CER Data Exchange Industry Co-Design

April 2025

Co-Design Summary

A paper outlining key insights, outcomes and recommendations for establishing a national CER Data Exchange

Important notice

Purpose

This publication outlines the key insights, outcomes, and lessons learned from the project. It provides an overview of consultation processes, industry requirements, governance considerations, and regulatory challenges. The paper presents a summary of the CER Data Exchange high-level design, cost assessment and implementation plan while outlining the long-term benefits for consumers. By consolidating findings from the project, it serves as a reference point for understanding the broader impact and strategic direction of the initiative.

Acknowledgements

AEMO would like to thank the many individuals and organisations who have contributed time and expertise through the project's Expert Working group, stakeholder meetings and workshops. These stakeholder contributions have informed AEMO's work towards a national CER Data Exchange as presented in this paper. This Project received funding from the Australian Renewable Energy Agency (ARENA) as part of ARENA's Advancing Renewables Program.

Disclaimer

This document or the information in it may be subsequently updated or amended. This document does not constitute legal or business advice, and should not be relied on as a substitute for obtaining detailed advice about the National Electricity Law, the National Electricity Rules, or any other applicable laws, procedures or policies. AEMO has made reasonable efforts to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness.

Accordingly, to the maximum extent permitted by law, AEMO and its officers, employees and consultants involved in the preparation of this document:

- make no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of the information in this document; and
- are not liable (whether by reason of negligence or otherwise) for any statements or representations in this document, or any omissions from it, or for any use or reliance on the information in it.)

The views expressed herein are not necessarily the views of the Australian Government, and the Australian Government does not accept responsibility for any information or advice contained herein.

Copyright

We acknowledge the Traditional Custodians of the land, seas and waters across Australia. We honour the wisdom of Aboriginal and Torres Strait Islander Elders past and present and embrace future generations. AEMO Group is proud to have launched its first Reconciliation Action Plan in May 2024 (scan QR code to read).

Table of Contents

Tables

Figures

Glossary and Abbreviations

Term	Definition
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
API	Application Programming Interface
ARENA	Australian Renewable Energy Agency
CBA	Cost Benefit Analysis
CDR	Consumer Data Right
CER	Consumer Energy Resources
CIM	Common Infrastructure Model
DER	Distributed Energy Resources
DERMS	Distributed Energy Resource Management System
DNSP	Distribution Network Service Provider
DOE	Dynamic Operating Envelope
DSO	Distribution System Operator
ENTSO-E	European Network of Transmission System Operators for Electricity
EWG	Expert Working Group
EY	Ernst & Young
FCAS	Frequency Control Ancillary Services
FFR	Fast Frequency Response
FTE	Full Time Equivalent
GDPR	General Data Protection Regulation
IDAM	Identity and Access Management
IDSP	Integrated Distribution System Planning
IDX	Industry Data Exchange
IEC	Information Exchange Committee
IPRR	Integrating Price Responsive Resources
ISP	Integrated System Plan
LNSS	Local Network Support Services
MITE	Market Interface Technology Enhancements
MVP	Minimum Viable Product
NEM	National Energy Market
NEO	National Electricity Objective
NER	National Electricity Rules

Term	Definition
NETP	National Energy Transformation Partnership
NMI	National Metering Identifier
NSP	Network Service Provider
OEM	Original Equipment Manufacturer
PC	Portal Consolidation
PII	Personally Identifiable Information
PM	Project Management
RBAC	Role-Based Access Control
RERT	Reliability and Emergency Reserve Trader
SOCI	Security of Critical Infrastructure
SWIFT	Society for Worldwide Interbank Financial Telecommunication
SWIS	South West Interconnected System
UI	User Interface
VPP	Virtual Power Plant

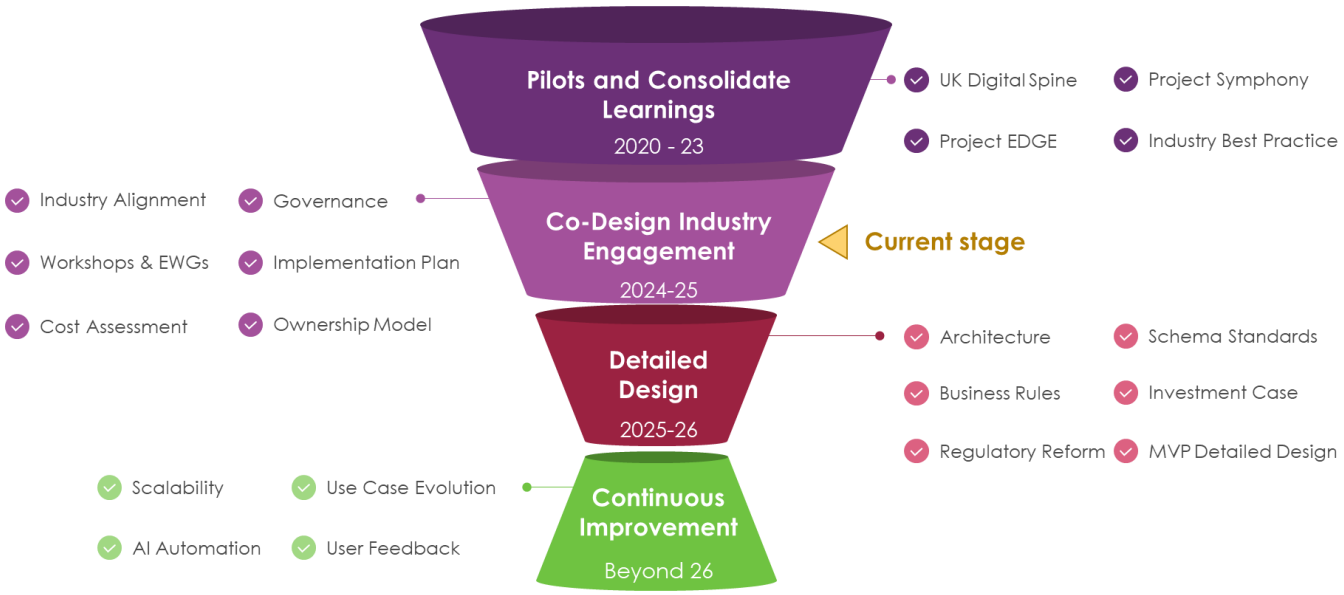
1 Introduction

1.1 The CER Data Exchange Industry Co-Design initiative

The Consumer Energy Resources Data Exchange (CER Data Exchange) Industry Co-design is a joint initiative between the Australian Energy Market Operator (AEMO) and AusNet with support from the Australian Renewables Energy Agency (ARENA) to work collaboratively with industry to co-design a national CER Data Exchange. It is part of a long-term, multistage process to build the digital foundation that will support the efficient integration of CER into the energy system in Australia.

This co-design project is one step in the process to arrive at a High-Level Design aligned with industry to build the digital foundation that will support the efficient integration of CER into the energy system in Australia (see Figure 1 below). It builds on the findings, consolidated learnings and experience from previous Australian CER integration pilots such as Project EDGE and Project Symphony[1] which demonstrated the value of a CER data exchange concept, as well as overseas initiatives such as United Kingdom's Digital Spine Feasibility Study.

Figure 1: The CER Data Exchange Industry Co-design project is part of a long term, multistage process



Since June 2024, a team consisting of members from AEMO and AusNet, supported by independent consultants Mott MacDonald and EY (the Project Team), have undertaken a significant industry co-design process to develop a high-level design for the CER Data Exchange. From providing written submissions to the consultation paper, participating in public workshops and detailed involvement through the Expert Working Group (EWG), stakeholders have had multiple avenues to contribute to the development of the high-level design.

[1] AEMO | Project EDGE Reports, Project Symphony - Final Lessons Learnt Report - Australian Renewable Energy Agency (ARENA)

1.2 This Co-Design Summary Report

This document is part of a series of reports marking the conclusion of the high-level design phase of this project. It provides a summary of the key outcomes the CER Data Exchange Industry Co-Design process, and a high-level plan to guide the futures detailed design and implementation phases of the project. This report should be read in conjunction with the reports depicted in Figure 2 below. AEMO will also publish a separate knowledge sharing report to outline the Project Team's journey of applying a co-design framework with a broad range of stakeholders to progress customer outcomes and key learnings from the process.

This phase of the CER Data Exchange will conclude with a final public webinar in late **April 2025** to present the findings and recommendations on next steps.

Figure 2: Reports for the CER Data Exchange Industry Co-Design project

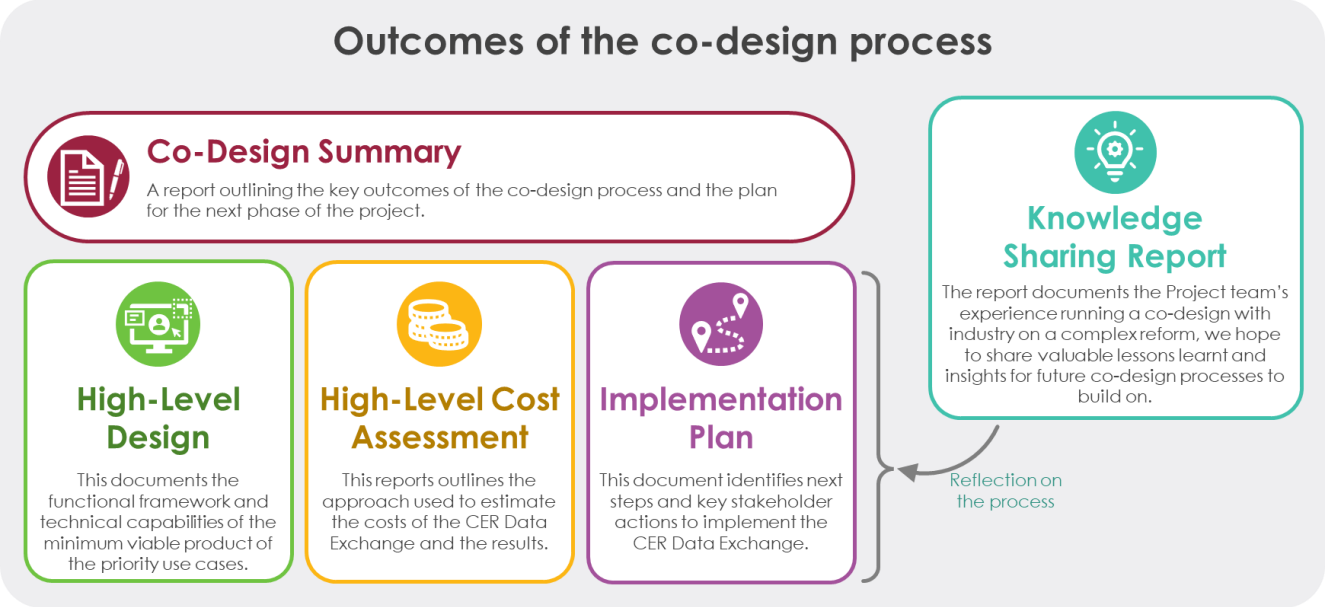
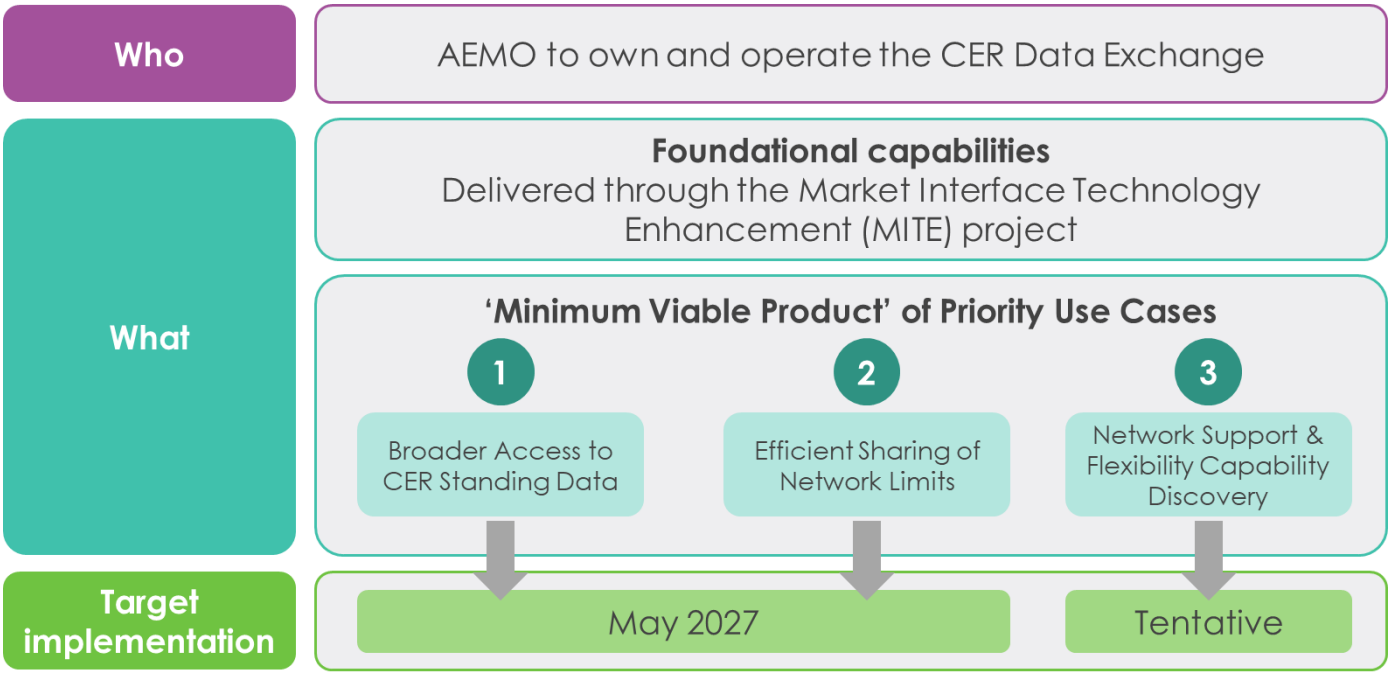


Figure 3: Thank you to the organisations that have participated in the Expert Working Group

2 Key outcomes of the co-design process

Figure 4 below shows the stakeholder preferred option for the CER Data Exchange. The outcomes incorporate feedback provided by stakeholders through three public workshops, submissions to the consultation paper, and significant input from members of the Expert Working Group (EWG). Figure 4

Figure 4: CER Data Exchange Stakeholder Preferred Option



2.1 AEMO to own and operate the CER Data Exchange

Through submissions to the consultation paper and feedback provided at public workshops, stakeholders expressed a clear preference for AEMO to own and operate the CER Data Exchange. Stakeholders considered the AEMO-led model as the most cost-effective and efficient, leveraging AEMO's existing expertise in operating industry-wide systems and interfaces.

Stakeholders expressed a second preference for the creation of an independent government agency to own and operate the CER Data Exchange. While this model could provide an impartial and consumer-focused outcome, stakeholders recognised the higher setup costs and potential for slower decision-making process.

2.2 Leveraging the capabilities delivered through the existing Market Interface Technology Enhancement (MITE) project

The CER Data Exchange will leverage the Industry Data Exchange (IDX) and Identity and Access Management (IDAM) capabilities being built under the Market Interface Technology Enhancement (MITE) project [2]. The CER

[2] AEMO | Market Interface Technology Enhancements

Data Exchange will share the same foundational capabilities such as authentication, role-based access, security controls, and structured data exchange mechanisms, which are essential for the transmission of data between many organisations.

Leveraging the capabilities that are already funded for, and planned to be delivered by the MITE project reduces the incremental costs of implementing the CER Data Exchange and reflects stakeholders' consistent feedback that the CER Data Exchange should leverage existing infrastructure as much as possible. As the MITE project focuses on improving the interface of existing market systems, there is still a requirement to develop and build capabilities that are specific to the exchange of CER data. The next stage of the CER Data Exchange initiative will focus on the detailed design and implementation (build, test and deploy) of the capabilities to provide the functionalities to deliver the priority use cases identified with stakeholders through this process.

2.3 Development of high-level design for three priority use cases

Stakeholders expressed a consistent preference that the CER Data Exchange should 'start small then grow' with a small number of high-value use cases. They consider this approach will lay the foundations that will enable future capabilities to develop. The priority use cases were selected with stakeholders because they will deliver tangible benefits early to industry and provide the initial data exchange capabilities for future use cases. The three priority use cases stakeholders selected are:

1. **Priority use case 1: Broader access to CER Standing Data.** This use case will create a secure, role-based access mechanism for sharing verified CER standing data between authorised organisations. It aims to establish trusted, standardised and dynamic access to CER data, creating a unified data exchange that ensures information integrity and interoperability between many organisations.
2. **Priority use case 2: Efficient Sharing of Network Limits.** This use case will create a mechanism to provide authorised organisations with visibility of network constraints (such as Dynamic Operating Envelopes (DOEs)). It is intended to support more transparency on distribution network capacity and provide information that would enable other parties such as customers agents and retailers to make informed decisions that would improve outcomes for their customers. It aims to preserve DNSP operational independence while improve dataset access linkages and enhance interoperability across DNSPs for customer agents, retailers and other authorised organisations.
3. **Priority use case 3: Network Support & Flexibility Capability Discovery**. A framework for coordinating the procurement of CER-based flexibility services to manage local network congestion without physical infrastructure augmentation. This use case aims to provide ease of operation across multiple networks for support service providers, like customer agents.

2.4 Targeting the delivery of at least two priority use cases by May 2027

2.4.1 First generation use cases to be a 'minimum viable product'

Consistent with stakeholder feedback to 'start small and grow', the first generation of the priority use cases will be 'minimum viable products' that will focus on providing the foundational elements for CER Data Exchange. This can enable early adoption by energy sector organisations and will be a key enabler for other reforms such as the

Integrating Price Responsive Resources rule change. The foundational elements, which will consist of capability developed under the MITE project and CER Data Exchange specific capabilities, include:

- a **secure data exchange infrastructure** that establishes standardised sharing patterns,
- an **access management framework** supporting authentication and authorisation for various market participants, and
- data **standardisation** that enables consistent data structures and validation protocols.

2.4.2 Staged delivery of priority use cases targeting May 2027

AEMO will target delivering priority use case 1 and 2 by May 2027 as they received the strongest stakeholder support during the co-design process. First, we will move through the AEMO governance process and then on to progressing Detailed Design. This timing is intended to align with the implementation of the *Integrating Price Responsive Resources* final rule,[3] as well as the go-live date for the foundational capabilities delivered under the MITE Project[4] and ensure MVP capabilities for the National CER Roadmap[5] to build upon.

AEMO will also progress the development of the *Network Support & Flexibility Capability Discovery* priority use case in conjunction with industry stakeholders as need and market maturity for the capability surfaces. Stakeholders considered that more time and effort is needed further develop the services and potential benefits that this use case will provide to customers. This stakeholder feedback has been reflected in the implementation roadmap, which shows a tentative deployment of this use case at this stage.

Further detail on the priority use cases, including their high-level reference design, can be found in Attachment A: High-Level Design

[3] AEMO | Integrating Price Responsive Resources into the NEM (IPRR)

[4] AEMO | Market Interface Technology Enhancements

[5] National Consumer Energy Resources Roadmap

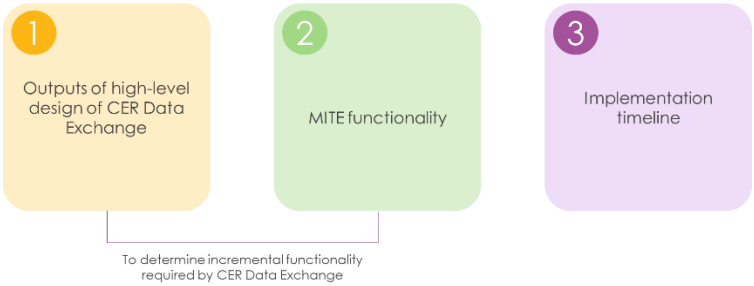
3 The costs of implementing the CER Data Exchange

3.1 The incremental cost of building the CER Data Exchange is under $25 million

As part of this co-design initiative, a high-level cost assessment (see Attachment B: High-Level Cost Assessment) was conducted to estimate the incremental cost to implement the 'minimum viable product' for the three priority uses. The high-level cost assessment has been an important part of this project as it demonstrates the viability and need for a CER Data Exchange against the counterfactual of continuing down the point-to-point path.

Incremental cost measured in the assessment refers to the cost to design, build and deploy capabilities in addition to those that will be provided by the MITE project. Figure 5 below shows the factors that were taken into considerations as part of cost assessment process.

Figure 5: High-level cost assessment considerations



The incremental cost to implement the 'minimum viable product' for the three priority uses cases is estimated at $24.4 million incurred within the first two years. AEMO is expected to incur a cost of $8.7 million to design, build, test and deploy the CER Data Exchange specific functionality while industry participants are estimated to incur $15.7 million in cost to participate in the detailed design process and then implement the necessary interfaces with the CER Data Exchange. It is estimated that the annual ongoing cost to maintain the services provided by priority use cases is $0.7 million, which predominantly relates to AEMO's cost to maintain the CER Data Exchange. Table 1 below shows the breakdown of the costs to AEMO and industry participants.

Table 1: Total cost split by AEMO and Industry ($m, FY26 real)

	Total	AEMO	Industry
Implementation: Detailed Design	**5.9**	3.1	2.8
Implementation: Build, test, deploy	**18.5**	5.6	12.9
Total Implementation	**24.4**	**8.7**	**15.7**
Ongoing (p.a.)	**0.7**	0.3	0.4

All industry participants (AEMO, DNSPs, Retailers / Aggregators, Others [6]) are estimated to experience the greatest costs during the build, test, deploy stage, from July 2026 to June 2027. This is largely a result of the cost required for the business logic, data integration and data processing. The largest component of AEMO cost is estimated to occur during detailed design phase.

Figure 6 and Figure 7 below represent the total costs over the 10-year model period, split by participant type and cost category, respectively.

Figure 6: Cost split by industry participant type

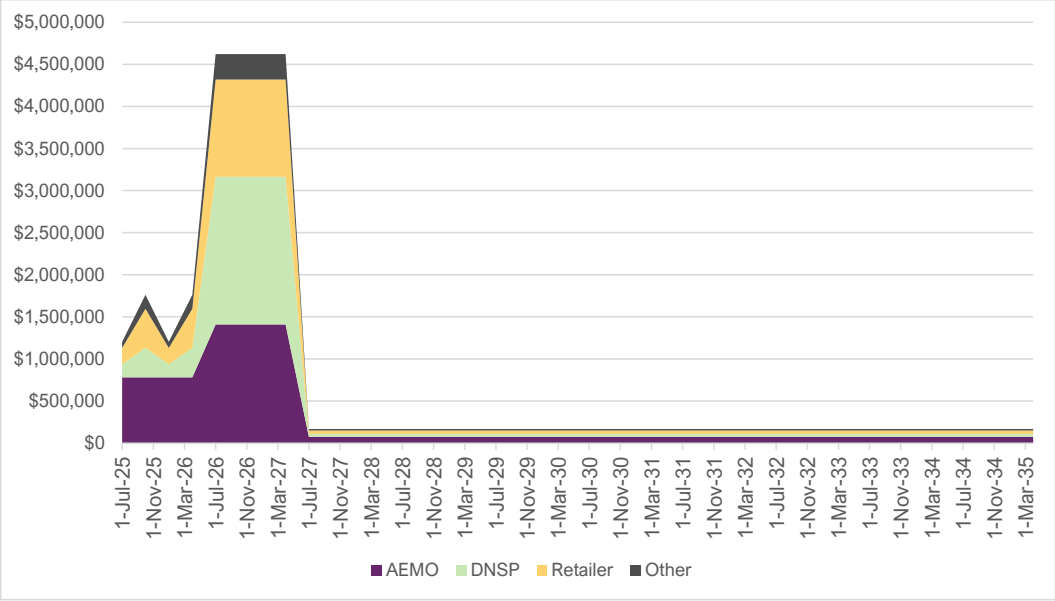
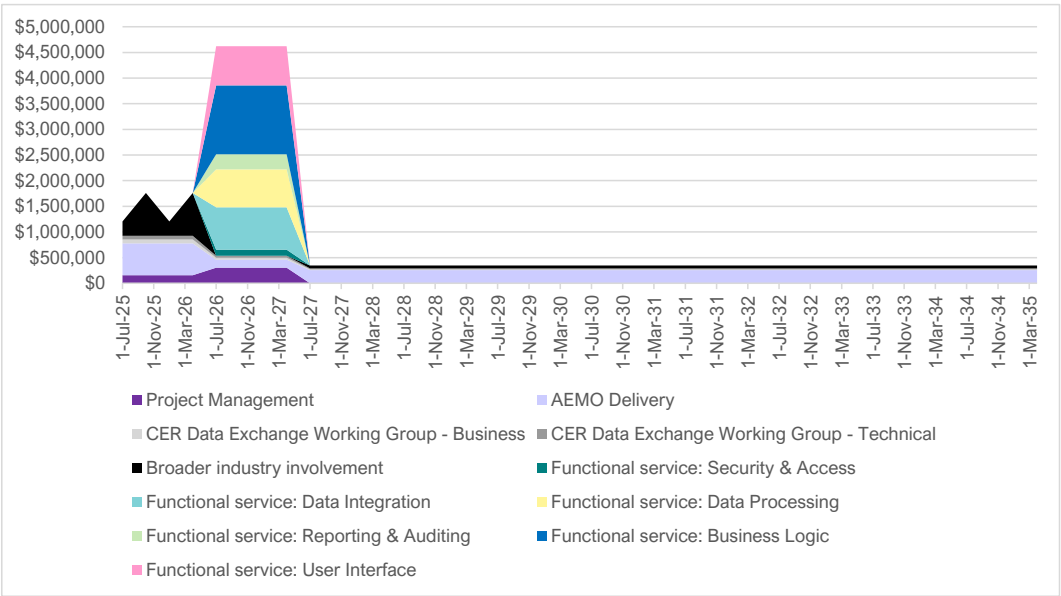


Figure 7: Cost split by cost category



[6] 'Others' is a generalised category to allow for participants other than DNSPs, retailers and aggregators. It is included to acknowledge that there may be new types of participants interested in using CER Data Exchange]

3.2 An investment in the CER Data Exchange could unlock significant system and consumer benefits

The system wide benefits of CER coordination are well documented

The future energy system requires the integration of large volumes of CER. The industry currently suffers from a lack of distributed energy data sharing at scale. The ability to ingest, standardise and share CER data between many organisations will be critical to make the most out of customers' CER investments.

The potential benefits of more efficient CER integration to the Australian community are very significant – including to support governments' net zero targets. A CER Data Exchange will make a significant contribution to this policy goal. Australian governments and market bodies are seeking to unlock billions of dollars in benefits to consumers by getting the most out of CER investments. For example, the following previous trials and studies found:

- AEMO's 2024 Integrated System Plan (ISP)[7] found that without effective coordination of consumer batteries, around **$4.1 billion** of additional grid-scale investment would be needed. The ISP assumes and relies on efficient CER integration to achieve consumer energy needs.
- The Clean Energy Council modelling[8] found that not meeting CER forecasts, under AEMO's draft 2024 ISP Step Change Scenario, risks losing **$22** billion in savings for Australian taxpayers.
- The Institute for Energy Economics and Financial Analysis found that CER has the potential to deliver a combined economic benefit for Australia of more than **$19 billion** by 2040 – including $11 billion in avoided network costs and $8 billion in reduced generation and storage costs, if CER is well integrated.
- The Western Australian Government's pilot of VPP technology, under Project Symphony[9], found redistributing excess power produced by residential solar panels, appliances and home batteries could create more than $920 million in value in the coming decade.

The stakeholder preferred option for the CER Data Exchange is a cost-effective solution to reduce industry cost

A Deloitte and Energeia cost–benefit analysis, undertaken as part of Project EDGE [10], found:

- a 'data hub' (like the concept of the CER Data Exchange) would reduce industry costs by up to **$440–450 million** compared to a point-to-point approach over a 20-year time horizon
- the costs to implement a local services exchange[11] via a data hub arrangement, as compared to the alternative point-to-point arrangement, would be $9 million lower.

The benefits that the CER Data Exchange will deliver is likely to far outweigh the cost of implementation. The stakeholder preferred option for the CER Data Exchange, which leverages capabilities that are being developed by the MITE project, will significantly reduce the cost of implementation.

[7] AEMO 2024 Integrated System Plan

[8] Clean Energy Council, Modelling the Value of CER to Energy Consumers, 2024

[9] Project Symphony, Final Project Assessment

[10] See: project-edge-independent-cba-full-report

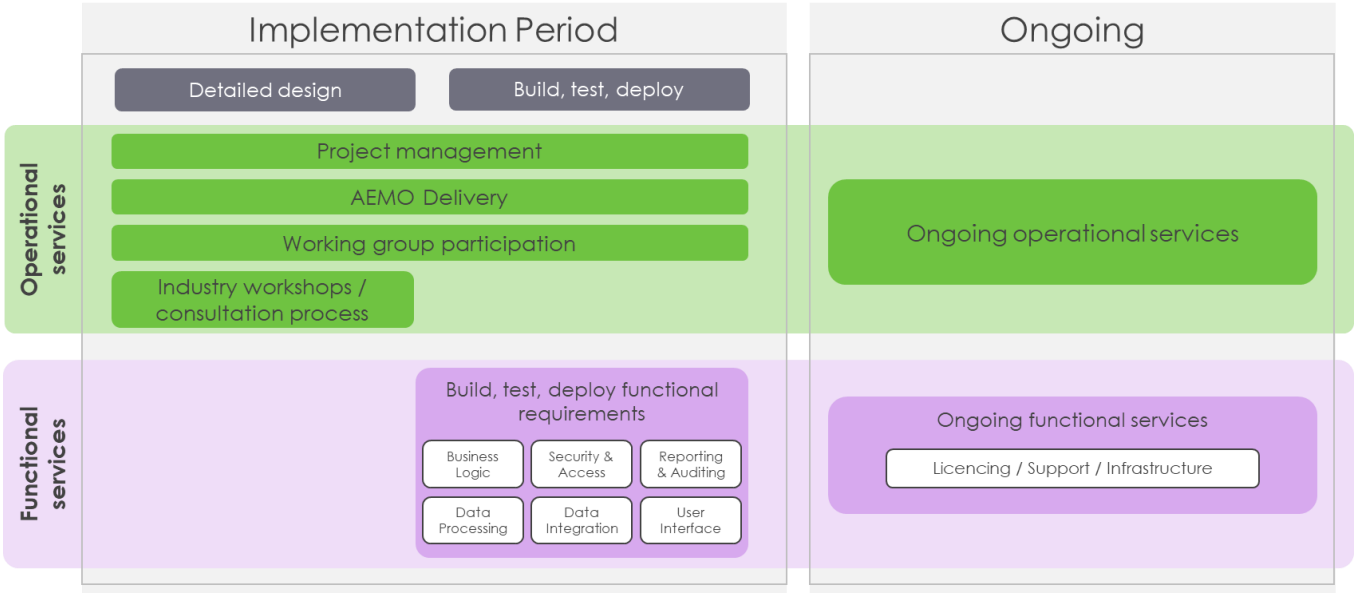
[11] As intended in Use Case 3: Network Support & Flexibility Capability Discovery.

