP (if battery is installed) via retailer or aggregator
Climate change	Medium	• Embedded connection application (C&I only) • Connection upgrade application	• Embedded generator recorded in DER register for network visibility (where applicable) • Major customer offer for DM contract (where applicable)
Urban intensification	Medium	• Connection upgrade or new connection application • Installation of new dedicated EV board for carpark • Embedded connection application (C&I only)	• EV charger and/or embedded generator recorded in DER register for network visibility • Customer DM offer for EV smart charging / load control and tariff in partnership with developer and retailer or aggregator • Customer offer for DM contract (where applicable)
Public EV chargers	Medium	• Connection upgrade or new connection request • ACT Government contract award for public EV chargers	• EV charger recorded in DER register for network visibility • DM contract offer for EV charger owner/operator
Electric bus fleets	Low	• Connection upgrade application • Installation of new dedicated EV board for bus fleet charging	• EV charging equipment recorded in DER register for network visibility • Customer DM offer for EV smart charging / load control and tariff in partnership with retailer or aggregator • DM contract offer for bus fleet owner/operator
Greenfields	Low	• Estate connection application	• DER installed in greenfield development recorded in DER register for network visibility • Customer DM package offer (inc. applicable tariffs) in partnership with developer and retailer or aggregator

4.3   Strategic initiatives

Evoenergy will execute four strategic initiatives which each have various focus areas as summarised in Table 9. Each initiative is mapped to the relevant DM objective to provide line of sight between strategic aspirations and execution. Specific actions are presented in Table 11

Table 10: DM strategic initiatives, focus areas and line of sight with DM Objectives

Legend: ✓★ = Directly aligned with DM objective (orange); ✓ = Supports DM objective

Strategic Initiatives	Focus Areas	DM 1	DM 2	DM 3	DM 4	DM 5	DM 6
Stakeholder & Community Engagement	Customers	✓			✓	✓★	
	ACT Government				✓	✓★	✓
	Energy Retailers and Aggregators	✓			✓	✓★	
	Developers	✓			✓	✓★	✓
	OEMs & Installers	✓			✓	✓★	
	Research Partners					✓★	✓
Innovation	External Innovations				✓		✓★
	Innovation Trials	✓	✓	✓	✓	✓	✓★
	Grant Funding	✓★					
	Innovation Evaluation						✓★
Capability Uplift	Broad Based DM Program	✓★	✓★	✓★	✓★	✓	✓
	Forecasting and Network Visibility	✓					✓★
	Network Planning and Investment	✓					✓★
	DM Procurement	✓★	✓★	✓★	✓★	✓	✓
	DERMS	✓	✓	✓	✓	✓	✓★
DM Marketplace	DSES Refresh					✓★	✓
	DSO Preparation	✓★	✓★	✓★	✓★	✓	✓
	DM Accreditation Scheme					✓	✓★
	DM Partnerships	✓★	✓★	✓★	✓★	✓	✓
	DM Contracts	✓★					✓★

DM 1: Drive lower electricity costs

DM 2: Maximise customer value

DM 3: Work existing assets harder

DM 4: Support decarbonisation

DM 5: Community engagement

DM 6: Best practice planning

✓★ Directly aligned with DM objective   ✓ Supports DM objective

Table 11: Action plan for strategic initiatives

Strategic Initiative	Focus Area	Action	Target Outcome
Stakeholder & Community Engagement	Customers	Develop a customer and stakeholder engagement plan with general marketing targeted at raising customer awareness on DM and its benefits. Address critical customer knowledge gaps on DM. Separate engagement strategies will be required for residential and commercial customers.	- Develop an understanding of customer barriers towards DM uptake and methods to remove barriers - Understand use cases and the customer value proposition - Build customer trust and loyalty
	ACT Government	Collaborate and leverage opportunities for DM with the ACT Government across the following key areas: - Integrated Energy Plan and associate gas transition activities - Bus fleet electrification (TCCS working group) - Public EV charger rollout - Canberra Big Battery - Programs and incentives for electric appliance upgrades, solar, batteries, EV chargers and EVs (Sustainable Household Scheme, NextGen Battery Program, EEIS) - Public housing efficiency and electrification upgrades	- Integrated approach to planning involving multiple stakeholders, reduce network costs and optimise outcomes for broader ACT community - DM default with opt-out option for applicable appliance upgrades and DER as part of ACT Government appliance incentive programs (including additional DM incentives) - Co-design DM innovation trials (e.g. public housing efficiency and electrification upgrades) - Jurisdictional support on smart meter rollout acceleration plans
	Energy Retailers and Aggregators	Build relationships with a range of active retailers and aggregators operating in the ACT.	Raise industry awareness of DM issues, opportunities and solutions
	Developers	Build relationships with a range of active developers operating in the ACT.	- Raise industry awareness of DM issues, opportunities and solutions - Advocate against instantaneous electric hot water - Advocate preferred EV smart charger communication protocol
	OEMs and installers	Build relationships with a range of OEMs and installers (including appliance retailers) that sell appliances in the ACT, particularly electric heat pumps.	- Raise industry awareness of DM issues, opportunities and solutions[24] - Build industry/vendor capabilities through innovative trials
	Research Partners	Engage and identify key DM research partners for collaboration and co-contributions, including tapping into academic and undergraduate and postgraduate studies and research. The ANU Battery Storage and Grid Integration Program is a potential key research partner.	- Reduce research burden on Evoenergy - Leverage research skills not available internally within Evoenergy - Activate innovation within the local energy ecosystem for Evoenergy and community benefit

