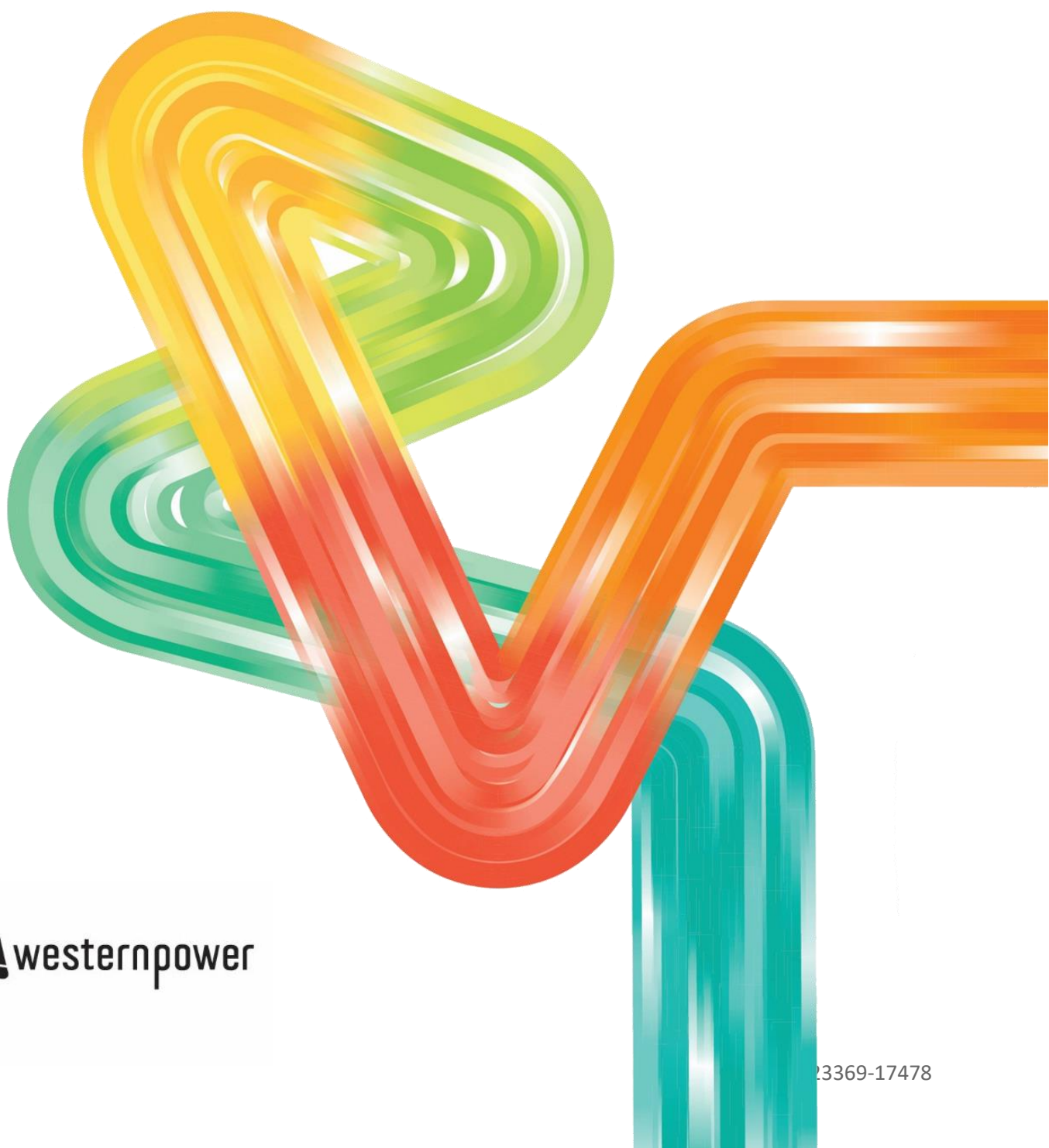


Western Power

Demand Management Innovation Allowance Report 2022/23 to 2024/25

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1. Introduction

1.1 Purpose and Compliance

Western Power welcomes the opportunity to provide the Demand Management Innovation Allowance (DMIA) compliance report to the Economic Regulation Authority (ERA) under clause 6.32(H-J) of the *Electricity Networks Access Code 2004* (the Code), amendments (No. 2), gazetted on 18 September 2020.

This report covers financial years 2022/23, 2023/24 and 2024/25 which covers three of the five years of the fifth Access Arrangement (AA5) and has been developed in accordance with the ERA's DMIA Guideline.¹

The DMIA mechanism enables Western Power to invest in research and development projects which have the potential to reduce long-term network costs², and is an 'annual ex-ante allowance in the form of a fixed amount of annual revenue at the commencement of each pricing year of an AA period'. DMIA projects must comply with the ERA-approved DMIA guidelines eligibility and reporting requirements.³

In line with section 6.32F of the code, an amount of the DMIA not used or approved by the ERA over the access arrangement period cannot be carried over to the subsequent access arrangement period or reduce the DMIA for the next access arrangement period⁴. The allowance of approximately \$7M over the AA5 period (~\$1.4M p.a.) is factored into prices and represents 0.08% of annual AA5 target revenue.

Initiatives include research and development projects with the intention to reduce or shift customer demand, avoid or defer network augmentation, or target a reduction in peak or broad-based demand. The research and development projects funded under the allowance are essential to our efforts to balance sustainability and long-term affordability as peak demand continues to be a principal driver of network augmentation costs. Reducing peak demand will reduce costs for customers in the long term by avoiding the need for more costly network investment. In recent years, increased two-way power flows, including 'peak reverse power flow' have had impacts on the network not experienced before.

The purpose of this report is to assist the ERA with its assessment of Western Power's DMIA initiatives in AA5. Enabling Western Power to recover the expenditure listed in Table 1.1 under the DMIA mechanism.

The amount claimed under DMIA in this submission is \$7.55M in nominal terms. This represents the first three years included as part of the DMIA allowance for AA5 period. While the annual amount set is \$1.4M, no annual cap applies, therefore the amount can be accumulated up to the value of \$7.1M over the AA5 period in nominal terms. The approved DMIA value accumulated to \$7.42 million in real terms over the AA5 period as of June 2025, while the total actual DMIA claim covering FY23 through FY25 is \$7.80 million in real terms.

¹ ERA, 2021, Demand management innovation allowance guideline, ([online](#)).

² Electricity Network Access Code 2004, clause 6.32G

³ ERA guideline: 3.2: [Demand management innovation allowance guideline \(erawa.com.au\)](https://erawa.com.au/demand-management-innovation-allowance-guideline)

⁴ AA5 Access Arrangement for Western Power Network, section 9.1.3 page 53

Table 1.1 DMIA expenditure (\$M nominal) *

DMIA eligible projects	Actual Capex (\$M) To date	Actual Opex (\$M) – 2022/23	Actual Opex (\$M) – 2023/24	Actual Opex (\$M) – 2024/25	Funding (ARENA & BESS) ⁵ – FY23, FY24 & FY25	Net DMIA claim – FY23, FY24 & FY25
Project Symphony/Encore	Not claimed ⁶	\$4.90	\$2.00	\$0.20	(\$1.90)	\$5.20
Project Jupiter	Not claimed	-	-	\$1.97	Nil	\$1.97
Strategic EV integration	n/a	\$0.04	\$0.04	\$0.02	Nil	\$0.08
Pathway to Net Zero Precinct	n/a	-	\$0.05	\$0.03	Nil	\$0.08
Distributed Energy Resource Test Lab	n/a	-	\$0.00	\$0.20	Nil	\$0.22
Total Expenditure	n/a	\$4.94	\$2.09	\$2.42	(\$1.90)	\$7.55

* Please note: Discrepancy identified in previous DMIA reports (FY23, FY24) while converting \$ thousands to \$ millions has been resolved and rectified in this report.

Table 1.2 DMIA expenditure (Real \$M as of June 2025)⁷

Financial Years	FY2022/23	FY2023/24	FY2024/25	FY2025/26	FY2026/27	Total Expenditure
Actual Expenditure	\$5.24	\$2.13	\$2.42	n/a	n/a	\$9.79
Less ARENA & BESS Funding	(\$1.48)	(\$0.51)	-	n/a	n/a	(\$1.99)
Total DMIA Claim	\$3.75	\$1.62	\$2.42	n/a	n/a	\$7.80
Total DMIA AA5 approved allowance	\$1.48	\$1.48	\$1.48	\$1.48	\$1.48	\$7.42

⁵ ARENA is the Australian Renewable Energy Agency, and BESS stands for Battery Energy Storage System

⁶ Use of the AA5 Capex allocation as NFIT compliant - <https://www.erawa.com.au/cproot/22447/2/AAI---Attachment-8.1---AA5-Forecast-Capital-Expenditure-Report-4-February-2022.pdf>

⁷ Converted Nominal \$M to Real \$M as of June 2025, CPI used for FY23 is 6.03%; & FY24 is 3.81% as published by Australian Bureau of Statistics

2. Research and development projects

Customer adoption of rooftop solar, battery storage, electric vehicles, and home energy management technologies continues to grow, making their safe and reliable connection to the grid increasingly critical.

Western Australia has one of the highest levels of Distributed Energy Resource (DER) penetration in the world, with around 40% of homes now generating their own renewable energy through rooftop solar. Each month, more than 3,000 new solar systems are installed, and household battery adoption continues to grow, a trend set to accelerate with the WA Residential Battery Scheme. As a result, more WA homes than ever before are generating and storing clean energy.

While this growth presents opportunities for customers, Western Power and energy industry participants, it also poses challenges for power system security and reliability. Increasing amounts of passive, unmanaged generation can cause local power quality issues within the distribution network and contribute to minimum demand challenges at a whole of system level due to excess solar generation particularly given the SWIS is not interconnected with other large interstate networks.

To enable DER benefits for both customers and the grid, Western Power is taking a whole-of-system approach to integration. One that enables more DER to connect, while enabling the opportunity for DER to participate in new markets and services, providing additional value to customers while maintaining grid security and reliability.

The main benefits of these changes include lower supply costs through deferred or avoided network augmentation (in both distribution and transmission assets), increased renewable energy generation driving lower carbon emissions and the ability for Western Australians to generate greater value from the energy assets they own.

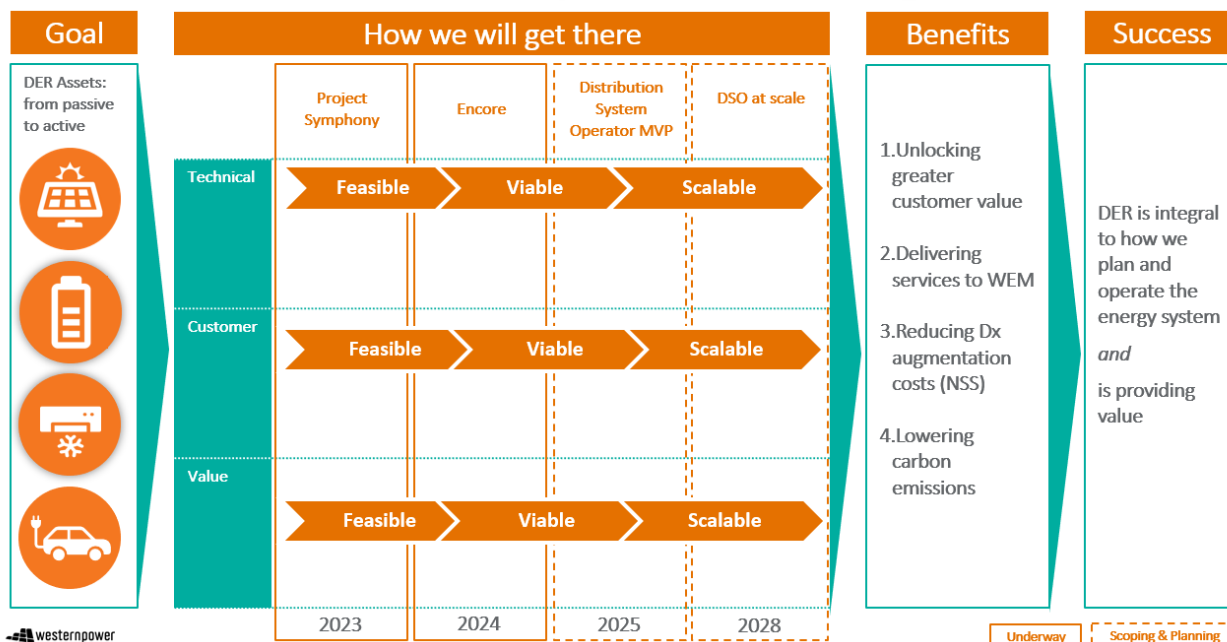
The DMIA allowance has allowed Western Power to conduct research and development (R&D), enabling us to better understand how to enable and utilise DER to manage demand. To help manage challenges and maximise the benefits of DER, Western Power has committed to developing distribution system operator (DSO) capabilities in AA5.

Through 2023 and 2024, Western Power had developed a DSO Strategy and Roadmap (DSO Strategy) to guide the scale, scope, and timing of our DSO commitments. The DSO Strategy works in conjunction with several other strategies which provide a consolidated approach to DER integration and participation in the SWIS (see figure 2.1).

Western Power's DMIA has principally been used for DSO capability build, early-stage deployment and testing. Project Symphony and Project Encore have successfully demonstrated the feasibility and viability of DER Participation in the SWIS with Project Jupiter testing the at-scale deployment of VPP technology in the SWIS.

Figure 1.1. DER integration roadmap

The Distribution Network as a platform to unlock greater benefit



Western Power’s DSO Program has a strong regulatory foundation and is aligned with the policy objectives of the WA State Government’s 2019 Energy Transformation Strategy (ETS). Western Power has and will continue to deliver on the ETS, a key focus of delivery to date has been the Action Plan set out in the DER Roadmap⁸.

In 2022, EPWA reinforced plans for DER participation in the SWIS, setting out the planned roles and responsibilities of industry participants⁹ – including Western Power as the DSO. Legislative certainty for the DSO role was delivered in March 2024 when the WA Parliament passed the *Electricity Industry Amendment (Distributed Energy Resources) Bill 2023*¹⁰ which amends the *Electricity Industry Act 2004*, commonly referred to as the “DER Bill”.

The DER Bill enables the uptake of new technologies and supports the State Government’s commitment to net zero by 2050. The Bill also defines the role of the DSO – piloted by Western Power in Project Symphony – introducing the regulatory framework for DER and defining the roles and responsibilities of the Coordinator of Energy, the Australian Energy Market Operator (AEMO), Western Power and aggregators to enable DER participation.