3.3 Assumptions, Scope and Methodology

The cost assessment estimated costs over a 10-year period, with a two-year implementation period at the start to design, build, test and deploy the functional requirements of the CER Data Exchange. Costs for ongoing operations were estimated for the remainder of the 10-year model.

The incremental CER Data Exchange functionality was divided into cost buckets, which represent the key activities that will incur costs during the implementation period (detailed design and build, test, deploy) and ongoing operations (Figure 8).

Figure 8: Cost buckets for the high-level cost assessment



A combination of effort-based (labour) estimates and 't-shirt sizing' techniques were used to estimate costs (see Figure 9 below). AEMO developed 't-shirt sized' estimates based on prior experience delivering other NEM reform programs.

Figure 9: Cost estimation parameters

Operational Services

- Effort-based estimates
- Effort aligned with:
  - **Project management** (AEMO)
  - **Project Delivery** (AEMO)
  - **Working group** participation (based on estimated number of participants by category)
  - All **industry workshops** and consultation (all industry)
- Split by participant category
- Standard labour rate applied

Functional Services

- Estimate of t-shirt sized costs for functional build, test and deploy
- Plus other costs such as hosting, storage, licence fees

See Attachment B: High-Level Cost Assessment for further detail on the cost assessment.

4 Next phase of the CER Data Exchange initiative

4.1 Broad stakeholder agreement for AEMO to progress the CER Data Exchange

As part of Workshop 3, the Project Team sought feedback from participants on the best way to undertake the detailed design and implementation phase of the CER Data Exchange initiative. The options discussed at the workshop is in Figure 10 below.

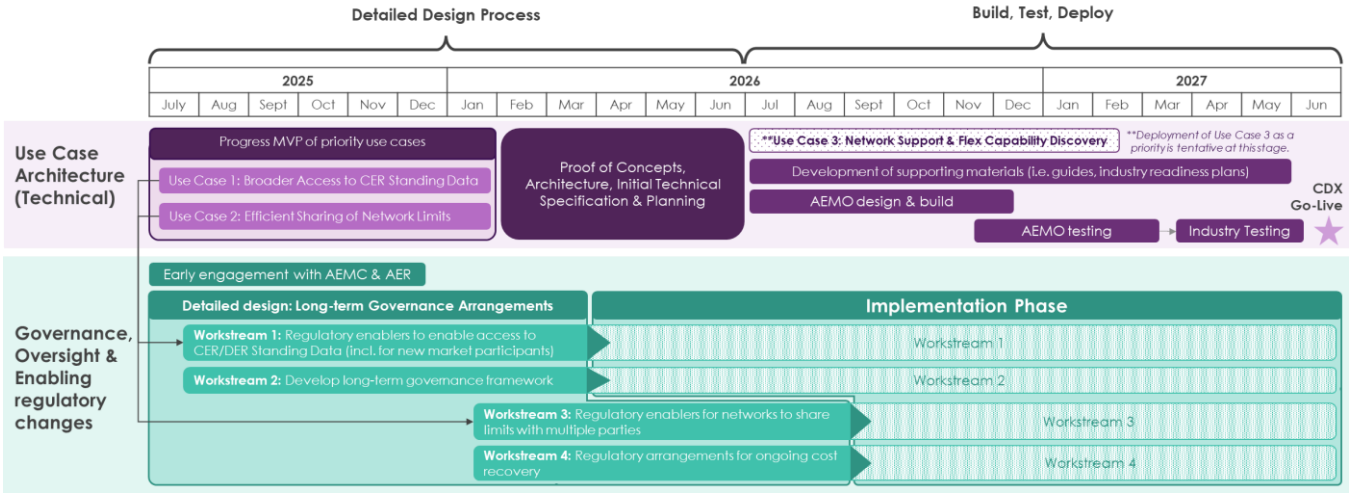
Most workshop participants supported the option for AEMO to lead the next stage of the initiative under the current CER Data Exchange banner. While using existing and related AEMO forums would reduce overhead, some stakeholders considered using existing forum risks the work being led by timeframes of those forums. Other stakeholders considered that progressing implementation under the CER Data Exchange banner is warranted as it helps maintain momentum and focus on CER specific issues and that different expertise from their organisation would be required compared to existing forums.

Consistent with stakeholder preferences, AEMO aims commence the next phase of the CER Data Exchange from **July 2025**.

Figure 10: Stakeholder preferences on CER Data Exchange ownership and detailed design and implementation process

Over a 24-month period, AEMO will undertake the detailed design and implementation of the 'minimum viable product' for the priority use cases. Figure 11 below provides an outline of the tasks for the detailed design and implementation phase of the CER Data Exchange initiative.

Figure 11: Indicative High-level timeline for the detailed design and implementation phase



4.2 Next phase will consider both short- and long-term implementation issues

The plan for the next phase reflects stakeholder preference that the CER Data Exchange should 'start small, then grow', and remains scalable and adaptable to the evolving needs of Australia's energy market.

The next phase will consider issues over two horizons as per the following indicative timelines:

- **Near term (2025-2027).** For this horizon, AEMO will work with industry stakeholders on resolving technical and regulatory issues that will enable the implementation and uptake of the priority use cases by May 2027.
- **Long-term (2027+).** For this horizon, AEMO will focus on developing frameworks that will support the operation of the CER Data Exchange beyond the initial establishment phase. The issues to consider include the role of industry working groups, governance arrangements and fee structures required to enable the evolution of existing use cases and the implementation of new use cases.

Figure 12: Phases for the CER Data Exchange development

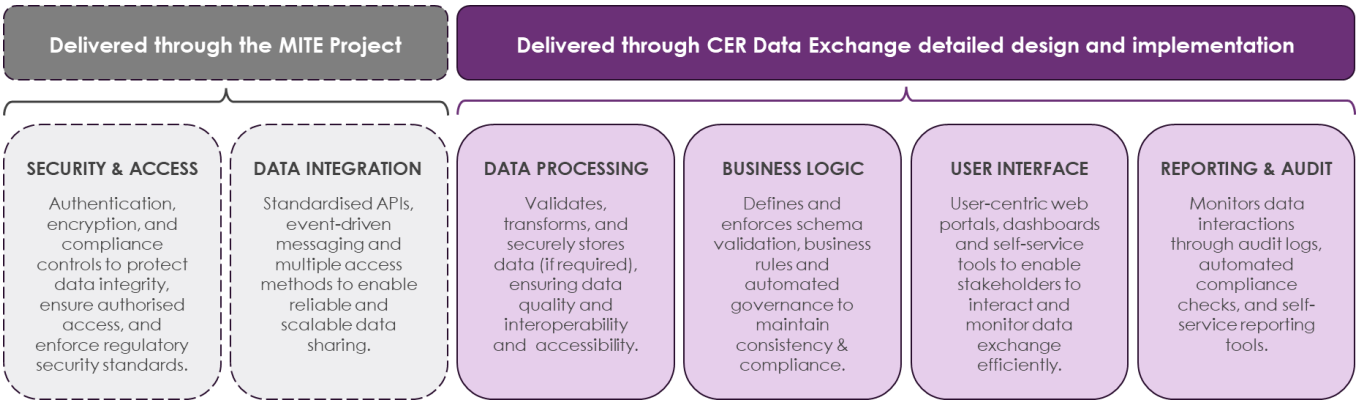
4.3 Separate working groups to consider technical and governance issues

The implementation of the priority use cases, and the development of long-term governance framework will require detailed input from industry stakeholders across a range of technical and governance related areas.

AEMO plans to conduct the detailed design and implementation phase of the CER Data Exchange initiative through two industry working groups: Technical and Governance. As shown in Figure 11, these workstreams are intended to operate concurrently as they are inherently interlinked and will need to be explored in parallel to achieve a streamlined deployment of the priority use cases.

- **Technical Working Group will develop core digital infrastructure including:**
    - Designing and developing the technical architecture and specifications (core digital infrastructure) that enables secure data exchange, processing and accessibility and the technical mechanics of data movement, validation and presentation to users.
    - The technical capabilities to be explored are outlined in Figure 13.
- **Governance Working Group will consider operational governance and regulatory enablers, including:**
    - Developing and implementing a longer-term operational governance framework that will support the evolution of the CER Data Exchange's capabilities and services.
    - Identifying regulatory enablers including potential rules changes which may be required to enable implementation

Figure 13: Technical capabilities for exploration

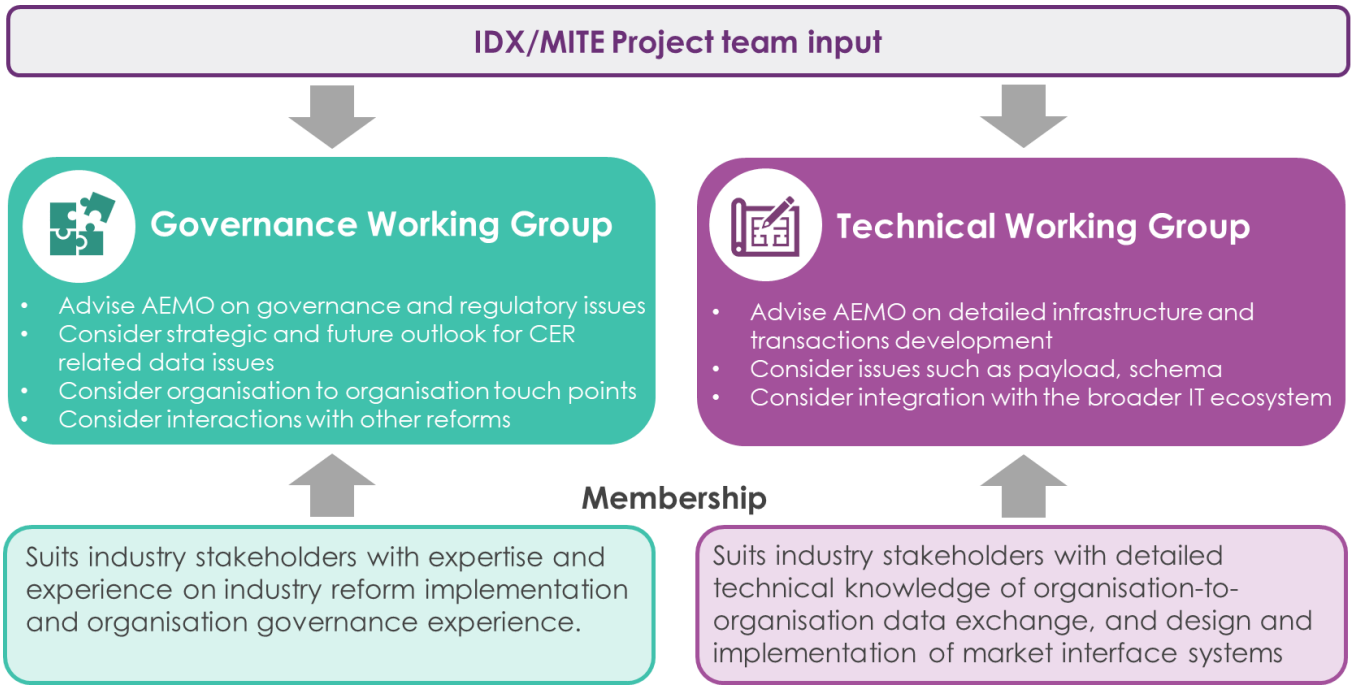


4.4 AEMO will convene working groups to seek industry stakeholders to provide expert input

A technical and industry working group to support detailed design and implementation

AEMO will maintain a collaborative approach for the next phase and convene two working groups to support the process. The working groups will enable AEMO draw on the expertise and experience of industry stakeholders so that the development and implementation the priority use cases meet customers and industry requirements. Figure 14 below shows the proposed functions and membership of the technical and industry working group.

Figure 14: Working groups for the detailed design and implementation of the CER Data Exchange



AEMO will seek nominations from industry

AEMO aims to seek industry stakeholder nominations to the technical and industry working group from **July 2025**, with a view to commence Detailed Design by Q3 2025. Stakeholder queries and early expression of interest to participate in the next stage of the process should be directed to **cerdataexchange@aemo.com.au**.

Appendices

A1. The CER Data Exchange

A1.1 CER Data Exchange – what is it?

The CER Data Exchange is intended to be a secure and common infrastructure which facilitates the exchange of standardised CER data sharing between many industry organisations such as network operators, retailers, aggregators, or customer agents (Figure 15). While it will not be the sole method for transferring CER data, it offers a common, scalable solution to improve efficiency and reduce the cost in duplication of data-sharing processes. It is intended to operate alongside other systems and frameworks, such as the Consumer Data Right (CDR) and the DER Register and facilitate flexible and efficient data sharing without replacing current systems. It is intended to enable customer agents and energy sector organisations to make better informed decisions that could support improved grid stability and more efficient energy use.

Figure 15: The CER Data Exchange concept

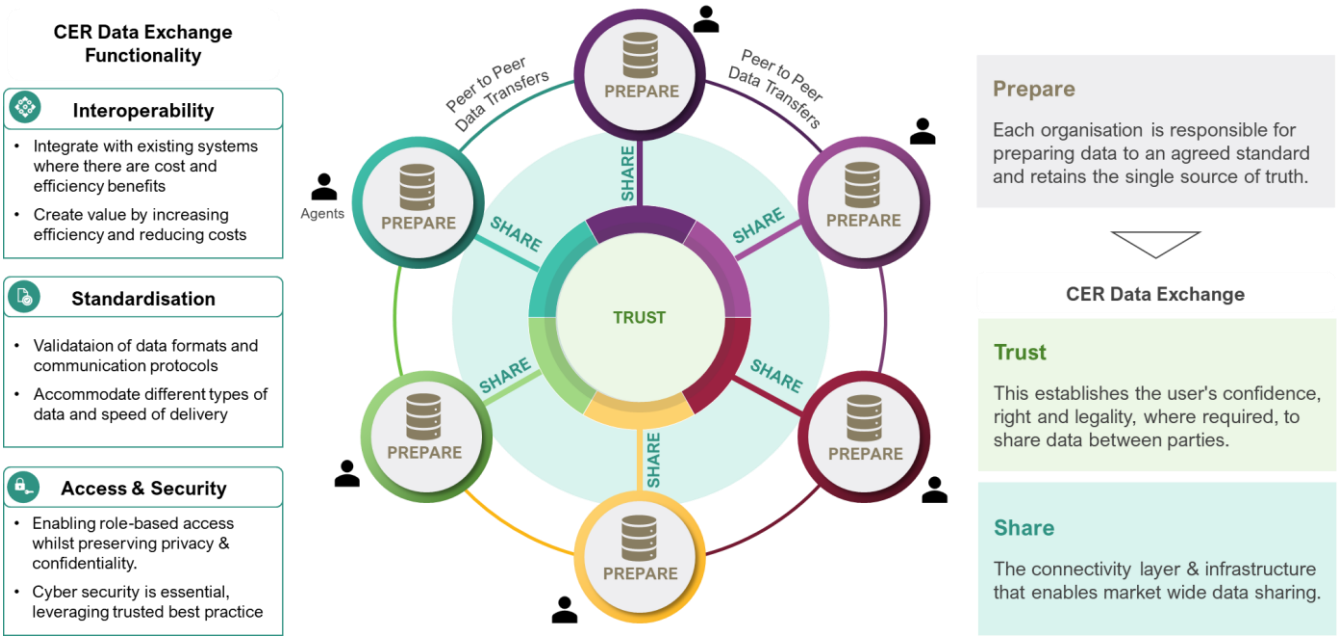


Figure 16: The CER Data Exchange – what it is and what it isn't

What it is	What it is not
The CER Data Exchange Is: • **A common infrastructure for standardised data sharing:** Facilitates the exchange of specific, standardised CER data across organisations. • **Supportive of specific, use cases:** Focuses on targeted applications like grid stability and energy market operations, without overextending to complex needs. • **An enabler of innovation:** Provides data access for new entrants and innovators accelerating the energy transition. • **Privacy-focused:** Ensures consumer data protection while enabling trusted data sharing. • **Aligned with net zero goals:** Helps efficiently integrate CER into the energy system, supporting sustainability and resilience. • **A foundational enabling tool:** Provides secure data infrastructure but integrates with, rather than replaces, existing systems.	**The CER Data Exchange Is Not:** • **A control system for devices:** Facilitates data sharing only; device control remains separate. • **A replacement for existing industry participant data systems:** Complements, rather than duplicates, existing investments. • **A central repository for all CER data:** Connects existing data sources, without storing or controlling them. • **A direct access point for consumers**: Focuses on organisation-to-organisation sharing, not direct customer interactions. • **A unified security and access system:** Does not impose a single security or access model across all CER devices or industry participant systems.

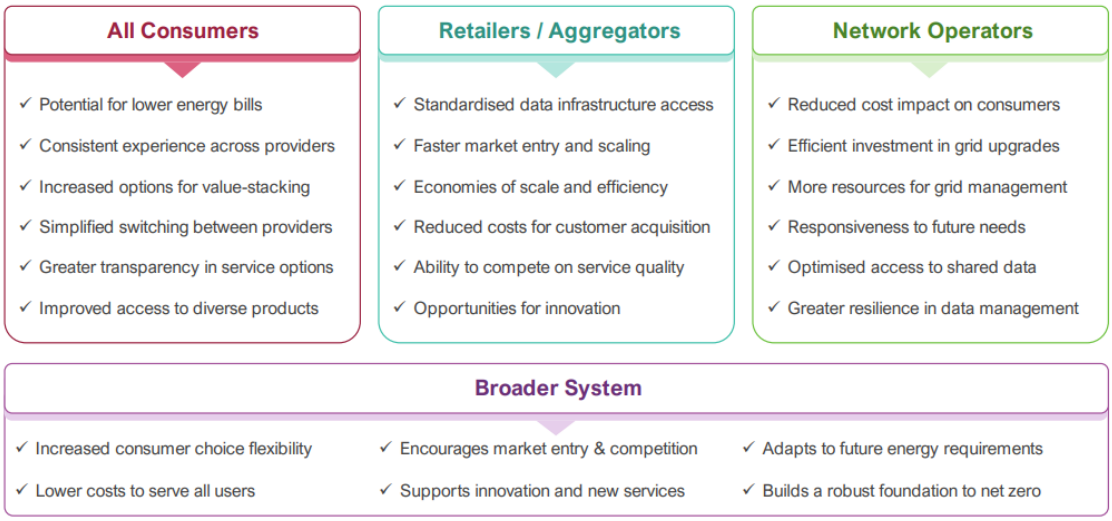
A1.2 How the CER Data Exchange improves outcomes in the long term

Currently, CER data is transferred through a network of fragmented, bespoke systems. As Australia progresses toward a net-zero energy future, the transition to a more decentralised energy system and corresponding rapid growth of CER, including rooftop solar, battery storage and electric vehicles, requires a reimagined energy system. Decentralisation is more than simply adding new technologies; it signifies a shift where consumers are active participants and decision makers in energy generation, storage, and consumption. This transition relies heavily on coordination among many more organisations than today, supported by robust, transparent data flows to manage the complexities of a diverse energy system.

By implementing standard integrations and transactions, the intent of the CER Data Exchange is to reduce reliance on fragmented, point-to-point connections that often complicate and add cost to exchange data. A CER Data Exchange would support the standardisation and streamlined data coordination across industry, simplifying CER integration and reducing costs by enabling compatibility across systems. By providing unified access to consistent and current CER data, a CER Data Exchange could encourage participation in flexible energy services and reduce barriers to entry – thereby enabling fast development of new CER flexibility services.

Although the CER Data Exchange primarily supports organisation-to-organisation data sharing, addressing these issues will benefit end-users of the power system. For example, CER customers will benefit from improved and more diverse service offerings at lower cost and reduced overall bills with increased access to 'rewards' for more actively participating in energy markets. Those without CER will benefit from cost savings from a more efficient power system (see Figure 17 below).

Figure 17: Summary of benefits of the CER Data Exchange



A1.3 How does the CER Data Exchange fit into the wider reform program

The Project Team, EWG members and workshop participants were mindful of the need for the high-level design for the CER Data Exchange to support current and future reforms. The co-design process applied design principles to ensure the high-level design would align with the broader national and state-based regulatory frameworks, existing market principles, and facilitate integration across various sectors, including emerging technologies, and non-traditional energy market participants.

Table 2 below outlines a non-exhaustive list of the related or impacted concurrent reforms which have been considered in the development of the implementation timeline for the CER Data Exchange, with the reform timelines outlined in Figure 18.

Table 2: Concurrent reforms relevant to the CER Data Exchange

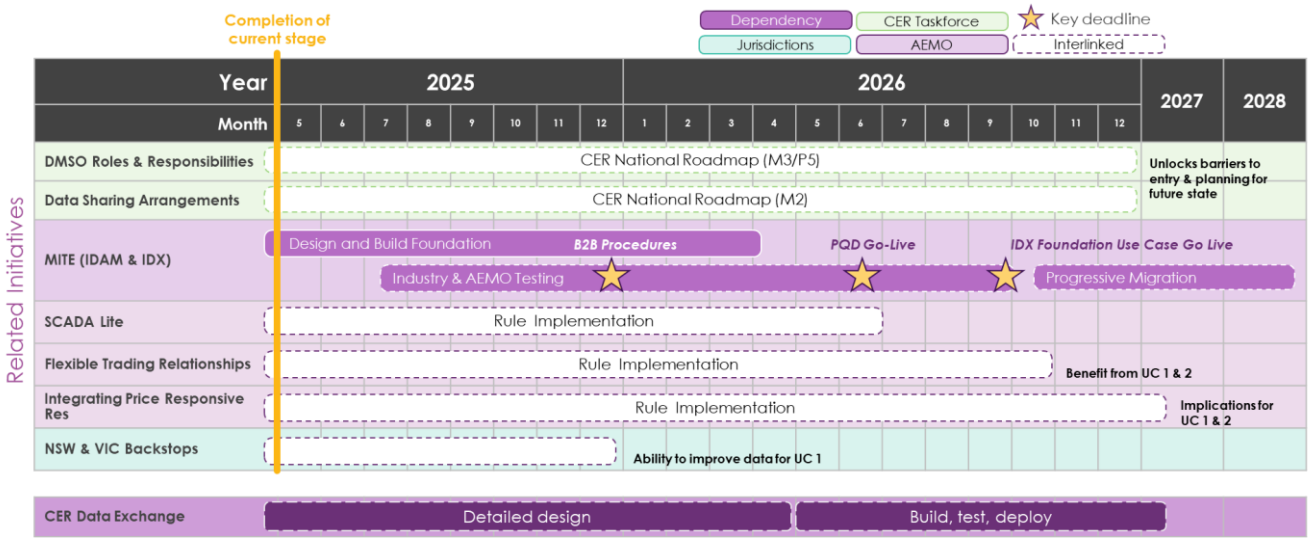
Reform	Description
Integrating Price Responsive Resources (IPRR) Rule Change	The IPRR Rule Change aims to enable flexible resources to participate directly in the market, supporting aggregated demand response and load management. However, existing systems do not fully support the multi-party data exchange needed to operationalise this rule change effectively. The CER Data Exchange could facilitate data sharing between flexible resources and market participants, potentially lowering barriers to entry and making it easier for new participants to engage in demand response and load management.[12]
Unlocking CER Benefits (Flexible Trading Arrangements Rule Change)	This rule change aims to enable more responsive trading arrangements and load flexibility for CERs, improving their market participation. Existing systems may not be fully equipped to handle the dynamic data-sharing requirements necessary for this rule change. The CER Data Exchange could support seamless data sharing for flexible trading arrangements, potentially improving load flexibility, supporting demand response, and enhancing grid reliability through coordinated CER integration. This could help realise the full potential of CERs as active voluntary participants in the market.[13]
National CER Roadmap	The National CER Taskforce/Roadmap aims to create a national strategy for integrating CERs into the electricity system, improving coordination, visibility, and market participation of CERs. However, without a data exchange, these goals may be challenging to achieve. National CER Roadmap outlines the need to establish arrangements necessary for operational CER data including flexible operating envelopes, network management and reliability and market exchange. This includes defining and implementing a CER data exchange to enable markets and services that incentivise consumer participation in CER coordination – as denoted in workstream *M.2 Data sharing arrangements to inform planning and enable future markets*.

[12] AEMO | Integrating Price Responsive Resources into the NEM (IPRR)

[13] AEMO | Flexible Trading Arrangements

Reform	Description
	The CER Data Exchange could serve as a core infrastructure for this workstream, enabling standardised, secure, and efficient data sharing across stakeholders, supporting broader decarbonisation and energy transition efforts. [14]
SCADA Lite	SCADA Lite will enable NEM non-NSP participants to establish a bi-directional connection to exchange operational information (telemetry and control) with AEMO. The SCADA Lite initiative provides greater visibility and operational control of network generation and ancillary service resources. [15]
NSW & VIC Backstop Mechanisms	States across Australia have / are implementing emergency backstop mechanisms designed to manage excess solar power generation on mild, sunny days when there is low demand for electricity. The mechanism, as implemented in Victoria, allows for the remote curtailment of solar exports to prevent grid instability, voltage issues and potential outages. [16] The emergency backstop requirements for small and medium solar systems (up to 200kW) commenced on 1 October 2024 in Victoria. NSW intend to introduce a mandatory backstop mechanism in 2025.
Market Interface Technology Enhancement (MITE) [17]	
Identity and Access Management (IDAM)	IDAM is a centralised system for managing user identities, permissions, and access across the NEM, ensuring secure access to market data. While IDAM manages access control effectively, it primarily focuses on existing market systems and may not fully address the additional security needs posed by CER data sharing at scale. The CER Data Exchange could integrate with IDAM, supporting role-based access and ensuring that CER data is shared securely and only with authorised parties, maintaining compliance with privacy and data protection standards.
Industry Data Exchange (IDX)	IDX is a NEM reform initiative focused on modernising existing data exchange capabilities in the NEM and WEM electricity and gas markets by replacing legacy systems with secure, standardised integration patterns. It aims to streamline data flows between market participants, DNSPs, aggregators, and service providers. While IDX focuses on core market transactions, it has not identified any specific CER data sharing use cases. The CER Data Exchange could leverage IDX's modern infrastructure to support more standardised data sharing for CER-related use cases, enabling seamless CER integration across the market and potentially supporting new use cases.

Figure 18: Expected timelines of concurrent reforms



[14] national-consumer-energy-resources-roadmap.pdf

[15] AEMO | SCADA Lite

[16] Victoria's emergency backstop mechanism for solar

[17] AEMO | Market Interface Technology Enhancements

A2. The Co-Design process

A2.1 Stakeholder feedback contributed significantly to the high-level design

The Project Team has undertaken extensive engagement with stakeholders to explore the various trade-offs of various design choices and evaluated the preferences for priority use cases to best achieve the long-term interests of all consumers. Since June 2024, the project team has engaged with over 250 stakeholders from across the energy industry through 15 EWG meetings, three public industry workshops, three public webinars, a consultation paper and numerous 1-on-1 engagements (Figure 19). This collaborative effort has included consumer advocacy groups, aggregators, customer agents, distribution network service providers, retailers, digital service providers, original equipment manufacturers (OEMs), industry bodies, and government and market bodies.

Figure 19: Significant contributions made by industry to shape reform

Across five workstreams, the Project Team and stakeholders explored the trade-offs of design choices and evaluated design preferences for priority use cases to best achieve the long-term interests, and reached broad alignment on key aspects of the CER Data Exchange's high-level design including use case functionality, data sharing capability, use cases, ownership, oversight, governance and implementation considerations.

Figure 20 below provides an overview of the co-design process, while Figure 21 outlines the focus of public workshops and consultations.