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[24] For example, when a customer replaces an old gas water heater with a smart electric heat pump, combining direct load control technology that is accessible to Evoenergy or related third party can save electricity costs when placed on an off-peak or 'solar-soak' tariff. This provides the customer value proposition and competitive advantage for the OEM/installer/appliance retailer selling in the ACT market.

Strategic Initiative	Focus Area	Action	Target Outcome
Innovation	External Innovations	Keep a watching brief on existing DM research, trials and innovation nationally and internationally, with a particular focus on the ARENA DEIP and AER DMIS/DMIA.	• Identify key innovations relevant for Evoenergy • Avoid R&D duplication
	Innovation Trials	Invest in a portfolio of DM innovation trials specifically relevant to Evoenergy. Ensure social science research is incorporated into the trial. Key innovation trials include: • Electric heat pump direct load control (hot water and RCAC) • EV smart charging and/or direct load control (including V2G) • DM via smart meters, HEMS and/or aggregators • Complementary tariffs (including 'solar sponge', off-peak tariffs, EV charging tariffs, network BESSs, two-way pricing) • Customer and/or other third-party incentives such as discounts, gift cards, bill credits, etc • Opportunities also exist to partner with the ACT Government for trials on public EV chargers, bus fleet electrification and electrification upgrades for public housing.	• Keep 'real options' open and prepare for a range of possible futures
	Grant Funding	Access available funding and incentives to support DM innovation and trials, including: • AER innovation allowances under the DMIS/DMIA • AER trial tariffs to facilitate niche trials in DM • ACT Government REIF Round 3 grants (closes 16 January 2023) • ARENA funding	• Reduce DM development costs for Evoenergy, customers and shareholders • Leverage tariff trial allowances to inform optimal tariff structures to complement DM at scale

Strategic Initiative	Focus Area	Action	Target Outcome
	Innovation Evaluation	Evaluate all DM innovation trials to validate the following: • Costs, resources and effort to implement • Participation rates • Demand reductions • Customer insights, customer need and value proposition • Key learnings and pitfalls • Market maturity • Strategic fit • Business case justification • Next steps, timing and/or triggers for scaled deployment (if applicable)	• Capture key insights from a range of DM technologies and solutions • DM Toolkit continuous improvement
Capability Uplift	Broad Based DM Program	Scale up and incorporate new capability developed from innovation trials over time once there is a clear need, maturity and business case.	• Dispatchable system-wide DM capability
	Forecasting and Network Visibility	Develop the following capability to support network planning: • DER register for solar, batteries, EV chargers and electrification • Locational mapping of existing flexible loads and DER to the network • Locational forecasts for DER uptake including solar, batteries, EV chargers and electrification (e.g., electric heat pumps) • Locational forecasts for load and generation flexibility	• Early identification of emerging network constraints • Early identification of the potential for DM in addressing an emerging network constraint