In July 2024, EPWA updated the DER Roadmap, reinforcing Western Power’s role as the Distribution System Operator (DSO). This shift is supported by the DER Bill, enacted through the Electricity Industry Amendment Act 2024, which introduced the State Electricity Objective and consolidated market rules into the new Electricity System and Market Rules (ESMR). The ESMR, key changes took effect in February 2025, renaming and expanding the scope of the former market rules to include DER integration.¹¹ Followed by WA Minister for Energy approval to Tranche 8 Amending rules in June 2025¹². The Tranche 8A Amending Rules are

⁸ WA Government (July 2024) - [Online](#)

⁹ WA Government (July 2022) - [Online](#)

¹⁰ WA Government (March 2024) - [Online](#)

¹¹ WA Government (February 2025) - [Online](#)

¹² WA Government (June 2025) - [Online](#)

scheduled to commence on 30 October 2025. These rules follow the Cost Allocation Reform and further expand the ESMR's scope. They aim to streamline market operations and support Western Power's evolving role as a DSO.¹³

Outside of its role as the DSO Western Power is also contributing to R&D work being undertaken in three other key areas:

1. The Strategic EV Integration (SEVI) project. SEVI is part of the reliable affordable clean energy (RACE) 2030 initiative. It brings together research capabilities across Australia to help address pressing research questions faced by the energy industry. Western Power was invited to participate and joined as a key Steering Partner with accompanying financial investment. The research and development work will expand Western Power's understanding of the challenge of EV integration for precincts, fleets and regions. The work packages include investigation into, social and market research trends, technology deployment and data, business models and value propositions, legal, tax and regulatory reform, and energy system and network analysis.
2. "Pathways to Net Zero Precincts" (NZP) is a project of the RACE for 2030 Cooperative Research Centre. RACE's primary objective is to drive innovation for a secure, affordable, clean energy future by bringing together top research capabilities addressing complex system-level challenges faced by the industry. NZP is developing templates to simplify and enable the achievement of Net Zero by precincts. Western Power is one of the key industry funders of the project.
3. DER Grid Lab project was established in response to the rapid uptake of rooftop solar and battery systems in the SWIS, which is creating challenges around minimum demand, reverse power flows, and localised capacity constraints. The DER Lab provided a controlled, simulated test environment where new DER technologies, control systems, and integration methods could be trialled against real-world network conditions before being deployed in the field. The lab combined advanced modelling, hardware-in-the-loop testing, and digital twins of network assets to replicate both normal and extreme operating conditions.

¹³ WA Government (September 2025) - [Online](#)

2.1 DSO Capability

This section demonstrates how Project Symphony and Project Encore meet the DMIA requirements.

Table 2.1. Summary of Project Symphony and Encore

WP Project Numbers:	Comments
Strategy / Activity Description:	Project Symphony/Encore
Business case(s):	This investment is staged over 2 business cases: • Symphony¹⁴ – Western Power initiated in September 2021 • Encore¹⁵ – Western Power initiated in April 2024
Details of Project Symphony Investment cost and funding (\$M) In 2022/23 and 2023/24 (no claim in FY25)	Project Symphony Cost 2022/23 and 2023/24 = \$6.3M (excluding forecast capex included in AA5) • FY23: \$4.9M • FY24: \$1.4M Less ARENA & BESS revenue received \$1.8M • FY23: \$1.4M • FY24: \$0.4M Total DMIA claim is \$4.5M
Details of Project Encore Investment cost and funding (\$M)	Project Encore • FY24: \$0.6M • FY25: \$0.2M Less BESS Revenue received \$0.1M for FY24 only Total DMIA claim is \$0.7M
Regulatory Category:	Non-recurring operating expenditure

In April 2020 the State Government published a DER Roadmap for Western Australia, with the ambition to enable “a future where DER is integral to a safe, reliable and efficient electricity system, and where the full capabilities of DER can provide benefits and value to all customers”. The roadmap also includes provisions to change policy and regulation, stemming from the inevitable evolution of the energy value chain.¹⁶

Effective DER integration requires focus on technical (e.g. network and system security and reliability), market (e.g. development of appropriate market frameworks to efficiently integrate DER), customer, regulatory and policy settings.

Project Symphony is an innovative project where customer-owned DER, including rooftop solar, battery energy storage and other major appliances such as air conditioning and pool pumps, are orchestrated as a virtual power plant (VPP) to participate in a future energy market. VPPs provide network support services by reducing peak demand, unlocking economic and environmental benefits for customers and the wider community.

¹⁴ Internal project code IAR130063

¹⁵ Internal project code IAR147803

¹⁶ https://www.wa.gov.au/system/files/2020-04/DER_Roadmap.pdf

The findings from Project Symphony were published in a Final Report¹⁷ and subsequently highlighted in the third DER Roadmap progress report, published in July 2024. Action 23b of the Final Report recognised the boundaries of the scope of Project Symphony and identified a need to extend testing under project Encore.

Project Encore was delivered from December 2023 to September 2024. Building on the findings of Project Symphony, Encore leveraged the existing technical solutions and integrations built for Project Symphony to further demonstrate the viability of orchestrated DER operating in the WEM.

In keeping with the strategic goals of the DER Roadmap, Encore focussed on the same four market scenarios from Project Symphony and extended testing of DER orchestration from the autumn/winter period to the summer period to assess the impact on peak demand.

Project Symphony and Encore have helped inform Western Power in developing our DSO Business case which will be delivered through Project Jupiter, which will deliver Minimum Viable Product (MVP) with provision of Network Support Services to defer augmentation as a main objective and Scale DSO Capabilities by 2025 and 2027 respectively (the latter is three years ahead of schedule).

The following table provides the information required to be included in this compliance report per the DMIA guidelines.

Table 2.2: Compliance Reporting Information

Background, nature, and scope of the project: <i>In this section we provide a summary of need and timing of the project and a summary of the nature and scope of works relevant to the DMIA</i>	DER are small scale devices that can generate, use or store electricity, and form a part of the local distribution system, serving homes and businesses. DER can include renewable generation such as rooftop solar PV systems, energy storage systems such as batteries, EVs, and technology to manage demand, like air-conditioners at a premise. Currently in Western Australia over 1 in 3 households have a solar PV system, contributing significantly to the 2GW of DER capacity available in the SWIS which can serve up to 67% of underlying demand. Whilst customers choosing to install DER are already enjoying the benefits of lower electricity bills, and are contributing to decarbonising the power system, the level of DER comes with challenges for the network and power system. Peak demand in areas of the network continues to grow and as experienced over summer 2021 has caused power quality and reliability issues¹⁸. <u>System Impacts</u> Minimum demand in the SWIS continues to decline as distributed PV uptake accelerates. The current record of 511 MW was set on 10 November 2024, with unscheduled demand dropping to 474 MW on the same day. The 2025 WEM ESOO projects further reductions, with the 50% POE¹⁹ forecast falling from 402 MW in 2024–25 to 25 MW by 2028–29, and notionally below zero from 2029–30, indicating excess PV generation available for storage.²⁰
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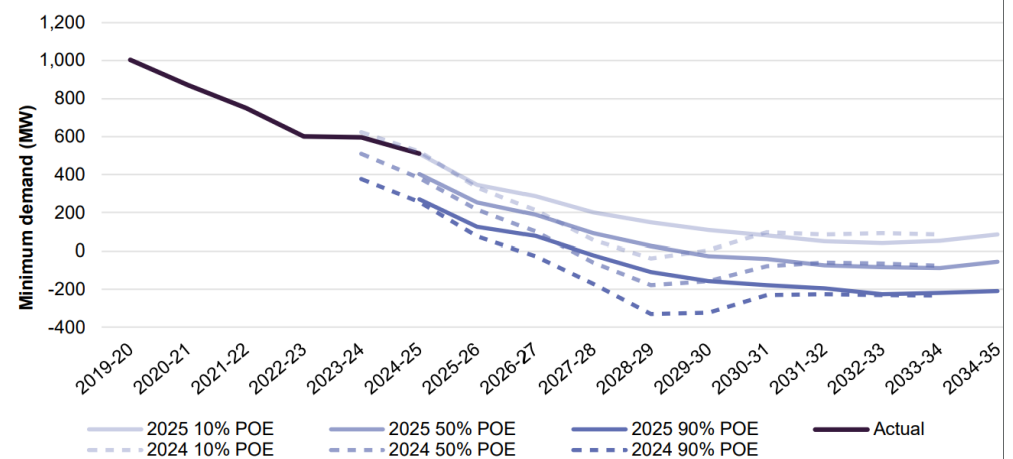
¹⁷ [Western-Power-Project-Symphony-Final-Lessons-Learnt-Report.pdf](#)

¹⁸ Independent Review of Christmas 2021 Power Outages Final Report, March 2022.

¹⁹ POE is the likelihood a peak or minimum demand forecast will be met or exceeded.

²⁰ WEM Electricity Statement of Opportunities, page 42. [Online](#)

Figure 18 Actual and 10%, 50%, and 90% minimum demand forecasts, Expected scenario from 2024 and 2025 WEM ESOOs, 2019-20 to 2034-35 (MW)



Notes:

- The starting point is lower than actual, mainly due to higher PV forecast in 2025 compared to actual 2024.
- The actuals displayed reflect observed demand under the prevailing weather conditions.

Compared to the 2024 ESOO, the 2025 forecast shows a less steep decline in minimum demand however, the minimum operation demand to continue to decrease. This change is driven by:

- Higher rooftop PV installation forecasts for 2025, reflecting stronger uptake trends.
- Slower electrification growth assumptions, reducing underlying demand.

To maintain system security, AEMO has identified a Minimum Demand Threshold (MDT) of 300 MW, managed through ESR charging and emergency solar curtailment when required. Over 1,000 MW of storage is expected to enter by 2026–27, complementing the 446 MW of NCESS already procured for 2024–25 and 2025–26, ensuring secure and reliable SWIS operation under minimum demand conditions.

Network Impacts

DER uptake is affecting the economics of network investment. Increasing solar PV generation and peak operating loads, are leading to lower, less efficient utilisation of network assets. DER management provides a solution for both the system and network impacts and thus enables supply chain benefits.

The DER Roadmap

The DER Roadmap outlines the requirement for Western Power to continue our development as the DSO. To do this Western Power will need to be able to remotely identify and manage issues at a distribution level.

The DER Roadmap also outlines a future where customer aggregation can manage DER as a way of providing services in the WEM as well as managing day-to-day issues faced in managing the Western Power network including load, thermal and voltage constraints.

The DER Roadmap and supporting changes made to the Electricity Networks Access Code require that Western Power pursue alternative option services, demonstrating how DER can be harnessed as an alternative to more costly distribution network investments.

Aims and expectations:

In this section we provide the aims and expectations of the project.

Project Encore was a continuation of our DSO capability build. Encore combined a mixture of commercial, third party and residential aggregation to meet localised network needs, whilst also providing services to the system and potentially future new market services via the WEM.

Project Symphony and Encore - DER Orchestration Pilot

Project Symphony's purpose was to address two of the high priority actions in the DER Roadmap:

Action 22: DER Orchestration Pilot – technology demonstration. Commence a comprehensive VPP technology pilot to demonstrate the end-to-end technical capability of DER in the SWIS.

Action 23: DER Orchestration Pilot – market demonstration. Complete a comprehensive VPP market participation pilot that tests the incorporation of aggregated DER into energy markets, including market dispatch and settlement arrangements from the market operator to individual customer.

Project Symphony quantified the costs and benefits of integrating and orchestrating customer DER assets to more efficiently manage the 'peaks and troughs' of energy demand in the distribution network while enabling broader participation in new energy markets e.g., balancing and capacity market and essential system services.

Project Encore expanded upon the Symphony outcomes by delivering the following additional outcomes:

- Curtailing up to 116 residential air-conditioners in both synchronised (entire fleet in same 15-minute period) and sequential (fleet split into four 15 min control groups dispatched sequentially over one hour) during the 2023/2024 Summer period.
- Tested dispatch of the VPP to provide Reserve Capacity as per the WEM rules for certification of electric storage assets and demonstrated the potential to value stack with Network Support Services (NSS) thus putting downward pressure on NSS prices.
- Tested "shaped dispatch" of the VPP through a contracted NSS during the 2023/2024 Summer period to provide 0.9 MW of feeder demand reduction at Southern River substation.
- Deployed the Harrisdale BESS (1 MW/2.6MWh) and City of Armadale aquatic centre battery (250kW/500kWh) with the fleet of residential batteries to deliver energy balancing, NSS and Reserve Capacity services including the operation/provision over the summer peak demand days.

Test dispatch of hot water system control from third party aggregator (Rheem) to provide additional demand response.

Anticipated outcomes:

In this section we provide:

1. anticipated outcomes if the project proves viable.
2. An estimate of the potential to reduce long-term network costs

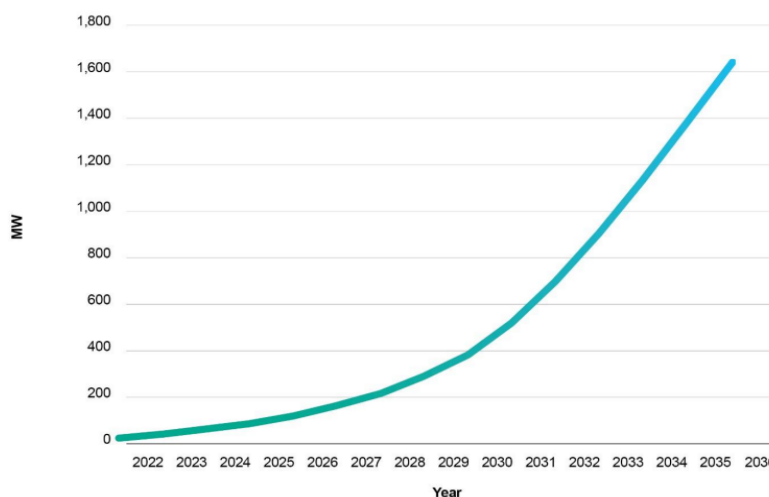
A high proportion of decentralised, unmanaged DER poses a risk to the stability of the WA power network when an excess of local rooftop solar generation greatly exceeds the demand for electricity in peak conditions. If Symphony and Encore prove viable it will orchestrate customer DER to not only overcome the technical challenges to the electricity network but also enable DER participation in future energy markets to unlock greater benefits to customers.

Most importantly, through DER orchestration there is an opportunity to flatten the “duck curve”²¹ by shifting demand from evening to midday and thereby improving the utilisation of network assets, enabling decarbonisation of the grid, and potentially providing an economically viable non-network option to more costly network investment.

Project Symphony engaged Oakley Greenwood (OGW) consultants to perform modelling of the economic benefits available from a full-scale deployment of the technology and processes available from Symphony²². The report found “VPP could result in a significant source of new dispatchable generation in the WEM. As shown in graph below, based on the economic benefits available, the VPP could result in the addition of over 1,600 MW of dispatchable generation/load by the end of the modelling period. For context, it should be noted that peak demand within the WEM at present is about 4,000 MW and Collie, the largest central generation plant in the WEM is about 340 MW.”