Figure 20: Co-design phases, engagement channels and stakeholder forums

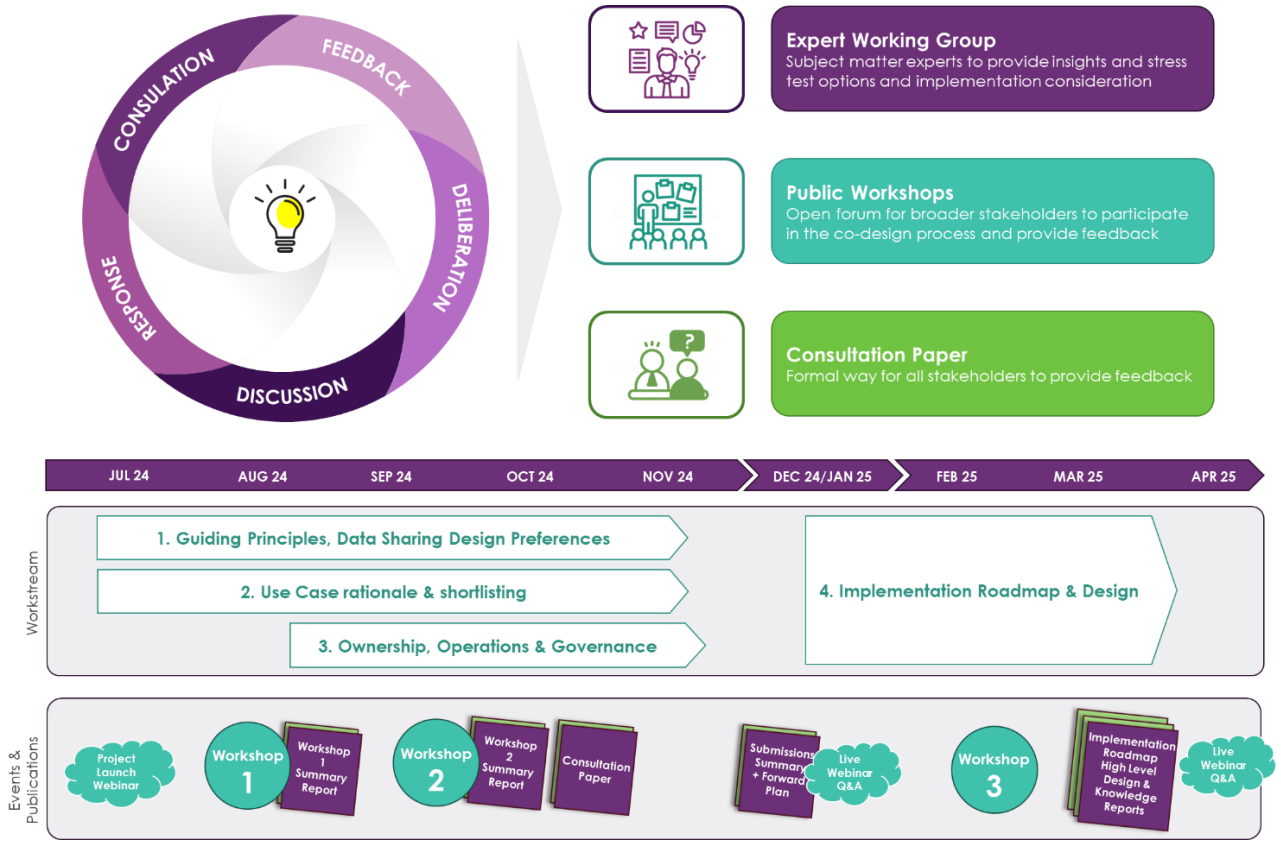
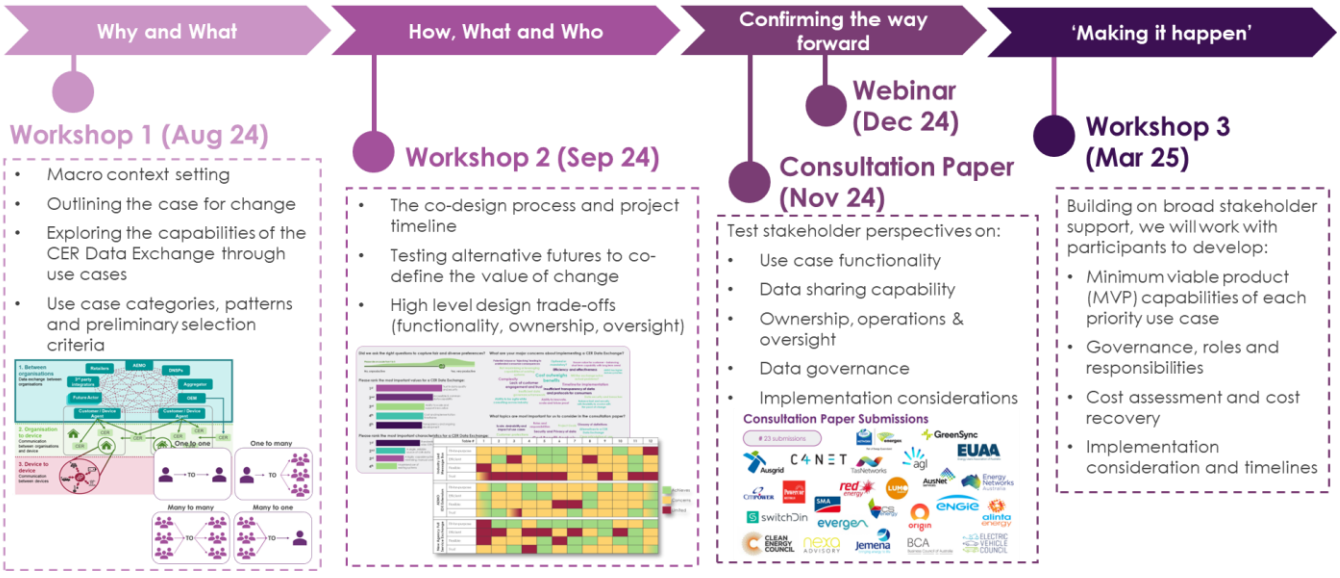


Figure 21: Public workshops and consultations area of focus



A2.2 Links to co-design process documents

Table 3: Summary of all project documents with links

Workshops	**Workshop 1 – Presentation**
	Workshop 1 – Summary Report
	Workshop 2 – Presentation
	Workshop 2 – Summary Report
	Workshop 3 – Presentation
	Workshop 3 – Summary Report
Consultation Paper	**Consultation Paper - Report**
	Consultation Paper - Questions
	Consultation Paper Submissions
	Consultation Submissions Summary Report
	Submissions Summary Webinar – Recording
	Submissions Summary Webinar – Slides
Webinars	**Introductory Public Webinar - Recording**
	Introductory Public Webinar – Presentation

CER Data Exchange Industry Co-Design

April 2025

Attachment A:

High-Level Design

The functional framework and technical capabilities through three priority use cases to establish a national CER Data Exchange.

Important notice

Purpose

This paper sets out the high-level design for the CER Data Exchange, shaped through stakeholder consultation. It establishes a foundational framework by detailing governance structures, operational considerations, and implementation timelines. The report informs the cost assessment and future planning, providing the basis for detailed design development. Ultimately, it aims to present the proposed solution that best meets industry requirements while supporting scalability and efficient deployment.

Acknowledgements

AEMO would like to thank the many individuals and organisations who have contributed time and expertise through the project's Expert Working group, stakeholder meetings and workshops. These stakeholder contributions have informed AEMO's work towards a national CER Data Exchange as presented in this paper. This Project received funding from the Australian Renewable Energy Agency (ARENA) as part of ARENA's Advancing Renewables Program.

Disclaimer

This document or the information in it may be subsequently updated or amended. This document does not constitute legal or business advice, and should not be relied on as a substitute for obtaining detailed advice about the National Electricity Law, the National Electricity Rules, or any other applicable laws, procedures or policies. AEMO has made reasonable efforts to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness.

Accordingly, to the maximum extent permitted by law, AEMO and its officers, employees and consultants involved in the preparation of this document:

- make no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of the information in this document; and
- are not liable (whether by reason of negligence or otherwise) for any statements or representations in this document, or any omissions from it, or for any use or reliance on the information in it.)

The views expressed herein are not necessarily the views of the Australian Government, and the Australian Government does not accept responsibility for any information or advice contained herein.

Copyright

We acknowledge the Traditional Custodians of the land, seas and waters across Australia. We honour the wisdom of Aboriginal and Torres Strait Islander Elders past and present and embrace future generations. AEMO Group is proud to have launched its first Reconciliation Action Plan in May 2024 (scan QR code to read).

Table of Contents

Tables

Figures

Glossary and Abbreviations

Term	Definition
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
API	Application Programming Interface
ARENA	Australian Renewable Energy Agency
CBA	Cost Benefit Analysis
CDR	Consumer Data Right
CER	Consumer Energy Resources
CIM	Common Infrastructure Model
DER	Distributed Energy Resources
DERMS	Distributed Energy Resource Management System
DNSP	Distribution Network Service Provider
DOE	Dynamic Operating Envelope
DSO	Distribution System Operator
ENTSO-E	European Network of Transmission System Operators for Electricity
EWG	Expert Working Group
EY	Ernst & Young
FCAS	Frequency Control Ancillary Services
FFR	Fast Frequency Response
FTE	Full Time Equivalent
GDPR	General Data Protection Regulation
IDAM	Identity and Access Management
IDSP	Integrated Distribution System Planning
IDX	Industry Data Exchange
IEC	Information Exchange Committee
IPRR	Integrating Price Responsive Resources
ISP	Integrated System Plan
LNSS	Local Network Support Services
MITE	Market Interface Technology Enhancements
MVP	Minimum Viable Product
NEM	National Energy Market

Term	Definition
NEO	National Electricity Objective
NER	National Electricity Rules
NETP	National Energy Transformation Partnership
NMI	National Metering Identifier
NSP	Network Service Provider
OEM	Original Equipment Manufacturer
PC	Portal Consolidation
PII	Personally Identifiable Information
PM	Project Management
RBAC	Role-Based Access Control
RERT	Reliability and Emergency Reserve Trader
SOCI	Security of Critical Infrastructure
SWIFT	Society for Worldwide Interbank Financial Telecommunication
SWIS	South West Interconnected System
UI	User Interface
VPP	Virtual Power Plant

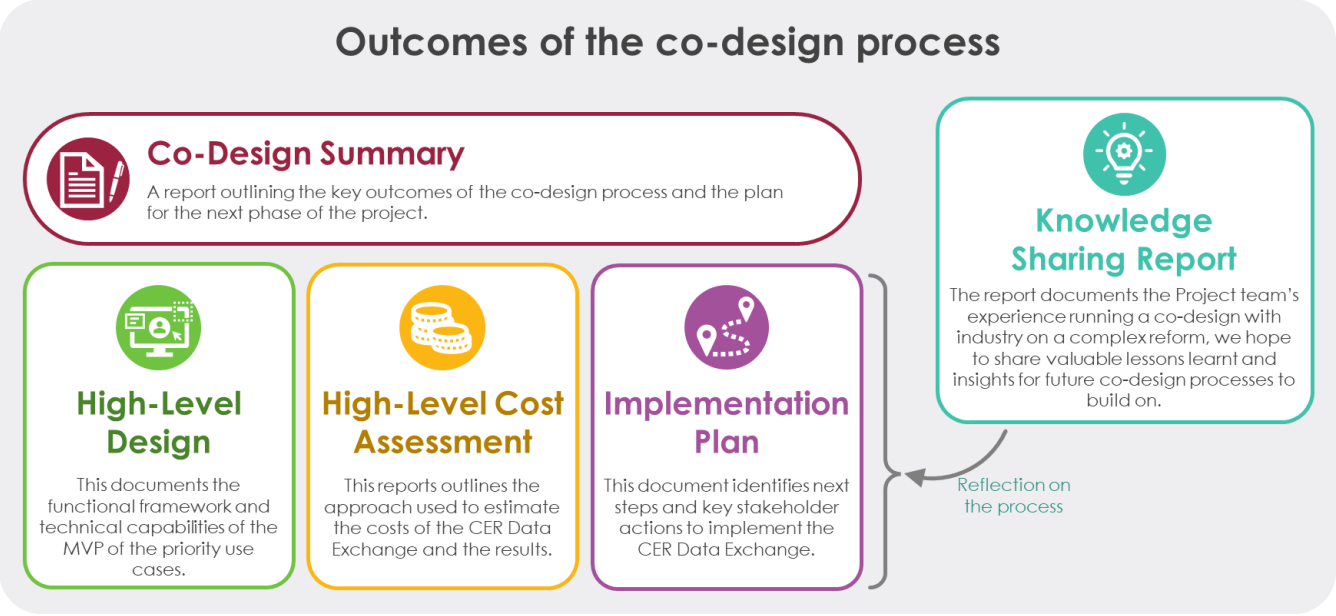
1 Introduction

1.1 The CER Data Exchange Industry Co-Design initiative

The Consumer Energy Resources Data Exchange (CER Data Exchange) Industry Co-design is a joint initiative between the Australian Energy Market Operator (AEMO) and AusNet with support from the Australian Renewables Energy Agency (ARENA) to work collaboratively with industry to co-design a national CER Data Exchange. It is part of a long-term, multistage process to build the digital foundation that will support the efficient integration of CER into the energy system in Australia. This phase of the CER Data Exchange will conclude with a final public webinar in late **April 2025** to present the findings and recommendations on next steps.

This document is part of a series of reports marking the conclusion of the high-level design phase of this project. This report should be read in conjunction with the reports depicted in Figure 1 below. AEMO will also publish a knowledge sharing report to outline the project team's journey of applying a co-design framework to progress customer outcomes and key learnings from the process.

Figure 1: Reports for the CER Data Exchange Industry Co-design project



1.2 This High-Level Design Report

This High-Level Design document outlines the functional framework and technical capabilities through three priority use cases to establish a national CER Data Exchange. The design synthesises insights from extensive industry consultation, international best practices, and emerging technology trends to leverage a data exchange that is secure, scalable, and capable of supporting Australia's evolving energy landscape.

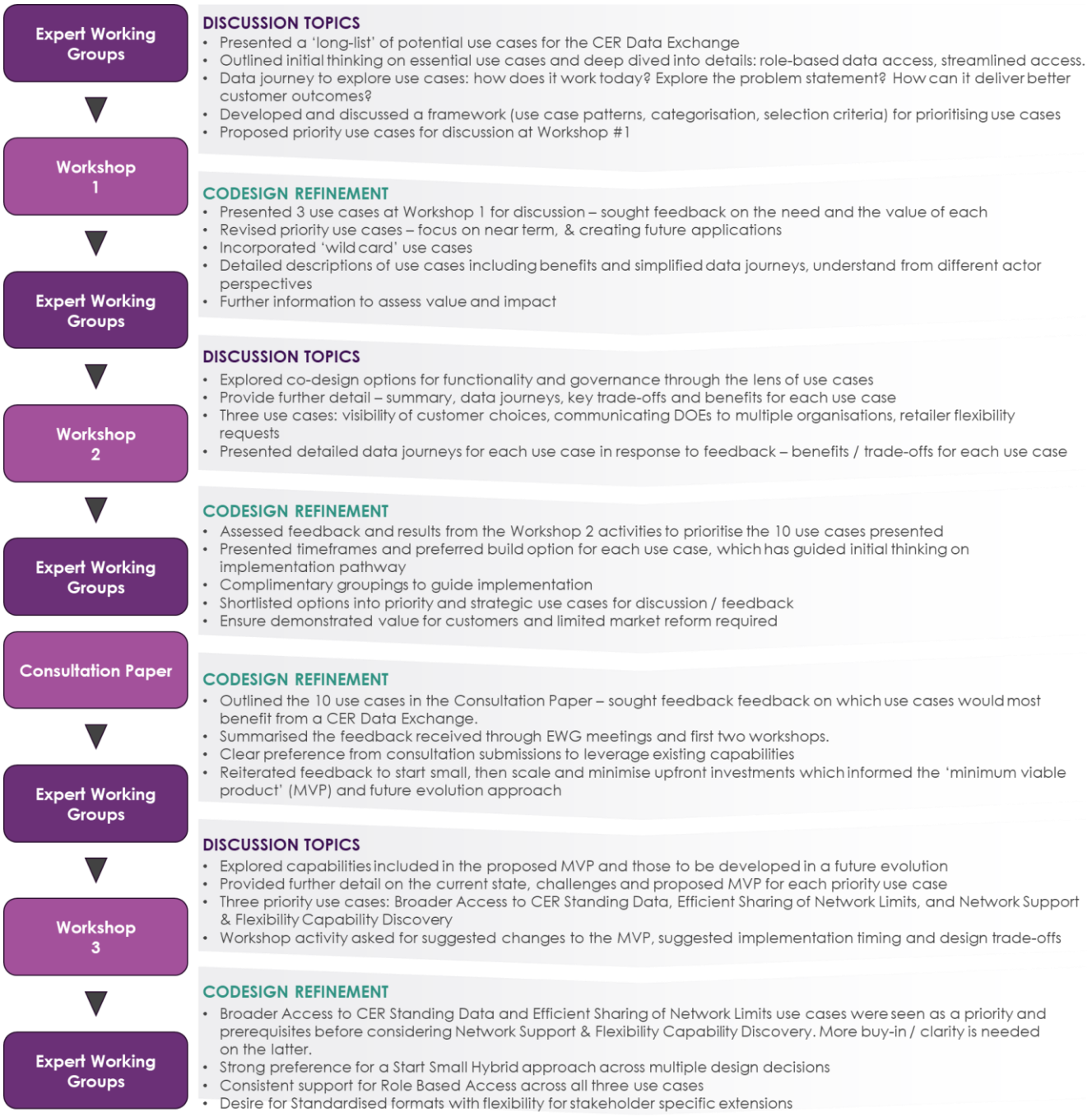
2 High Level Design Overview

2.1 Co-design Feedback

The High-Level Design is based on feedback provided by the Expert Working Group (EWG) members, numerous individual discussions, webinars and industry-wide stakeholder workshops (see Figure 3). At a high-level, the co-design process and the stakeholder feedback received to date has led to the industry preferred option of a CER Data Exchange.

Figure 2: Stakeholder Preferred Option for a CER Data Exchange

Figure 3: Co-design refinement stages



An initial long list of use cases was developed using learnings from Australian pilots and international initiatives. Workshop 1[1] focused on the scope of the design and presented use case options to determine functionality. Four use cases were discussed with the inclusion of "forecasts sharing and visibility" informed by EWG feedback, and stakeholder suggested use cases were encouraged. Following Workshop 1, the project team and EWG explored data journeys, functionality and data governance to take forward three priority use cases. The trade-off implications of a basic compared with full-service exchange was also discussed.

[1] CER Data Exchange Workshop 1 – Summary Report

Workshop 2[2] focused on co-defining the value of use cases in alternative futures, with each table assigned three out of the ten proposed use cases and asked to work through prioritisation, timing and preferred build option. Sharing Network Limits and Network Support & Flexibility Discovery Services (formerly named Supporting Local Network Services) emerged as priority use cases with consistent CER Standing Data deemed immediately necessary, and high value to industry. This list of ten use cases was outlined in the Consultation Paper for further feedback as these use cases are intended to address both immediate needs and future opportunities – laying the groundwork for an efficient, consumer-focused energy landscape.

Submissions received to the Consultation Paper[3] reiterated a clear preference to leverage existing capabilities which led to building on MITE foundations. Feedback also highlighted the preference to minimise upfront cost, learn from the implementation of use cases and remain adaptable which informed the 'Create the MVP and evolve overtime' approach. Stakeholders supported the priority use cases of Sharing Network Limits, Supporting Local Network Services and CER Standing Data, which was seen as an immediate priority.

The third industry workshop[4] confirmed support for the priority use cases. Stakeholders considered the key trade-offs had been identified, and there was broad agreement on the preferred MVP for each use case. However, there were mixed preferences on implementation timing. Further, workshop participants highlighted key issues, challenges and questions that require further consideration at the detailed design stage. We have summarised these considerations in Section 3 of Attachment C: Implementation Plan and outlined upcoming AEMO processes that will address the issues in the Implementation Roadmap.

Overall, the ideal future state features are expected to improve access to high value CER or DER impacted dataset and equitable benefit distribution among all consumers. Nevertheless, stakeholders also highlighted important trade-offs to consider, including the balance between control and flexibility, cost versus MVP features, efficiency against practicality, and the speed of implementation versus reliability. Additionally, importance was given to ensuring consideration be given to data quality management, security measures, and avoiding a "big bang" approach in favour of incremental implementation whilst considering consumer benefits.

2.2 Priority Use Cases

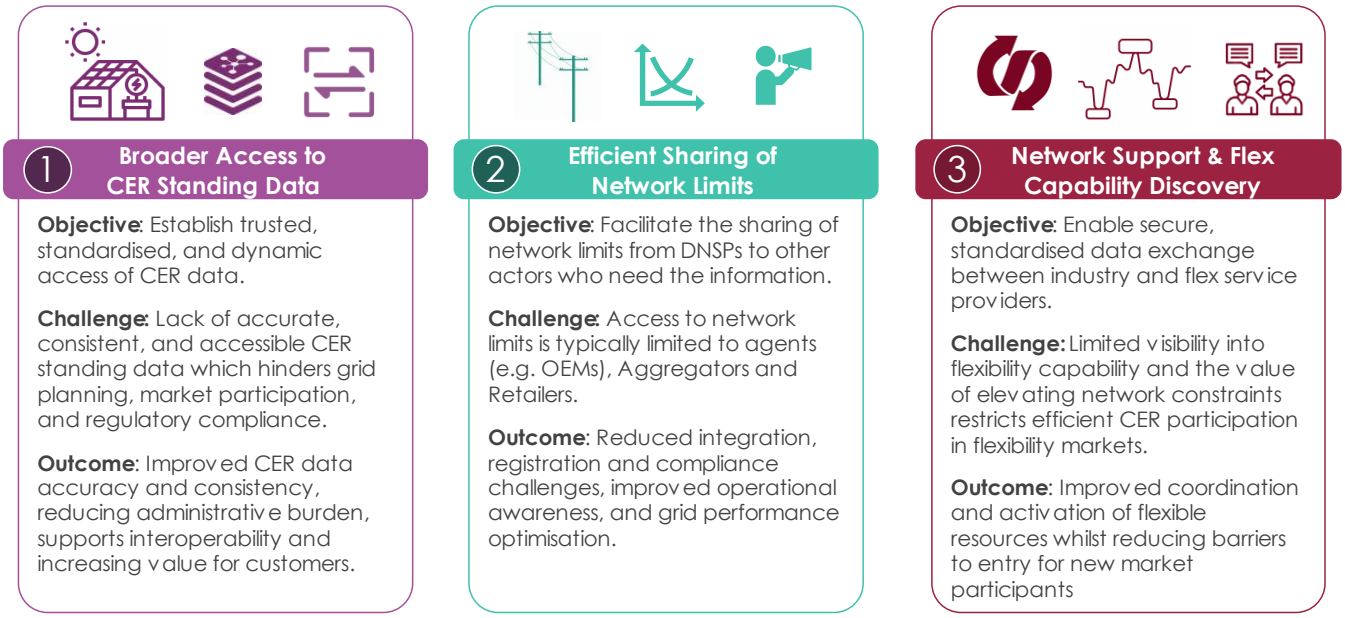
The CER Data Exchange has been structured to evolve over time, beginning with an initial set of priority use cases that lay the foundation for broader capabilities. These first-generation use cases enable secure data-sharing infrastructure, access management frameworks, and data standardisation, supporting the long-term vision of an integrated, efficient, and consumer-centric energy system. As the Exchange grows, its functionalities are intended to expand to address emerging industry needs, regulatory requirements, and technological advancements.

The three-priority use cases are:

[2] CER Data Exchange Workshop 2 – Summary Report

[3] CER Data Exchange Industry Co-Design Consultation Paper

[4] CER Data Exchange Workshop 3 – Summary Report



The proposed sequencing order of the priority use cases follows a logical progression of having access to CER Standing Data as a foundational piece, with further value unlocked with the efficient sharing of network limits to improve the value of CER flexibility in the market.

The priority use cases have been selected for their immediate benefits to industry and for their ability to establish core capabilities that would support future use cases. The foundational elements of the CER Data Exchange all build upon a combination of Industry Data Exchange (IDX) Identity and Access Management (IDAM) from the MITE Project and additional capability under development by AEMO. Specifically, the three foundational elements include:

- a **secure data exchange infrastructure** that establishes standardised sharing patterns,
- an **access management framework** supporting authentication and authorisation for various market participants, and
- data **standardisation** that enables consistent data structures and validation protocols.

Together, these capabilities form a scalable foundation that would reduce both complexity and cost when implementing future energy market use cases.

2.3 Create an MVP and evolve over time

Proposed by stakeholders through the co-design process, the approach begins with an MVP and gradually expands the CER Data Exchange's functionality. This phased approach aims to deliver immediate value while setting the stage for future enhancements by focusing on core functionalities and high priority use cases. By concentrating on these essential elements, the MVP balances complexity and risk, while enabling early adoption by stakeholders.

It is expected that as the CER Data Exchange evolves, these foundational elements would support continuous improvement, allowing the platform to address emerging needs, comply with regulatory changes, and incorporate

technological advancements. Expanding capabilities in a phased and incremental manner ensures the Exchange would remain relevant, effective, and aligned with the long-term vision of an integrated, efficient, and consumer-centric energy system.

By starting small and building a solid foundation, the Exchange could adapt to changes and grow in a way that maximises benefits for all stakeholders. This approach not only ensures initial success but also provides a clear pathway for future development, ensuring that the CER Data Exchange remains a vital tool in Australia's energy market landscape as intended.

2.4 Design Principles

A core component of the CER Data Exchange is its ability to facilitate secure, standardised, and efficient data-sharing between organisations. Our consultation identified several data sharing capabilities for the CER Data Exchange, these include:

Capabilities such as information security, format standardisation, access management and platform interoperability are considered fundamental to the Exchange providing secure, consistent and reliable services. Functionalities such as advanced data validation and custom data format could be optional features that offer adaptability for specialised requirements and less critical functions.

The high-level design of the CER Data Exchange builds on several key design principles to ensure future use cases are effective, scalable, and adaptable to the evolving needs of Australia's energy market. Each objective is reinforced by practical implementation measures, aligning with stakeholder expectations and industry best practices. Co-designing these principles was a key focus of Workshop 1, where participants were asked to consider, comment, change or refine the overarching guiding principles of "prudent, efficient & effective", "adaptable & scalable", and "secure & resilient", and communicate preferences at a high-level on governance, functionality, standardisation, interoperability, security and access. These have since been refined iteratively throughout the project, with stakeholder feedback shaping the design principles outlined in Table 1.

Table 1: Design Principles

Objective	Implementation Measures
SEAMLESS AND SECURE DATA EXCHANGE Facilitate secure, standardised, and automated data flows between stakeholders to enhance	– Establish role-based access control (RBAC) and end-to-end encryption to safeguard data transmission and prevent unauthorised access. – Implement audit logging and compliance tracking to ensure transparency, trust, and regulatory oversight across all transactions.

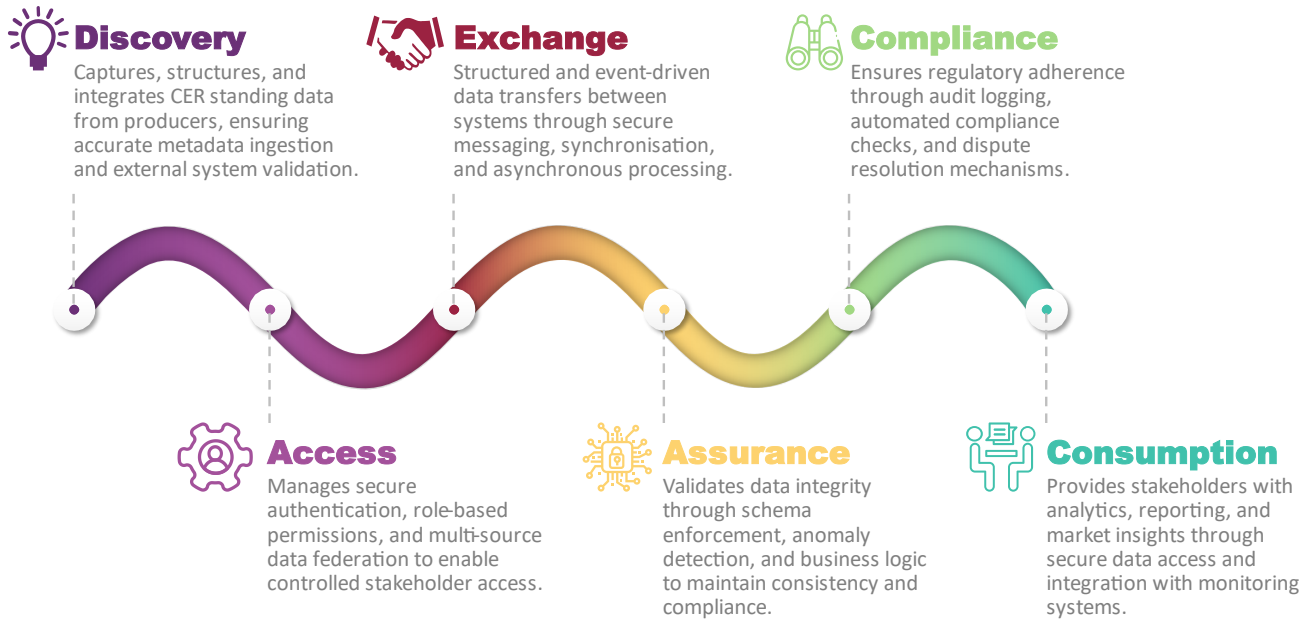
Objective	Implementation Measures
operational efficiency and decision-making while ensuring robust security and privacy protections.	– Develop structured API gateways that support both real-time and batch data exchange, ensuring smooth interoperability across different market platforms.
REDUCED INTEGRATION COSTS Lower system integration costs by having common data models, schema alignment, and standardised APIs, making it easier for new participants to connect and interact with the CER Data Exchange.	– Adopt international data exchange standards (e.g. IEEE, IEC, CIM) to promote seamless compatibility with existing energy systems and global best practices. – Provide schema validation and automated data processing to reduce errors, ensuring high-quality, reliable data exchanges. – Implement plug-and-play API integration that reduces development overhead for businesses, supporting easy onboarding and reducing the complexity of integrating legacy systems.
SUPPORTING MARKET INNOVATION Enable new business models, future energy solutions, and advanced grid services while maintaining system reliability and stability through enhanced data-driven decision-making.	– Establish flexible data access and permission structures to support aggregators, DNSPs, retailers, and new market entrants, fostering innovation and market participation. – Implement data-sharing mechanisms that provide insights into network conditions, allowing proactive management of grid stability, distributed energy interoperability and energy distribution.
SCALABLE AND FUTURE-READY PLATFORM Develop a modular and extensible platform capable of expanding to support emerging market needs, new regulations, and technological advancements.	– Deploy a batch and event-driven architecture that dynamically scales with increasing transfer volumes and evolving industry demands. – Ensure backward and forward compatibility by supporting interoperability with both legacy systems and next-generation digital platforms. – Provide version-controlled updates that enable incremental system enhancements without disrupting existing functionalities, ensuring ongoing platform stability and adaptability.
COMPLIANCE AND REPORTING Ensure that the Exchange complies with national energy regulations, cybersecurity frameworks, and compliance reporting requirements to provide a trusted and transparent data-sharing environment.	– Automate regulatory reporting, validation, and compliance checks, reducing administrative burden while improving regulatory adherence. – Maintain secure and immutable data logs, ensuring traceability, legal accountability, and end-to-end data integrity. – Align with cybersecurity standards and regulatory structures, ensuring that the Exchange meets national security and data protection obligations while fostering regulatory confidence.

These principles and implementation measures serve as the foundation for the CER Data Exchange, helping to ensure it works towards enhancing transparency, market efficiency, and industry innovation. As new technologies, policies, and market structures emerge, the CER Data Exchange it intended to remain a foundational cornerstone of a modern, data-driven decentralised energy ecosystem.

2.5 Data Journey

The data journey represents the end-to-end flow of data within the CER Data Exchange, ensuring secure, standardised, and efficient management of data. It follows a structured data journey process from data discovery and access to exchange, assurance, compliance, and consumption, enabling seamless integration, regulatory adherence, and informed decision-making information for stakeholders (Figure 4).

Figure 4: Data Journey



The successful functioning of the CER Data Exchange is intended to rely on the collaborative efforts of various stakeholders, each with their own responsibilities in the data journey. While AEMO expect to own and operate the Exchange, it does not mean they will necessarily fulfill assurance or compliance functions. Drawing on international best practices, including the UK's Digital Spine feasibility studies, the detailed design phase must ensure a robust framework for secure, efficient, and compliant data exchange is established. This framework would include specific measures such as regular data audits, stringent access controls, real-time monitoring of data flows, and a clear protocol for addressing data breaches. These steps would help to foster regulatory confidence and enhance market efficiency.

This data journey aligns with international best practice by embracing several proven principles seen in successful data exchanges globally. The separation of authentication from data transfer mirrors approaches in European energy data hubs like Elhub (Norway) and ENTSO-E (EU-wide). The emphasis on schema enforcement and anomaly detection reflects lessons from financial sector exchanges like SWIFT and the UK's Open Banking Implementation Entity. Additionally, the architecture's attention to both synchronous and asynchronous processing accommodates varying stakeholder technical capabilities, similar to Singapore's MyInfo and Estonia's X-Road frameworks.

What distinguishes the CER Data Exchange approach is its balanced consideration of both operational governance and technical requirements, which is a hallmark of mature data exchange implementations worldwide. It is intended that the CER Data Exchange would establish a complete data lifecycle approach rather than focusing solely on the data transmission mechanics.