Strategic Initiative	Focus Area	Action	Target Outcome
	Network Planning and Investment	Develop and/or enhance the following capability to support efficient and robust assessments of non-network DM options in addressing a current or emerging network constraint: • Network connection policy, specifically in relation to EV charging equipment • Network planning and investment decision framework and processes • DM Toolkit comprising a portfolio of DM solutions and methods that can be used to quantify demand reductions and costs • Financial tools for calculating the value of capital deferral • Supporting guidelines, examples, etc	• DM solutions efficiently and accurately analysed and quantified • Robust evaluation of non-network solutions that are comparable on a level playing field with traditional network investment • Confident decision making that leads to efficient and prudent investments in network assets and non-network solutions
	DM Procurement	Develop fit-for-purpose DM procurement process, guidelines and templates.	• Effective, efficient and timely DM procurements • DM procurement delivers value for money and customer outcomes
	DERMS	Develop DERMS capability over time and integrate with existing IT/OT platforms, train and upskill operators	• Single platform for network operations and DM (ideal future state) • Operators are skilled and confident at deploying DM operational actions • Demand reductions from DM operations are measured and verified
DM Marketplace	DSES Refresh	Refresh the Demand Side Engagement Strategy (DSES)	• DSES aligned to DM Strategy • Drive increased industry engagement and interest in DM • Develop commercial relationships with DER traders and aggregators for DM procurements
	DSO Preparation	Prepare for DSO and facilitate aggregated DER services. Keep a watching brief on the ESB post 2025 market design, DER interoperability and AEMC smart metering review.	• Identify the preferred DSO model adopted by the industry. • Pivot DM strategy where necessary

Strategic Initiative	Focus Area	Action	Target Outcome
	DM Accreditation Scheme	Investigate development of a DM accreditation scheme for the ACT that is publicly shared with customers and the general public. The DM accreditation scheme should cover: • OEMs and installers • Appliance and DER retailers • Energy retailers and aggregators • Developers	• Drive industry demand for DM to differentiate in a competitive market • Drive adoption of technical standards and communication protocols preferred by Evoenergy • Build customer trust with the DM marketplace and increase community DM adoption and participation • Leverage existing marketing efforts by accredited third parties to further drive DM engagement and awareness • Provide options for DM procurements based on panel or standing offer arrangement of accredited DM suppliers (streamlining)
	DM Partnerships	Leverage relationships to build commercial partnerships with a range of third parties for DM solutions where mutual value propositions can be established, including: • Developers (greenfields and multi-unit developments) • Energy retailers and aggregators • OEMs and installers • Appliance retailers	• Leverage partnerships as a channel to the customer • Offer DM capability with opt-out options for customers with DER and controllable appliance including tariffs or incentives for increasing uptake. • Leverage existing retailer/aggregator VPPs for DM outcomes • Deploy EV smart charging solutions for multi-unit developments that optimises cost outcomes for the developer, landlord and tenant, while ensuring Evoenergy is not left with a stranded asset or delayed revenue realisation
	DM Contracts	Engage directly with large electricity users connected to Evoenergy's network who have embedded generation and/or flexible loads (e.g., Icon Water, data centres, universities, etc)	• Increase large customer awareness on DM benefits including available financial incentives • Reduce reliance on 'good will' DM customers • Increase DM under direct contract

Appendix 1.20.A

Case Studies for DM Trials from peer distribution networks within Australia and internationally.

Table 12: Endeavour Energy case study

DNSP	Endeavour Energy
Country	Australia
About	Endeavour Energy distributes electricity to over 2.6 million people living and working across Sydney's Greater West, the Blue Mountains, the Southern Highlands, Illawarra and the South Coast of NSW.
DM Achievements / Priorities	**Modern grid strategy** for a smarter, more flexible and integrated modern grid that will allow adapting to evolving customer needs, while maintaining a safe and reliable network. **EV integration** including deploying EV smart chargers in residential homes, rolling out EV charging stations and integrating an electric bus depot with the grid. **Investing in community batteries** that can act as a 'solar-soak'. **Community microgrid** announced for the South Coast of NSW made up of a grid connected battery and solar and home batteries. **Hot water direct load control via smart meters** in partnership with Intellihub. More than 2,500 smart meters have been deployed with hot water direct load capability which can be dynamically controlled by Endeavour Energy or any of the 10 retailers that are participating in the program. The hot water systems can be individually switched on and off remotely via a communicating modem in the smart meter. Endeavour Energy will be sent energy and network data from each meter, that will provide greater visibility of the low voltage network and household connection. It can help detect safety issues with neutral connections, detect when power is out and provide insight on voltage fluctuations resulting from solar power flowing back into the grid. **PowerSavers DM program** for direct load control of air conditioners, EV chargers, hot water systems and solar systems. Eligible participating customers are provided with the following incentives for participation (or provided a gift card if they already have a compatible device): - free Sensibo smart air conditioner thermostats - free smart EV charger - free HEMS connected to the hot water unit - gift cards for accessing a customer's solar and/or battery system