The forecast increase in battery capacity coupled with the development of DSO capability provides an opportunity for Western Power to contract and manage dispatchable generation for the purpose of providing NSS to manage peak demand in the network.

Figure 2: Total economic potential of VPP-enabled BTM battery capacity (MW) through 2038



Source: OGW analysis

Total economic potential of VPP enabled BTM battery capacity (MW)

²¹ The duck curve describes the shape of the SWIS daily energy demand profile which is characterised by an evening peak (the head of the duck) and the daytime trough (the belly of the duck). Exacerbation of the duck curve adversely affects the economics of DNSPs as infrastructure must be built to support a few hours per year of peak demand.

²² The OGW report can be found here: [project-symphony-der-services-report.pdf \(arena.gov.au\)](https://www.arena.gov.au/project-symphony-der-services-report.pdf)

DSO capability should include an estimate of the potential to reduce long-term network costs, taking into account any additional costs that may arise in total electricity costs as a result (for example, additional essential services that maybe required).

It is difficult to accurately apportion the economic benefits to downward pressure on network costs. As the report findings demonstrate the economic benefits may be shared in various ways depending upon the assumptions made about incentive payments by Aggregators to customers and the value sharing between participants, such as AEMO, Aggregators and Western Power.

Aside from the potential to reduce long term network costs, Symphony does provide increased opportunity for customers to increase energy self-sufficiency as the DSO will enable management of DER and this will provide Western Power the means to offer higher generation connection and export limits, which when coupled with battery storage enable customers to reduce their net energy expenditure. This benefit is in addition to the OGW economic analysis as this outcome was not included in the initial model.

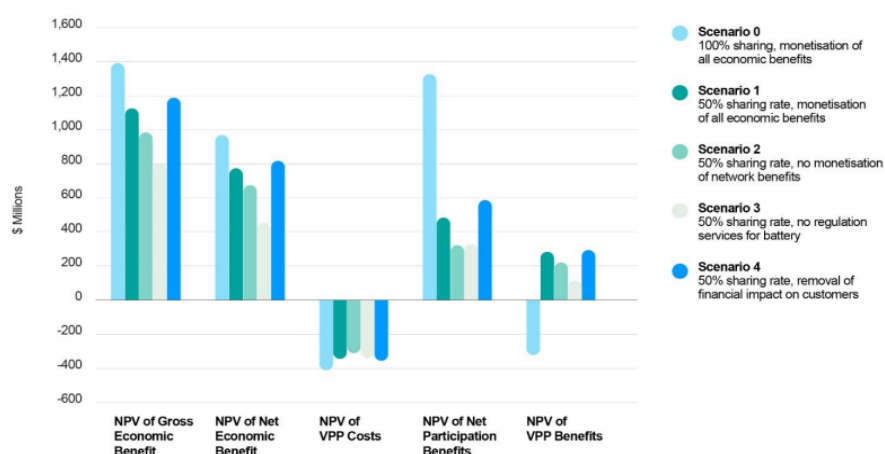
The report suggests there will be strong economic benefits for customers who invest in battery storage and other forms of demand management (such as load control).

OGW Findings (Summary of scenario results presented in chart below):

All scenarios (in the chart) produce positive gross economic benefits. The maximum economic benefit that is produced in Scenario 0 is significant at \$1.4b over 15 years in present value terms, based on a weighted cost of capital (WACC) of 4%.

The maximum net economic benefits of \$967m over the 15-year forecast time horizon occur in Scenario 0; they fall to just over \$776m and \$671m under Scenarios 1 and 2, and down to \$453m for Scenario 3.

Figure 1: Summary of scenario results



Source: OGW analysis

Scenarios and their results

- The 'Gross Economic Benefit' reflects the total economic benefit calculated under each scenario, in net present value (NPV) terms, excluding any economic cost associated with implementing the VPP.

The 'Net Economic Benefit' reflects the gross economic benefits less the estimated economic costs of implementing the VPP, expressed in NPV terms.

The 'VPP costs' reflects the cost of implementing the VPP, in NPV terms. The 'Net Participant Benefit' is the net benefit that accrues to participants (being the providers of the DER devices which are orchestrated via the VPP) under each of the scenarios, which reflects: (a) the proportion of the economic benefit that is assumed to be passed on to them under that scenario (e.g., the sharing ratio); (b) the upfront costs they are assumed to have to incur in order to participate in the VPP; and (c) except for Scenario 4, the financial (opportunity) cost they face from ceding management of their devices to the VPP operator.

The 'VPP benefits' reflect the benefit to the VPP provider, in NPV terms, taking into account: (a) the proportion of the economic benefit that they are assumed to be retained under each scenario (e.g., the sharing ratio); and (b) the cost of implementing the VPP.

Extracts from the project Symphony pilot results and recommendations report are below²³:

Value Outcomes

With customer participation and technical feasibility achieved as part of Symphony, the pilot was able to consider the financial costs and benefits of DER orchestration in the WEM and SWIS by extrapolating its results over a 10-year period. The resultant Cost Benefit Analysis (CBA) prepared by Ernst & Young (EY) quantitatively assessed the costs and benefits to each participant in the Pilot: customers, Aggregator/s, Western Power as DSO and AEMO as DMO in relation, and limited to the available DER orchestrated and the four 'must-have' scenarios.

Further, the CBA considered barriers to equitable distribution of value and provided high level recommendations for achieving the conditions under which VPPs could scale in the SWIS. Limitations naturally exist in CBA modelling such as the dependency on how Symphony was rolled out (being the first time such end-to-end orchestration of assets had been attempted), the higher costs incurred in a pilot and development environment when compared with mature products and technology, and necessarily conservative assumptions used regarding future market constructs. However, the modelling showed that the combined cashflows for the DSO, DMO, aggregators, and customers still increased year on year, delivering a combined positive NPV of \$450 million over 10-years in the 'Expected Growth' scenario (mid), with the NPV ranging from \$280 million in the 'Limited Pilot' scenario (low) to \$920 million in the 'Hyper Growth' scenario (high).

The analysis demonstrates that substantial value can be created from DER orchestration in the SWIS. This suggests that implementing enabling actions or recommendations and creating the conditions for DER aggregation over the short to medium-term is in the interests of customers. Additionally, sensitivity analysis around issues such as the cost of development and implementation suggest that the benefits of DER aggregation are likely to grow materially as technology, systems, processes, and underpinning policy and regulation matures.

²³ Final report – p12 Executive Summary, Value Outcomes : [Western-Power-Project-Symphony-Pilot-Results-and-Recommendations.pdf](#) ([arena.gov.au](#))

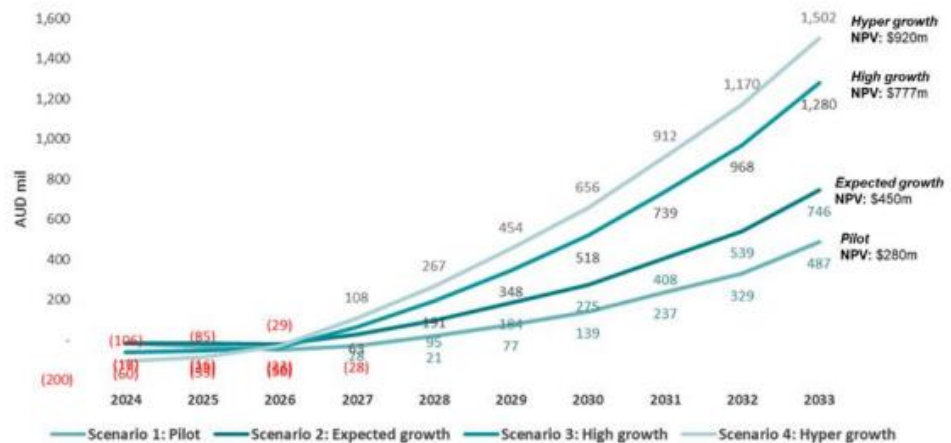


Figure 6: Combined undiscounted yearly cashflows for the Fully Orchestrated scenario.

Over and above the positive NPV achieved under the modelled scenarios, the most noteworthy outcomes of the CBA include:

- A net positive value across all participants can only be achieved when value stacking both network and market services, indicating the need for optimisation or sophistication in the participation of aggregated DER.
- The distribution of value across participants is sensitive to the costs associated with developing and maintaining DER orchestration and aggregator capabilities; however, significant upside potential can be realised as technology costs reduce, business capabilities mature, and customer engagement approaches become more commercially focused.
- The greater the number of customer DER assets that are recruited into a VPP, the greater the value generated per customer and the higher the opportunity to share benefits across all participants.
- Orchestrating DER through aggregation via a VPP can substantially reduce system costs and helps alleviate local network constraints, ultimately allowing a reduction in costs to be passed through to market participants and end-use customers.
- Further work is required to develop the commerciality of a VPP to equitably pass through the financial benefits of DER orchestration across participants and actors within a VPP while not passing-through additional costs to customers in the SWIS that do not own DER or elect not to participate in a VPP.
- The way in which payment for NSS and CTZ is provided requires further work to ensure it is priced to provide sufficient incentive for aggregators to invest in providing the service, whilst maintaining an acceptable distribution of benefits.
- Battery storage within a VPP can access multiple revenue streams from the market and nonmarket services, in contrast to other DER assets. Further value could be derived in VPPs by prioritising the recruitment of battery storage over other types of DER.

The amount of the allowance incurred by the Service Provider (SP): 3. <i>Incurred to date as at the end of that pricing year.</i> 4. <i>Incurred in that pricing year.</i> 5. <i>Expected to be incurred in total over the duration of the project.</i>	1. <i>Incurred to date as at the end of the period assessed:</i> Project Symphony DMIA claim for FY23 and FY24 is \$4.5M - FY23: \$4.9M - FY24: \$1.4M - Forecast future spend \$0M Less ARENA & BESS revenue received \$1.8M - FY23: \$1.4M - FY24: \$0.4M Total DMIA spend = \$4.5m Project Encore DMIA claim for 2022/23, 2023/24 and 2024/25 is \$0.6M - FY23: \$0M - FY24: \$0.6M - FY25: \$0.2M Less BESS Revenue received \$0.1M for FY24 only - Forecast future spend = \$0M Total DMIA spend = \$0.7m
How and why the project meets 'Eligibility Criteria': In this section we provide details on how and why the project meets eligibility criteria specified in the DMIA guideline	#1. Project consists of research and development: <i>Demonstrate that the project is for experimental activities whose outcomes cannot be known or determined in advance using current knowledge, information, or experience and that the activities are conducted for the purpose of generating new knowledge:</i> The project required each of the partners to invest in the development of bespoke platforms and communications systems to implement the Evolve (a collaboration between Zepben and Australian National University (ANU) platform to support its DSO function. During Encore Western Power chose to continue to use technology it had developed during Symphony with the following enhancements: - Engaged ANU to develop advanced feeder forecasting method using machine learning techniques. Forecasting methods will be important to reliably schedule NSS to mitigate peak demand. - Engaged ANU to provide a CSIP-AUS sandbox for demonstration of potential application of this protocol for DSO management of DER. CSIP-AUS is an emerging standard which Australia is pioneering its application in the management of DER via DOEs. - Joined a national consortium of DNSPs to develop and procure public key infrastructure (PKI) to certify and enable secure communication with DER, Aggregators and original equipment manufacturers (OEMs). Secure communications to DER and Aggregators are critical to avoid cybersecurity attacks which could have significant consequences for network and system security and reliability.

#2. Project is for demand management:

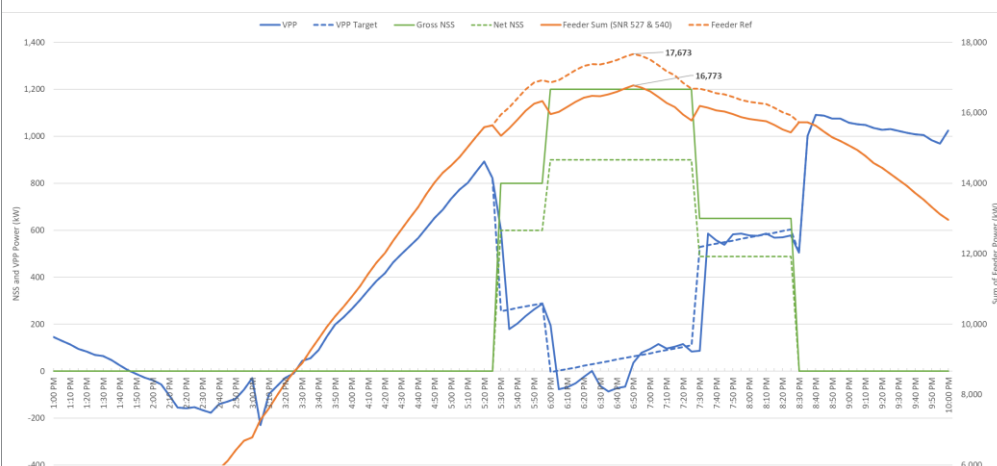
The service provider must provide details of the effect the project, if proved viable, will have on network demand usage patterns:

The projects piloted ways to support the lifting of the “belly of the duck” and “reducing peak demand” by providing customer incentives and market control enabling:

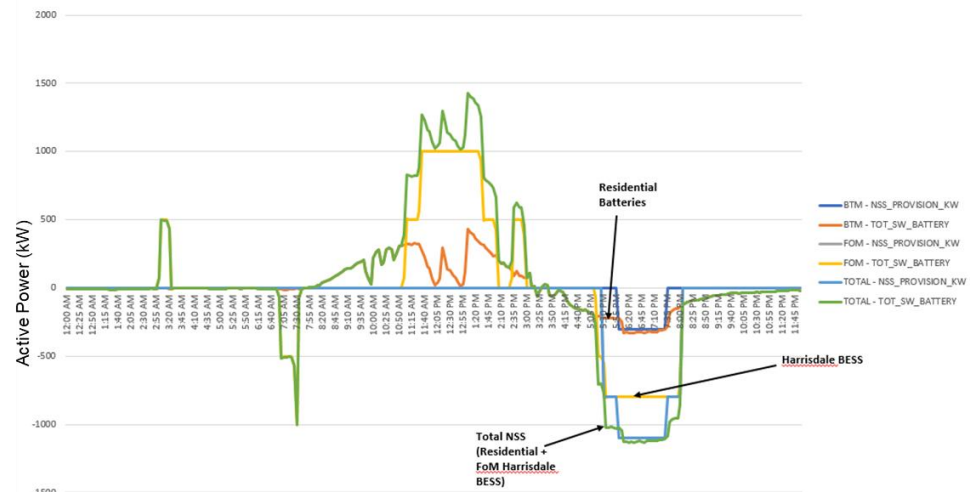
- Solar PV to be curtailed during low system demand periods in response to negative WEM pricing
- Batteries to be charged during low system demand periods in response to low WEM pricing and to be discharged during high evening peak periods, under Network Support Service (NSS) contracts to Western Power
- Managed loads, such as air-conditioners and in future EVs, to be curtailed during high evening peak periods, under NSS contracts to Western Power.