2.6 Exchange Services

Key services to support the Data Journey outlined above are expected to be established both to prioritise MVP implementation of the CER Data Exchange, and enable future enhancements required for foundational capability

and additional use cases. An establishment phase is envisioned to develop core data management MVP functions, secure data access, and essential compliance mechanisms.

Many of these services build upon the foundational capabilities under development in the MITE business case, specifically through IDAM and IDX[5] [6]. These foundational capabilities provide authentication, role-based access, security controls, and structured data exchange mechanisms essential for the transmission of data between data producers and data consumers. However, additional capabilities will need to be built beyond what is provided in MITE to support broader functionality required for the CER Data Exchange (Figure 5).

Figure 5: CER Data Exchange Services

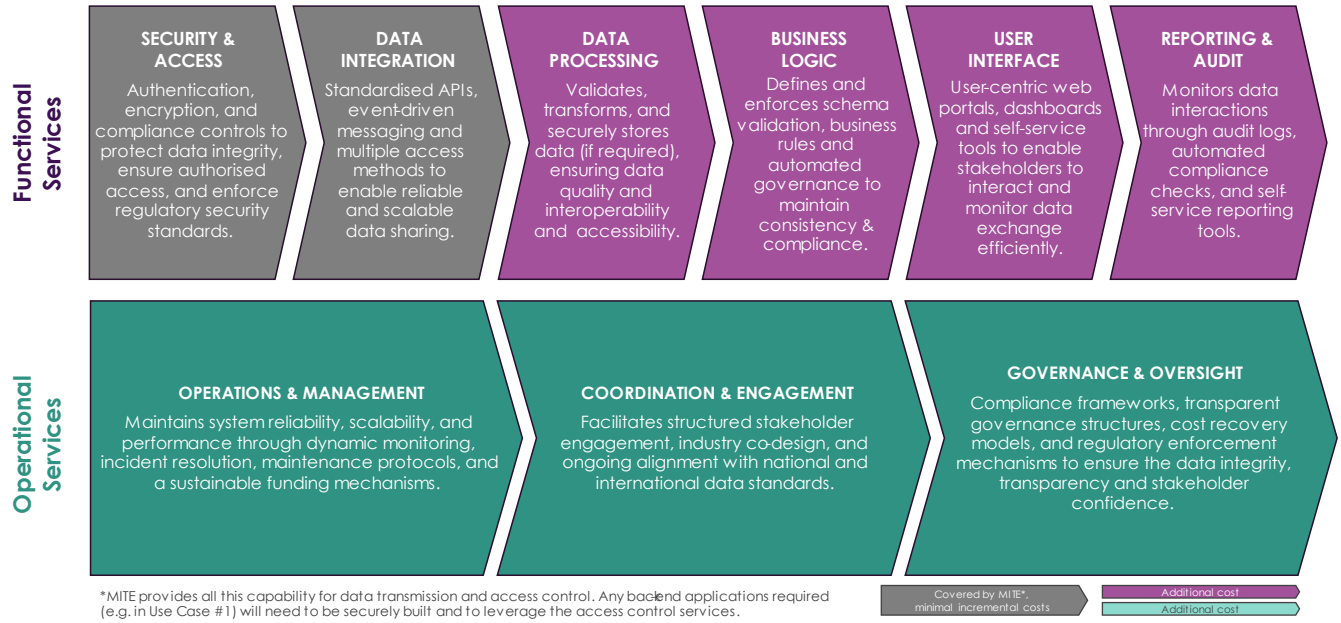


Table 2 and Table 3 below contextualises how each service category within the CER Data Exchange aligns with MITE's foundational capabilities, clarifying which elements are already provided versus those that require additional development. In summary, MITE program provides all capabilities for data transmission and access control across the identified functional areas. Any backend applications required (e.g. for Broader Access to CER Standing Data) for the CER Data Exchange would need to be securely built and leverage the existing access control services.

Each of the services are broken down into two categories:

- **Functional Services** form the core digital infrastructure that enables secure data exchange, processing and accessibility. These services collectively handle the technical mechanics of data movement, validation and presentation to users.
- **Operational Services** provide the organisational framework that ensures the exchange functions effectively within industry contexts. These services focus on maintaining ongoing management, facilitating stakeholder engagement and implementing governance structures that build trust in the CER Data Exchange.

[5] AEMO Market Interface Technology Enhancements

[6] Market Interface Technology Enhancements Business Case

Together these services ensure data security, accessibility, validation, and automation while enabling compliance with regulatory frameworks.

To elaborate, the MITE foundational capabilities provide authentication, role-based access, security controls, and structured data exchange mechanisms essential for the transmission of data between data producers and data consumers. Additional capabilities would need to be built beyond what is provided in MITE to support broader functionality required for the CER Data Exchange. However, utilising the MITE infrastructure provides a cost benefit and a program of work that is highly complementary. For further information, please refer to Attachment B: High-Level Cost Assessment and the further background on the MITE business case in the Consultation Paper [7].

Table 2: Functional Services

Functional Services	LEGEND ☑ Full Covered by MITE ➲ Partially Covered by MITE ❖ New Build
1. SECURITY & ACCESS **Authentication, encryption, and compliance controls to protect data integrity, restrict authorised access, and enforce regulatory security standards.**	
☑ **Authentication & Role-Based Access Control (RBAC):** Identity verification with structured permission controls based on key roles. ☑ **Encryption & Key Management:** Robust data protection utilising automated security credential rotation protocols. ☑ **Application-layer role enforcement**: Embedded access restrictions integrated within CER Data Exchange functionality. ➲ **Audit Logging & Monitoring:** Security event tracking with configurable notification thresholds for suspicious activities. ➲ **Cybersecurity & Compliance**: Multi-tiered protection architecture aligned with recognised security standards.	
2. DATA INTEGRATION **Standardised APIs, event-driven messaging and multiple access methods to enable reliable and scalable data sharing.**	
☑ **Standardised APIs & Custom Endpoints:** Consistent connection frameworks with options for distinct use case requirements. ☑ **Multiple Access Patterns:** Diverse data exchange methodologies supporting varied integration scenarios. ☑ **Message Handling & Event Triggers:** Framework where business events automatically initiate appropriate processes. ☑ **Flow Control & Connectivity:** Traffic management mechanisms preventing system overload with regulated data exchange. ☑ **Interoperability Standards:** Adherence to established protocols enabling data exchange with external systems.	
3. DATA PROCESSING **Validates, transforms, and securely stores data (if required), ensuring data quality, interoperability, and accessibility.**	
☑ **Data Format / Structure Validation:** Ensures data conforms to schemas and technical standards, reducing formatting errors. ❖ **Content-level validation:** Implements validation beyond schema checks to enforce business rules and market compliance. ❖ **Data Transformation:** Converts diverse formats into standardised structures to support interoperability across different platforms. ❖ **Data Re-Sends & Recovery:** Enables retransmission of data to ensure integrity and completeness in case of failures.	
4. BUSINESS LOGIC **Defines and enforces schema validation, business rules and automated governance to maintain consistency & compliance.**	
❖ **Business Rule Enforcement:** Implements automated decision logic to validate transactions against regulatory and market frameworks. ❖ **Automated Data Governance:** Compliance enforcement mechanisms to ensure all exchanged data meets governance requirements. ❖ **Incremental Data Management:** State-aware data processing to efficiently manage partial updates and track system changes.	
5. REPORT & AUDITING **Monitors data interactions through audit logs, automated compliance checks, and self service reporting tools.**	
❖ **Audit Logging:** Captures system-level activities to ensure compliance with security and regulatory requirements.	

[7] AEMO CER Data Exchange Industry Co-Design - Consultation Paper

- ❖ **Self-Service Reporting:** Tools enabling stakeholders to generate and retrieve reports for operational insights and regulatory filings.
- ❖ **Analytics:** Authorised stakeholders to run queries, generate reports, and analyse data within regulatory limits.

6. USER INTERFACE

User-centric web portals, dashboards and self-service tools to enable stakeholders to interact and monitor data exchange efficiently.

- ❖ **Web Portal & Dashboards:** Provides a user-friendly interface for stakeholders to monitor data exchange interactions.
- ❖ **Self-Service Tools:** Allows participants to configure data queries and access reports without system administrator intervention.
- ❖ **Customised Dashboards:** Provides role-based data insights tailored to different market participants.

Table 3: Operational Services

Operational Services	LEGEND ☑ Full Covered by MITE ➲ Partially Covered by MITE ❖ New Build
1. EXCHANGE OPERATIONS **Maintains system reliability, scalability, and performance through CER Data Exchange management, monitoring, incident resolution, maintenance, which is supported by sustainable cost and platform governance.**	
☑ **Support:** Provides technical support functions (Tier 3 helpdesk) for participants	
☑ **Dynamic Monitoring & Incident Response:** Provides system-level performance monitoring of the platform for proactive availability, reliability and performance against service level agreements, and provides the ability to detect and resolve issues	
☑ **System Maintenance & Upgrades:** Enables ongoing improvements to the platform's security, scalability, and efficiency.	
➲ **Service Level Agreements (SLAs):** Defines measurable performance benchmarks and commitments for exchange services.	
❖ **Cost Management:** Develops governance models to sustain efficient long-term exchange cost management.	
2. COORDINATION & ENGAGEMENT **Facilitates structured stakeholder engagement, industry co-design, and ongoing alignment with national and international data standards.**	
❖ **Co-Design & Engagement:** Facilitates consultations with various stakeholders.	
❖ **Data Standards & Schema Management:** Ensures exchange-wide adherence to national and international best practices.	
❖ **Continuous Improvement:** Establishes iterative refinement processes to enhance exchange functionality.	
❖ **Implementation & Change Management Framework:** Structured onboarding and transition strategies for new stakeholders.	
3. GOVERNANCE & OVERSIGHT **Compliance frameworks, transparent governance structures, cost recovery models, and regulatory enforcement mechanisms to ensure the data integrity, transparency and stakeholder confidence.**	
❖ **Regulatory Compliance:** Foundational role-based access controls for enforcing security and regulatory compliance.	
❖ **Market Governance & Oversight:** Transparent decision-making structures for governing the exchange.	
❖ **Audit Monitoring & Compliance:** Enforcement mechanisms & permanent records to ensure compliance accountability.	
❖ **Cost Recovery & Funding:** Equitable financial structures to support continued development and maintenance of the Exchange.	
❖ **Industry & Regulatory Alignment:** Ongoing dialogue with market stakeholders to adapt to evolving regulatory frameworks.	

3 Priority Use Cases High Level Designs

This chapter outlines the three priority use cases identified for the CER Data Exchange. These use cases address immediate needs for improved data-sharing capabilities and align with the broader objectives of Australia's energy transition. Each use case is designed to deliver tangible benefits for all of industry in terms of efficiency, innovation, and grid stability.

AEMO will focus its efforts on delivering priority use case 1 and 2 by May 2027, as they received the strongest stakeholder support, which aligns with Workshop 3 feedback, interlinkages with other initiatives, and interdependencies and with the MITE implementation plan[8].These priority use cases are intended to be key enablers for other parallel workstreams including the Integrating Price Responsive Resources (IPRR) final rule and the National CER Roadmap.

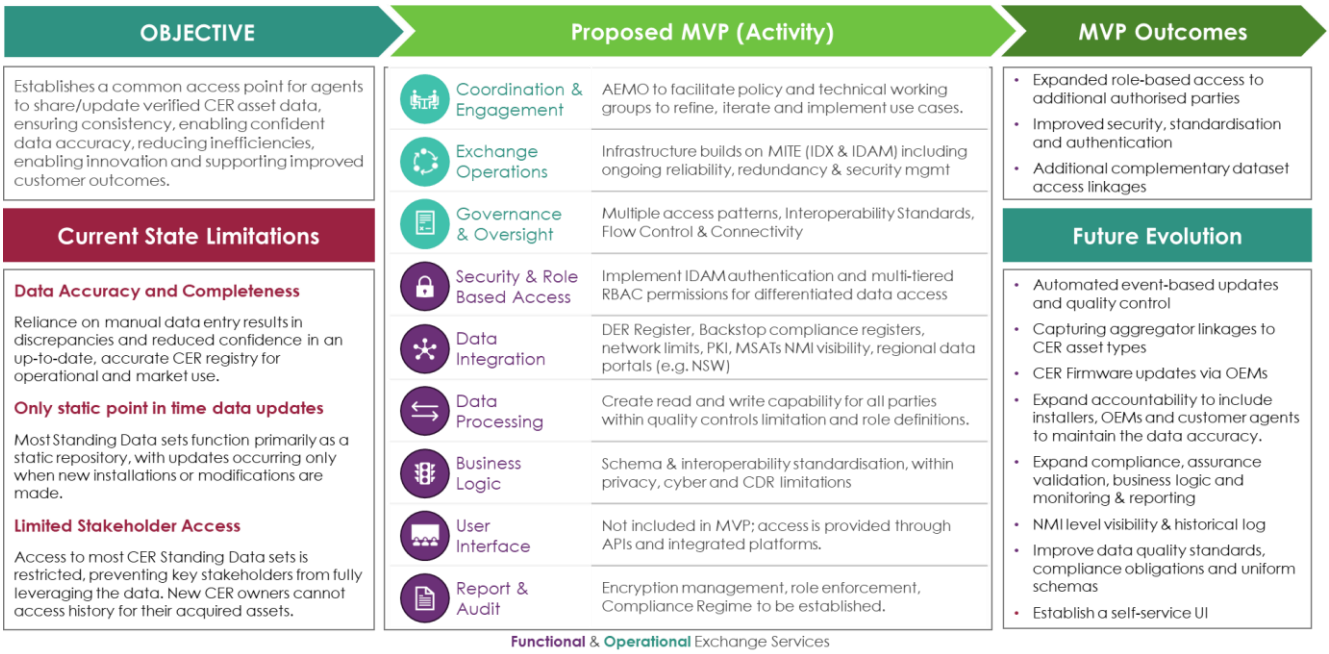
3.1 Use Case: Broader Access to CER Standing Data

3.1.1 Use Case Overview

The *Broader Access to CER Standing Data* initiative primarily aims to rectify the challenge of limited access to CER/DER data within Australia's energy market ecosystem. Currently, the restricted access to accurate, consistent and accessible CER standing data hinders grid planning, market participation and regulatory compliance efforts. Ensuring greater controlled access to this data is crucial outcome of this use case.

[8] MITE Webpage, including Business Case & Implementation Plan

Figure 6: Broader Access to CER Standing Data overview [9]



This use case aims to establish trusted, standardised and dynamic access to CER data, creating a unified data exchange capability that ensures information integrity and interoperability. Building on access to the established DER Register and leveraging advancements from the MITE program, this initiative adopts industry-leading data governance practices, including SOCI (Security of Critical Infrastructure) compliance and ISO 27001 standards for information security management.

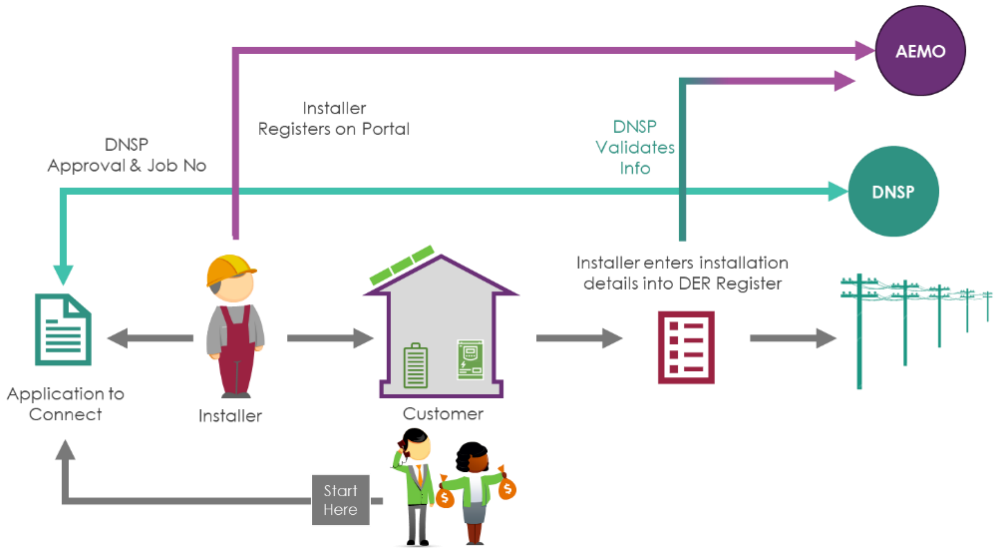
3.1.2 Current Challenges

The foundation to a highly decentralised energy system is a trusted understanding of where the distributed energy infrastructure is installed and what functional capability it has. By broadening CER Standing Data access, stakeholders can make more informed decisions based on accurate information.

The diagram below illustrates the current workflow for capturing data into the DER Register. The process begins with customers initiating an application to connect their energy resources. From this starting point, installers submit the connection application typically on behalf of the customer which the DNSP review, approve and provide a job number. The installer registers on the portal and proceeds to install DER equipment at the customer's premises and uploads detailed installation information into the DER Register. This data undergoes validation by the DNSP, with the validated information subsequently flowing to both the DNSP systems and AEMO.

[9] CER Data Exchange Workshop #3 Presentation, link: https://aemo.com.au/-/media/files/electricity/der/2025/cer-data-exchange-workshop-3-presentation.pdf?la=en

Figure 7: DER Register Data Capture Process



The existing frameworks for CER data management present several challenges that require resolution to support Australia's evolving energy ecosystem:

- **Fragmented and Manual Data Entry:** The DER Register currently relies on manual data entry by installers and Network Service Providers (NSPs), which introduces errors, delays, and inconsistencies. As the volume of CER installations continues to grow exponentially, this manual approach is increasingly unsustainable. Automated systems, as seen in international models[10], could significantly enhance data reliability and reduce operational inefficiencies.
- **Limited Access and Visibility:** Access to DER Register is restricted under current frameworks[11], with stakeholders such as retailers and aggregators unable to fully leverage the benefits for customers. This limited access impedes innovation and fails to mirror the open-data policies adopted internationally[12] in energy market transition.
- **Data Quality and Compliance Gaps:** The DER Register lacks the advanced validation mechanisms and compliance enforcement seen in leading jurisdictions. Without automated anomaly detection or schema validation, data inaccuracies persist, undermining the reliability of the register and its ability to support regulatory compliance.
- **Absence of Streamlined Updates**: The DER Register currently functions primarily as a static database, with updates occurring on an infrequent basis tied to installation changes. This structure does not align with the needs of a modern grid, which requires both real-time updates and robust multi-party read and write capabilities. Real-time data updates are crucial for functions such as load

[10] European Union's Clean Energy for All Europeans package, includes mechanisms such as the use of the Common Information Model (CIM) for standardised data sharing and the implementation of data hubs like Denmark's Energinet, which streamline information exchange between market participants.

[11] The existing access restriction relate to a few factors, some data is considered Personally Identifiable Information (PII) or linked to critical infrastructure which is limited by the Privacy Act 1988 (Cth), AEMO's Privacy Policies and the NER. The National Electricity Rules (specifically, Clause 3.7E) mandate the establishment of the DER Register but only authorise access to a defined list of parties, which includes: AEMO, NSPs, Market Participants (to the extent required for their operations). Third parties such as OEMs, aggregators, research institutions, or energy service providers are not automatically authorised to access the DER Register data, unless acting under an explicit arrangement or authorised exemption. Lastly there is a no defined consent and access framework for third parties.

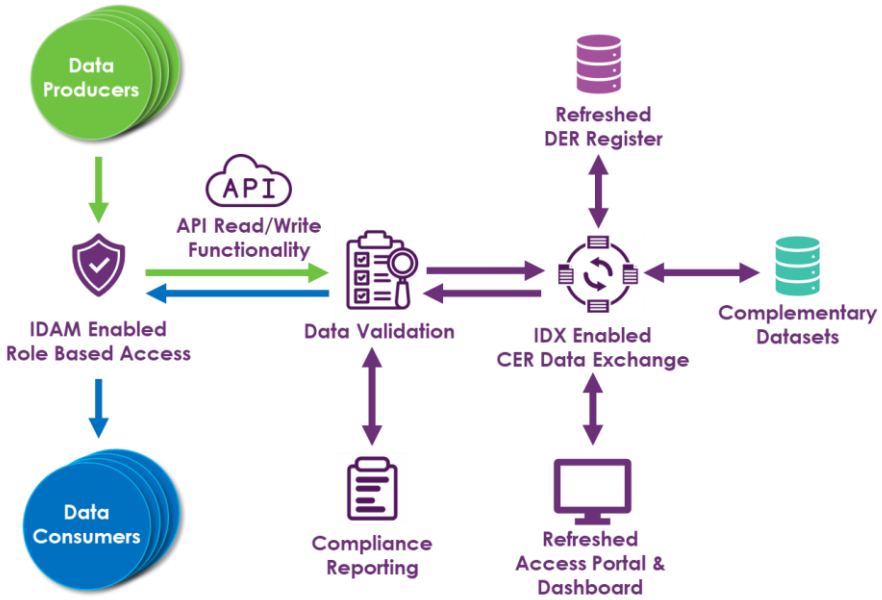
[12] UK's Midata initiative and the European Union's General Data Protection Regulation (GDPR)-aligned energy data frameworks.

management, fault detection, and distributed energy optimisation, as they allow grid operators to respond dynamically to fluctuating grid conditions. In addition, the absence of multi-party read and write capabilities limits collaboration among stakeholders such as retailers, aggregators, and NSPs.

3.1.3 Proposed Minimum Viable Product & Future Evolution

The use case seeks to broaden access to CER Standing Data, addressing the limitations in current data availability experienced by various market participants and customer agents. By leveraging IDX and IDAM, the initiative aims to enhance accessibility, security, scalability, and interoperability, thereby facilitating comprehensive and reliable access to the data. Additionally, the DER Register could be extended to capture high-value CER data sets, such as associations with aggregator platforms, software updates, or emergency backstop registration and compliance details, either directly or through data linkage with complementary data sets.

Figure 8: MVP - Broader Access to CER Standing Data illustration



The above diagram illustrates the use case architecture. It shows data flowing from Data Producers through an API with read/write functionality to a central Data Validation component. This component connects to an IDX-enabled CER Data Exchange, which can link to multiple endpoints. Data Consumers access information through IDAM-enabled RBAC protocols, ensuring secure and appropriate data utilisation. The bidirectional arrows indicate the flow of information between parties, creating an interconnected ecosystem that enables structured data validation, exchange, and access for authorised participants while maintaining compliance and data integrity.

The *Broader Access to CER Standing Data* use case aims to address limited access to CER/DER data. Restricted access to accurate, consistent, and accessible CER data hampers grid planning, market participation, and regulatory compliance. Ensuring controlled access to this data is a crucial outcome. The aim is to also improve data integration efficiency and accuracy of updates to CER Standing Data. The proposed MVP introduces foundational capabilities that could transition to advanced functionalities, focusing on data reliability, access, and integration with market participants.

- **Data Access**: The MVP would incorporate Role-Based Access Control (RBAC), ensuring that only authorised parties can access specific data based on their roles. This tiered access control would specifically differentiate permissions for customer agents and retailers, based on regulatory requirements, enhancing both data security and operational efficiency.
- **Data Type:** The MVP could support static attributes such as device make, model, and capacity, ensuring fundamental data accuracy and consistency while following with existing DER Register processes. Future enhancements could expand to operational parameters and firmware details, offering deeper insights into asset performance and enabling more advanced market interactions.
- **Data Frequency**: The MVP is intended to introduce the ability to include structured data updates, triggered by annual schedules or key events such as ownership transfers or system modifications, ensuring data accuracy and reliability. Over time, updates could evolve to include event-driven updates, enhancing responsiveness and automation.
- **Data Integration**: The proposed MVP supports structured static and periodic updates, enabling automated data transfers enabling seamless integration with existing data processes where feasible. Future developments will introduce automated event-driven updates, incorporating operational telemetry and customer preferences to optimise customer outcomes, grid management and market integration. These advancements will be complemented by additional dataset access linkages, expanded role-based access for authorised parties, and improved security measures through enhanced standardisation and authentication protocols, creating a more comprehensive and secure data ecosystem.

This use case ensures an efficient and secure exchange of accurate CER Standing Data via the CER Data Exchange, facilitated by the MITE infrastructure. The framework distinguishes two key components: the DER Register as the system of record, and the CER Data Exchange for data linkage and data transfer infrastructure. Foundational capabilities from IDAM and IDX support core functionalities, which enable standardised data sharing, authorised access, flexible exchange methods, and data validation. The CER Data Exchange would act as an upload pipeline for data producers while distributing notifications and updated information to participants through push/pull mechanisms.

It is crucial to note that while MITE provides foundational capabilities, additional data sharing capability and operational frameworks would need to be developed to achieve the desired outcomes of this and other use cases. The table below highlights the additional capability required for each proposed design characteristic.

Table 4: High Level Design – Broader Access to CER Standing Data

LEGEND ☑ Full Covered by MITE or other systems ➲ Partially Covered by MITE or other systems ❖ New Build		
Services	Minimum Viable Product (MVP)	Future Functionality
Functional Services		
Security & Access Protects data integrity,	☑**RBAC Authentication:** Implement identity verification with multi-tiered RBAC permissions for differentiated access using IDAM capability.	❖ **Expanded Access:** Extend limited/full access and controls to include additional authorised parties.

LEGEND ☑ Full Covered by MITE or other systems ➲ Partially Covered by MITE or other systems ❖ New Build		
confidentiality, and availability.	☑ **Tiered Access Control:** Enable role-based access for customer agents and retailers based on regulatory requirements. ☑ **Zero-Trust Security:** Enforce continuous verification security for all data access events. ☑ **Encryption Management:** Apply data encryption protection controls aligned to the compliance requirements.	
Data Integration Enables seamless sharing of CER data through standardised APIs.	☑ **API Capability:** Leverage IDX and IDAM infrastructure to enable read/write functionality with quality controls for authorised parties. ➲ **System Integration:** Connect with the DER Register, compliance registers and regional data portals. Where feasibility overcome manual entry through automated data ingestion. ☑ **Interoperability Standards:** Implement consistent protocols and common connection patterns. ☑ **Periodical updates:** Enable post installation updates, particularly as they may affect the CER operational characteristics, to ensure device information is up to date and remains accurate.	❖ **Event-Based Updates:** Automatically send updated data when changes occur, using assurance checkpoints to ensure quality. ❖ **Aggregator Connections:** Establish customer agent operational linkages to CER asset types via aggregator systems.
Data Processing Ensures standing data accuracy, consistency, and accessibility.	☑ **Schema Validation:** Enforce schema-based automated validation for all standing data entries. ➲ **Data Lineage:** Data lineage tracking to maintain an audit trail record and verify changes to the CER Standing Data.	❖ **NMI Visibility:** Implement detailed NMI tracking with comprehensive historical logs. ❖ **Consistency Verification:** Develop system-wide validation across data platform (e.g. Backstop certification could help verify quality of CER Standing Data sets).
Business Logic Defines and enforces rules for standing data governance.	☑ **Core Rules:** Core business rules for managing, updating, and validating CER Standing Data within the limitation of legal and regulatory frameworks. ➲ **Compliance Validation:** Automate compliance validation for standing data based on predefined regulatory requirements. ➲ **Anomaly Detection:** Anomaly detection to flag discrepancies in submitted data and implement data integrity measures through rule-based write access. ➲ **Standard Schema Formats:** Use extensible schemas with flexibility to include network, OEM or customer agent specific fields.	❖ **Compliance Detection:** Enable anomaly detection for automated standing data compliance enforcement. ❖ **Flexible Rule Engines:** Flexible rule engines to support evolving regulatory requirements. ❖ **Cross-Platform Policies:** Cross-platform policy enforcement to ensure alignment with market and regulatory frameworks.
User Interface Provides dashboards and tools for managing standing data.	☑ **User Interface:** API access only for system-to-system standing data integration and no user interface proposed for the MVP. ➲ **NEM DER Dashboards:** Improve the existing AEMO DER Dashboard. ➲ **CER Data Portal:** Adapt the DER Register Portal to include the updated schema and to enable additional functionality.	❖ **Custom UI:** Customisable user interfaces for enhanced data reporting & analytics. ❖ **Multi-Device Support:** Multi-device accessibility, including web and mobile portals for standing data management. ❖ **Workflow Tools:** Interactive workflow tools for managing data discrepancies and updates.
Reporting & Audit Ensures compliance and transparency in standing data management.	❖ **Audit Logs:** Implement compliance tracking, encryption, and audit logging. ❖ **Compliance Reporting:** Establish foundational compliance reporting. ❖ **Historical Access:** Role-based access to historical standing data logs for investigation and compliance review.	❖ **Predictive Compliance:** Proactively detect data or compliance inconsistencies. ❖ **Self-Service Logs:** Backlog trails for stakeholders to track data modifications at a device and NMI level. ❖ **Anomaly Resolution:** Automated anomaly resolution workflows to correct standing data errors in real time.

LEGEND ☑ Full Covered by MITE or other systems ➲ Partially Covered by MITE or other systems ❖ New Build		
Operational Services		
Exchange Operations Ensures standing data reliability, scalability, and resilience.	❖ **Service Management:** Operational support to enable efficient sharing of CER Standing Data, including incident tracking, uptime monitoring and workflow support. ❖ **Incident Management:** Protocols to resolve network limit data discrepancies. ❖ **Scalability:** Enable scalability linked to CER market growth, customer switching and additional technology types, with the capability to make periodical data accuracy updates.	❖ **Performance Monitoring:** Implement proactive service quality measurement and reporting. ❖ **Business Continuity:** Develop robust processes for ensuring uninterrupted service. ❖ **Operational Maturity:** Create pathway for advancing service capabilities.
Coordination & Engagement Supports structured collaboration for standing data governance.	❖ **Stakeholder Coordination:** Facilitate working groups to align data-sharing practices and schema standardisation. ❖ **Change Management:** Manage transition and onboarding of participants joining the exchange. ❖ **Industry Communications:** Develop frameworks for consistent information sharing.	❖ **Participant Onboarding:** Create streamlined processes for new data providers and consumers. ❖ **Feedback Integration:** Establish mechanisms to incorporate stakeholder insights. ❖ **Relationship Management:** Develop structured approach to ongoing engagement.
Governance & Oversight Ensures regulatory compliance and enforcement for standing data.	❖ **Operating Model:** Establish CER Data Exchange governance structures and decision frameworks. ❖ **Compliance Monitoring:** Create processes for assessing adherence to regulatory requirements. ❖ **Performance Reporting:** Develop regular reporting on operational metrics and service levels. ❖ **Regulatory Reform:** Identification of any regulatory changes required to enable the efficient operation of the CER Data Exchange. This may result in the preparation of rule changes.	❖ **Dynamic Compliance:** Introduce dynamic regulatory compliance monitoring to identify standing data inaccuracies. ❖ **Dispute Resolution:** Deploy automated dispute resolution frameworks for standing data discrepancies. ❖ **Adaptive Policies:** Develop adaptive governance policies that align with evolving regulatory requirements.