Table 13: Energy Queensland case study

DNSP	Energy Queensland
Country	Australia
About	Energy Queensland is the group of electricity distribution, retail and energy services businesses 100% owned by the state of Queensland. It's distribution businesses include Energex and Ergon Energy Network, its retail business includes Ergon Energy Retail and innovative products and services are delivered by its Yurika brand.
DM Achievements / Priorities	**Existing ripple control system** using Audio Frequency Load Control (AFLC) which can control over 770,000 participating appliances (hot water systems, pool pumps, air conditioners and batteries). This is combined with load control tariffs. **Cashback rewards program** for customers and installers for installing a Demand Control Signal Receiver (DCSR) on a compatible air conditioner that can receive an external ripple control signal (AFLC) for reducing load in accordance with AS 4755 (DRED standard). **Future Grid Roadmap** which defines the activities and no-regret investments necessary for Energex and Ergon Energy Network to achieve this transformation over the next 10 – 20 years. **Demand Management Plan** which sets out a five-year strategy with various categories of DM initiatives including broad based, targeted, development and innovation. The plan has a focus on trialling direct load control options and aggregated demand response from HEMS to complement AFLC to build the capabilities needed for the next decade. **HEMS market trial** with upfront incentives to attract customers with solar, battery or smart hot water system. Average demand reductions per customer ranged between 0.9 and 1.2 kW. '**Solar soak' DM development initiative** to configure load control systems to move hot water heating into the middle of the day. **Stakeholder engagement** with customers, DER installers, retailers and industry partners to improve understanding of DM, benefits and opportunities. **Various DMIA innovation trials** completed or underway. **Battery trials** in residential and commercial settings with demand response capabilities to understand how customers use batteries and load profile impacts, investigate coordination of standardised demand response from batteries and to explore customer incentive options that provide new value to the industry and customers. The trial was also used to demonstrate the ability to issue load control messages to BESS using the following methods (i.e. keep real options open for a range of possible futures): - AFLC (business as usual) - Third party software - Distribution management software (schedule and operator initiated) **EV tactical plan** with online EV registration form to prepare for the EV transition, EV SmartCharge trial and plan for V2G functionality trial. **Rewards based tariff trial** completed to incentive customers to reduce electricity demand at peak times. **Various air conditioning direct load control trials** completed.

Table 14: Consolidated Edison case study

conEdison logo	
DNSP	Consolidated Edison
Country	United States
About	Provider of electric, gas, and steam services for 10 million people who live in New York City and Westchester County.

DM Achievements / Priorities	• **Existing DM programs** for dispatchable load relief (e.g. enrolled thermostats) which can be deployed to relieve network peak demand based on day-ahead and same-day demand forecasts or in response to network level contingencies.
	
	• **Customer engagement** providing customers with actionable insights, energy audits, educational materials, access to information on efficient products and services, and promotion of controllable technologies
	
	• **DM marketplace** includes facilitating a robust market of third-party actors and providing training programs to more than 1,000 independent contractors and ongoing engagement so partners can best leverage incentives, education, and tools provided by Con Edison. This also includes ongoing improvements and enhancements to Con Edison's non-wire procurement process.
	
	• **Smart meter rollout** reaching 50% penetration.
	
	• **Data sharing** to customers and authorised third parties to helps developers with business case development and promote customer choice.
	
	• **Energy efficiency programs** for load reduction targeting nearly 1,050 MW in peak demand reduction by the end of 2025. This includes developing a dynamic marketplace for third-party energy efficiency products and services. Since 2019, more than 1 million customers have upgraded to energy efficient equipment.
	
	• **Reducing technical and economic barriers for batteries** by testing new business models, building utility capabilities and engaging third-party providers for greater representation of storage in non-network portfolios. This includes:
	   ○ conducting innovative BESS network tariffs to inform future mass market tariff design, testing both opt-in and opt-out approaches to customer recruitment.
	   ○ providing information on optimal locations and levels of energy storage, make-ready provisions for battery connections, land provision (where available), electrical infrastructure, connection guidelines, commercial arrangements and offsets for the cost of connection.
	   ○ ownership of mobile 500 kW/1.34 MWh lithium-ion battery trailers which can be deployed under multiple use cases and temporary load needs in multiple locations (can be used to validate the business case before deploying a permanent solution).
	
	• **Preparing for increased EV adoption** using a multi-faceted approach including off-peak charging incentives, facilitating charging infrastructure deployment and fleet initiatives.
	
	• **Grid modernisation plan** for enhanced grid visualisation, granular DER models and forecasts, real-time control and dispatch of DER.
	
	• **DERMS proof of concept** which will be expanded upon to inform its approach to scale DERMS over time.

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