Western Power’s AA5 contains substantial network investment, future investment beyond AA5 has the potential to be deferred using NSS. Other energy market services facilitated by Symphony (such as balancing market trades based upon system demand) are likely to assist reduce demand.

The figure below shows during Encore the data for 7 of the dates with highest average temperatures using a shaped NSS profile dispatch. The feeder peak (mean over 7 days) is 16,773 kW whereas the feeder reference peak was 17,673 (mean difference of 900 kW). This shows an observable reduction in feeder peak demand.



The graph on next page shows how Symphony orchestrated residential batteries, and a Western Power owned community battery to ‘lift the belly of the duck’ (increase daytime load by charging batteries) and flatten its head (lower feeder peak) by a “shaped” NSS deployment in the evening on 21/6/2023. The graph shows the deployment signal sent to the facility containing residential BESS (dark blue line is deployment and orange is actual response) and another containing the Harrisdale BESS installed by Western Power (yellow line is deployment and light blue is response).



The Harrisdale BESS was dispatched at 800kW from 5.30pm to 8pm and residential BESS dispatched at 300kW from 6pm to 7:30pm to achieve a combined 1.1MW of NSS (green line). The benefit of a shaped dispatch is it enables the shape of the peak to be more closely followed and thus leads to more efficient utilisation of storage capacity. In other dispatches the residential and Harrisdale BESS were combined into a single facility for deployment to achieve the same outcome.

#3. Project has the potential, if proved viable, to reduce long term network cost:

The service provider must provide a description and estimation of the costs that can be reduced. Any additional costs that may arise in total electricity costs as a result of the demand management project (for example, effects on power system security, power system reliability or other aspects of the wholesale electricity market) should be taken into account when estimating the reduction in costs.

This project provided a blueprint for unlocking future efficiencies and cost savings for the state and constituents through the integration of distributed energy resource services. The project initially focuses on the orchestration of customer DER and the provision and validation of services that support the power system network, and access to markets or other arrangements to unlock the value of these services. It will transition into testing of integration between aggregated DER, network management systems and market dispatch systems.

Opportunities are significant due to the direct engagement of key WA electricity market stakeholders (Western Power, Synergy and AEMO), with a commitment by all parties to share learnings, and integrate into broader DER programs including the Distributed Energy Integration Programs (DEIP).

However, what is known is that targeting demand reduction at the edge of the grid provides benefits upstream through the entire distribution and transmission system. In AA5, Western Power is approved to invest heavily in network augmentation to cater for decarbonisation and growth. The project has the potential to deliver learnings which allow for the deferral or even avoidance of more costly network augmentation.

In October 2024, Western Power published an EOI for Metropolitan Capacity Expansion Services as a Network Support Service (NSS) via the Non co-optimised Essential System Services (NCESS) framework. This event will hopefully realise our first deferral of capacity expansion capital investment through the use of non-network solutions.

During Encore the following additional objectives were achieved:

Tested the potential for network and residential storage assets orchestrated in a VPP to obtain Reserve Capacity credits. This provides the opportunity of value stacking services on battery assets and thus provides an additional revenue stream. Modelling of NSS dispatch during Reserve Capacity Mechanism (RCM) dispatch obligation intervals demonstrated the additional revenue would place downward pressure on NSS pricing and thus potentially further reduce network costs.

Tested enhanced methods of forecasting peak network demand using weather forecasts which enabled more reliable and efficient dispatch of NSS.

Implemented a new NSS control architecture which enabled direct communication between Western Power and the NSS provider (Synergy) and thus removed a potential point of failure in the control of NSS.

#4. Project is innovative and not an otherwise efficient and prudent alternative option that a service provider should have provided for in its proposed access arrangement.

The service provider will need to describe and demonstrate that the project is innovative in terms of one or more of the following:

- is based on new or original concepts, and/or*
- it involves technology or techniques or concepts that differ from those previously implemented or used by network operators in Australia, and/or*
- It is focused on customers in a market segment that significantly differs from those previously targeted by implementations of the relevant technology, in relevant geographic or demographic characteristics that are likely to affect demand.*

Western Power would ordinarily not undertake a project like Encore as an Access Arrangement investment due to the uncertainty of network benefits and the ability to recruit the other industry participants (Synergy and AEMO), who also needed to commit significant budget for R&D, and without the support of the State Government to make key regulatory reforms in support of the OPeN Hybrid model.

Encore represents a continued collaboration between Western Power, Synergy and AEMO. The Encore project extended the test scenarios (added RCM testing) and collected additional data on the deployment of key assets (Harrisdale BESS, City of Armadale BESS, air-conditioning control and HWS control).

The unique design of the WEM market, with its inclusion of a capacity market, means testing of RCM as a value stacking opportunity have not been tested in the NEM.

Similarly, the role of Synergy as the only retailer for non-contestable customers means the market design and customer recruitment into Aggregated VPPs in WA is different to other states.

System security risks continue to develop as DPV and large-scale renewable generation displaces dispatchable thermal generators that currently provide all system security services (e.g., inertia, frequency control, system strength and voltage control). Thus, in the WEM there is greater importance to market mechanisms to procure frequency support services provided by storage assets than in the NEM, which is interconnected between states.

#5. The service provider must identify all potential sources of funding for the project with an explanation of why it was not able to obtain funding for the project from those sources.

This should include sources such as the Australian Renewable Energy Agency, and federal or state government schemes.

In July 2021, the Minister for Energy approved Western Power to enter into a Commonwealth Funding Agreement with the Australian Renewable Energy Association (ARENA) as part of the Advancing Renewables Program. ARENA has agreed to provide a \$8.557M contribution towards the Symphony project to offset the total project cost.

Despite Symphony achieving its objectives, additional ARENA funding was not available for the Encore project and, as the delivery by project Partners of an OPeN hybrid model was part of the State Government DER Roadmap, the further investment in Encore was considered necessary to achieve the additional outcomes explained in this report.

#6. The costs were not included in the forecast capital or operating expenditure approved in the ERA's determination for the Access Arrangement period under which the demand management innovation mechanism applies, or under any other incentive scheme in the Access Arrangement determination.

Project Encore investment costs were not included in the AA5 investment forecast. Alternative investment options were also not included in the AA5 investment forecasts.

Note that the AA5 Capacity Expansion Capex expenditure plan included \$6M for DSO implementation post symphony (\$1.2M in FY23). AA5 also contained an Opex step change of \$4.4M per annum for DSO capability.

This DMIA submission only relates to R&D activities within Project Symphony, beyond the approved Access Arrangement expenditure.

For projects that have not been completed during the year: 1. A summary of project activity to date 2. An update on any material changes in that regulatory year 3. Any preliminary results 1. A summary of planned future activity.	n/a
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For projects that have been completed during the year:

In this section we should include:

1. *The quantitative results of the project.*
2. *Analysis of the results.*

The quantitative results of the project.

Synergy as the PMO has engaged Ernst and Young to prepare the overall Encore Final Report including analysis, findings and recommendations from all partners.

- 238 customers participated with 458 DER assets aggregated which included 200 solar, 152 air-conditioners, 90 BESS & 16 HWS.
- 15 fortnightly test cycles completed across four high level objectives to demonstrate project viability (integration & orchestration of DER, technical & financial feasibility, DER orchestration for NSS, customer experience & engagement).
- Symphony's market scenarios were adapted against high-level objectives to perform specific test scenarios (as suggested in table below):

	BMO	NSS	CTZ	ESS-CRR
Integration and Orchestration of DER	DOE submissions			ESS-CRR enablement
Technical and Financial Feasibility	Mildly binding DOEs, Short notice DOEs, RCM accreditation, Reserve Capacity, DOE impact on Reserve Capacity	Shaped NSS, direct NSS	Feasibility of CTZ (CTZ net, gross, third-party aggregator)	ESS-CRR compliance
DER Orchestration for NSS	DOE compliance	Linear NSS, Shaped NSS, NSS + Reserve Capacity	CTZ and NSS timing	
Customer Experience and Engagement	Encore mobile APP, customer air conditioner control perceptions		CTZ gross, third-party aggregator	

BMO – Bi-directional Energy Balancing Market

NSS – Network Support Services

CTZ- Constrain to Zero

ESS-CRR – Essential System Service – Contingency Reserve Raise

- 48 of 58 sub-objectives under the high-level objectives were fully achieved, 9 partially achieved and 1 not achieved which fell under technical & financial feasibility objective.
- 68%, on average, dispatch intervals within tolerance of the parent aggregator over the test cycles. Dispatch compliance allowed tolerance of $\pm 5\%$ aggregated nameplate capacity.
- Harrisdale front-of-meter (FOM) DESS contributed 67–100% of total energy injected during NSS events and maintained 96% availability ($> 94\%$ target).
- Air conditioner orchestration successfully reduced peak demand during NSS dispatches, but customer recruitment costs and technology costs currently outweigh potential value. Encore under achieved customer recruitment despite substantial incentives.

Analysis of the results.

A copy of Western Power's Encore results is available upon request. Western Power are willing to provide a presentation demonstrating the findings of Encore and its benefits to the network. Some key insights were:

- Aggregated DER demonstrated technical capability to provide Reserve Capacity services in the WEM Reserve Capacity Mechanism (RCM).

3. *A description of how the results of the project will inform future demand management projects.*

- A key issue, however, included the City of Armadale DESS being offline for extended periods of time, impacting testing of this C&I DESS. This showed the risk of overreliance on any one C&I asset. Additionally, the third-party aggregator reported issues when controlling the City of Armadale DESS during Constrain to Zero (CTZ) Net events, with the DESS unable to soak up excess DPV generation.
- Testing ramping performance of large DESS vs aggregated residential DESS, the results showed considerable interference from solar intermittency impacting the VPP capacity of aggregated DESS to keep ramping linearity.
- However, inclusion of large DESS significantly improved ramping performance achieving 1MW over 20-minute period.

A description of how the results of the project will inform future demand management projects, including any lessons learnt about what demand management projects or techniques (either generally or in specific circumstances) are unlikely to form technically or economically viable non-network options.

Project Encore successfully advanced the work of Project Symphony, delivering key insights into the orchestration of distributed energy resources (DER) across multiple market services. Encore demonstrated:

- Air conditioner orchestration for Network Support Services (NSS), which successfully reduced peak demand but remains cost-prohibitive due to high recruitment and technology costs.
- Reserve Capacity participation by aggregated customer DER, proving technical capability but highlighting the need for Wholesale Electricity Market (WEM) rule changes to enable VPP participation.
- Direct DSO-to-aggregator NSS deployment, which improved dispatch efficiency while requiring continued visibility for the DSO and DMO.
- Performance of front-of-meter (FOM) and large commercial and industrial (C&I) DESS, which consistently outperformed residential behind-the-meter (BTM) batteries in ramping, droop response, and cost-effectiveness.

Across the high-level objectives, major insights identified were:

Integration & orchestration of DER

- Forecasting Improvements – Parent Aggregator forecasting accuracy is heavily dependent on visibility of DESS state-of-charge (SOC). Better SOC monitoring will improve dispatch and market performance.
- System Integrations – Data exchange between the Parent Aggregator and the DMO must achieve a cyclic rate of ≤ 2.5 minutes. Integration standards are also needed to enable seamless participation by third-party aggregators.
- Ramping Requirements – Residential DER often cannot meet current linear ramping requirements, indicating the need for bespoke VPP performance standards.
- Compliance Monitoring – Aggregators should provide DER telemetry to the DSO to support ongoing connection and operating-envelope compliance.

4. *Any other information available to the SP required to make an informed reader to understand and evaluate the project.*

Technical & Financial Feasibility

- Visibility Needs – Critical data for both Parent Aggregator and DMO includes DESS SOC, NSS dispatch status, and dynamic operating envelopes (DOEs).
- Redundancy Operating Envelopes (OEs) – Short-notice OEs improve grid stability by enabling rapid response to network changes.
- ESS-CRR Droop Response – Residential DESS struggled to meet droop requirements, whereas large Front-Of-Meter (FOM) DESS performed reliably. Aligning ESS-CRR standards with AS/NZS 4777.2 for smaller VPPs could facilitate participation.
- Reserve Capacity – VPPs can technically provide Reserve Capacity, but current RCM rules need amendment to accommodate DER aggregation.
- Value Optimisation Tool – A proof-of-concept tool demonstrated potential for optimising service provision and customer value, warranting further development.

DER orchestration for NSS

- Direct DSO-aggregator NSS dispatch is feasible if visibility to the DSO/DMO is maintained.
- FOM DESS outperform behind the meter batteries in cost, dispatch accuracy, and reliability, largely due to independence from household load.
- Air conditioners can technically deliver NSS demand management but are currently uneconomic for aggregators.

Customer Experience and Engagement

- Air Conditioner Control Perception – Despite generous incentives, customer appetite for air conditioner orchestration was low; however, those who participated reported high satisfaction.
- Encore Mobile App – The app improved customer transparency and engagement compared to Project Symphony, enhancing overall satisfaction and trust.

Any other information available to the service provider required to enable an informed reader to understand and evaluate the project.

Project Encore demonstrated the growing technical readiness of DER for network and market services while highlighting the policy, integration, and cost barriers that must be addressed to scale virtual power plants across the SWIS.

2.2 Project Jupiter

This section demonstrates how Project Jupiter meet the DMIA requirements.