3.1.4 Implementation Considerations

The implementation of the *Broader Access to CER Standing Data* use case is intended to deliver significant advancements in data accuracy, market efficiency, and grid reliability. By leveraging a structured, secure, and interoperable MITE data-sharing infrastructure, stakeholders could benefit from greater transparency, security, and access to CER Standing Data. This use case would establish a robust foundation for future energy market evolution, ensuring seamless integration with emerging CER technologies and evolving regulatory requirements.

- **Challenge and Purpose:** The *Broader Access to CER Standing Data* use case is designed to address the critical challenge of inaccessible and inconsistent CER data.
- **Core Architecture:** The framework establishes two distinct components:
    1. an exchange layer connecting diverse stakeholders through secure and standardised interfaces.
    2. A system that retrieves information from the source of truth and exchanges data with authorised parties
- **Key Capabilities:** Leveraging the MITE functionality, the use case would deliver standardised data sharing, authorised access controls, robust validation mechanisms and flexible distribution methods.

- **Implementation Approach:** The proposed MVP follows a staged delivery model with comprehensive risk management strategies addressing data migration challenges, stakeholder adoption, security considerations, technical complexity, and resource constraints.
- **Strategic Alignment:** By leveraging MITE infrastructure and conforming to global data standards, this initiative intends to position Australia's energy sector to better manage decentralised energy while reducing administrative burden and delivering greater customer value.

3.1.5 Key Risks and Mitigations

Table 5: Risks and Mitigations

Risk	Details	Proposed Mitigation
Data Migration and Integration Challenges	• The transition from current systems to the new framework involves data migration processes. • Legacy data structures may contain inconsistencies, gaps, or non-standardised formats that could compromise data integrity during transfer. Integration with existing. • DER Register processes requires careful planning to maintain operational continuity while implementing new capabilities.	• Implement rigorous data profiling, cleansing routines and staged migration with comprehensive validation gates before full transition.
Stakeholder Adoption and Change Management	• Success depends heavily on stakeholder adoption across the energy ecosystem. Resistance to change from installers, DNSPs, retailers, and other participants availability and ability to support will impact implementation. Varying levels of technical capability among participants may create adoption barriers, particularly for smaller organisations with limited resources.	• Develop tailored engagement strategies, provide technical support resources, build in longer lead times for stakeholders to gain access and demonstrate early value through pilot programs with key stakeholders.
Security and Privacy Considerations	✓ Enhanced data sharing introduces potential vulnerabilities. Expanded access points create additional attack surfaces for cyber threats, while more comprehensive data collection raises privacy concerns regarding customer information. Compliance with evolving regulatory requirements adds complexity to implementation.	• Apply zero-trust architecture principles, conduct regular security assessments, and embed privacy-by-design approaches with continuous compliance monitoring.
Technical Complexity and Interoperability	• Achieving true interoperability across diverse systems requires overcoming significant technical challenges. Varying data schemas, communication protocols, and system architectures among participants may create compatibility issues. Establishing robust validation mechanisms without introducing excessive operational friction represents a difficult balance.	✓ Develop reference implementations, establish robust conformance testing procedures, and implement flexible adapters with clear migration pathways.
Resource and Timeline Constraints	• Implementation requires resources across multiple organisations. Competing priorities, resource limitations, and coordination challenges could lead to delays or incomplete adoption. A phased approach introduces dependency risks, where delays in foundational components impact subsequent capabilities.	• Create realistic delivery roadmaps with appropriate contingencies, prioritise capabilities by value, and establish clear governance for resource allocation decisions.

3.1.6 Use Case Outcomes

The *Broader Access to CER Standing Data* use case aims to enhance the accessibility of CER Standing Data across the energy market. It has been designed to deliver five primary outcomes:

- **Access to Data:** Provide expanded access to CER Standing Data for participants who currently do not have access but need it to effectively perform their roles and make informed decisions.
- **Improved Data Integrity**: Significantly enhance the integrity and accuracy of data, ensuring that all stakeholders have access to reliable and precise information.

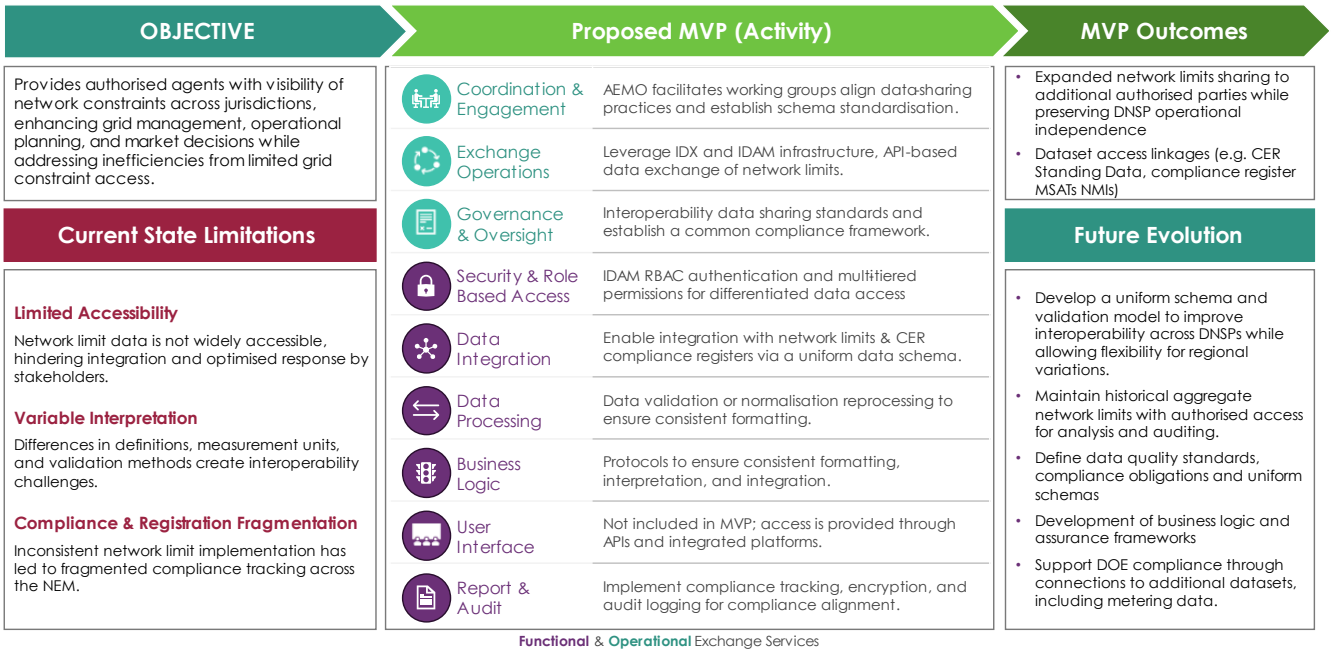
- **Expanded Market Efficiency**: Considerably improve market efficiency through better access to CER Standing Data, facilitating smoother transactions and more effective market operations.
- **Enhanced Grid Reliability**: Strengthen and maintain grid reliability and operational efficiency, ensuring that the grid can meet current and future demands effectively and sustainably.
- **Regulatory Compliance**: Ensure strengthened and improved regulatory compliance, helping all participants adhere to the necessary standards and regulations more effectively.

3.2 Use Case: Efficient Sharing Network Limits

3.2.1 Use Case Overview

The *Efficient Sharing of Network Limits* use case addresses the challenge of limited accessibility and inconsistent interpretation of network constraint data across the energy market. Currently, network limit information is not widely accessible, hindering integration and optimised response by stakeholders who need the information. This fragmentation creates operational inefficiencies and impedes effective grid management, planning, and market decision-making.

Figure 9: Efficient Sharing Network Limits use case overview



This use case aims to provide authorised agents with visibility of network constraints across jurisdictions through a standardised, secure data exchange framework. By leveraging the MITE infrastructure, the initiative establishes API-based data exchange capabilities that ensure consistent formatting, interpretation, and integration of network limits. The use case seeks to balances standardisation with flexibility, accommodating existing DNSP systems while implementing automated data transformation where necessary.

The anticipated outcomes include expanded sharing of network limits to additional authorised parties while preserving DNSP operational independence, improved dataset access linkages (e.g., connections to CER Standing Data, compliance registers, and MSATs NMIs), and enhanced interoperability across DNSPs.

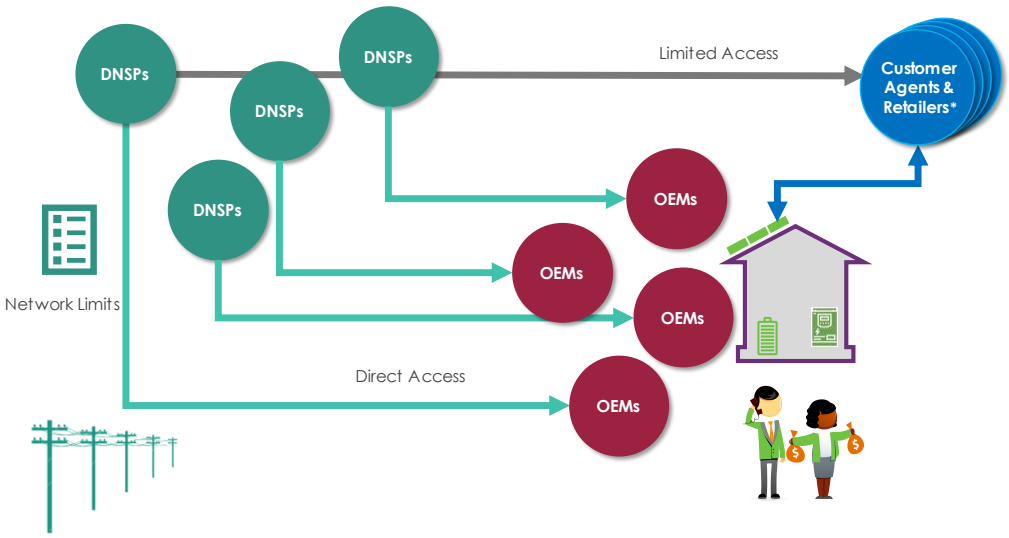
3.2.2 Current Challenges

Currently, DNSPs rely on bespoke integrations between utility servers and customer devices, which is manageable for their own operations. However, the real challenge lies in providing adequate visibility for other

parties. This lack of accessibility undermines efficiency outcomes, which this use case aims to address through a standardised and secure data exchange framework.

The diagram below seeks to illustrate the current network limit data sharing frameworks. DNSPs are the primary generators of network limit information generated by their inhouse utility servers. The data sharing is typically via non-standardised pathways using varying protocols, data formats, and authentication methods. Most DNSP target direct data sharing to OEMs for operational purposes, which limits the access to network limit data by customer agents (i.e. site controllers, home energy management systems, aggregators, retailers and embedded network operators), creating an information gap that hinders their ability to also optimise their operations within the network limits. This use case is seeking to expand the accessibility of the network limit data in a standardised format.

Figure 10: Sharing Network Limits Data Capture



* Note: Customer agents are assumed to include site controllers (i.e. HEMs), aggregators, embedded network operators etc and may include some OEMs.

The existing frameworks for sharing network limit data present several significant challenges that impede efficient grid management and market efficiency, these include:

- **Integration Complexity**: The reliance on bespoke integrations between entities and each DNSP increases technical investment and operational costs for data users. Varying authentication methods and the lack of standardised onboarding processes create significant barriers for smaller aggregators and new entrants.
- **Inconsistent Formatting:** Differences exist in how network limits are formatted and shared across DNSPs. This lack of standardisation creates interoperability challenges when attempting to integrate data from multiple sources. Variations in units of measurement, constraint definitions, and calculation methodologies make it difficult for stakeholders to develop consistent approaches to network limit management, particularly when operating across different distribution networks areas.
- **Limited Visibility and Data Accessibility**: Network limit data is not widely accessible to relevant stakeholders, creating information asymmetry in the market. This restricted access prevents key stakeholders, including Retailers, Aggregators, and Virtual Power Plant operators, from effectively

planning and optimising their operations based on actual network constraints, resulting in suboptimal resource allocation and potentially missed opportunities for grid support services.

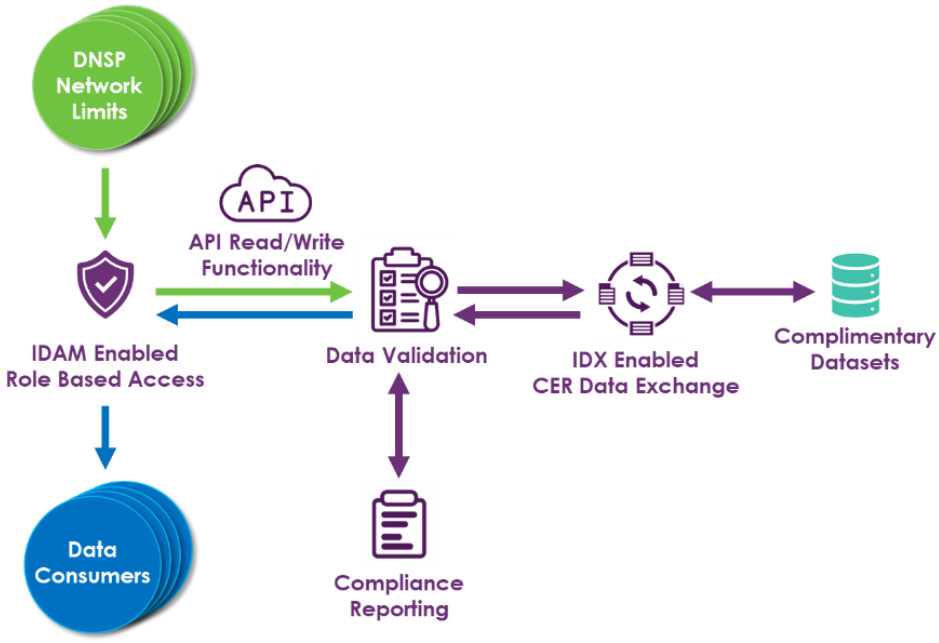
- **Scalability Challenges**: As CER adoption continues to rise, the fragmented framework risks amplifying operational inefficiencies, creating bottlenecks, and hindering the development of advanced grid management strategies such as Dynamic Operating Envelopes (DOEs) and Flexible Export Limits (FELs).

These challenges collectively hamper the market's ability to efficiently navigate network constraints, potentially resulting in suboptimal utilisation of the existing grid infrastructure, higher costs for consumers, and barriers to the integration of renewable energy resources. This use case proposes to address these issues through a balanced approach that improves data accessibility, while respecting operational boundaries and ensuring appropriate security and governance frameworks.

3.2.3 Proposed Minimum Viable Product & Future Evolution

This use case seeks to establish a standardised approach for sharing network limits, implementing a solution that balances immediate operational needs with strategic future capabilities using the MITE infrastructure.

Figure 11: MVP - Efficient Sharing of Network Limits illustration



The above diagram illustrates the proposed use case architecture. DNSPs, as data producers, share network limits through the CER Data Exchange via an API in a standardised format. IDAM enables secure, role-based access for authorised data consumers, while connections to other datasets provide complementary information and context. A refreshed dashboard provides greater aggregated data visibility and insights. This architecture creates an integrated ecosystem that enables validation, secure exchange, and appropriate access to network limit data while connecting with related systems and maintaining compliance.

The objective is to share network limits which will improve the efficiency and accuracy of grid management, planning, and market decision-making. These foundational capabilities of the MVP would evolve across four dimensions.

- **Data Access:** Ensuring that relevant stakeholders have secure access to network limit data is essential to the success of this use case. The proposed MVP seeks to implement robust access control mechanisms, including role-based access controls (RBAC) facilitated by IDAM, to ensure that only authorised parties can access the network limit data. Future iterations could enhance these access controls, incorporating more advanced authentication protocols and potentially integrating with other data security frameworks to further safeguard the information and streamline access for authorised users. These improvements have been designed to support the evolving needs of the energy market and enable more sophisticated data management capabilities.
- **Data Type:** The proposed MVP supports static network constraint data ensuring format consistency while integrating with existing DNSP systems. Future enhancements could expand to dynamic constraint data including real-time operational limits, forecasted constraints, and temporal variations, enabling more sophisticated grid management and responsive market mechanisms.
- **Data Frequency:** The MVP would implement a batch-based approach with scheduled updates for routine constraints and optional real-time updates for critical constraints, ensuring data sharing value while managing implementation complexity. Over time, updates could evolve toward more comprehensive real-time data exchange capabilities, enhancing responsiveness and supporting dynamic constraint management.
- **Data Integration:** The proposed MVP would support standardised API interfaces for network limits with consistent schemas co-designed with DNSPs, enabling automated data transformation where necessary to accommodate existing systems. Future developments could establish connections to additional operational datasets, including metering data and DOEs frameworks, and enhanced compliance mechanisms. These advancements would be complemented by expanded dataset access linkages, additional role-based access for authorised parties, and improved security measures through enhanced standardisation and authentication protocols.

This use case would ensure structured, secure, and standardised management of network limit data via the IDX-enabled CER Data Exchange. It distinguishes between two separate components: the existing DNSP systems that serve as the source of truth for network constraints, and an exchange layer that links these systems with authorised parties. Foundational capabilities from MITE support core functionalities, such as standardised data sharing, authorised access, flexible exchange methods, data validation and API integration. Additionally, the Exchange is intended to function as both a data validation pipeline for network limit producers and a distribution mechanism for sending notifications and updated constraint information to participants through push/pull mechanisms. These capabilities would ensure automation, scalability, and regulatory alignment, creating a data journey that keeps network limit information accurate, accessible, and standardised, while preserving DNSP operational independence and serving as a reliable foundation for future energy market evolution.

Table 6: High Level Design – Efficient sharing of Network Limits

LEGEND ☑ Full Covered by MITE or other systems ➲ Partially Covered by MITE or other systems ❖ New Build		
Services	Minimum Viable Product (MVP)	Future Functionality

LEGEND ☑ Full Covered by MITE or other systems ➲ Partially Covered by MITE or other systems ❖ New Build		
Functional Services		
Security & Access Protects data integrity, confidentiality, and availability.	☑ **RBAC Authentication:** Implement identity verification with multi-tiered RBAC permissions for differentiated access using IDAM capability. ☑ **Tiered Access Control:** Enable role-based access for customer agents and retailers based on regulatory requirements. ☑ **Zero-Trust Security:** Enforce continuous verification security model for all data access. ☑ **Encryption Management:** Apply data encryption protection controls aligned to the compliance requirements.	❖ **Expanded Access:** Extend limited/full access and controls to include additional authorised parties while preserving DNSP operational independence and security.
Data Integration Enables seamless sharing of network limits through standardised APIs.	☑ **API Capability:** Leverage IDX and IDAM infrastructure, API-based data exchange of network limits. ➲ **System Integration:** Enable integration into a common network limit data schema and linkage to various compliance registers. ☑ **Interoperability Standards:** Implement consistent protocols and connection patterns.	❖ **Schema Governance:** Develop assurance checkpoints to enable interoperability across DNSPs, while allowing regional variations. ❖ **Aggregator Connections:** Establish linkages to aggregator platforms. ❖ **DOE Compliance:** Support compliance validation through linkages to complimentary datasets, including metering data.
Data Processing Ensures standing data accuracy, consistency, and accessibility.	☑ **Data Validation:** Enforce schema-based automated validation for all network limit data entries. ➲ **Data Transformation:** Implement automated transformation into a common network limit data schema, accommodating existing DNSP systems.	➲ **Anomaly Detection:** Flag discrepancies in network limit data. ➲ **Historical Data:** Maintain historical aggregate network limits with authorised access for analysis and auditing. ➲ **Quality Standards:** Define data quality standards, compliance obligations and uniform schemas.
Business Logic Defines and enforces rules for network limit data governance.	❖ **Core Rules:** Protocols to ensure consistent formatting, interpretation, and integration. ❖ **Compliance Validation:** Automate compliance validation based on regulatory requirements. ❖ **Standard Schema Formats:** Co-design with DNSPs to create a balanced common network limit schema format.	❖ **Assurance Frameworks:** Development of business logic and assurance frameworks. ❖ **Flexible Rule Engines:** Support evolving regulatory requirements (e.g. IPRR) ❖ **Cross-Platform Policies:** Ensure alignment with market and regulatory frameworks.
User Interface Provides dashboards and tools for managing network limit data.	☑ **User Interface:** API access only for system-to-system data sharing and no user interface proposed for the MVP. ❖ **Batch Data Exchange:** Share network limits in batch-based approach with optional real-time updates for critical constraints.	❖ **Custom UI:** User interfaces for network limit data reporting & analytics. ❖ **Multi-Device Support:** Web and mobile portals for network limit data. ❖ **Dashboard Visualisations:** Visualisation tools for critical constraint monitoring.
Reporting & Audit Ensures compliance and transparency in network limit data management.	❖ **Audit Logs:** Implement compliance tracking, encryption, and audit logging. ❖ **Compliance Reporting:** Establish foundational compliance reporting. ❖ **Historical Data Access:** Consider role-based access to historical network limit data logs.	❖ **Predictive Compliance:** Proactively detect data or compliance inconsistencies. ❖ **Self-Service Logs:** Backlog trails for tracking network limit data modifications. ❖ **Anomaly Resolution:** Automated workflows to correct network limit data errors.
Operational Services		
Operations & Management Ensures network limit data reliability,	❖ **Service Management:** Operational support to enable efficient sharing of network limits, including incident tracking, uptime monitoring and workflow support.	❖ **Performance Monitoring:** Implement proactive service quality measurement and reporting. ❖ **Business Continuity:** Develop robust processes for ensuring uninterrupted service.

LEGEND ☑ Full Covered by MITE or other systems ➲ Partially Covered by MITE or other systems ❖ New Build		
scalability, and resilience.	❖ **Incident Management:** Protocols to resolve network limit data discrepancies. ➲ **Scalability:** Assumed batched weekly network limit data flows, with the option for high priority real-time pushed updates for critical constraints impacting network limits.	❖ **Operational Maturity:** Create pathway for advancing service capabilities.
Coordination & Engagement Supports structured collaboration for network limit governance.	❖ **Stakeholder Coordination:** Facilitate working groups to align data-sharing practices and schema standardisation. Assumed to start with voluntary adoption by DNSPs, transitioning to include obligations outlined in the regulatory framework. ❖ **Change Management:** Manage transition and onboarding of participants joining the exchange. ❖ **Industry Communications:** Develop frameworks for consistent information sharing.	❖ **Participant Onboarding:** Create streamlined processes for new data providers and consumers. ❖ **Feedback Integration:** Establish mechanisms to incorporate stakeholder insights. ❖ **Relationship Management:** Develop structured approach to ongoing engagement.
Governance & Oversight Ensures regulatory compliance and enforcement of network limits.	❖ **Operating Model:** Establish CER Data Exchange governance structures and decision frameworks. ❖ **Compliance Monitoring:** Create processes for assessing adherence to regulatory requirements. ❖ **Publish Limits Only:** Preserve DNSP operational independence by only publishing network limits and not enabling any control functionality. ❖ **Regulatory Reform:** Identification of any regulatory changes required to enable the efficient operation of the CER Data Exchange. This may result in the preparation of rule changes.	❖ **Dynamic Compliance:** Introduce dynamic regulatory compliance monitoring to identify data inconsistencies. ❖ **Dispute Resolution:** Deploy automated dispute resolution frameworks for data inconsistencies. ❖ **Adaptive Policies:** Develop adaptive governance policies that align with evolving regulatory requirements.

3.2.4 Implementation Considerations

The implementation of the *Efficient Sharing of Network Limits* use case is intended to deliver significant advancements in network constraint data visibility, market efficiency, and grid reliability. By leveraging a structured, secure, and interoperable MITE data-sharing infrastructure, stakeholders would benefit from greater transparency, security, and access to network constraint information. This use case has been designed to establish a robust foundation for future energy market evolution, ensuring seamless integration with advanced grid management approaches and evolving regulatory requirements.

- **Challenge and Purpose:** The *Efficient Sharing of Network Limits* use case seeks to address the critical challenge of fragmented integrations, inconsistent data sharing formats, and limited accessibility of network constraint information.
- **Core Architecture:** The framework establishes two distinct components:
    1. existing DNSP systems serving as the authoritative source of truth for network limits, and
    2. an exchange layer connecting diverse stakeholders through secure and standardised interfaces while preserving DNSP operational independence.
- **Key Capabilities:** Leveraging the MITE functionality, the use case aims to deliver standardised network limit data sharing, authorised access controls, robust validation mechanisms and flexible distribution methods.
- **Implementation Approach:** The proposed MVP follows a staged delivery model beginning with voluntary adoption by DNSPs while transitioning to regulatory framework obligations. Comprehensive risk management strategies address data transformation challenges, stakeholder adoption, security considerations, technical complexity, and resource constraints.
- **Strategic Alignment:** By leveraging MITE infrastructure and implementing consistent data sharing standards, this use case seeks to better position Australia's energy sector to manage network constraints in an increasingly decentralised energy landscape while reducing integration overhead and enabling more efficient market operations.

3.2.5 Key Risks and Mitigations

Table 7: Risks and Mitigations

Risk	Details	Proposed Mitigation
Data Transformation and Schema Standardisation	• Network limit data formats vary significantly across DNSPs, with inconsistent definitions, units, and granularity. • Creating a uniform schema while accommodating regional variations requires balancing standardisation with flexibility. • Automated transformation processes may introduce errors if not properly validated, potentially compromising operational decisions based on network constraint data.	• Implement collaborative schema development through industry working groups to ensure broad acceptance. • Develop robust data transformation patterns with comprehensive validation rules and anomaly detection. • Use a phased transformation approach with parallel validation against source systems before full transition.

Risk	Details	Proposed Mitigation
DNSP Operational Independence Concerns	• DNSPs may resist sharing detailed network limit data due to concerns about operational independence[13]. • Publication of constraint information may raise questions about decision-making authority. • Potential misalignment between constraint information and operational reality could create confusion about grid management responsibilities.	• Clearly delineate that the exchange only publishes limits without enabling control functionality. • Implement appropriate disclaimers and usage policies that clarify DNSP operational independence. • Develop governance frameworks that respect existing regulatory roles while enhancing information transparency.
Security and Access Control Complexity	• Network limit data has varying sensitivity levels requiring sophisticated access control mechanisms. • Multiple stakeholders with different access needs creates complex permission management requirements. • Integration with existing security frameworks across diverse organisations introduces compatibility challenges.	• Implement tiered RBAC with fine-grained permissions based on data sensitivity and stakeholder roles. • Adopt zero-trust security principles with continuous verification for all network limit data access. • Conduct regular security assessments with specific focus on network constraint data protection.
Scalability and Performance Constraints	• Growing CER penetration will dramatically increase the volume and frequency of network limit updates. • Real-time constraint data sharing creates significant performance demands on infrastructure. • Maintaining system responsiveness during peak constraint periods is critical for operational reliability.	• Design infrastructure with significant headroom for expected CER growth trajectories. • Implement progressive performance monitoring with early warning systems for capacity constraints. • Develop tiered data delivery approaches prioritising critical constraint information during high-demand periods.
Regulatory Alignment and Evolution	• Current regulatory frameworks may not fully support the obligation to share standardised network limit information. • Evolution toward Dynamic Operating Envelopes will require regulatory adaptation. • Balancing voluntary adoption with eventual mandatory compliance presents transition challenges.	• Engage proactively with regulatory bodies to align development with emerging frameworks. • Design flexible implementation approaches that can adapt to evolving regulatory requirements. • Create a staged compliance pathway with clear transition points from voluntary to mandatory participation.

3.2.6 Use Case Outcomes

The implementation of *Efficient Sharing of Network Limits* use case aims to deliver significant advantages through increased visibility and standardisation of data in a consistent and common way across the industry. It is intended to deliver four primary outcomes:

- **Improved Access**: Implementing a robust access framework, aligned with role-based access controls, and secured through strong authentication mechanisms, ensures that only authorised users can access critical network constraint information.
- **Sharing of Network Limits:** Expanded sharing of network limits ensures this critical information reaches those who benefit from it which empowers organisation to make informed decisions and contributes to a more efficient energy market which ultimately benefit customers.

[13] Operational independence refers to the ability of networks to manage and control their own network operations without external interference, in accordance with their network license obligations.

- **Improved Consistency**: Standardisation of network limit data through a common schema co-designed with industry, promotes consistent and efficient communications. This development also facilitates better decision-making, bolstering market efficiency and strengthening grid reliability.
- **Enhanced Operational Planning**: The expanded access to shared network limit data will likely strengthen grid reliability and lead to improved operational planning, reducing the risk of disruptions and ensuring a stable decentralised energy system.

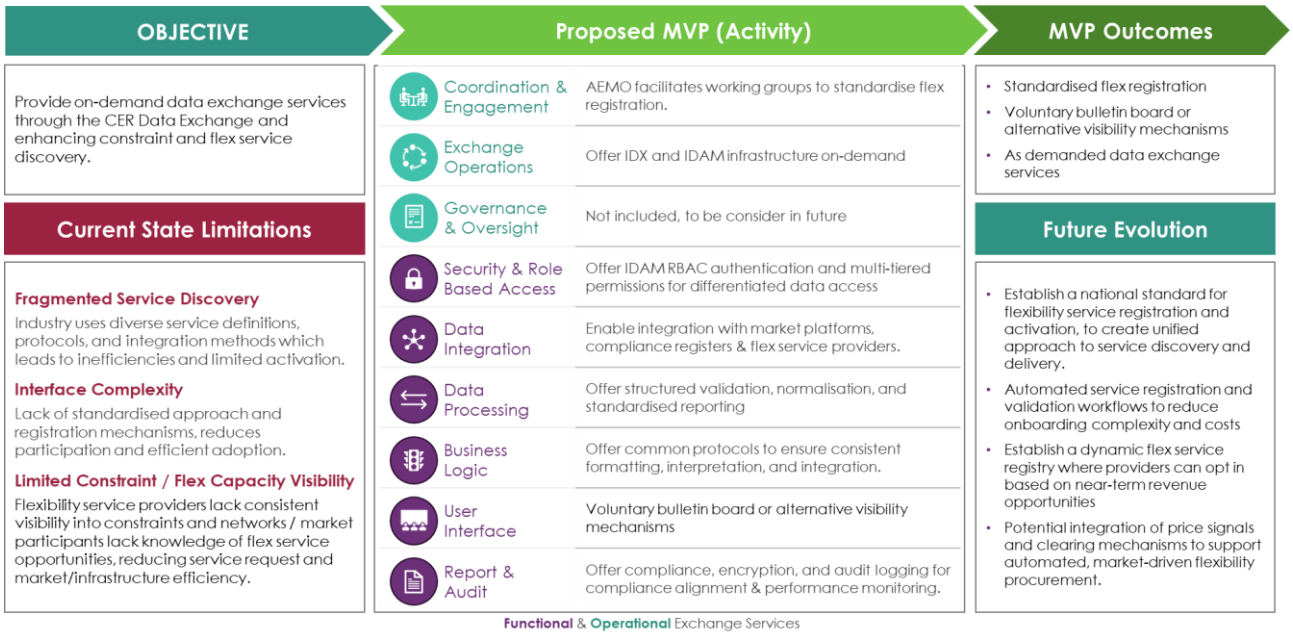
3.3 Use Case: Network Support & Flexibility Capability Discovery

3.3.1 Use Case Overview

The *Network Support & Flexibility Capability Discovery* use case seeks to address the need for standardised visibility of constraints and exchange of flexibility service capability data within the energy market. This use case would enable flex providers, constrained parties, and market participants to discover and share information about constraints and available flexibility resources through a secure, standardised framework.