Table 2.2. Summary of Project Jupiter

WP Project Numbers:	Comments
Strategy / Activity Description:	Project Jupiter – Scaling DSO capability across the SWIS Western Power-led initiative under an ARENA grant, co-delivered with Synergy, AEMO, and WA Government; funded under Advancing Renewables Program, commencing Feb 2025
Business case(s):	Total project investment for Western Power is \$52.78M as per IAR147803 business case for DSO - Project Jupiter. This is comprised of \$14.3M operating expenditure.
Details of Project Jupiter Investment cost and funding (\$M) In 2024/25	Actual Expenditure - FY25: \$ 1.97M Budget OPEX Expenditure - FY26: \$2.14M - FY27: \$3.71M - FY28: \$3.42M DMIA claim for FY25 \$1.97M
Regulatory Category:	Non-recurring operating expenditure

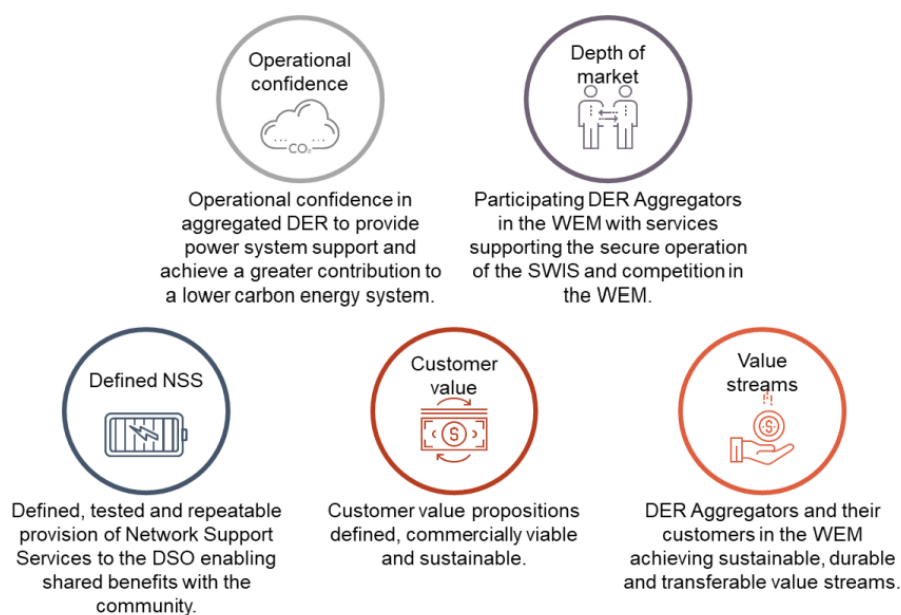
Completion of Project Symphony and Encore have helped inform Western Power in developing Minimum Viable Product (MVP) with provision of Network Support Services to defer augmentation as a main objective and Scale DSO Capabilities by 2025 and 2028 through Project Jupiter.

Project Jupiter aims to build on the continued maturation of DER integration technologies to accelerate the implementation of a commercial DER orchestration solution in the WEM, with a vision to realise the full potential of DER in WA's energy transition by developing Australia's first energy system and market where DER is safely and securely integrated at scale for the benefit of our community.

The high-level objectives of Project Jupiter are shown in the figure below:²⁴

²⁴

<https://arena.gov.au/assets/2025/08/Western-Power-Project-Jupiter-Vision-and-Impact-Pathway-Report-v2.pdf>, pg.5

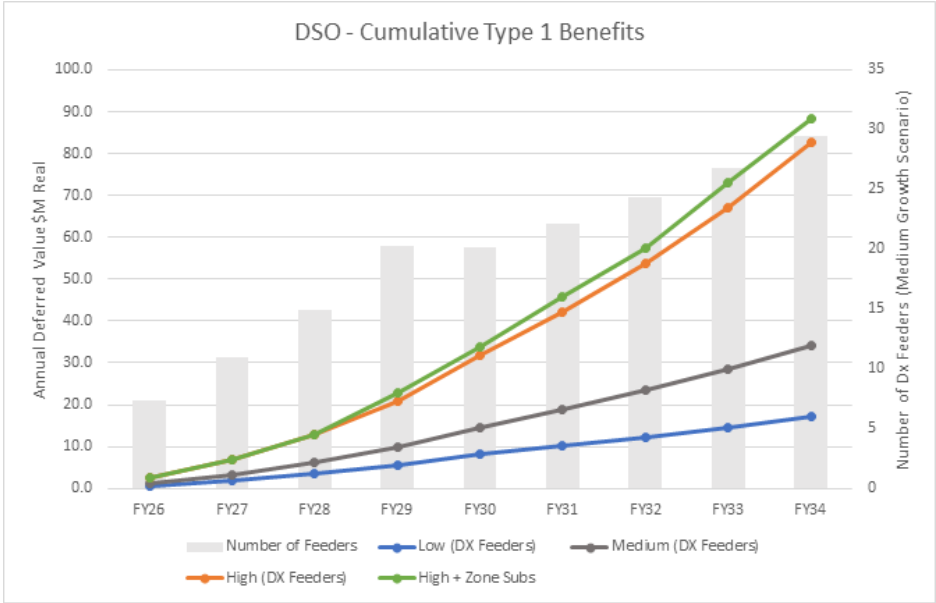


The following table provides the information required to be included in this compliance report per the DMIA guidelines.

Table 2.2: Compliance Reporting Information

Background, nature, and scope of the project: <i>In this section we provide a summary of need and timing of the project and a summary of the nature and scope of works relevant to the DMIA</i>	Background More than 40% of WA households now have rooftop solar – one of the highest uptake rates in the world – with around 30,000 new systems installed each year. As more homes and businesses add solar, batteries and EVs, opportunities to harness renewable energy continue to grow. At the same time, this rapid growth creates new challenges for balancing supply and demand in the SWIS, which is critical to keeping electricity secure, reliable and affordable. To meet this challenge, customer energy assets need to be better coordinated with the network, system and market. Nature Program led by Western Power (in partnership with Synergy, AEMO and Energy Policy WA) to scale Distribution System Operator (DSO) capability across the South West Interconnected System (SWIS) by building and demonstrating end-to-end DER orchestration — including Parent Aggregator, DSO and Distribution Market Operator (DMO) platforms, a DER data hub, dynamic operating envelopes (DOEs), Network Support Service (NSS) productization, customer recruitment pathways and an explicit Monitoring & Evaluation (M&E) framework. Project Jupiter’s scope directly addresses the DMIA objective of supporting experimental demand management R&D because it combines novel platform integrations, product testing (DOEs/NSS) and market participation trials that cannot be executed as Business as Usual (BAU) network programs. The Vision & Impact Pathway explicitly frames the programme as a test-and-learn R&D pathway for technology and commercial maturity that will generate new technical evidence for network management and non-network options.
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would result in gradual decrease NSS contract costs. Below network asset benefits tend to provide \$17-\$88M (real) over the next 10 years.



Uncertainty remains around aggregators responses, participants uptake and Western power’s ability to procure through unknown operational challenges. The high growth rate scenario reaches a peak of 41 feeder augmentations. Other benefits of the project identified are customer reliability, reputation, improved performance standards and compliance obligations. As the project progresses, cost benefit analysis (CBA) report yet to be released, will provide the methodology and result by which the cost and benefits of the objectives of the Project are distributed across the WEM. The CBA and learnings from the Project will also provide insights and recommendations to support the transition to business-as-usual and enable continued growth in the new DER-integrated market.²⁵

The amount of the allowance incurred by the Service Provider (SP):

- 6. Incurred to date as at the end of that pricing year.
- 7. Incurred in that pricing year.
- 8. Expected to be incurred in total over the duration of the project.

Incurred to date as at the end of the period assessed:

Project Jupiter DMIA claim for FY25 is \$1.97M

Cost 2024/25 = \$1.97M (excluding forecast capex included in AA5)

- FY25: \$1.97M

Expected to be incurred in total over the duration of the project:

- FY26: \$2.14M
- FY27: \$3.71M
- FY28: \$3.42M

²⁵

<https://arena.gov.au/assets/2025/08/Western-Power-Project-Jupiter-Vision-and-Impact-Pathway-Report-v2.pdf>, p27

How and why the project meets 'Eligibility Criteria': In this section we provide details on how and why the project meets the guideline's 6 x eligibility criteria specified in the DMIA guideline	#1. Project consists of research and development: <i>Demonstrate that the project is for experimental activities whose outcomes cannot be known or determined in advance using current knowledge, information, or experience and that the activities are conducted for the purpose of generating new knowledge:</i> Project Jupiter explicitly frames itself as an experimental, test-and-learn strategy framework whose purpose is to increase the technical and commercial maturity of DER orchestration. The project's workstreams which are being prototyped — platform integration, DOE development, NSS trials and market transaction testing — are activities whose outcomes are uncertain and intended to generate new knowledge and inform operational procedures. The milestone 1 report included outcomes and lessons learnt within governance, value, and technical aspects to deliver the project objectives. The project documents are full of pivot points (e.g. abandoning RCM path, exploring alternative mechanisms), indicating experimentation rather than deterministic development.
	#2. Project is for demand management: <i>The service provider must provide details of the effect the project, if proved viable, will have on network demand usage patterns:</i> Key performance indicator (KPI) is established which states, "A minimum of 100MW of DER nameplate capacity is recruited into a virtual power plant (VPP) via an aggregator (including through the use of third-party aggregators) to actively provide network and market services." This was identified based on current existing behind-the-meter (BTM) storage capacity in the SWIS, forecasted growth of BTM storage connected to the network, capacity requirements of NSS, and Reserve Capacity Mechanism (RCM) needs. AEMO's 2024 WEM Energy Statement of Opportunity (ESOO) forecasts approximately 500MW of BTM DESS will be connected by 2028 at the completion of Project Jupiter. As such, the project would rely on approximately 20% of this capacity to achieve the 100MW target. With policy and regulatory changes, the project partners are confident this is attainable. Additionally, to provide transmission-level NSS, Western Power requires a minimum of 10MW DER to be connected to the relevant substation, which can be provided complementarily to the RCM. The project's core use cases are demand management in the accepted sense: orchestrated curtailment/charging/discharging and managed load control to reduce peak demand and reshape the "duck-curve." Project Jupiter's product development and NSS trial objectives are specifically targeted at delivering locational demand reduction and increased hosting capacity, thereby directly changing network demand usage patterns if scaled. The SWIS will be able to accommodate the expected accelerated uptake of DER while supporting a smooth and affordable transition for customers and maintaining system security and reliability on the network.

#3. Project has the potential, if proved viable, to reduce long term network cost:

The service provider must provide a description and estimation of the costs that can be reduced. Any additional costs that may arise in total electricity costs as a result of the demand management project (for example, effects on power system security, power system reliability or other aspects of the wholesale electricity market) should be taken into account when estimating the reduction in costs.

Large-scale integration and participation of DER in future capacity, energy and NSS services will realise enduring value for the network and the market. Participation in WEM energy and capacity services will help meet forecast shortfalls currently met by DER participation short term in NCESS and Supplementary Reserve Capacity (SRC) contracts, and provide long term value streams for Aggregators, Retailers and Customers, and complement localised NSS contracts available at the distribution level.

To integrate DER in the WEM, Project Jupiter categorises use cases as ‘design-only’ use cases or ‘design and build’ use cases. Project Jupiter will develop the ecosystem required to enable the right DER assets to be aggregated via a VPP to generate value across all services in the WEM. However, the use cases captured under this are at varying degrees of maturity, both technologically and commercially. To account for this, the design-only use cases seek to develop the high-level design to enable these capabilities, utilising a technology system design that enables modular expansion as the use cases mature.

Project Jupiter will develop and implement product constructs for a scaled DER-integrated market. Though these will be reviewed and amended as part of normal product review processes, the products will be implemented and marketed for use by customers and will continue beyond the project completion.

#4. Project is innovative and not an otherwise efficient and prudent alternative option that a service provider should have provided for in its proposed access arrangement.

The service provider will need to describe and demonstrate that the project is innovative in terms of one or more of the following:

- *is based on new or original concepts, and/or*
- *it involves technology or techniques or concepts that differ from those previously implemented or used by network operators in Australia, and/or*
- *It is focused on customers in a market segment that significantly differs from those previously targeted by implementations of the relevant technology, in relevant geographic or demographic characteristics that are likely to affect demand.*

Western Power would ordinarily not undertake a project like Jupiter as an Access Arrangement investment due to the uncertainty of network benefits and the ability to recruit the other industry participants (Synergy, ARENA and AEMO), who are also needed to commit significant budget for R&D, and without the support of the State Government to make key regulatory reforms.

Project Jupiter is innovative because it integrates novel and technically complex elements — a three-platform (Aggregator/DSO/DMO) operational model, DOE application at scale, and live interaction with the WEM. This tripartite orchestration architecture has not previously been trialled in Western Australia or elsewhere in Australia at this scale.

Project Jupiter employs several technological and methodological concepts that differ from other DNSPs such as Dynamic Operating Envelopes (DOEs) at scale, integration of aggregator and DSO platforms with market operator systems through advanced technical solutions (i.e. data hub), and adaptive R&D methodology (Test and Learn Strategy).

In WA, over 40% of households have rooftop solar, creating the world's highest DER penetration, and new DER connections must now be compliant with orchestration standards (Emergency Solar Management and export limits). Jupiter's focus is on these households and small businesses as a dispatchable resource pool, which is significantly different from the large C&I customers traditionally engaged in east-coast demand response schemes. Jupiter is deliberately designed to engage broad-based residential DER customers in WA, who differ from previous demand management target groups in both scale and system context. The SWIS is an isolated grid with no interconnection to other states, meaning demand management solutions must be tailored to a unique geographic and market context where DER impacts are more acute. The project's design acknowledges these differences and adapts orchestration techniques accordingly.

#5. The service provider must identify all potential sources of funding for the project with an explanation of why it was not able to obtain funding for the project from those sources.

This should include sources such as the Australian Renewable Energy Agency, and federal or state government schemes.

Western Power received funding from Australian Renewable Energy Association (ARENA) as part of the Advancing Renewables Program. ARENA has agreed to provide a contribution towards the Jupiter project to offset the total project cost for all the partners involved in the project. Current DMIA claimed operating expenditure excludes ARENA funding and other partner's contribution.

#6. The costs were not included in the forecast capital or operating expenditure approved in the ERA's determination for the Access Arrangement period under which the demand management innovation mechanism applies, or under any other incentive scheme in the Access Arrangement determination.

No specific allocation for this investment was included in the AA5 Submission.

This DMIA submission only relates to R&D activities within Project Jupiter that are beyond the approved Access Arrangement capital and operating expenditure or funded under other incentive schemes.

For projects that have not been completed during the year:

In this section we should include

- 9. A summary of project activity to date
- 10. An update on any material changes in that regulatory year
- 11. Any preliminary results
- 12. A summary of planned future activity.

1. A summary of project activity to date.

Project Jupiter formally commenced in February 2025 under a \$20.8 million ARENA funding agreement, with total project costs of \$108.34 million shared among Western Power, Synergy, AEMO, and the WA Government. Initial activities have focused on project mobilisation, governance, and program design. According to the Lessons Learnt Report 1, the first six months were dedicated to establishing the governance framework, project management structures, and technical sub-working groups, ensuring collaboration across partners and alignment with national DER integration initiatives. In parallel, Western Power published the Vision & Impact Pathway Report, which defined the program’s monitoring and evaluation framework (using Technology Readiness Levels, Commercial Readiness Index, and Adoption Readiness Level metrics), the test-and-learn methodology, and the sequencing of key work packages including DSO/DMO platform development, DER recruitment, and DOE/NSS trials. A National Alignment Report was also produced, benchmarking Project Jupiter against other DER integration programs and ensuring consistency with national standards.

2. An update on any material changes in that regulatory year.

During the reporting period, the project experienced several material changes as documented in the Lessons Learnt Report 1. One major pivot was the decision to step back from pursuing Reserve Capacity Mechanism (RCM) participation in early trials due to regulatory and policy barriers, and instead redirect efforts toward testing alternative market participation pathways such as the Individual Reserve Capacity Requirement (IRCR). The report also highlighted refinements in program governance, with new sub-working groups formed to focus on interoperability, customer recruitment, and compliance processes, reflecting lessons from Project Symphony and early findings from Jupiter. Additionally, early misalignments in program terminology were identified and corrected through a shared project glossary and onboarding process to ensure consistent understanding across all partners, ensuring clearer scope definition and a more cohesive delivery framework. These changes reflect the adaptive R&D character of the program, in line with the “test and learn” methodology embedded in the Vision & Impact Pathway.

3. Any preliminary results.

While no quantitative trial outcomes have yet been published, several important preliminary results are documented in the first Lessons Learnt report. First, the establishment of effective governance and collaboration mechanisms across Western Power, Synergy, AEMO, and Energy Policy WA has been critical, with early successes in decision-making under tight timelines. Second, the pivot away from RCM trials demonstrated the program’s ability to adapt dynamically to regulatory and policy realities, preserving the project’s overall objectives while refining its delivery pathway. Third, the creation of technical sub-working groups has already generated early insights into interoperability requirements and customer recruitment strategies. Finally, early analysis emphasised the importance of aligning technical standards and policy settings to enable scaled DER participation, highlighting the need for flexibility in both technology deployment and regulatory engagement. Collectively, these preliminary results show progress in de-risking technical and policy challenges before full-scale DER orchestration trials begin.

13.A summary of planned future activity.

4. Summary of planned future activity

Planned activities for the next regulatory year include progressing the development and integration of the Parent Aggregator, DSO, and DMO platforms; advancing interoperability testing across these systems; and commencing DER customer recruitment with a target of at least 100 MW of nameplate capacity enrolled into virtual power plant arrangements. According to the Vision & Impact Pathway, subsequent phases will focus on deploying Dynamic Operating Envelopes (DOEs) at scale, designing and trialling Network Support Service (NSS) products, and piloting DER-reflective tariffs and customer enrolment mechanisms. Monitoring and evaluation (M&E) activities will also expand, with baseline data collection and the first application of TRL/CRI/ARL metrics to track technology, commercial, and adoption maturity. Lessons Learnt reports will continue to be published as key milestones are reached, with interim analysis feeding back into program governance to refine trials and ensure alignment with the WA DER Roadmap and national DER integration priorities.

For projects that have been completed during the year:

n/a

In this section we should include:

14. *The quantitative results of the project.*
15. *Analysis of the results.*
16. *A description of how the results of the project will inform future demand management projects.*
17. *Any other information available to the SP required to make an informed reader to understand and evaluate the project.*

2.3 Strategic Electric Vehicle Integration (SEVI)

This section demonstrates how the SEVI trial meets the DMIA requirements.

Table 2.3: High level summary

WP Project Numbers:	Comments
Strategy / Activity Description:	Strategic Electric Vehicle Integration
Business case(s):	IAR154743 – Innovation Investment Fund
Investment cost and funding From inception to date	Opex. Actual cost FY23: \$35,714 (May 2023-June 2023) FY24: \$39,793 (July 2023-June 2024) FY25: \$24,086 (July 2024-June 2025) Forecast FY26: \$18,708 (July 2025-June 2026) Estimated total cost to Western Power \$118,301
Regulatory Category:	Non-recurring operating expenditure

Table 2.3-1: Compliance Reporting Information

Background, nature, and scope of the project: <i>In this section we provide a summary of need and timing of the project and a summary of the nature and scope of works relevant to the DMIA</i>	CSIRO's EV Projection 2023²⁶, projected annual electricity consumption from EVs in the SWIS to reach 4TWh by 2035²⁷. As a point of comparison, current total annual electricity consumption in the SWIS is 17 TWh²⁸. While EV use will drive significant consumption increase, huge opportunities to manage its impact on network demand exist given its flexibility and future bi-directional and remote management technological capabilities. Like all cars, EVs are generally parked more than 90% of the time²⁹, providing significant flexibility for charging to happen outside of network demand peak period. EV charging infrastructure needs to be designed to enable this and manage peak loads on the network. Most EVs are constantly connected to the internet, with multiple features, including charging available for remote management. This enables a future where EV charging can be coordinated or orchestrated to avoid network constraints and lead to a lower overall cost to consumers. Vehicle-to-Grid (V2G) is a technology that allows EVs to export energy to the grid. V2G is already here, and its mass adoption is a key priority for the Australian government³⁰. With V2G, EVs can provide more network services beyond
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²⁶ Strategic Electric Vehicle Integration | RACE for 2030 - <https://racefor2030.com.au/project/strategic-electric-vehicle-integration/>

²⁷ https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2024/csiro-2023-electric-vehicle-forecast-report.pdf

²⁸ <https://aemo.com.au/-/media/files/electricity/wem/wholesale-electricity-market-fact-sheet.pdf>

²⁹ Can the current energy grid handle the increasing number of electric vehicles on the road? - Electric Vehicle Council

³⁰ ECMC Communique 19 July 2024.docx (live.com)

	demand management, helping to inject more energy into the grid during network peak, reducing network infrastructure cost for all. Overall, EVs present promising opportunities, but they will not be realised by default. The right policies and infrastructure need to be designed and implemented at the right time for the EV ecosystem to invest and develop the right culture and capabilities. There are major uncertainties and unknowns on the specifics and timings of policies and investments. The EV ecosystem consists of numerous global players interacting with a diverse profile of EV users and diverse typology of the Australian electricity networks. There are many use cases, for Western Power to effectively plan for the EV transition, it needs to engage and understand the use cases sufficiently. The RACE for 2030 Cooperative Research Centres (CRC) is one of the larger industry-led CRCs funded by a \$68.5 million government investment. It identifies EV as an important priority and set up the 3-year project “Strategic EV Integration” (SEVI) project³¹. SEVI brings together research capabilities across Australia to help address broader systemic research questions faced by the industry. Western Power was invited to participate and joined as Steering Partner with accompanying financial investment. SEVI identified 3 key research domains under the broader theme of integrating EVs “strategically”, such that EVs can serve multiple objectives concurrently, including that of a network operator like Western Power. 1) EVs and Precincts – EV adoption in a local area 2) EVs and Fleets – EV adoption by business and government organisations 3) EVs and Regions – EV adoption in regional areas where the grid is weaker. These are pertinent use cases for the Western Power network. Western Power needs to understand how EV adoption may affect network assets in a local area, how quickly businesses will convert their vehicle fleet, especially heavier vehicles to electric, and how the regional network can support EV adoption without significant cost increase due to network upgrades. By engaging these use cases early, Western Power will maximise the opportunity to harness EVs’ flexibility for demand management and avoid a future of high network investments due to overwhelming charging during peak.
Aims and expectations: <i>In this section we provide the aims and expectations of the project.</i>	Strategic EV Integration” (SEVI) project - focuses on 5 work packages for each of the 3 research domains, EVs and Precincts, EVs and Fleets, and EVs and Regions. The 5 work packages are: 1) Social and Market Research Trends 2) Technologies Deployment and Data 3) Business Models and Value Proposition 4) Legal, Tax, and Regulatory Reform 5) Energy System and Network Analysis While “Energy System and Network Analysis” is clearly relevant and an important subject to a network operator like Western Power, all 5 work packages are

³¹ [Strategic Electric Vehicle Integration | RACE for 2030](#)

	valuable to help Western Power developed a comprehensive and more nuanced understanding of the EV transition. SEVI will identify a suitable, pre-existing project for each of the research domains. Companion research will be designed with guidance from Steering Partners, which include Western Power. The companion research will address the 5 work packages. The following are corresponding projects for the research domains: 1) EVs and Precincts – Witchcliffe Ecovillage 2) EVs and Fleets – NSW Government and Ausgrid 3) EVs and Regions – Windsor Gardens Holiday Park (South Australia) (pending confirmation) supported by SA government. Above projects are of the sufficient scale and complexity to provide insightful lessons. Western Power is fully supportive of the scope and approach and look forward to the outputs from all 5 work packages from the companion research of the 3 projects.
Anticipated outcomes: <i>In this section we provide:</i> 1. anticipated outcomes if the project proves viable. 2. An estimate of the potential to reduce long-term network costs	<i>Anticipated outcomes if the project proves viable.</i> 1) Expand Western Power’s understanding of the challenge of EV integration for Precincts, Fleets and Regions along the 5 work packages of Social and Market Research Trends, Technologies Deployment and Data, Business Models and Value Proposition, Legal, Tax, and Regulatory Reform, Energy System and Network Analysis. 2) EVs are projected to reach annual energy consumption of 4TWh by 2035²⁷, which will require significant network augmentation if most EVs are charged during peak demand period, which is the most convenient time to charge for most people as they return home from work. The earlier and better Western Power understand various use cases, the more lead time is available to develop and implement the right policies and technological infrastructure to facilitate the grid friendly EV charging culture and behaviours. 3) The uptake of EVs among business fleets may also see sudden ramp up given stakeholders’ pressure to reduce emission and the financial capacity for larger volume procurement. There is currently a lack of suitable electric light to medium duty commercial vehicle models. When the product is available, Western Power may see sudden increase if both grid connection upgrades and network demand. Understanding the decision-making factors of fleet early allows more time for Western Power to develop suitable products and policies that encourage more daytime and overnight fleet charging. 4) There are parts of Western Power regional network that are served by long feeders, microgrids or standalone power systems. The right solutions to enable regional uptake of EVs, which is also an equity consideration, will depend on how quickly EVs are adopted and what innovative solutions can be provided at a local level. E.g. SEVI is working with Witchcliffe Ecovillage and Windsor Gardens Holiday Park, which are both in the regions. If EV charging can be provided by residential developments or holiday parks via their distributed energy resources (DER) investments, that will help reduce or avoid expensive regional network upgrades.

The amount of the allowance incurred by the Service Provider (SP): 3. <i>Incurred to date as at the end of that pricing year.</i> 4. <i>Incurred in that pricing year.</i> 5. <i>Expected to be incurred in total over the duration of the project.</i>	Opex. Actual cost FY23: \$35,714 (May 2023-June 2023) FY24: \$39,793 (July 2023-June 2024) FY25: \$24,086 (July 2024-June 2025) Forecast FY26: \$18,708 (July 2025-June 2026) Estimated total investment from Western Power \$118,301
How and why the project meets 'Eligibility Criteria': <i>In this section we provide details on how and why the project meets the guideline's 6 x eligibility criteria specified in the DMIA guideline</i>	#1. Project consists of research and development: <i>Demonstrate that the project is for experimental activities whose outcomes cannot be known or determined in advance using current knowledge, information, or experience and that the activities are conducted for the purpose of generating new knowledge:</i> The electric vehicle (EV) sector remains in an early stage of development, with products that have yet to achieve full parity with internal combustion engine vehicles (ICEVs) in several key areas, notably driving range and refuelling convenience. ICEVs currently offer longer ranges per tank and benefit from a well-established network of fuel stations enabling rapid refuelling. In certain market segments—such as utility vehicles and light to medium-duty fleet vehicles—practical EV alternatives are still limited. However, innovation in the EV industry is progressing rapidly. New models with improved capabilities and lower price points are being introduced at an accelerating pace, signalling a strong trajectory toward broader adoption. Research in this domain is inherently complex, encompassing diverse technologies, products, suppliers, customers, and stakeholders, all evolving simultaneously. Each participant contributes a piece to a larger puzzle, but achieving a comprehensive understanding of the future landscape requires coordinated efforts across the ecosystem. This level of collaboration cannot be effectively or efficiently undertaken by any single organization. To ensure neutrality and broad participation, such research should be led by a non-commercial entity. This approach enables the recruitment of competing commercial organizations, the development of a comprehensive research scope, and the dissemination of insights across the industry. While the resulting knowledge will be valuable to all stakeholders, it would be impractical for individual entities to generate independently due to resource constraints.

#2. Project is for demand management:

The service provider must provide details of the effect the project, if proved viable, will have on network demand usage patterns:

The focus of SEVI is broadly about enabling efficient EV uptake, avoiding grid constraints and expensive grid upgrades. Each domain explores specific demand management opportunities:

- 1) EVs and Precinct: Focuses on supporting residential and public EV charging with on-site PV generation and battery storage. Seeking to understand the optimum DER technology mix to maximise return on investment. Understand the grid policies and products required to unlock financial benefits for the precincts. Facilitate demand management outcomes of lower export to the grid during system low and higher export during system peak and supporting EV charging with onsite DER rather than grid upgrade.
- 2) EVs and Fleet: Understand the pace of fleet electrification. The opportunity for flexible connection – where a higher grid capacity is provided overnight, and a much smaller constraint grid capacity during peak period, managing the demand away from peak to overnight. Also to understand the opportunity of fleet participating in Virtual Power Plant (VPP) when vehicle-to-grid (V2G) become available. Further strengthening the scope for demand management.
- 3) EVs and Regions: Understand how EV charging can be provide in the region without significantly more expensive network upgrade. Holiday parks' DER investments can support charging. When EVs become mainstream, they can also support other peak period electricity usage by exporting to the grid.

#3. Project has the potential, if proved viable, to reduce long term network cost:

The service provider must provide a description and estimation of the costs that can be reduced. Any additional costs that may arise in total electricity costs as a result of the demand management project (for example, effects on power system security, power system reliability or other aspects of the wholesale electricity market) should be taken into account when estimating the reduction in costs.

The evolution of electric vehicles (EVs) can be viewed in two distinct phases: pre-V2G and post-V2G mainstream adoption.

In the near term, before vehicle-to-grid (V2G) technology becomes widespread, the priority is to promote grid-friendly charging behaviour. This includes encouraging charging during solar generation hours and overnight periods, supported by incentives such as increased solar investment and lower off-peak electricity tariffs.

The second phase, following mainstream V2G adoption, will see EVs operating as bi-directional energy assets. EVs will function as distributed battery storage systems, capable of exporting energy to the grid during peak periods or providing ancillary services. V2G will create strong incentives for EV owners to maximize self-consumption by powering homes during peak demand, significantly reducing system peak loads. For Western Australia, where solar generation is abundant, the long-term strategy to minimize network costs involves fostering optimal charging behaviour during the pre-V2G phase and enabling greater asset value realization once V2G becomes mainstream.

#4. Project is innovative and not an otherwise efficient and prudent alternative option that a service provider should have provided for in its proposed access arrangement.