Whilst use cases 1 & 2 were seen as priority and prerequisites by stakeholders, additional support and clarity around this use case is needed. It was unclear to Workshop 3 participants whether there is sufficient value in implementing this use case as a priority. Some stakeholders raised concerns that the data to enable this use case is not yet readily available. This stakeholder feedback has been reflected in the implementation roadmap, which shows a tentative deployment of this use case as a priority at this stage.

Figure 12: Network Support & Flexibility Capability Discovery use case overview



This use case aims to standardise the registration of flexibility services and improve the visibility of network constraints and available flexibility capacity. By utilising the MITE infrastructure, it seeks to establish a secure and voluntary data exchange framework that ensures the consistent formatting and validation of flexibility services, along with the creation of a common registration system and bulletin board for efficient service discovery.

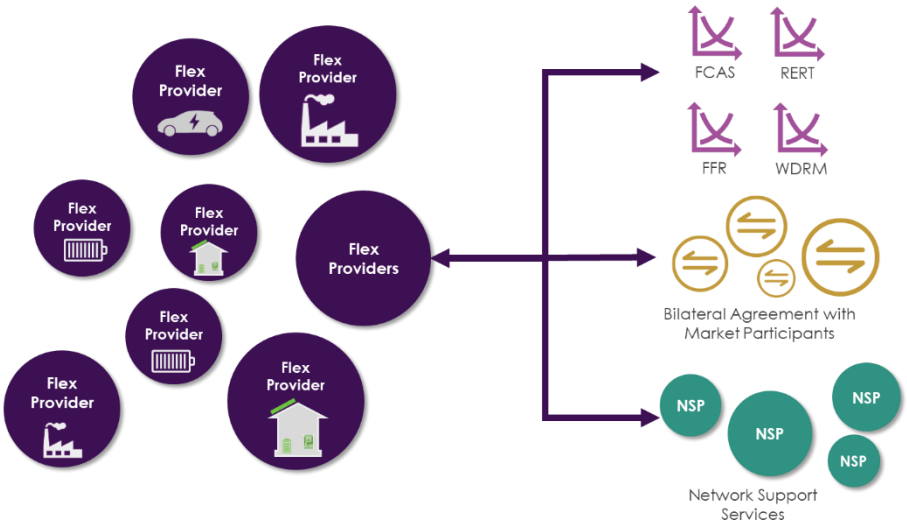
The anticipated outcomes include standardised flexibility service registration protocols, voluntary bulletin board mechanisms for constraint and capacity visibility, on-demand data exchange services, and improved data linkages between flexibility providers and constrained parties. These enhancements would create a foundation for future evolution toward a national standard for flexibility service registration and activation, automated workflows, and market-driven flexibility procurement.

3.3.2 Current Challenges

Flexibility service providers currently navigate multiple market frameworks and NSPs through disparate registration processes and inconsistent data exchange mechanisms. This fragmentation can affect individual assets, aggregated distributed energy via VPPs and demand-responsive providers differently, creating an inefficient ecosystem that constrains the discovery and utilisation of flexibility services. Furthermore, trials like Piclo's platform[14] may contribute to additional interfaces, adding to potentially additional layers of complexity for providers seeking seamless integration and optimal resource utilisation.

The diagram illustrates the current flexibility service discovery landscape. Various flexibility providers, from residential batteries and electric vehicles operating in VPPs to industrial loads and commercial buildings providing demand response, must navigate connections across multiple market frameworks (FCAS, RERT, FFR, WDRM), sometime via bilateral agreements with market participants, and NSPs for Local Network Support Services (LNSS). Each provider faces unique challenges based on their operational model, with VPP operators managing aggregated resources across multiple customer sites, while demand response providers focus on coordinated load reduction at specific locations.

Figure 13: Current Flexibility Service Discovery Landscape



The existing framework presents several key challenges impeding efficient market participation and grid optimisation:

- **Fragmented Service Discovery**: Disparate service definitions, protocols, and integration methods force flexibility service providers to manage multiple registration processes and technical requirements. This increases operational complexity and costs while limiting effective discovery and activation of flexibility services. The inconsistent approaches between regions further complicates participation for providers operating across multiple distribution network areas.
- **Interface Complexity**: Varying data formats, authentication methods, and registration procedures across NSPs and market frameworks create significant adoption barriers, particularly for smaller aggregators and new market entrants. These technical differences require custom integration solutions

[14] Australian networks CitiPower and Powercor and United Energy share network constraints on Piclo platform

that increase IT expenditure and operational overhead, delaying market entry and reducing participation.

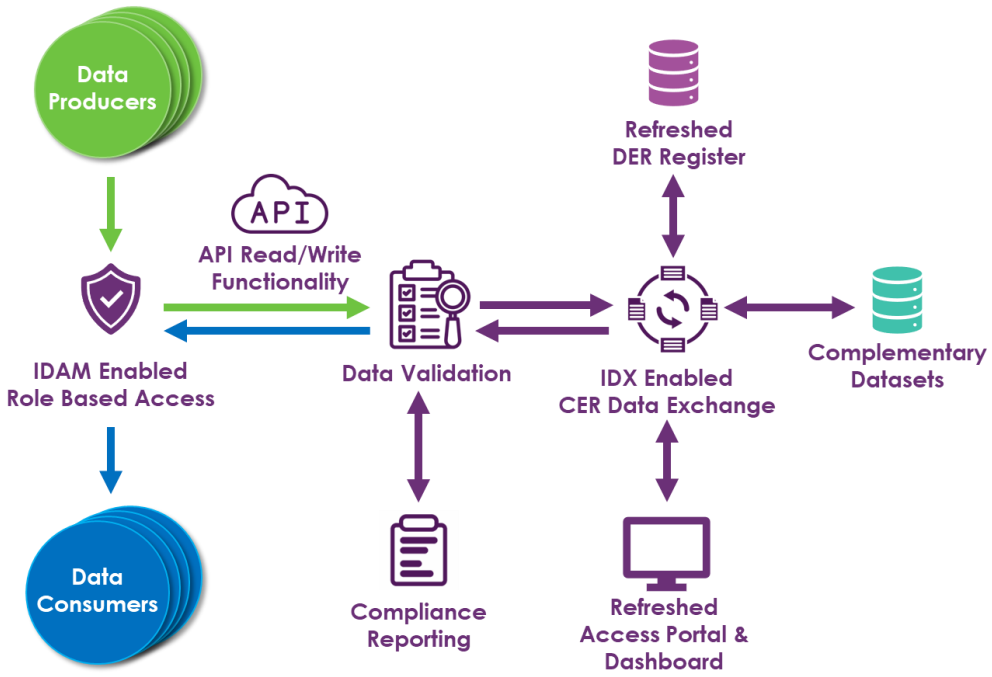
- **Limited Constraint and Capacity Visibility**: Flexibility providers lack consistent visibility of network constraints, while NSPs and market participants have limited visibility of available flexibility resources. This information asymmetry prevents effective matching of flexibility supply with constraint needs. The absence of standardised mechanisms or constraint visibility tools results in missed opportunities for both constraint mitigation and service provision.
- **Market Fragmentation**: Multiple pathways for flexibility services (wholesale markets, FCAS, network support) operate in isolation with minimal coordination. This fragmentation inhibits value stream stacking and cross-market optimisation, reducing the overall economic value of flexibility resources. Market siloes also lead to competing signals and potentially conflicting dispatch instructions, undermining efficient resource utilisation and system reliability.
- **Registration Burden**: Each market framework requires separate registration processes with different data requirements and verification protocols. This administrative burden disproportionately impacts smaller providers and creates inefficiencies across the industry through duplicated effort and inconsistent data quality.

These challenges collectively hinder efficient discovery, access and utilisation of flexibility services, resulting in suboptimal utilisation of decentralised and demand response resources, increased system costs, and barriers to renewable energy integration. Addressing these issues requires balancing improved service discovery with operational independence and appropriate security frameworks, while maintaining voluntary participation to encourage early adoption and industry collaboration.

3.3.3 Proposed Minimum Viable Product & Future Evolution

This use case seeks to establish a standardised approach for flexibility service discovery, balancing operational needs with strategic future capabilities using existing infrastructure. Unlike other use cases, this functionality would be developed and implemented on-demand, responding to stakeholder requirements as they arise rather than as a comprehensive initial build.

Figure 14: MVP - Network Support & Flexibility Capability Discovery illustration



The above diagram illustrates the proposed architecture. Flexibility providers and constrained parties share information through standardised APIs in consistent formats. IDAM enables secure, role-based access for authorised data consumers, while data validation ensures quality and compliance. An IDX-enabled CER Data Exchange would facilitate secure data sharing, with connections to complementary datasets providing context. A voluntary bulletin board would offer visibility of constraints and available flexibility capacity, creating an ecosystem that enables validation, secure exchange, and appropriate access while maintaining voluntary participation. This use case aims to improve efficiency and accessibility of flexibility service discovery through standardisation, recognising that adoption will depend on stakeholder value perception and participation levels.

The objective is to improve efficiency and accessibility of flexibility service discovery, with capabilities developed incrementally on-demand across three dimensions:

- **Registration Approach:** The solution would support standardised flex registration protocols co-designed with industry participants, implemented as requested. This approach ensures format consistency while accommodating different provider types without requiring comprehensive upfront investment.
- **Visibility Mechanisms:** When requested, voluntary bulletin board or alternative visibility mechanisms for network constraints and flex capacity could be implemented. This targeted approach seeks to allow stakeholders to request specific visibility tools based on identified pain points.
- **Data Exchange:** The solution has been designed to deliver as-demanded data exchange services focusing on discovery only when requested by participants. This prevents duplication of effort with existing point-to-point solutions and ensures investment occurs only where clear value exists.

This use case would ensure structured, secure, and standardised discovery while recognising industry readiness varies across stakeholder groups. It distinguishes between existing systems that serve as data sources of flexibility capability and constraint needs, and an exchange layer implemented incrementally as

demand emerges. Core functionalities which are proposed for inclusion are standardised registration, authorised access, flexible exchange methods, and data validation, each implemented when requested.

The on-demand approach acknowledges that the full value proposition emerges through widespread adoption rather than through individual implementations. This wouldallow stakeholders to engage based on identified pain points and specific business needs, creating a pathway for organic growth without requiring simultaneous investment from all parties. This ensures interoperability and market alignment while preserving operational independence, allowing the solution to evolve based on actual market demands rather than predetermined functionality.

Table 8: High Level Design – Network Support & Flexibility Capability Discovery

LEGEND ☑ Full Covered by MITE or other systems ➲ Partially Covered by MITE or other systems ❖ New Build		
Services	Minimum Viable Product (MVP)	Future Functionality
Functional Services		
Security & Access Protects data integrity, confidentiality, and availability for network support and flex services.	☑ **RBAC Authentication:** Implement identity verification with multi-tiered RBAC permissions for differentiated access using IDAM capability. ☑ **Tiered Access Control:** Enable role-based access for authorised stakeholders on a voluntary, as-demanded basis. ☑ **Zero-Trust Security:** Enforce continuous verification security model for data access. ☑ **Encryption Management:** Apply data encryption protection controls aligned to the compliance requirements.	❖ **Expanded Access:** Extend access controls to include additional stakeholders while maintaining voluntary participation.
Data Integration Enables seamless sharing of local network support and flex service data through standardised APIs.	☑ **API Capability:** Offer IDX and IDAM infrastructure on-demand for voluntary data exchange services. ➲ **System Integration:** Enable optional integration with external market platforms, compliance registers, including integrating NSP local network support services platforms & flex service provider systems. ☑ **Interoperability Standards:** Implement consistent protocols to facilitate voluntary participation.	❖ **Establish National Standard:** Create a unified approach to flexibility service registration and activation, supporting service discovery and delivery. ❖ **Aggregator Connections:** Establish linkages to flex service systems while preserving voluntary participation. ❖ **Price Signal Integration:** Support integration of price signals and clearing mechanisms for automated, market-driven flexibility procurement.
Data Processing Ensures data accuracy, consistency, and accessibility.	➲ **Market Facilitation:** Enable the efficient sharing of data based on third party marketplaces or platforms using a common registration frameworks and codesigned schemas. ➲ **Dynamic Registry:** Establish a dynamic flex service registry where providers can opt in based on near-term revenue opportunities.	❖ **Automated Service Registration:** Deploy automated flexibility service registration and validation workflows to reduce onboarding complexity and costs. ❖ **Quality Standards:** Define data quality standards for flex services while maintaining voluntary framework. ❖ **Dynamic Registry:** Develop a dynamic flex service registry where providers can opt in based on near-term revenue opportunities.
Business Logic Defines and enforces rules for network limit data governance.	❖ **Common Protocols:** Offer common protocols to ensure consistent formatting, interpretation, and integration for voluntary participants. ❖ **Compliance Validation:** Automate compliance validation based on regulatory requirements for participating providers.	❖ **Flexible Rule Engines:** Support evolving regulatory requirements and market structures. ❖ **Market Integration:** Integration with market mechanisms for flexibility services. ❖ **Cross-Platform Policies:** Ensure alignment with market and regulatory frameworks.

LEGEND ☑ Full Covered by MITE or other systems ➲ Partially Covered by MITE or other systems ❖ New Build		
	❖ **Anomaly Detection:** Anomaly detection to flag discrepancies in submitted data and implement data integrity measures through rule-based write access. ❖ **Standard Schema Formats:** Co-design with NSPs, market participants and flex providers to establish a common framework while allowing flexible implementation. Implement a basic schema – option to extend as required.	
User Interface Provides dashboards and tools for managing network limit data.	❖ **Voluntary Bulletin Board:** Establish voluntary bulletin board or alternative visibility mechanisms for network constraints, local network support services, and flex capacity information. ❖ **As-Demanded Services:** Provide data exchange services on-demand integrated with third party marketplaces or platforms, assumed no transaction functionality would be included in the MVP. ❖ **Discovery Only:** MVP supports flexibility streamlined discovery.	❖ **Dynamic Service Registry:** Establish a dynamic flex service registry where providers can opt in based on near-term revenue opportunities. ❖ **Multi-Device Support:** Web and mobile portals for flexibility service data management. ❖ **Procurement Support:** Integration of price signals, flexibility capability discovery and clearing mechanisms to support automated, market-driven platforms.
Reporting & Audit Ensures compliance and transparency in standing data management.	❖ **Audit Logs:** Implement compliance, encryption, and audit logging for compliance alignment & performance monitoring for voluntary participants. ❖ **Compliance Reporting:** Establish foundational compliance reporting for participating providers. ❖ **Historical Data Access:** Role-based access to historical data logs on an as-demanded basis.	❖ **Predictive Compliance:** Proactively detect data or compliance inconsistencies. ❖ **Self-Service Logs:** Tracking mechanisms for data modifications. ❖ **Performance Analytics:** Enhanced monitoring of flexibility services performance while maintaining voluntary participation framework.
Operational Services		
Operations & Management Ensures network limit data reliability, scalability, and resilience.	❖ **Exchange Operations:** Offer IDX and IDAM infrastructure for as-demanded data exchange services. ❖ **Incident Management:** Support incident management protocols for voluntary participants ❖ **Scalability:** Framework to accommodate various flexibility market structures on an opt-in basis.	❖ **Performance Monitoring:** Implement proactive service quality measurement and reporting. ❖ **Business Continuity:** Develop robust processes for ensuring uninterrupted service. ❖ **Operational Maturity:** Create pathway for advancing service capabilities while preserving voluntary participation.
Coordination & Engagement Supports structured collaboration for standing data governance.	❖ **Stakeholder Coordination:** Facilitate working groups to align data-sharing practices and schema standardisation. Assumed to start with voluntary adoption by DNSPs whilst transitioning the regulatory framework obligations. ❖ **Change Management**: Manage transition approaches for participants joining the exchange. ❖ **Industry Communications**: Develop frameworks for consistent information sharing.	❖ **National Standard:** Establish a national standard for local network support and flexibility service registration and activation, creating unified approach to service discovery and delivery. ❖ **Automated Onboarding:** Automated service registration and validation workflows to reduce onboarding complexity and costs. ❖ **Market Maturity:** Develop structured approach to ongoing engagement as market matures.
Governance & Oversight Ensures regulatory compliance and enforcement for standing data.	❖ **Not included in MVP:** To be considered in future phases. ❖ **Voluntary Framework:** Assessment of pathways for alignment as the market matures, preserving voluntary participation. ❖ **Limited Scope:** Focus on standardised flex registration and voluntary visibility mechanisms provided on-demand.	❖ **Regulatory Reform:** Identification of any regulatory changes required to enable the efficient operation of the CER Data Exchange. This may result in the preparation of rule changes. ❖ **Operating Model:** Establish flex data exchange governance structures and decision frameworks that support voluntary participation. ❖

3.3.4 Implementation Considerations

Implementation of the *Network Support and Flexibility Capability Discovery* use case seeks to enhance visibility of flexibility services through standardised registration and discovery mechanisms. This on-demand infrastructure would reduce integration complexity while improving service visibility across stakeholder groups, creating a foundation for more coordinated flexibility markets without requiring extensive upfront investment.

- **Challenge and Purpose:** The proposed MVP would address fragmented service discovery, interface complexity, limited visibility, and market fragmentation that currently prevent efficient matching of flexibility resources with network needs. Existing bespoke integrations and inconsistent protocols create significant barriers especially for VPP operators and demand response providers navigating multiple markets simultaneously.
- **Core Architecture:** The framework establishes two distinct components:
    1. Existing systems as authoritative sources for flexibility services and constraints, including VPP management platforms, demand response systems, and network management tools, and
    2. On-demand data exchange layer connecting stakeholders through standardised interfaces while preserving operational independence and security boundaries, and
- **Key Capabilities:** Leveraging existing infrastructure, the proposed MVP would deliver standardised registration protocols accommodating both aggregated and direct participation models, a voluntary bulletin board for network constraints and flexibility capacity visibility, on-demand data exchange with standardised APIs focused on discovery functionality, role-based access control with tiered permissions for authorised stakeholders, and comprehensive data validation ensuring quality and consistent interpretation across flexibility service types.
- **Implementation Approach:** The MVP is intended to follow an on-demand delivery model where CER Data Exchange components are built or used in response to specific requests and demonstrated value. Implementation of the priority use cases is intended for 2027 to align with stakeholder preferences and parallel reforms, both enabling and enabled by the CER Data Exchange. This addresses the "network effect" challenge by targeting investment where immediate benefits exist while creating pathways for broader adoption. The coordination function of the Exchange could include creating clear standards with industry working groups, defining stakeholder-specific value propositions through journey mapping, and establishing governance frameworks ensuring sustainable operation as the market evolves.
- **Strategic Alignment:** This use case intends to support Australia's energy sector to better utilise distributed resources by creating standardised discovery mechanisms while acknowledging varied industry maturity. The on-demand approach would enable organic growth driven by market needs rather than requiring simultaneous commitment from all participants, creating a practical pathway toward a more integrated and efficient flexibility marketplace.

3.3.5 Key Risks and Mitigations

Table 9: Risk and Opportunity Assessment

Risk	Details	Proposed Mitigation
Stakeholder Adoption and Network Effect	• Voluntary participation creates adoption challenges and potential for limited network effect value. • Stakeholders may continue with existing point-to-point solutions rather than adopting standardised approaches. • Uneven adoption across participant types may reduce overall system value.	• Develop stakeholder-specific value propositions through detailed journey mapping. • Implement on-demand delivery model targeting initial development where clear pain points exist. • Create success metrics and case studies that demonstrate value to drive broader adoption. • Facilitate industry working groups to build consensus around standards and protocols.
Registration Standards Complexity	• Diverse flexibility service types require accommodating varying technical characteristics. • Existing systems use incompatible registration frameworks and data formats. • Balancing standardisation with flexibility creates potential for implementation complexity.	• Co-design registration protocols with representative stakeholders across service types. • Implement flexible schema standards that accommodate both aggregated and direct participation models. • Develop transformation patterns for mapping existing registration data to standardised formats. • Create comprehensive validation rules to ensure data quality and consistency.
Visibility Mechanism Effectiveness	• Bulletin board approaches must balance detail with usability. • Limited stakeholder participation may create incomplete visibility. • Inconsistent update frequencies could reduce reliability of information.	• Design intuitive user interfaces with stakeholder-focused filtering capabilities. • Implement clear data quality indicators showing freshness and completeness. • Develop automated alerting for significant constraint or capacity changes. • Create standardised visualisation tools to enhance understanding of complex data.
Security and Access Control	• Flexibility service data may be commercially sensitivity requiring robust protection. • Tiered access requirements introduce permission management complexity. • Cross-organisational authentication creates integration challenges.	• Implement role-based access control with fine-grained permissions. • Adopt secure API standards with comprehensive authentication protocols. • Conduct regular security assessments focusing on data protection. • Develop clear data usage policies and agreements.
Operational Sustainability	• On-demand approach risks fragmented development without cohesive roadmap. • Maintenance requirements increase with system complexity and adoption. • Funding models for ongoing operations may be challenging in voluntary framework.	• Establish clear governance structure for prioritising development requests. • Develop modular architecture enabling efficient maintenance and enhancement. • Create sustainable funding models aligned with stakeholder value realisation. • Implement comprehensive monitoring and operational support processes.

3.3.6 Use Case Outcomes

The *Network Support and Flexibility Capability Discovery* use case is intended to enhance visibility and standardisation of constraint management using decentralised energy. It would deliver three primary outcomes:

- **Reduced Market Entry Barriers**: Reduced market entry barriers through consistent registration mechanisms, lowering operational costs for flexibility providers.

- **Enhanced Visibility**: Enhanced visibility of available flexibility and network constraints across previously fragmented markets.
- **Improved Market Efficiency:** Enhanced market efficiency through coordinated visibility across wholesale, ancillary, and network support markets, enabling value stacking opportunities and increasing DER integration capacity through more efficient utilisation of existing flexibility resources.

4 Conclusion

The purpose of this document is to outline the High-Level Design of the CER Data Exchange, detailing how the three industry-agreed priority use cases will serve as the foundation for its technical and operational functionality. This document is intended to be read in conjunction with the documents outlined in Figure 1 which together summarise the co-design process, identify next steps to implement the CER Data Exchange and outline the approach used to estimate the cost. Notably, Attachment C: Implementation Plan outlines key implementation considerations, anticipated timing of use case development and foreseeable risks.

The High-Level Design outlined in this document draws on international insights, cross-industry best practices, and builds on the AEMO MITE program. Throughout the co-design process, industry input and stakeholder feedback has shaped what capabilities which should be included in the MVP and what could be implemented in a future evolution. In particular, participants who attended the third industry workshop considered that the key trade-offs had been identified, and there was broad agreement on the preferred MVP (outlined above).

Beyond the functionality of the CER Data Exchange, stakeholders raised concerns relating to data quality, collection processes and the need for complementary compliance frameworks and regulations. Stakeholders called for clearer roles and responsibilities, improved scalability and security measures and the need to address DOE policy variability. These issues will need to be addressed during detailed design phase. Feedback also highlighted the need to consider parallel reforms and integrate with existing systems, platforms and data sources. These considerations have been outlined in further detailed in Section 3 of Attachment C: Implementation Plan.

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

CER Data Exchange Industry Co-Design

April 2025

Attachment B: Cost Assessment

An overview of the methodology, assumptions and results of the cost assessment to implement the CER Data Exchange.

Important notice

Purpose

This publication presents a high-level cost evaluation of the CER Data Exchange, including expenditure requirements, assumptions, and benefits. It provides decision-makers with financial insights necessary to assess the viability of the recommended approach.

Acknowledgements

AEMO would like to thank the many individuals and organisations who have contributed time and expertise through the project's Expert Working group, stakeholder meetings and workshops. These stakeholder contributions have informed AEMO's work towards a national CER Data Exchange as presented in this paper. This Project received funding from the Australian Renewable Energy Agency (ARENA) as part of ARENA's Advancing Renewables Program.

Disclaimer

This document or the information in it may be subsequently updated or amended. This document does not constitute legal or business advice, and should not be relied on as a substitute for obtaining detailed advice about the National Electricity Law, the National Electricity Rules, or any other applicable laws, procedures or policies. AEMO has made reasonable efforts to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness.

Accordingly, to the maximum extent permitted by law, AEMO and its officers, employees and consultants involved in the preparation of this document:

- make no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of the information in this document; and
- are not liable (whether by reason of negligence or otherwise) for any statements or representations in this document, or any omissions from it, or for any use or reliance on the information in it.)

The views expressed herein are not necessarily the views of the Australian Government, and the Australian Government does not accept responsibility for any information or advice contained herein.

Copyright

We acknowledge the Traditional Custodians of the land, seas and waters across Australia. We honour the wisdom of Aboriginal and Torres Strait Islander Elders past and present and embrace future generations.
AEMO Group is proud to have launched its first Reconciliation Action Plan in May 2024 (scan QR code to read).

Table of Contents

Tables

Figures

Glossary and Abbreviations

Term	Definition
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
API	Application Programming Interface
ARENA	Australian Renewable Energy Agency
CBA	Cost Benefit Analysis
CDR	Consumer Data Right
CER	Consumer Energy Resources
CIM	Common Infrastructure Model
DER	Distributed Energy Resources
DERMS	Distributed Energy Resource Management System
DNSP	Distribution Network Service Provider
DOE	Dynamic Operating Envelope
DSO	Distribution System Operator
ENTSO-E	European Network of Transmission System Operators for Electricity
EWG	Expert Working Group
EY	Ernst & Young
FCAS	Frequency Control Ancillary Services
FFR	Fast Frequency Response
FTE	Full Time Equivalent
GDPR	General Data Protection Regulation
IDAM	Identity and Access Management
IDSP	Integrated Distribution System Planning
IDX	Industry Data Exchange
IEC	Information Exchange Committee
IPRR	Integrating Price Responsive Resources
ISP	Integrated System Plan
LNSS	Local Network Support Services
MITE	Market Interface Technology Enhancements
MVP	Minimum Viable Product
NEM	National Energy Market
NEO	National Electricity Objective

Term	Definition
NER	National Electricity Rules
NETP	National Energy Transformation Partnership
NMI	National Metering Identifier
NSP	Network Service Provider
OEM	Original Equipment Manufacturer
PC	Portal Consolidation
PII	Personally Identifiable Information
PM	Project Management
RBAC	Role-Based Access Control
RERT	Reliability and Emergency Reserve Trader
SOCI	Security of Critical Infrastructure
SWIFT	Society for Worldwide Interbank Financial Telecommunication
SWIS	South West Interconnected System
UI	User Interface
VPP	Virtual Power Plant

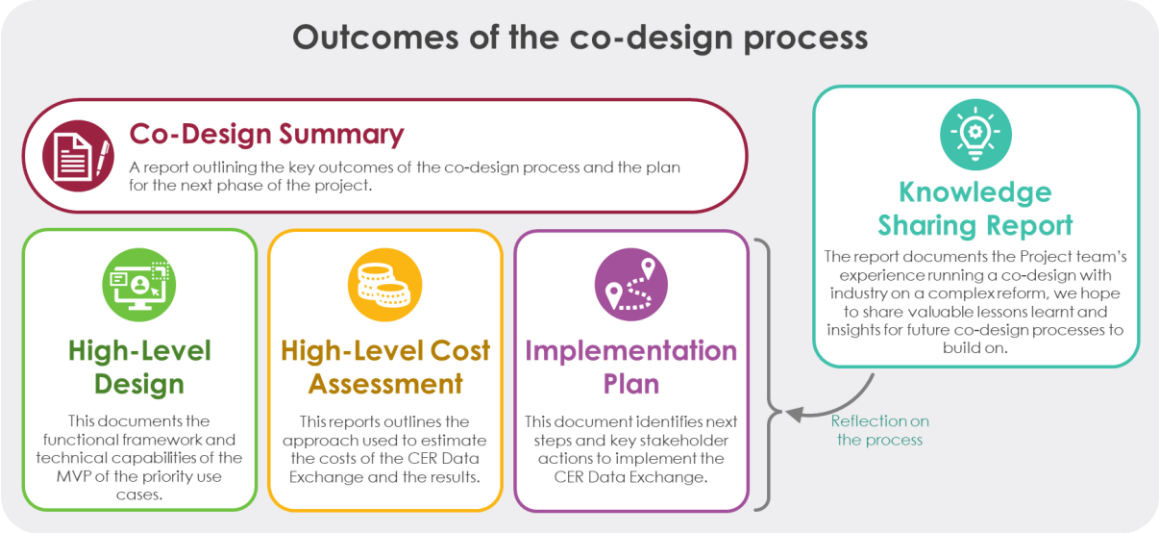
1 Introduction

1.1 The CER Data Exchange Industry Co-Design initiative

The Consumer Energy Resources Data Exchange (CER Data Exchange) Industry Co-design is a joint initiative between the Australian Energy Market Operator (AEMO) and AusNet with support from the Australian Renewables Energy Agency (ARENA) to work collaboratively with industry to co-design a national CER Data Exchange. It is part of a long-term, multistage process to build the digital foundation that will support the efficient integration of CER into the energy system in Australia. This phase of the CER Data Exchange will conclude with a final public webinar in late **April 2025** to present the findings and recommendations on next steps.

This document is part of a series of reports marking the conclusion of the high-level design phase of this project. This report should be read in conjunction with the reports depicted in Figure 1 below. AEMO will also publish a knowledge sharing report to outline the project team's journey of applying a co-design framework to progress customer outcomes and key learnings from the process.

Figure 1. Reports for the CER Data Exchange Industry Co-design project



1.2 This Cost Assessment

The purpose of this document is to:

1. Outline the scope, assumptions and methodology (collectively, 'the approach') used to estimate the costs of the CER Data Exchange, and
2. Provide the results of the cost assessment applying that approach.

2 Scope, assumptions and methodology

2.1 Scope and assumptions

AEMO commenced a co-design phase of work in mid-2024 to work with industry to develop a high-level design for the CER Data Exchange. Industry engagement over the co-design phase involved 15 meetings with an Expert Working Group, three whole-of-industry workshops, and a public consultation document. Industry workshop presentations and the consultation paper are available on AEMO's website: AEMO | CER Data Exchange Industry Co-Design.