The service provider will need to describe and demonstrate that the project is innovative in terms of one or more of the following:

- *is based on new or original concepts, and/or*
- *it involves technology or techniques or concepts that differ from those previously implemented or used by network operators in Australia, and/or*
- *It is focused on customers in a market segment that significantly differs from those previously targeted by implementations of the relevant technology, in relevant geographic or demographic characteristics that are likely to affect demand.*

Electric vehicles (EVs) remain relatively new in Western Australia, with approximately 38,110 EVs registered as of June 2025, compared to more than 2.15 million vehicles overall. This represents a sharp increase from around 20,000 EVs in June 2024, highlighting strong growth in adoption. Vehicle-to-Grid (V2G) technology is still in its infancy and has not yet been implemented in the state, although Horizon Power has commenced a small-scale V2G trial in Exmouth to explore its potential.

As EV uptake accelerates among consumers and businesses, charging behaviour—whether from the grid, at home, in public locations, or using on-site solar and storage—differs significantly from traditional refuelling at service stations. At this stage, there is no established pattern of charging behaviour, and EV users collectively represent an emerging customer segment for the electricity network.

#5. The service provider must identify all potential sources of funding for the project with an explanation of why it was not able to obtain funding for the project from those sources.

SEVI is partly funded by the Commonwealth, and partly by industry and academic institutions. Western Power is one of the industry funders.

Western Power is not the appropriate party to apply for ARENA funding given it does not lead the research project. The project is led by RACE.

#6. The costs were not included in the forecast capital expenditure or operating expenditure approved in the ERA's determination for the Access Arrangement period under which the demand management innovation mechanism applies, or under any other incentive scheme in the Access Arrangement determination.

RACE started initial discussion with Western Power on SEVI in July 2022. The project was eventually finalised in May 2023. Due to the uncertain nature of early discussions and a mismatch of timing, it was not factored in the forecast.

For projects that have not been completed during the year:

In this section we should include

6. *A summary of project activity to date*
7. *An update on any material changes in that regulatory year*
8. *Any preliminary results*

6. A summary of project activity to date

The Strategic Electric Vehicle Integration (SEVI) Project from February 2023 to February 2025, under the RACE for 2030 CRC. Nearly 30 researchers across six universities with 14 funding partners and 14 advising organisations. The project explores how EVs can be integrated as energy assets across three demonstration sites:

- NSW (Fleets): Business and government EV fleets with depot-based charging (Ausgrid, NSW Govt).
- WA (Precincts): Residential precincts (Witchcliffe Ecovillage) with shared solar, batteries, and public charging (Curtin University, Western Power, Plico, SwitchDin).
- SA (Holiday Parks): Caravan and holiday parks integrating private and public EV charging with behind-the-meter energy storage and orchestration (UniSA, Curtin, Edwards Group, Powertech, SA Gov, SAPN).

7. An update on any material changes in that regulatory year

- Market and Policy Context:
 - By 2025, EV sales in Australia reached ~10% of new vehicles, with fleets seen as key to scaling adoption.
 - Policy shifts included NSW's \$105m investment in EV fleet incentives and the phasing out of free registration/stamp duty concessions.
 - FBT and home-charging barriers emerged as significant issues for fleet electrification.
- Demonstration Adjustments:
 - WA (Witchcliffe): Some public chargers temporarily disconnected due to low early utilisation, awaiting higher EV uptake, interventions to reduce costs (shut off charging ports), experiment with higher prices, add signage to guide drivers
 - SA (Holiday Parks): Surveys highlighted uncertainty among park operators about EV charging as a revenue source vs. guest amenity.
 - NSW (Ausgrid depot): Rising energy demand post-COVID and early EV fleet adoption required scaling modelling assumptions and managed charging scenarios.

8. Any preliminary results

- NSW Fleets (Ausgrid Artarmon Depot):
 - Managed charging cut depot peak demand by ~9% (2025) and ~5% (2030 Est). Charger utilisation improved from ~34% to 50%.
 - Depot flexibility block of ~100–130 kW dispatchable load identified for 2–4 hours, supporting non-network solutions.
 - Behavioural research found 79% of staff wanted to continue or start driving EVs, though range/time-to-charge concerns persisted. Interventions like awareness and staff training improved acceptance.

9. *A summary of planned future activity.*

- WA Precincts (Witchcliffe Ecovillage):
 - Public charging utilisation low (one charge every 3–4 days), expected to grow.
 - 80% of charging occurred in daylight, aligning well with solar generation.
 - Surveys showed location, speed, and cost were the most important factors for users; amenities mattered least.
 - Economics: internal energy trading model between residents and strata showed profitability sensitive to solar buy/sell pricing, Chargefox fees significant.
- SA Holiday Parks (Edwards Group/Powertech):
 - EV charging demand per car ~equivalent to 5–10 cabins/day.
 - 39 park operators surveyed: top perceived benefit was attracting guests, but top concerns were installation cost, grid capacity, risk of not recouping investment.
 - Guests often expected free charging, unmanaged charging risked tripping breakers.
 - Initial user tracking showed EVs mostly available overnight, with some overlap during solar hours, offering potential for managed charging.

9. *A summary of planned future activity*

- Further deliverables:
 - Economic multipliers and procurement and investment insights
 - Energy orchestration insights, EV and DER utilisation analysis
 - Regulatory change landscape and proposals
 - Final project videos, Thematic communication, Capacity building module
 - Replicable and scalable lessons
- Behavioural Research: Continue interventions at Ausgrid and expand analysis of staff adoption barriers across fleets. Witchcliffe EV charger survey will continue to run.
- Technical Trials: Refine smart/PV-aware charging algorithms, add departure-time awareness, and integrate telemetry for KPIs (SOC, queueing, PV headroom).
- Scaling Models: Generalise depot playbooks to other fleets; replicate Witchcliffe lessons for other residential precincts; develop business case models for holiday park operators.
- Regulatory/Policy Work: Address FBT barriers for home charging, explore subsidies for small/medium business fleet charging, and refine tariff models for public EV charging.
- Engagement: Keep disseminating findings via short industry pamphlets and targeted partner knowledge-sharing sessions.

For projects that have been completed during the year:

In this section we should include:

10. *The quantitative results of the project.*
11. *Analysis of the results.*
12. *A description of how the results of the project will inform future demand management projects.*
13. *Any other information available to the SP required to make an informed reader*

n/a

2.4 Pathway to Net Zero Precincts

This section demonstrates how the Pathway to Net Zero Precincts trial meets the DMIA requirements.

Table 2.4: High level summary

WP Project Numbers:	Comments
Strategy / Activity Description:	Pathway to Net Zero Precincts
Business case(s):	IAR154746 – Innovation Investment Fund FY24
Investment cost and funding From inception to date	Opex. Actual cost FY24: \$50,353 (Nov 2023-June 2024) FY25: \$28,451 (July 2024 – June 2025) Forecast FY26: \$74,597 (July 2025-June 2026) Estimated total Western Power investment (claimed under DMIA during AA5) \$153,401
Regulatory Category:	Non-recurring operating expenditure

Table 2.4-1: Compliance Reporting Information

Background, nature, and scope of the project: <i>In this section we provide a summary of need and timing of the project and a summary of the nature and scope of works relevant to the DMIA</i>	"Pathways to Net Zero Precincts" (NZP) is a project of "Reliable Affordable Clean Energy for 2030 Cooperative Research Centre" (RACE). RACE is an industry-led research centre established in 2020 with \$68.5 million of Commonwealth funding³². RACE's primary objective is to drive innovation for a secure, affordable, clean energy future by bringing together top research capabilities to address complex system-level challenges faced by the industry. NZP identifies a strategy for national or state overall carbon Net Zero objectives to be progressed bottom-up, precinct by precinct. A precinct here is an area where there is an organisation that has effective ability to manage the area's carbon emission. The precincts can be a strata development, a large corporate or university campus, an industrial park, an area designated by its local government for special development. NZP analyses representative case studies to understand on how various precinct configurations can develop effective Net Zero structure, strategy and plans, how they can meet various global and local accreditation standards and therefore distil the lessons to templates that will simplify and catalyse the adoption of Net Zero strategies by various precincts across Australia, enabling the nation to achieve its Net Zero ambitions.
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³² Strategic Electric Vehicle Integration | RACE for 2030 - <https://racefor2030.com.au/project/strategic-electric-vehicle-integration/>

	NZP focuses on 4 core aspects: 1) NZP Certification; 2) NZP DER & Grid Integration; 3) NZP Governance; 4) Urban Design NZP commenced with 13 case studies, 7 of which are based in Western Australia, with the rest from South Australia, Victoria, Queensland and New South Wales. NZP is led by a WA research team based in Curtin University.
Aims and expectations: <i>In this section we provide the aims and expectations of the project.</i>	Western Power needs to work closer with these emerging models to better understand how to adapt the grid to support them and thus decarbonisation, and how these projects are ensuring reliable electricity supply to the communities. Western Power's strategic vision is "Working together to power a cleaner energy future". The vision reflects a once-in-a-generation opportunity that will fundamentally shift the way electricity is used - and the key role our employees, industry, government and the community have in enabling decarbonisation. Our community remains our key beneficiary. We need to continue to provide reliable power, keep cost low and to enable decarbonisation. The goal of this research is to help Australia achieves its Net Zero ambition through NZP, which the grid has an important role. Supporting this research is an exemplification of the strategy. Another important goal is to ensure that our community has reliable supply. Participating in this research provides an avenue for WP to emphasise the importance of electricity supply that is reliable for the long-term and under various challenging scenarios, e.g., continuous hot summer days. It is also an avenue for WP to understand the needs of NZPs, such that more suitable products or services can be developed to meet their needs.
Anticipated outcomes: <i>In this section we provide:</i> 1. anticipated outcomes if the project proves viable. 2. An estimate of the potential to reduce long-term network costs	<i>Anticipated outcomes if the project proves viable.</i> If successful, the project will provide effective templates to achieve Net Zero for various types of precincts, which can be residential, commercial or industrial, under various ownership and connection arrangements. Each template will have a component on DER and Grid Integration, which will encourage DER investment and guide the precincts to adopt energy behaviour that supports the grid and enhances returns on investment. Western Power will learn through this project how its connection processes and technical rules need to change to facilitate the DER investments by the precincts. What technical capabilities Western Power need to be built to better integrate with the precincts, and what network and system opportunities the precincts are better placed to capture and should be prioritised by Western Power.
The amount of the allowance incurred by the Service Provider (SP): 3. <i>Incurred to date as at the end of that pricing year.</i> 4. <i>Incurred in that pricing year.</i> 5. <i>Expected to be incurred in total project duration</i>	Opex. Actual cost in FY24 FY24: \$50,353 (Nov 2023-June 2024) FY25: \$28,451 (July 2024-June 2025) Forecast cost FY26: \$74,597 (July 2025-June 2026) Estimated total Western Power Cost (AA5 DMIA claim) \$153,401

How and why the project meets 'Eligibility Criteria': <i>In this section we provide details on how and why the project meets the guideline's 6 x eligibility criteria specified in the DMIA guideline</i>	#1. Project consists of research and development: <i>Demonstrate that the project is for experimental activities whose outcomes cannot be known or determined in advance using current knowledge, information, or experience and that the activities are conducted for the purpose of generating new knowledge:</i> NZP is developing templates to simplify and enable achievement of Net Zero by precincts. This is an emerging field as net zero certification standards, precincts' business models, and DER technologies are all in early stages, and interacting with one another iteratively. It is not clear how viable the net zero precincts are, how quickly they will be adopted, what kind of technology investments and policy changes are required to enable them. Without this project, investors of each type of precincts will conduct their own development and experimentation. But none will have the skills and scale to engage net zero certification authorities meaningfully. Western Power will have to engage each precinct separately and will find difficulty establishing a general and strategic view. Overall progress of the ecosystem will be slow and cumbersome, with significant rework and trial and error. Notwithstanding, no single party will find establishing an overarching view via a research project worthwhile, and unlikely to share the knowledge openly after significant investment. The project brings together participants of various types of precincts, distil their common endeavours and challenges, and streamline engagement with common authorities. Western Power will benefit from a centralised engagement and the value adding analysis and facilitation provided by the project.
	#2. Project is for demand management: <i>The service provider must provide details of the effect the project, if proved viable, will have on network demand usage patterns:</i> A key lever to achieve net zero is to increase the contribution of renewable energy, which for the precincts will typically be solar, and also battery storage systems to store excess solar generated electricity for evening consumption. There are two key impacts to the network: 1) alleviate daytime minimum demand as charging of battery storage increases daytime demand; 2) alleviate peak maximum demand as battery storage supports self-consumption or export to the network. Self-consumption of daytime solar generated electricity stored in during peak period will help manage peak demand downwards. In the future, as the grid offers more ways for distributed energy resources to provides services, precincts are also better positioned, given their scale and resources, to invest in required technological capabilities to further improve their returns on investment. At that stage, demand management will be more sophisticated and better able to meet the grid's needs.

#3. Project has the potential, if proved viable, to reduce long term network cost:

The service provider must provide a description and estimation of the costs that can be reduced. Any additional costs that may arise in total electricity costs as a result of the demand management project (for example, effects on power system security, power system reliability or other aspects of the wholesale electricity market) should be taken into account when estimating the reduction in costs.

This project is R&D in nature with many unknown unknowns, however, being involved in this research at a modest cost allows Western power to share its knowledge and in return, influence the scope of the research to derive direct impacts analysis on the network, which in turn may lead to more practical applications or further research specific to the Grid impact and response.

In addition, the insight gained will enable Western Power to more proactively respond to changes in market and customer needs.

It is generally easy for individual homeowner, especially those on a green title to invest in DER like solar, battery and EVs. Those who are part of a larger development may encounter barriers to the installation of DERs and the charging of EVs. They are also likely part of an embedded network, limiting their flexibility to engage with electricity retailers.

Notwithstanding, these larger developments may present better opportunities to the network, as they have more physical space for DER installation, economies of scale that reduce average investment fixed costs, and greater leverage from larger grid connection and consumption. In addition, there is a significant population of these larger developments, and their number will only increase as population density increases.

In order to turn this from a challenge to an opportunity, what is required is an easy how-to manual and template for developments to adopt net zero and the accompanying DER and demand management. WA is starting from an advantageous position given its larger share of net zero precincts compared nationally. And that is what the NZP project is seeking to achieve.

When there is a simpler and more straightforward way to adopt net zero, the long-term network cost will naturally reduce.

#4. Project is innovative and not an otherwise efficient and prudent alternative option that a service provider should have provided for in its proposed access arrangement.

The service provider will need to describe and demonstrate that the project is innovative in terms of one or more of the following:

- *is based on new or original concepts, and/or*
- *it involves technology or techniques or concepts that differ from those previously implemented or used by network operators in Australia, and/or*
- *It is focused on customers in a market segment that significantly differs from those previously targeted by implementations of the relevant technology, in relevant geographic or demographic characteristics that are likely to affect demand.*

Net zero precincts is a new idea, so new that there is no clear global or national guidelines and standards for its certification. It is also a confluence of 3 key domains: 1) net zero concepts and calculations; 2) enabling technologies; 3) grid connection rules. While “1” and “2” are broadly globally defined, “3” will be more locally defined based on the standards and rules of the Southwest Interconnected System (SWIS). In fact, it is not a one-way relationship as the SWIS will have to understand the new requirements and adapt itself to meet them.

Most DER installations thus far have been passive solar systems. They are generally set and forget and require no ongoing active intervention from its users. With the focus on net zero and as battery storage system and management software becomes more financially viable, users now need to be more involved if they want better returns on their investments. This also creates more opportunities for Western Power. Instead of just letting asset owners charge and discharge around self-consumption, their assets can be utilised to provide more services to the grid.

This opportunity is bigger with precincts given their larger systems.

Western Power current DER policies have been developed in a more static and passive DER environment. The assumptions and policies need to be reviewed to unlock more value and eliminate outdated policies that increase cost barriers to entry.

Net zero precincts as a customer segment is very new and they do not present sufficient common traits or scale, which as a result have been poorly served by Western Power current policies and processes.

By participating in NZP, Western Power ensures that the project understand the unique requirements of the SWIS and gains insights on the development of net zero precincts.

	#5. The service provider must identify all potential sources of funding for the project with an explanation of why it was not able to obtain funding for the project from those sources. NZP is partly funded by the Commonwealth, and partly by industry and academic institutions. Western Power is one of the industry funders (Western Power funding represents 5% of the total investment - Project total expense = \$2,066,785; Western Power's cash contribution is \$100,000) Western Power is not the appropriate party to apply for ARENA funding given it does not lead the research project. The project is led by RACE.
	#6. The costs were not included in the forecast capital expenditure or operating expenditure approved in the ERA's determination for the Access Arrangement period under which the demand management innovation mechanism applies, or under any other incentive scheme in the Access Arrangement determination. The costs were not included in the forecast capital expenditure or operating expenditure approved in the ERA's determination for the Access Arrangement period.

For projects that have not been completed during the year:

In this section we should include

6. *A summary of project activity to date*
7. *An update on any material changes in that regulatory year*
8. *Any preliminary results*
9. *A summary of planned future activity.*

Project Establishment – Oct 23 – Mar 24 – Done

NZP Certification Review – Oct 23 – Jan 24 – Done³³

Case studies – Jan 24 – June 26 – Underway

Synthesis Pathways – Jan 24 – Sep 26 – Underway

- NZP Certification Practices
- DER & Grid Integration Practices
- Governance Practices
- NZP Urban Design (Newly added pathway)

Activity, Progress and Preliminary Results in Regulatory Year:

Public Forums³⁴

1. Showcase on Immersive Technologies and Digital Twins (Sep 24)
 - Curtin and Industry Showcases
2. Net Zero Certification for Urban Precincts (Nov 24)³⁵
 - a. Sustainability Certifications in the built environment
 - b. Global trends & Australia's response
 - c. Net zero precincts in practice

Summary of Completed Activity:

- **Jan 2024 – Oct 2024:** Establishment (Ethics, training, workplan)
- **Oct 2024 – Dec 2024:** CER and Grid integration literature review
- **Oct 2024 – Feb 2025:** Case study baseline interviews, synthesis and report

Summary of On-going Activity:

- **Oct 2024 – May 2026:** IRG meetings
- **Oct 2024 – Oct 2027:** PhDs
- **Jan 2025 – May 2026:** Design and test case study interventions
- **Feb 2025 – May 2026:** Technical data collection & analysis
- **Mar 2025 – Feb 2026:** Digital Twin demonstrations
- **Apr 2025 – Jul 2025:** Forum (include preparation & report)
- **May 2025 – Jun 2026:** Publications submitted (May-25, Nov-25, Jun-26)

³³ Project Website: [Pathways to Net Zero Precincts: Embedding Research to Accelerate Adoption](#)

³⁴ Video featuring Peel Business Park - Nambeelup Kaadadjian - [Pathways to Net Zero Precincts](#) (March 25)

³⁵ [Our Annual Report - Pathways to Net Zero Precincts](#)

For projects that have been completed during the year:

n/a

In this section we should include:

10. *The quantitative results of the project.*
11. *Analysis of the results.*
12. *A description of how the results of the project will inform future demand management projects.*
13. *Any other information available to the SP required to make an informed reader to understand and evaluate the project.*

2.5 Distributed Energy Resources Test Lab

This section demonstrates how the Distributed Energy Resources Test Lab meets the DMIA requirements.

Table 2.5: High level summary

WP Project Numbers:	Comments
Strategy / Activity Description:	DER Test lab
Business case(s):	IAR154746 – Innovation Investment Fund FY24
Investment cost and funding From inception to date	Opex Actual cost FY24: \$2,337 (April 2024-June 2024) FY25: \$212,003 (July 2024-June 2025) Estimated total Western Power investment (claimed under DMIA during AA5) \$214,340
Regulatory Category:	Non-recurring operating expenditure

Table 2.5-1: Compliance Reporting Information

Background, nature, and scope of the project: <i>In this section we provide a summary of need and timing of the project and a summary of the nature and scope of works relevant to the DMIA</i>	Western Power and industry stakeholders had limited ability to trial Distributed Energy Resources (DER) functionality (communication, control, orchestration and performance) in a realistic environment without exposing live customers to disruption and operational risk. The DER Test lab was proposed and funded as a proof-of-concept (PoC) DER test facility to address that gap. The Innovation Investment Fund (IIF) pitch was approved in FY24 and the facility was designed, fitted-out, commissioned and handed over during 2024–2025. <i>Nature of works</i> Development of electrical & communications design, procurement/RFQ, installation, commissioning and development/on-boarding of initial test use cases (e.g., CSIP set-point controls). Fit-out of the dedicated DER test area at South Metro Depot included a main switchboard, PV circuit DC combiner, multiple BESS/inverter arrangements, PV array integration, communications rack and data recorders for each DER device.
Aims and expectations: <i>In this section we provide the aims and expectations of the project.</i>	Provide a safe, controlled environment to test DER communications, control and orchestration solutions without customer disruption. Enable collaborative industry testing and training to accelerate DER integration while managing operational and cyber risks. Generate validated technical and process outcomes (e.g., communications interoperability, test reports, training materials) that can be translated into operational business practices, customer products or next-stage investments.

	Rapid prototyping and verification of DER protocols (first use case: CSIP set point testing for inverters). Production of test reports and inputs to operational procedures and installer training. Evidence and lessons to support scaling the facility under a follow-on investment (anticipated scale decision ~12 months post-PoC).
Anticipated outcomes: <i>In this section we provide:</i> 14. anticipated outcomes if the project proves viable. 15. An estimate of the potential to reduce long-term network costs	<i>Anticipated outcomes if the project proves viable.</i> • Operational outputs: Validated test cases, technical test reports, standardised test procedures and safe onboarding processes for industry participants. • Capability outcomes: Faster, lower-risk rollouts of DER products (e.g., BESS connection and set-point changes), improved installer training, and stronger inter-organisational collaboration (WP, Synergy, Horizon, AEMO). • Strategic outcomes: A proven foundation for scaling to a larger DER lab that can support broader use cases (frequency response, emergency start, cyber scenarios, Demand monitoring, Demand control) and feed into Distribution System Operator (DSO) processes and Project Jupiter/DER roadmap deliverables. The DER Test lab value is in enabling validated DER controls and operational processes that <i>can</i> reduce long-term network costs by enabling non-network responses (peak shaving, constrained-area avoidance, deferred augmentation) once those DER solutions are proven and deployed at scale. The lab accelerates risk-reduction, reduces field re-work and improves the effectiveness of DER activation, so it materially increases the probability and scale of future avoided or deferred network investment. Quantitative approach to determine the benefits of DER Gridlab for assessing practical feasibility of the proposed DER based non-network solutions: Estimate DER contribution to peak reduction — Measure, via lab-tested control strategies, the realistic per-site/aggregator MW reduction achievable and how many assets would be required to meet the scenario. Use lab test reports as the technical input to these assumptions. Calculate avoided cost — Multiply the deferred augmentation capital cost (discounted to present value) by the probability that validated DER solutions will be used to defer the investment.
The amount of the allowance incurred by the Service Provider (SP): 16. <i>Incurred to date as at the end of that pricing year.</i> 17. <i>Incurred in that pricing year.</i> 18. <i>Expected to be incurred in total over the duration of the project.</i>	Opex. Actual cost FY24: \$2,337 (April 2024-June 2024) FY25: \$212,003 (July 2024-June 2026) Estimated total Western Power Cost (AA5 DMIA claim) \$214,340

How and why the project meets 'Eligibility Criteria':

In this section we provide details on how and why the project meets the guideline's 6 x eligibility criteria specified in the DMIA guideline

#1. Project consists of research and development:

Demonstrate that the project is for experimental activities whose outcomes cannot be known or determined in advance using current knowledge, information, or experience and that the activities are conducted for the purpose of generating new knowledge:

The DER Test lab is a proof-of-concept test facility used to test communications protocols and control strategies (e.g., Common Smart Inverter Protocol communication set-point adjustments), to validate new DER coordination techniques and generate test evidence needed before operational roll-out. The work involved design, prototyping, commissioning and experimental testing of DER behaviours — classic R&D activity. Western Power and other local WA organisations did not have a suitable facility to meet the recommendations of Project Symphony; to develop a facility whereby energy partners and industry would be able to test DER orchestration use cases and familiarise and train users in order to gain new knowledge of evolving dynamics of the energy technologies.

#2. Project is for demand management:

The service provider must provide details of the effect the project, if proved viable, will have on network demand usage patterns:

The facility was explicitly designed to enable testing of DER orchestration and control use cases that manage customer-connected generation and storage to influence network demand patterns (e.g., priority order, constrain-to-zero, set-point limits). If proven and deployed, these tested control strategies will change demand profiles (peak reduction, constrained-area relief) by enabling coordinated dispatch of DER. Early test results (Synergy Common Smart Inverter Protocol communication tests) demonstrate the facility's direct applicability to demand management product development.

#3. Project has the potential, if proved viable, to reduce long term network cost:

The service provider must provide a description and estimation of the costs that can be reduced. Any additional costs that may arise in total electricity costs as a result of the demand management project (for example, effects on power system security, power system reliability or other aspects of the wholesale electricity market) should be taken into account when estimating the reduction in costs.

The lab produces validated approaches to coordinate DER to deliver non-network services (peak reduction, dynamic operating envelopes). These approaches, when implemented at scale, can defer or avoid augmentation investments. The facility's role is to reduce technical and operational risk so that DER solutions become a credible substitute for network investment — consistent with ERA/AER objectives for DMIA funding. See the “anticipated outcomes” and the recommended quantitative approach above.

Customer-owned energy assets add real value to the grid when they can be activated to offset network peaks or support reliability. The lab allows us to test detailed scenarios, validate end to end functionality and data flows, and develop solutions like Dynamic Operating Envelopes — ensuring we can integrate DER in a way that strengthens the network for everyone. This was proven through the tests conducted for Synergy in preparation for July 1st roll out of Battery Energy Storage System subsidy and the allowance of 10kW inverter connections. Tests included testing inverter local set point adjustment versus commands via Common Smart Inverter Protocol communication (CSIP) for assessment of priority order and constrain to zero functionality.

#4. Project is innovative and not an otherwise efficient and prudent alternative option that a service provider should have provided for in its proposed access arrangement.

The service provider will need to describe and demonstrate that the project is innovative in terms of one or more of the following:

- *is based on new or original concepts, and/or*
- *it involves technology or techniques or concepts that differ from those previously implemented or used by network operators in Australia, and/or*
- *It is focused on customers in a market segment that significantly differs from those previously targeted by implementations of the relevant technology, in relevant geographic or demographic characteristics that are likely to affect demand.*

The lab implements a new, dedicated, industry-accessible physical test environment for DER orchestration in WA where previously the only practical testing was in live field/customer environments. That operating model (contained, multi-device testbed for DSO use cases) is a new procedural and physical capability for Western Power.

The combination of multi-brand inverter/BESS arrays, DC combiner, data recorders per device and CSIP orchestration testing represents an integration of devices and protocols not previously packaged into a single WP facility.

The facility targets utility/aggregator/AEMO/installer collaboration for system-level DER orchestration use cases — a market segment (system operators and aggregators) and set of use cases that differ from the small customer-level testing that historically occurred in customer premises.

#5. The service provider must identify all potential sources of funding for the project with an explanation of why it was not able to obtain funding for the project from those sources.

DMIA pathway was more aligned and fitted with the purpose of the test lab.

#6. The costs were not included in the forecast capital expenditure or operating expenditure approved in the ERA's determination for the Access Arrangement period under which the demand management innovation mechanism applies, or under any other incentive scheme in the Access Arrangement determination.

The funding for the DER Test lab was approved from Western Power's internal Innovation Investment Fund and treated as innovation/operational expenditure for FY24–FY25; the project was not part of the capital or operating expenditure forecasts in the Access Arrangement determination.

For projects that have not been completed during the year: <i>In this section we should include</i> 19. <i>A summary of project activity to date</i> 20. <i>An update on any material changes in that regulatory year</i> 21. <i>Any preliminary results</i> 22. <i>A summary of planned future activity.</i>	Future investment in the lab will see it be able to: • Complete end to end testing of the application of Dynamic Operating envelopes from Western Power to end devices • Test Vehicle to Grid, bi-directional charging and use of EV capacity for VPPS • Demand management of controllable loads for peak shaving services.
For projects that have been completed during the year: <i>In this section we should include:</i> 23. <i>The quantitative results of the project.</i> 24. <i>Analysis of the results.</i> 25. <i>A description of how the results of the project will inform future demand management projects.</i> 26. <i>Any other information available to the SP required to make an informed reader to understand and evaluate the project.</i>	Quantitative results: 1) Inverter set point communication – Confirmed ability to send comms to DER asset to configure the export limit enabling: • July 2025 DER Connection process changes • Introduction of the state and federal battery subsidies 2) Utility server to Inverter communication - Confirmed ability to initiate and maintain connection between Synergy Utility Server and DER assets enabling • Battery subsidy information provision • Compliance information development for DER managed customers 3) Establish export limit - Confirmed local export limit is prioritised by DER asset, when an export limit command is sent to an asset that has an existing export limit configured locally on the device Remote inverter set point adjustment vs local setting adjustment enabling: • Export limits to be remotely adjusted for participation in VPPs allowing a higher capacity provision at peak demand times. 4) Asset adherence to configuration after an outage - Confirmed that a DER asset will continue to comply with published OE/DOE when network connect / connection to utility server is lost enabling: • DER compliance obligations to be set and adhered to 5) Default export limit control – Confirmed that a default export limit from the server for a value of 0W can be set as a failsafe, enabling: • Remote safety management of installation with DER.