Through this process, industry identified its preference for:

- AEMO to own and operate the CER Data Exchange;
- The CER Data Exchange to build on AEMO's Market Interface Technology Enhancements (MITE) project;
- The CER Data Exchange to start small and progressively grow to gain more capability;
- The CER Data Exchange to start with use cases that address the industry's most pressing needs. Three priority use cases were identified to be delivered by the CER Data Exchange: Broader Access to CER Standing Data, Efficient Sharing of Network Limits and Network Support & Flexibility Capability Discovery; and
- Specifically with respect to the cost assessment, industry highlighted that:
    - The methodology and assumptions underpinning the cost assessment are reasonable given the stage of the project, but individual participant's implementation costs and timings will vary based on differences in scale, technical capabilities, starting points and regulatory cycles;
    - Participants will incur additional costs, outside the scope of implementing the CER Data Exchange, to operationalise use cases such as processes to calculate network limits;
    - Another checkpoint at the end of detailed design would be helpful to further refine cost estimates, and validate that the design of the use cases will delivery benefits.

These preferences provide valuable input to the cost assessment, but it is important to note that even with these design choices, the CER Data Exchange is still in early stages of development. As a result, the cost assessment is based on a number of assumptions relating to the scope of functionality determined in this process that will be provided by the CER Data Exchange, the timeline over which those functions will be delivered, and how the CER Data Exchange will be governed and operated going forward. The design is likely to continue evolving which may impact the assumptions and the cost estimates.

Key assumptions underpinning the cost assessment are outlined in Table 1.

Table 1. Key assumptions

Assumption category	Assumption

Implementation approach	• CER Data Exchange will build on functionality being implemented by AEMO's MITE project.
	• The MITE timeline will therefore determine the earliest possible go live for CER Data Exchange functionality.
	• CER Data Exchange will have a phased implementation.
	• Over the implementation period:
	  ○ AEMO will project manage the CER Data Exchange project and provide resources to drive the detailed design
	  ○ Working groups consisting of industry representatives (technical and governance) will be formed to oversee the detailed design, build, test and deploy activities, and design the governance and operational frameworks to support ongoing operation of the CER Data Exchange.
	  ○ It is anticipated that broader industry will continue to be engaged including through whole-of-industry workshops and through formal (written) consultation processes.
	• Once live:
	  ○ AEMO will be responsible for ongoing operation of the CER Data Exchange.
	  ○ Industry representatives will form (or join existing) working groups to oversee the ongoing operation of the CER Data Exchange, including managing the implementation of future functionality.

Technical functionality	• The cost assessment will focus on delivering functionality for 'minimum viable product' (MVP) versions of three priority use cases:
	  ○ Broader Access to CER Standing Data
	  ○ Efficient Sharing of Network Limits
	  ○ Network Support & Flexibility Capability Discovery
	• Functionality to support further use cases can be added to the CER Data Exchange in the future, using the ongoing operational approach to be agreed with industry.

Cost types included	• Only costs that are incremental to MITE are included in the cost assessment. ○ Incremental costs are those that industry participants incur as a result of the CER Data Exchange being the means by which data is exchanged. The scope of the cost assessment does not extend to system or process changes that individual participants need to undertake regardless of the means by which CER data is exchanged, such as DERMS platform implementation or performing Dynamic Operating Envelope (DOE) calculations. • Both upfront and ongoing costs are included (provided they are incremental). • Costs incurred by all relevant industry participant types are included.
Core modelling assumptions	• Model period of 10 years • Cost commences from 1 July 2025 (FY26), representing the move from co-design phase into the Phased implementation. • The detailed design component of the implementation period runs for approximately 12 months, from 1 July 2025 to 30 June 2026. • The build, test, deploy component of the implementation period runs for approximately 12 months, from 1 July 2026 to 30 June 2027. • Internal labour rate: $150/hour. • External labour rate for project management and delivery support: $350/hour. • Inputs are in FY25 dollars.

2.2 Benefits of a CER Data Exchange

Several projects have quantified the benefits of orchestrated DER as part of the energy system. These benefits are in the billions of dollars and are predominantly related to avoided spend on large-scale generation and transmission infrastructure.

The ability to exchange high volumes of CER data in a secure, timely manner is a necessary component of the ecosystem needed to unlock the benefits. Therefore, some projects have specifically quantified the costs and benefits of options to exchange CER data. These projects compare the use of common infrastructure (in the form of a data exchange) to standardise the exchange of CER-related data versus a counterfactual that involves the point-to-point exchange of data.

A summary of the key projects that have quantified the benefits of CER and enabling infrastructure appears below. Whilst the timeframes over which net benefits are quantified differs from project to project, they nonetheless provide important references for the size of benefits available.

2.2.1 Project EDGE

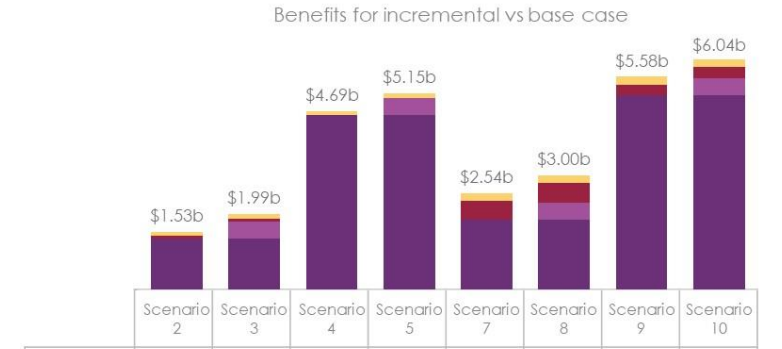
Project EDGE was undertaken by AEMO, AusNet and Mondo over 2021 to 2023 to demonstrate a proof-of-concept DER Marketplace that enabled efficient and secure co-ordination of aggregated DER to provide wholesale and local network services. Project EDGE involved a series of in field trials that tested various options for Dynamic Operating Envelopes (DOE) configuration and data exchange to gather evidence on how DER responded when called on to provide services.

A comprehensive cost benefit analysis (CBA) was undertaken as part of Project EDGE. With respect to data exchange, Project EDGE's CBA considered three configuration options for the scalable exchange of DER data:

1. Data Hub – centralised (which is similar to the CER Data Exchange concept developed with industry as outlined in this document);
2. Data Hub – decentralised; and
3. Point-to-point.

The Project EDGE CBA found that, across a 20-year time horizon, **a Data Hub approach would reduce costs by $0.44b to $0.45b** (under a centralised and decentralised model respectively) compared to a point-to point approach, as outlined in Figure 2.

Figure 2. Project EDGE benefits



	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 7	Scenario 8	Scenario 9	Scenario 10
DOE	1.33	1.33	4.56	4.56	1.83	1.83	5.08	5.08
Data Hub		0.45		0.45		0.45		0.45
LSE	0.07	0.08		0.01	0.5	0.51	0.29	0.3
Visibility of DER	0.12	0.12	0.12	0.12	0.2	0.2	0.2	0.2

Scenarios 3, 5, 8 and 10 have a Data Hub

All other scenarios involve point-to-point exchange of data

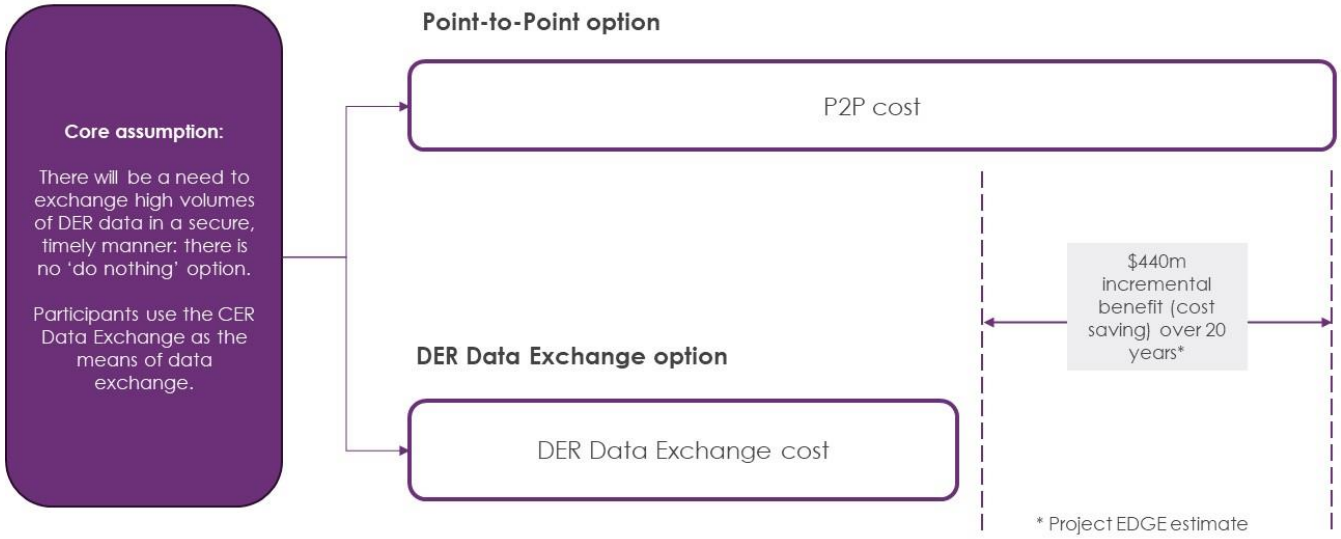
The reduced cost of a Data Hub is a result of avoiding the challenges of a point-to point approach, which include:

- Integration burdens as a result of different technology integrations, causing inefficient coupling at scale;
- Administrative inefficiencies from bespoke contracts, legal and collaboration delays, and duplicative administration;
- Fragmented availability of data from inconsistent access conditions.

In addition, the CBA found that a Data Hub compared to a point-to point approach could deliver further upside through facilitating new DER-based service innovations more easily and at lower cost as it simplifies integration, identity verification and reporting between participants.

Figure 3 presents the incremental cost saving between a Data Hub and point-to-point option visually. Even though there is a cost to implement the exchange, it is estimated to be materially lower than the counterfactual of developing point-to-point integrations.

Figure 3. Incremental cost saving of CER Data Exchange



The cost avoidance benefits associated with a Data Hub-style exchange form part of the broader net benefits identified in the CBA which concluded that greater co-ordination of active DER in the NEM can result in up to $6b benefits over 20 years.

2.2.2 Project Symphony

Project Symphony was undertaken by AEMO, Western Power and Synergy over 2021 and 2022. Similar to Project EDGE, it involved in field trials in Western Australia's South West Interconnect System (SWIS) through enrolling customers' DER into Virtual Power Plant (VPP) to test various aspects of DER integration, including the exchange of data between participants.

Project Symphony's CBA concluded that orchestrating DER could result in **up to $920m benefits over 10 years,** as outlined in Figure 4Figure 4. Positive value accrued to all participants when value stacking network and market services in an orchestrated scenario and greater levels of participation result in greater value.

Figure 4. Project Symphony reported benefits

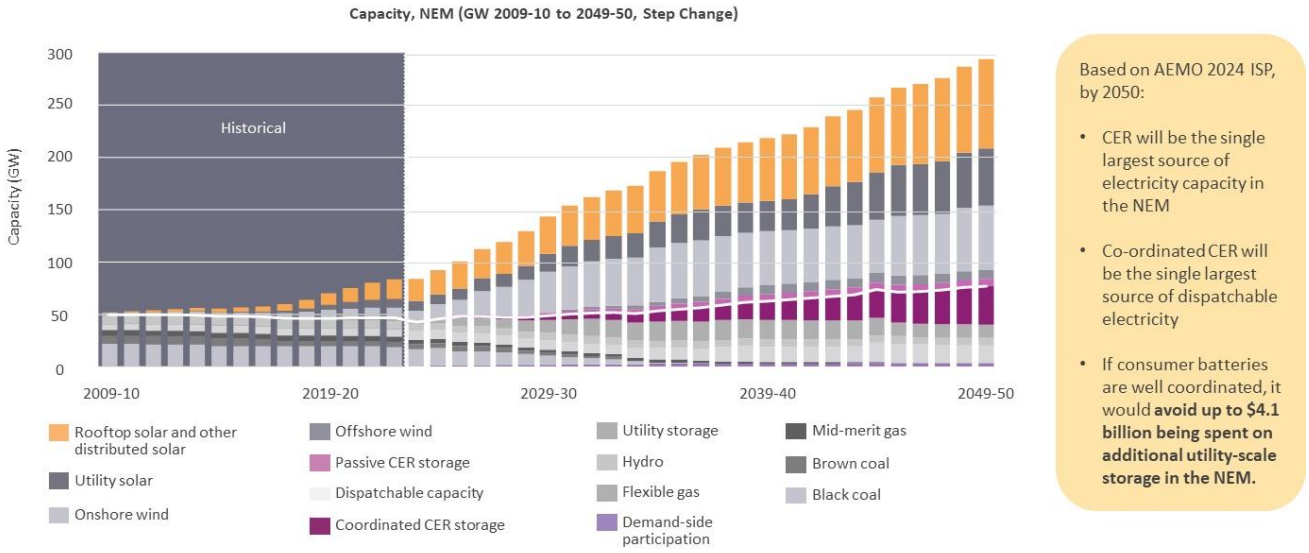
2.2.3 Integrated System Plan

Every two years, AEMO develops an Integrated System Plan (ISP) to outline the optimal suite of investment needed to meet Australia's energy and decarbonisation goals over the next 20 years. The ISP involves developing detailed electricity supply and demand forecasts.

In the 2024 ISP, AEMO estimated that by 2050, CER will be the single largest source of electricity capacity in the NEM, and co-ordinated CER will be the single largest source of dispatchable electricity (see Figure 5).

AEMO estimates that co-ordinated CER will save **up to $4.1 billion of avoided spend** on additional utility-scale storage in the NEM if CER is co-ordinated.

Figure 5. ISP's forecasted NEM capacity



2.2.4 UK's Digital Spine Feasibility study

In 2022, the UK's Energy Digitalisation Taskforce made recommendations to develop a 'digital spine' for the energy sector in response to the rapid digitisation. The UK government then commissioned a feasibility study to scope what precisely a digital spine is, and how it might be developed to benefit the energy sector. The feasibility study identified the need for the energy sector to facilitate data sharing, and how these needs could be met through a common approach to data sharing infrastructure. Specifically, it found that common data sharing infrastructure creates the potential to:

- Reduce costs to consumers and businesses
- Improve energy system efficiency
- Improve energy system reliability
- Support decarbonisation

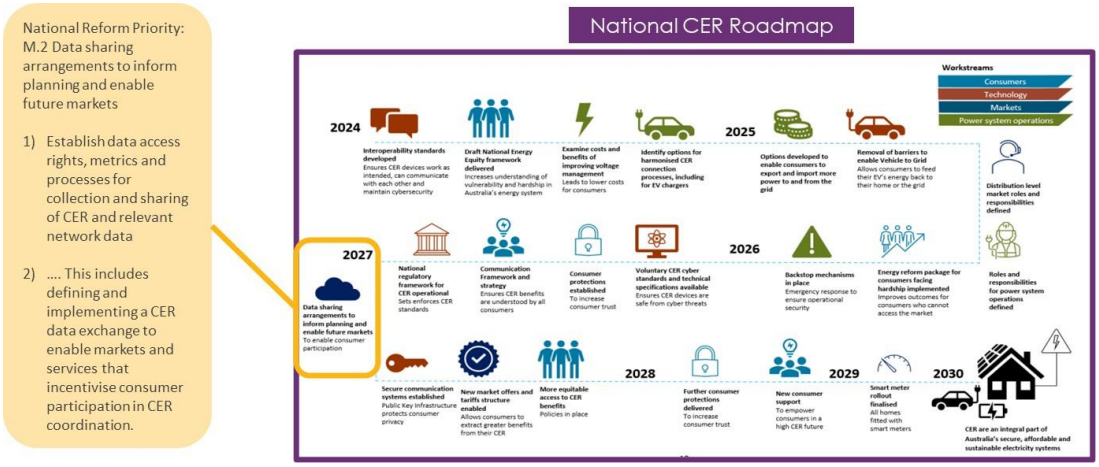
2.2.5 National CER Roadmap

National and global trials outlined above consistently demonstrate the benefits of CER co-ordination, including the benefits of common digital infrastructure that enables the secure flow of high volumes of DER data between participants. As a result, at the November 2023 Energy and Climate Change Ministerial Council (ECMC) meeting, Ministers agreed to the creation of a CER Taskforce to fast track priority CER-related projects. The CER Roadmap has been developed by the interjurisdictional CER Working Group established under the National Energy Transformation Partnership (NETP) and outlines a series of actions to progressively develop the ecosystem needed to integrate CER into Australia's electricity system and markets.

One action under the CER Roadmap, summarised in Figure 6, is to develop data sharing arrangements to inform planning and enable future markets. This includes:

- Establishing data access rights, metrics and processes for collection and sharing of CER and relevant network data; and
- Defining and implementing a CER data exchange to enable markets and services that incentivise consumer participation in CER coordination.

Figure 6. National CER Roadmap actions



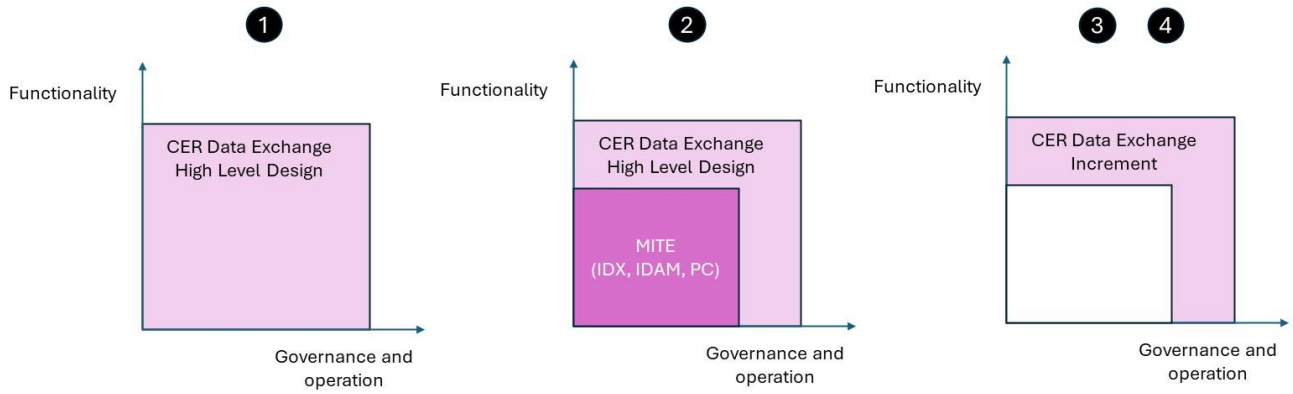
2.3 Methodology

The methodology to quantify costs of the CER Data Exchange was as follows:

1. Complete high-level design of the MVP for the implementation of the three priority use cases for CER Data Exchange;
2. Understand scope of the MITE business case and the timeline over which MITE functionality will be delivered;
3. Identify the incremental functionality needed to operationalise the CER Data Exchange three priority use cases on top of MITE; and
4. Estimate costs to deliver the incremental functionality.

The cost methodology is outlined graphically in Figure 7.

Figure 7. Cost methodology



2.3.1 High-level design of CER Data Exchange

A high-level design document for the CER Data Exchange has been prepared, see Attachment A: High-Level Design.

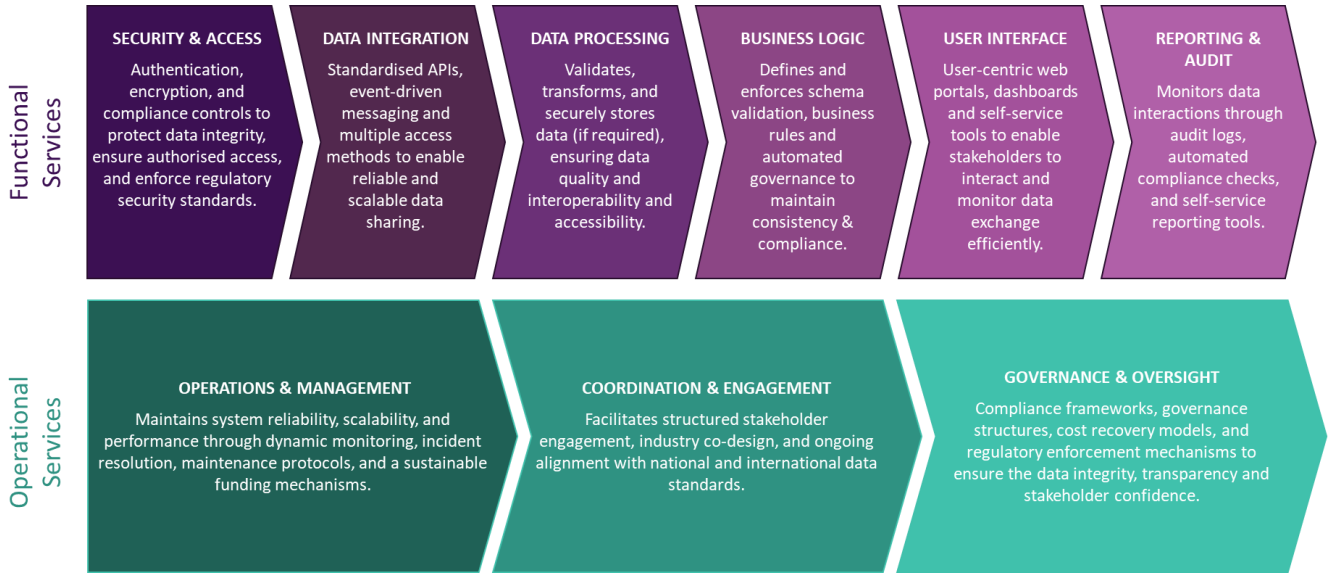
The design was based on input from industry, international insights and cross-industry best practices for data exchange. The scope of the design is the MVP required to deliver the three priority use cases:

- **Broader Access to CER Standing Data**: A secure, role-based access mechanism for managing and sharing verified CER standing data changes across authorised stakeholders. In the future, this use case will likely involve incorporating regular firmware updates to ensure device operational datasets are up to date, enable adherence to established technical standards, and implementing quality control measures. This use case will form a basis of the decentralised energy system insights and will significantly improve the overall data quality and efficiency outcomes in the energy system.
- **Efficient Sharing of Network Limits**: A standardised approach for distributing dynamic network limits across jurisdictions. This protocol will enable retailers and customer agents, to access and utilise accurate information about available network capacity. This will facilitate better decision-making and optimise the use of network resources.

- **Network Support & Flexibility Capability Discovery:** A comprehensive framework for coordinating the procurement of flexibility services based on CER capabilities. This framework will enable the management of network congestion through demand response and other flexibility services, reducing the need for costly physical infrastructure upgrades. It will also support the integration of CER into the broader energy network, enhancing the system's overall flexibility and resilience.

The core functions needed by the CER Data Exchange to deliver the MVP are outlined in Figure 8.

Figure 8. CER Data Exchange core functions



2.3.2 MITE scope and timeline

In 2024, industry and AEMO agreed to proceed with the foundational components of the MITE project to uplift the technology and processes used by AEMO to provide three foundational services: Identity and Access Management (IDAM), Industry Data Exchange (IDX), and Portal Consolidation (PC). Table 2 outlines the functionality of each foundational service, as well as the pain point it aims to address.

Table 2. MITE services

MITE component	Pain Point	MITE functionality
IDAM	AEMO's current IDAM services: • Are disparate, requiring users to retain multiple sets of credentials in order to access AEMO business services. • Do not meet best practices in cyber security controls (e.g. multifactor authentication) • Are insufficient to meet new industry obligations introduced under the SOCI Act.	A unified mechanism to authenticate and authorise external identity and entitlements when accessing AEMO services, consolidating and improving overall cyber security controls

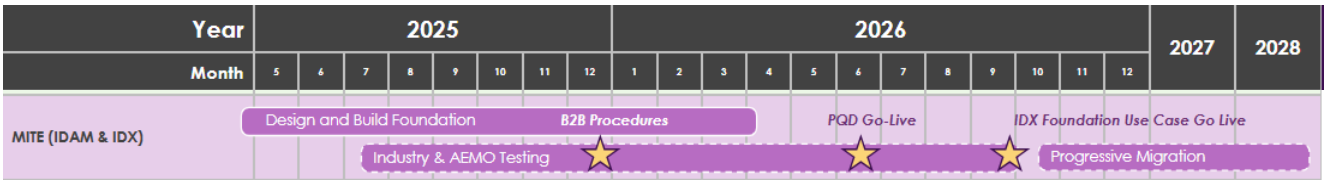
MITE component	Pain Point	MITE functionality
IDX	AEMO's existing data exchange systems have been variously acquired over the 10-15 years, and use inconsistent standards, protocols and formats across systems, fuels and jurisdictions. AEMO's markets are also undergoing significant transformation, resulting in new data exchange needs. Introducing new data exchange patterns without unified target state and roadmap is inhibiting participants from modernizing their systems.	A unified data exchange mechanism to support the secure and efficient exchange of data between energy stakeholders for new services required by NEM Reforms, existing legacy services and provide a framework extensible to other energy markets.
PC	AEMO browser services are exposed over a disparate range of end points and require multiple sets of credentials to consume these services This results in a suboptimal user experience for energy stakeholders. The requirement to access browser services via private networks creates technical barriers to consuming these services.	A new web and mobile user portal to provide a unified stakeholder experience. The portals framework is an enabling platform that supports energy market participants and other partners to consume AEMO browser services in a secure manner.

It is important to note that MITE is not CER-specific. Rather, it is designed to provide foundational capability on which new use cases/business services (such as the exchange of CER data) can be developed. For example:

- IDX will deliver industry-agreed integration patterns, protocols and payload standards. The CER Data Exchange will leverage the base platform, standards, channels, patterns, guard-rails, payload formats, and decision tree to develop the business services (use cases) without the need to build new target state capabilities;
- The CER Data Exchange will leverage the IDAM solution, authentication and authorisation mechanisms, advanced data sharing capabilities and advanced security features; aligning with the requirements of legislative compliance; and
- The CER Data Exchange User Interface will be built on the enhanced portal framework that can be internet-enabled and leverage the framework and patterns defined by the PC target state.

MITE is currently scheduled to go live with the bulk of the foundational capability by December 2026. A preliminary drop with limited capability is scheduled to occur in June 2026 to accommodate the Power Quality Data rule changes that come into effect from 1 July 2026. The timeline for implementation of MITE is outlined in Figure 9

Figure 9. MITE timeline

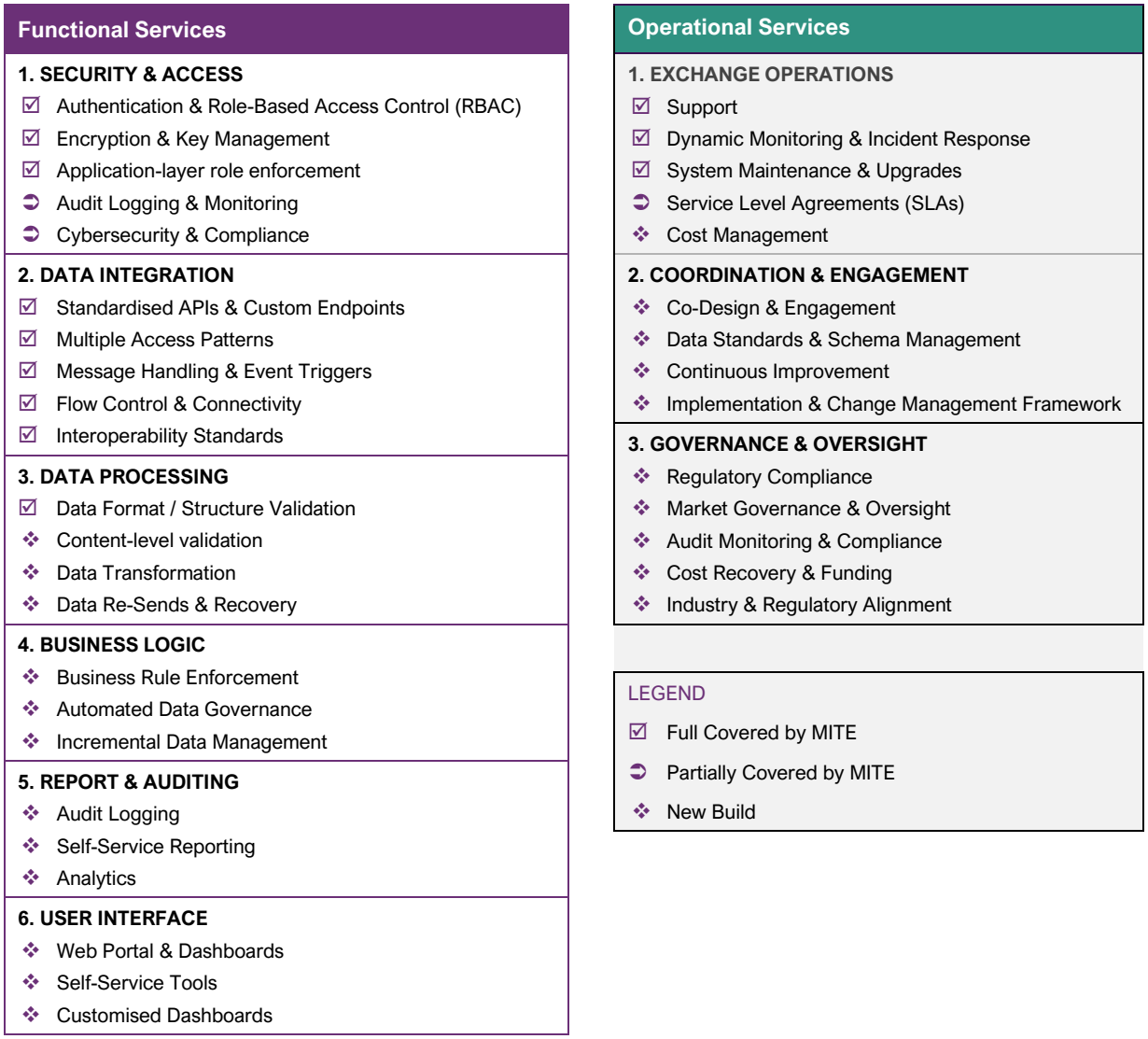


Through the co-design phase, industry was supportive of leveraging the foundational capability that would be delivered through the MITE project as the basis on which to build CER Data Exchange functionality.

2.3.3 Incremental CER Data Exchange functionality

The gap between the functionality required of the CER Data Exchange (2.3.1) and the capability of MITE (2.3.2) is referred to in this document as the incremental CER Data Exchange functionality. Figure 10 outlines the functionality required of the CER Data Exchange, obtained from the high-level design, as well as the components of this functionality which will be delivered entirely or partially through MITE. The incremental functionality is therefore the components required of the CER Data Exchange which is not delivered, or only partially delivered, through MITE.

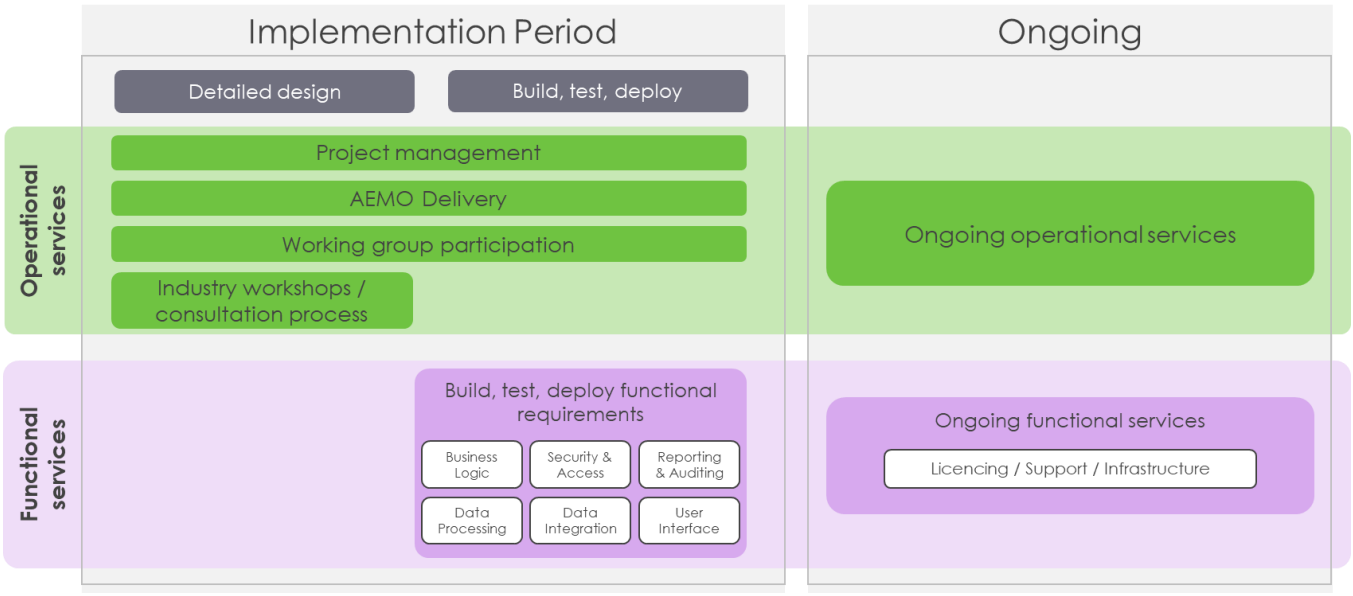
Figure 10. Incremental functionality



2.3.4 Estimated costs

The incremental CER Data Exchange functionality was divided into cost buckets for estimation purposes. Cost buckets represent the key activities that will accumulate costs during implementation (detailed design and build, test, deploy) and ongoing operation. Not all cost buckets apply to all industry participants. The cost buckets used for estimation purposes are summarised in Figure 11.

Figure 11. CER Data Exchange cost buckets



To estimate the cost of each cost bucket, a combination of effort-based (labour) estimates and t-shirt sizing techniques were used:

- Effort-based estimates were used for Operational services. These rely on an estimate of the number of resources, the time commitment and standard labour rates to quantity the cost of an activity.
- T-shirt sizing was used for Functional services. T-shirt sizing involves breaking a project down into tasks (in this case, the tasks associated with building, testing and deploying the functionality needed for the three priority use cases). Each task is ascribed a 't-shirt size' such as high, medium or low based on its anticipated complexity to deliver, and each t-shirt size has a set level of effort. The overall effort is then multiplied by a standard labour rate to quantify the cost.

The calculation basis and assumptions were tested with EWG members and industry, and feedback incorporated. The techniques utilised are typical for technology-related projects that are in high-level design phase. Recent projects delivered by AEMO, and industry (including MITE and other reform projects) also provided a basis for comparison of cost estimates.

Table 3 outlines the cost buckets and their details.

Table 3. Cost buckets

Cost Type	Cost bucket	Description	Incurred by	Calculation basis and assumptions
Operational Services (implementation phase)	Project management	Costs associated with managing the CER Data Exchange program including costs such as: • Project management • Working group secretariat • Arranging industry workshops • Managing consultation processes	AEMO Industry participants	AEMO: Labour costs based on AEMO PM resource (1 FTE) + external PM support (0.5 FTE) over two-year implementation period. Industry participants: 5% of build cost.
	AEMO Delivery	Costs associated with AEMO for time spent on CER Data Exchange development including technical, governance and operational aspects.	AEMO	Labour costs based on AEMO resources (4 FTE) + external resources (2 FTE) for detailed design phase. Then moves to quarter of this effort for build, test, deploy phase.
	Working group participation - Governance	Costs associated with industry participants for time spent in working groups to oversee CER Exchange development including technical, governance and operational aspects.	Industry participants with working group representatives	Working group representative labour costs estimates based on 2 working groups (governance and technical) overseeing development of CER Data Exchange. 10 representatives on both working groups: • DNSPs (x4) • Retailers / aggregators (x4) • Others (x2) ['Others' is a generalised category to allow for participants other than DNSPs, retailers and aggregators. It is included to acknowledge that there may be new types of participants interested in using CER Data Exchange] Each representative spends 2 days per month over detailed design phase. Then half this effort for build, test, deploy phase.
	Working group participation - Technical	Costs associated with industry participants for time spent in working groups to oversee CER Exchange development including technical, governance and operational aspects.		
	Broader industry involvement	Costs associated with industry participants for formal consultation on the detailed design.	Industry participants	Labour costs based on estimates resources involved in two all industry workshops and two all industry consultation processes (each open for about 1 month) over detailed design phase. The cost assessment is based on 31 industry participants being involved in the broader industry consultation process: • DNSPs (x 11) • Retailers (x 15) • Others (5x).
Operational Services (ongoing)	Ongoing	Costs to maintain three priority use cases in CER Data Exchange once they are in production	Industry participants	Both working groups continue (governance and technical). 10 representatives on both: • DNSPs (x4) • Retailers/aggregators (x4) • Others (x2) 1 hour per week per resource for industry ongoing.

Cost Type	Cost bucket	Description	Incurred by	Calculation basis and assumptions
				Broader industry participant effort to keep systems up to date as changes are made to the CER Data Exchange: Approximately 30 stakeholders 1 hour per week ongoing.
			AEMO	$240k per annum incremental cost to AEMO for IDX as a result of the three CER use cases.
Functional Services (Implementation period only)	Build, test, deploy	Includes costs to build, test and deploy the CER Data Exchange functionality as per detailed design	AEMO Industry participants	AEMO: T-shirt sizing (see table below for further details) Industry participants: Proportion of AEMO cost based on MITE proportions: • DNSPs – 0.14x • Retailers – 0.07x • Other – 0.05x

AEMO developed t-shirt sized estimates to deliver the incremental functionality needed to operationalise the three priority use cases. AEMO's experience delivering other NEM reform programs was used as the basis for determining the effort for each t-shirt size. A summary of the effort estimates appears in Table 4.

Table 4. AEMO t-shirt size assumptions

Days effort	Simple	Medium	Complex	Very complex
Security and Access	20	40	60	80
Data Integration	20	40	60	80
Data Processing	60	120	240	360
Business Logic	60	120	240	360
User Interface	60	120	240	360
Reporting and Audit	60	120	240	360

Factors	% reduction based on re-use
New	100%
Modified	70%

Use Case	Type	Name/Description	Complexity	New/Modified	# of Units
Broader Access to CER Standing Data	User Interface	Portal Access	complex	new	1
	Data Integration	IDX Business Services: Producers	medium	new	3
	Data Integration	IDX Business Services: Consumers	simple	new	3
	Security and Access	IDAM configuration for RBA	simple	modified	1
	Data Integration	DERR integration	simple	new	1
	Data Processing	DERR datastore	simple	new	3
	Business Logic	DERR business logic	complex	new	3
	Reporting and Audit	DERR Reports	simple	modified	2
	User Interface	Portal Access	simple	modified	1

Use Case	Type	Name/Description	Complexity	New/Modified	# of Units
Efficient Sharing of Network Limits	Data Integration	IDX Business Services: B2M	simple	new	3
	Security and Access	IDAM configuration for RBA	medium	new	2
	Data Integration	Network Limits Management Solution	medium	new	2
	Data Processing	Network Limits Management Solution	complex	new	2
	Business Logic	Network Limits Management Solution	complex	new	2
	User Interface	Network Limits Management Solution	medium	new	3
	Reporting and Audit	Network Limits Management Solution	simple	new	3
Network Support & Flexibility Capability Discovery	User Interface	Portal Access	simple	modified	1
	Data Integration	IDX Business Services	medium	new	10
	Security and Access	IDAM configuration for RBA	simple	modified	1
	Business Logic	Bulletin Board	n/a	n/a	0
	Reporting and Audit	Reporting	n/a	n/a	0

From Table 4, it can be seen that:

- The cost for AEMO to build, test and deploy the CER Data Exchange functionality is largely driven by the need to develop business logic across the three use cases, followed by data integration, user interface and data processing functionality;
- The Efficient Sharing of Network Limits is the most effort-intensive use case, followed by Boarder Access to CER Standing Data.

To estimate the industry costs to build, test and deploy the CER Data Exchange functionality, AEMO build, test and deploy costs were extrapolated using the same proportionality of AEMO to industry costs as applied in the MITE business case. Using this approach, the multiple applied for each participation category *per participant* is as follows:

- DNSPs: 0.14 (that is, each DNSP's build, test, deploy cost is estimated to be 0.14x AEMO's total build, test and deploy cost);
- Retailers: 0.07; and
- Other: 0.05.

This is a high-level estimation approach to provide industry with an indication of the likely costs to implement the functionality associated with the three priority use cases. It reflects the early stage of the CER Data Exchange project. Each industry participant has unique circumstances and will need to undertake their own costing assessment and internal approvals process.

3 Cost Assessment

3.1 Summary of cost assessment

The estimated cost to implement the three priority use cases is $24.4m over a two year implementation period, $8.7m of which are incurred by AEMO to design, build, test and deploy the CER Data Exchange functionality on top of MITE, and $15.7m incurred by industry to participate in the detailed design process and then implement the necessary interfaces with the CER Data Exchange.

It is estimated annual cost to maintain the use cases going forward is $0.7m. These predominantly relate to AEMO's cost to maintain the CER Data Exchange once it is operational and the incremental CER-related effort on workgroups.

Table 5 outlines the implementation and ongoing costs to AEMO and Industry.

Table 5. Total cost split by AEMO and Industry ($m, FY26 real)

	Total	AEMO	Industry
Implementation: Detailed Design	**5.9**	3.1	2.8
Implementation: Build, test, deploy	**18.5**	5.6	12.9
Total Implementation	**24.4**	**8.7**	**15.7**
Ongoing (p.a.)	**0.7**	0.3	0.4

3.2 Details of cost assessment

3.2.1 Participant cost breakdown

Table 6 presents the total implementation costs of the CER Data Exchange by participant type. Aside from AEMO, DNSPs have the largest portion of cost, with the greatest impact in the build, test and deploy stage for all industry participants.

Table 6. Cost by participant type ($m, FY26 real)

	Total	AEMO	DNSP	Retailer	Other[1]
Implementation: Detailed Design	**5.9**	3.1	1.0	1.3	0.5
Implementation: Build, test, deploy	**18.5**	5.6	7.1	4.6	1.2
Total	**24.4**	8.7	8.1	5.9	1.7

[1] 'Other' is a generalised category to allow for participants other than DNSPs, retailers/aggregators. It is included to acknowledge that there may be new types of participants interested in using the CER Data Exchange.

3.2.2 Cost bucket breakdown

Table 7 presents the implementation cost to each type of industry participant for each cost bucket in the implementation phase (detailed design and build, test, deploy). The largest component of AEMO cost is estimated for Detailed Design Delivery. For industry participants, the greatest cost is required for Business Logic, followed closely by Data Integration and Data Processing.

Table 7. Cost by participant for each cost bucket – Implementation ($m, FY26 real)

Cost bucket	Total	AEMO	DNSP	Retailer	Other
Project Management	**1.9**	1.3	0.3	0.2	0.1
AEMO Detailed Design Delivery	**3.1**	3.1	0.0	0.0	0.0
CER Data Exchange Working Group – Governance	**0.5**	0.0	0.2	0.2	0.1
CER Data Exchange Working Group - Technical	**0.5**	0.0	0.2	0.2	0.1
Broader industry involvement	**2.1**	0.0	0.8	1.0	0.3
Functional service: Security & Access	**0.4**	0.1	0.2	0.1	0.0
Functional service: Data Integration	**3.3**	0.9	1.3	0.9	0.2
Functional service: Data Processing	**3.0**	0.8	1.2	0.8	0.2
Functional service: Reporting & Auditing	**1.2**	0.3	0.5	0.3	0.1
Functional service: Business Logic	**5.4**	1.4	2.2	1.4	0.4
Functional service: User Interface	**3.0**	0.8	1.2	0.8	0.2
Total	**24.4**	**8.7**	**8.1**	**5.9**	**1.7**

3.2.3 Cost profile over period

Figure 12, Figure 13 and Figure 14 present the total costs over the 10 year model period, split by participant, cost type and cost bucket respectively. All industry participants are estimated to experience the greatest costs during the build, test, deploy stage, from July 2026 to June 2027. This is largely a result of the cost required for the Business Logic, Data Integration and Data Processing.

Figure 12. Cost profile by participant type

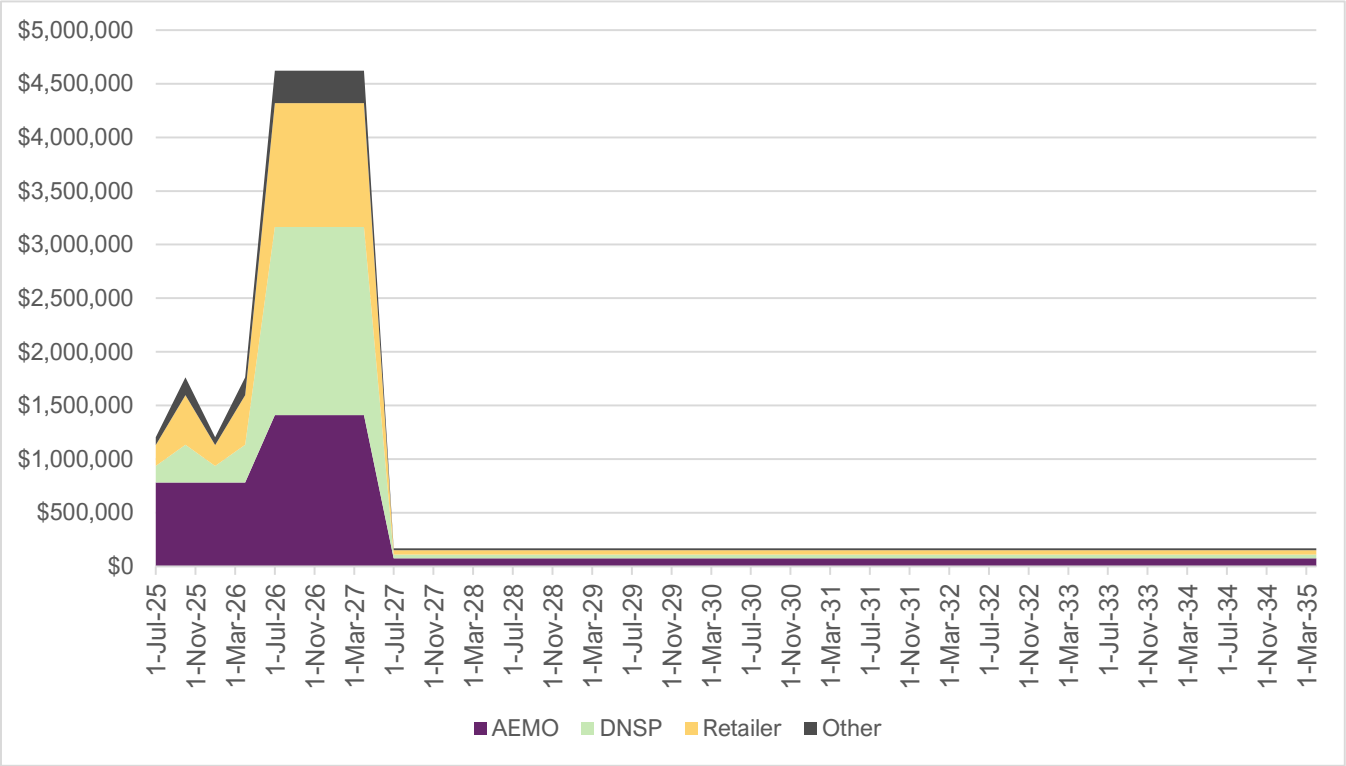


Figure 13. Cost profile by cost type

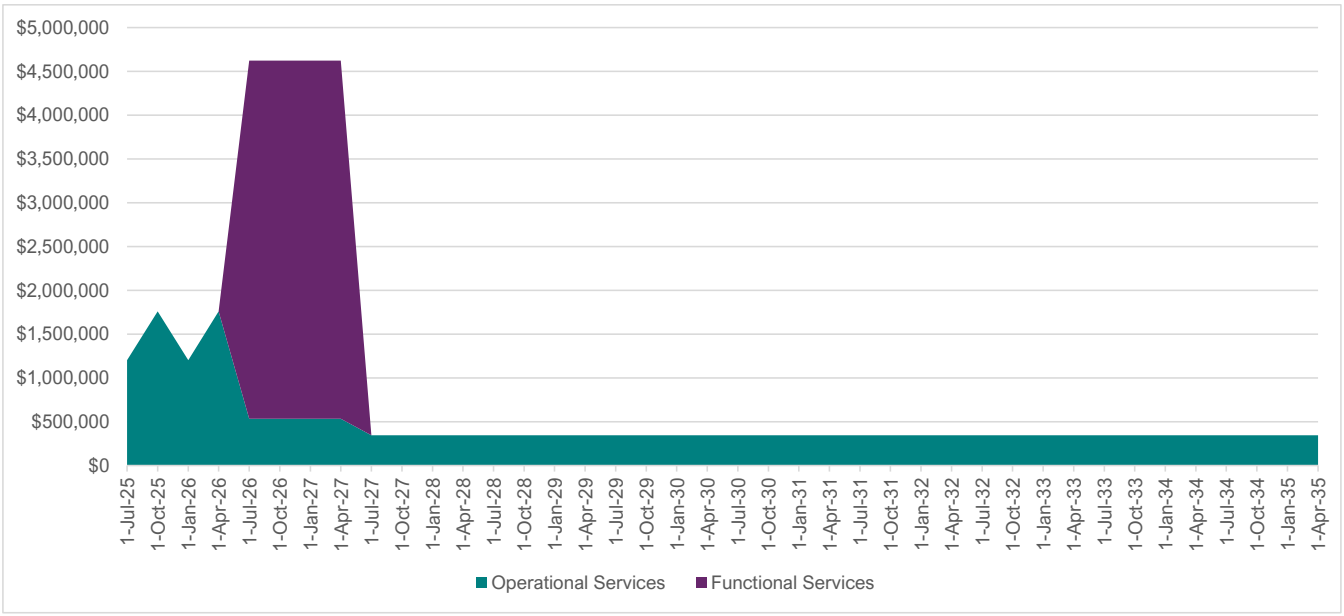
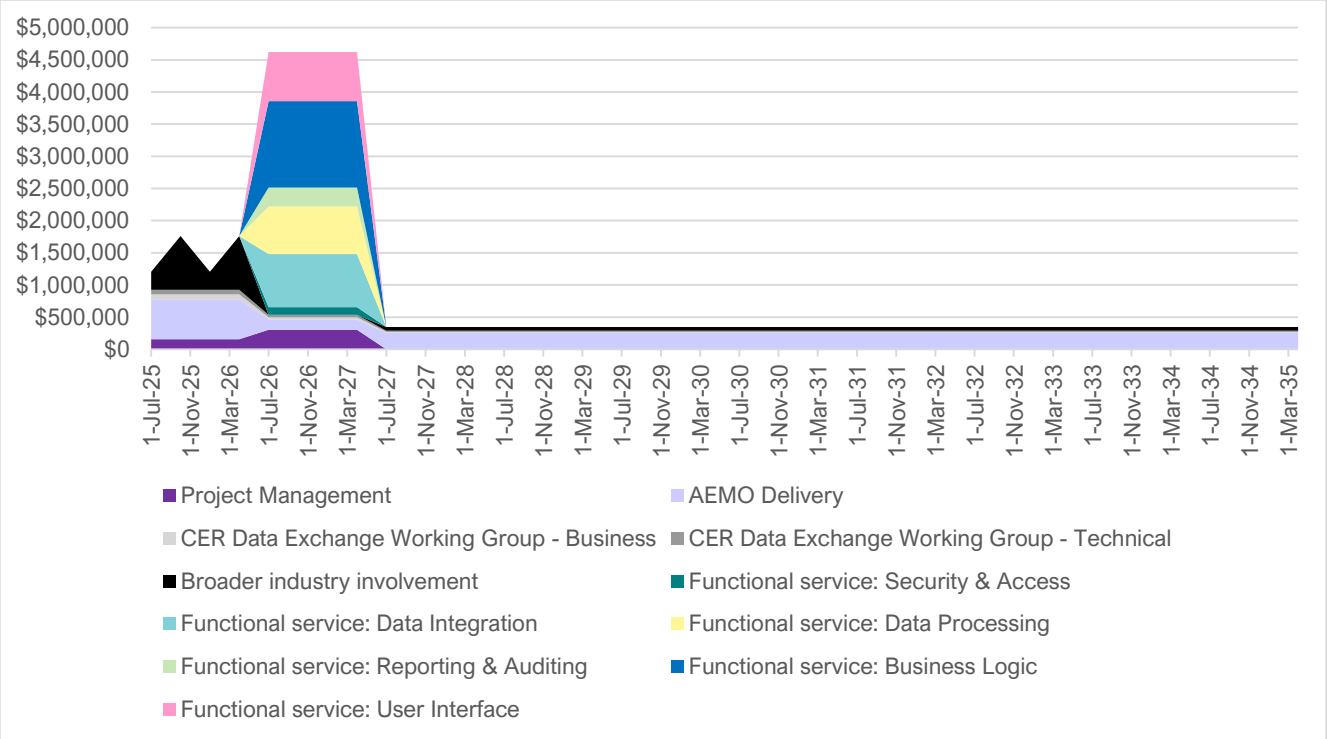


Figure 14. Cost profile by cost bucket



4 Conclusion

The high-level cost assessment outlined in this document is based on the outputs from the co-design phase for the CER Data Exchange, which were developed in collaboration with industry including stakeholder feedback through EWG meetings and industry consultation.

MITE will deliver critical foundational capability on which the CER use cases will be built. As the business case for MITE has already been approved by industry, this cost assessment quantifies the incremental costs to implement and maintain the MVP versions of three CER use cases that industry prioritised for delivery.

Overall, the estimated cost to implement MVP versions of the three priority use cases is:

- $24.4m over a two-year implementation period; and
- $0.7m per annum for ongoing maintenance.

This investment by industry will play an important role in unlocking the billions of dollars in benefits that have been identified in numerous CER integration projects.

Progressing development of the CER Data Exchange involves moving from co-design phase into implementation. Implementation will commence with a detailed design period led by AEMO with industry input via governance and technical working groups and broader industry input. Once detailed design is complete, industry participants will move into a phase of building, testing and deploying functionality into production systems. Once functionality is live, the ongoing process of maintaining the functionality will commence, led by AEMO as the operator of the CER Data Exchange.

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

CER Data Exchange Industry Co-Design

April 2025

Attachment C: Implementation Plan

An implementation roadmap outlining key steps, technical and governance considerations, and timelines to support from planning to execution of the CER Data Exchange.

Important notice

Purpose

This report defines the approach for delivering the CER Data Exchange, identifying key implementation steps, regulatory considerations and timelines. By mapping out practical execution strategies, the report supports industry stakeholders in navigating challenges, ensuring a structured and effective transition from co-design to implementation.

Acknowledgements

AEMO would like to thank the many individuals and organisations who have contributed time and expertise through the project's Expert Working group, stakeholder meetings and workshops. These stakeholder contributions have informed AEMO's work towards a national CER Data Exchange as presented in this paper. This Project received funding from the Australian Renewable Energy Agency (ARENA) as part of ARENA's Advancing Renewables Program.

Disclaimer

This document or the information in it may be subsequently updated or amended. This document does not constitute legal or business advice and should not be relied on as a substitute for obtaining detailed advice about the National Electricity Law, the National Electricity Rules, or any other applicable laws, procedures or policies. AEMO has made reasonable efforts to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness.

Accordingly, to the maximum extent permitted by law, AEMO and its officers, employees and consultants involved in the preparation of this document:

- make no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of the information in this document; and
- are not liable (whether by reason of negligence or otherwise) for any statements or representations in this document, or any omissions from it, or for any use or reliance on the information in it.)

The views expressed herein are not necessarily the views of the Australian Government, and the Australian Government does not accept responsibility for any information or advice contained herein.

Copyright

We acknowledge the Traditional Custodians of the land, seas and waters across Australia. We honour the wisdom of Aboriginal and Torres Strait Islander Elders past and present and embrace future generations.
AEMO Group is proud to have launched its first Reconciliation Action Plan in May 2024 (scan QR code to read).

Table of Contents

Tables

Figures

Glossary and Abbreviations

Term	Definition
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
API	Application Programming Interface
ARENA	Australian Renewable Energy Agency
CBA	Cost Benefit Analysis
CDR	Consumer Data Right
CER	Consumer Energy Resources
CIM	Common Infrastructure Model
DER	Distributed Energy Resources
DERMS	Distributed Energy Resource Management System
DNSP	Distribution Network Service Provider
DOE	Dynamic Operating Envelope
DSO	Distribution System Operator
ENTSO-E	European Network of Transmission System Operators for Electricity
EWG	Expert Working Group
EY	Ernst & Young
FCAS	Frequency Control Ancillary Services
FFR	Fast Frequency Response
FTE	Full Time Equivalent
GDPR	General Data Protection Regulation
IDAM	Identity and Access Management
IDSP	Integrated Distribution System Planning
IDX	Industry Data Exchange
IEC	Information Exchange Committee
IPRR	Integrating Price Responsive Resources
ISP	Integrated System Plan
LNSS	Local Network Support Services
MITE	Market Interface Technology Enhancements
MVP	Minimum Viable Product
NEM	National Energy Market
NEO	National Electricity Objective

Term	Definition
NER	National Electricity Rules
NETP	National Energy Transformation Partnership
NMI	National Metering Identifier
NSP	Network Service Provider
OEM	Original Equipment Manufacturer
PC	Portal Consolidation
PII	Personally Identifiable Information
PM	Project Management
RBAC	Role-Based Access Control
RERT	Reliability and Emergency Reserve Trader
SOCI	Security of Critical Infrastructure
SWIFT	Society for Worldwide Interbank Financial Telecommunication
SWIS	South West Interconnected System
UI	User Interface
VPP	Virtual Power Plant

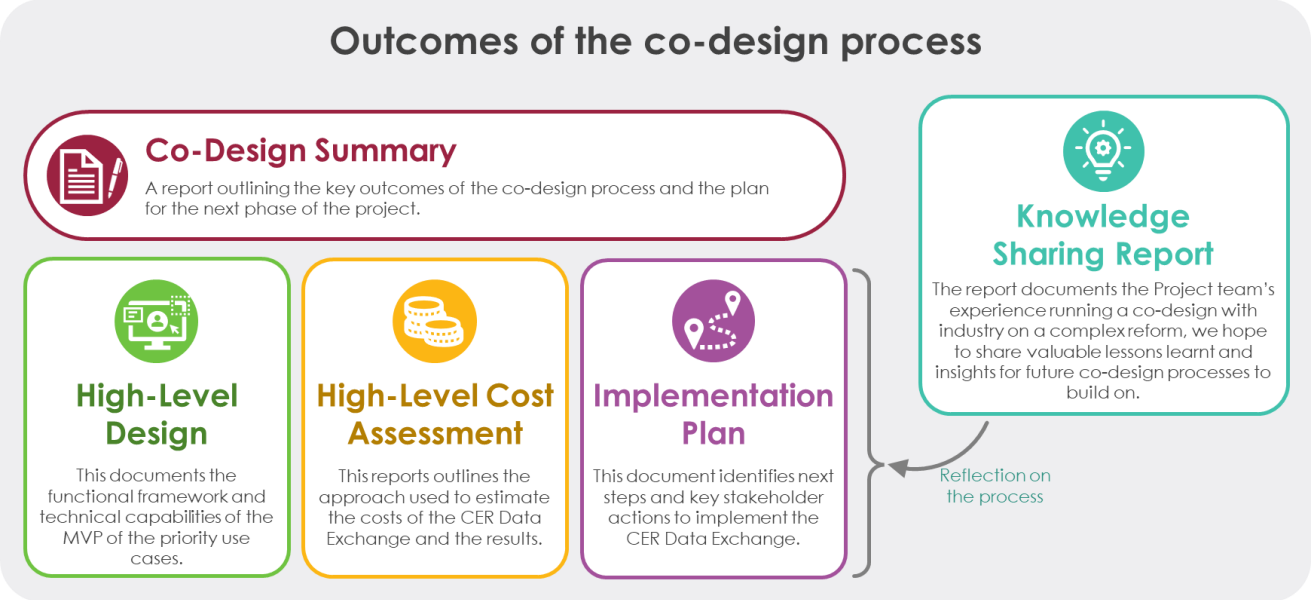
1 Introduction

1.1 The CER Data Exchange Industry Co-Design initiative

The Consumer Energy Resources Data Exchange (CER Data Exchange) Industry Co-design is a joint initiative between the Australian Energy Market Operator (AEMO) and AusNet with support from the Australian Renewables Energy Agency (ARENA) to work collaboratively with industry to co-design a national CER Data Exchange. It is part of a long-term, multistage process to build the digital foundation that will support the efficient integration of CER into the energy system in Australia. This phase of the CER Data Exchange will conclude with a final public webinar in **April 2025** to present the findings and recommendations on next steps.

This document is part of a series of reports marking the conclusion of the high-level design phase of this project. This report should be read in conjunction with the reports depicted in Figure 1 below. AEMO will also publish a knowledge sharing report to outline the project team's journey of applying a co-design framework to progress customer outcomes and key learnings from the process.

Figure 1: Reports for the CER Data Exchange Industry Co-Design project



1.2 This Implementation Plan

The stakeholder preferred option for the CER Data Exchange

Since June 2024, a team consisting of members from AEMO and AusNet, supported by independent consultants Mott MacDonald and EY (the Project Team), have undertaken a significant industry co-design process to develop a high-level design for the CER Data Exchange.[1] Stakeholders feedback provided through public workshops and

[1] Details of the co-design process can be found in Appendix A2 of the Co-Design Summary.

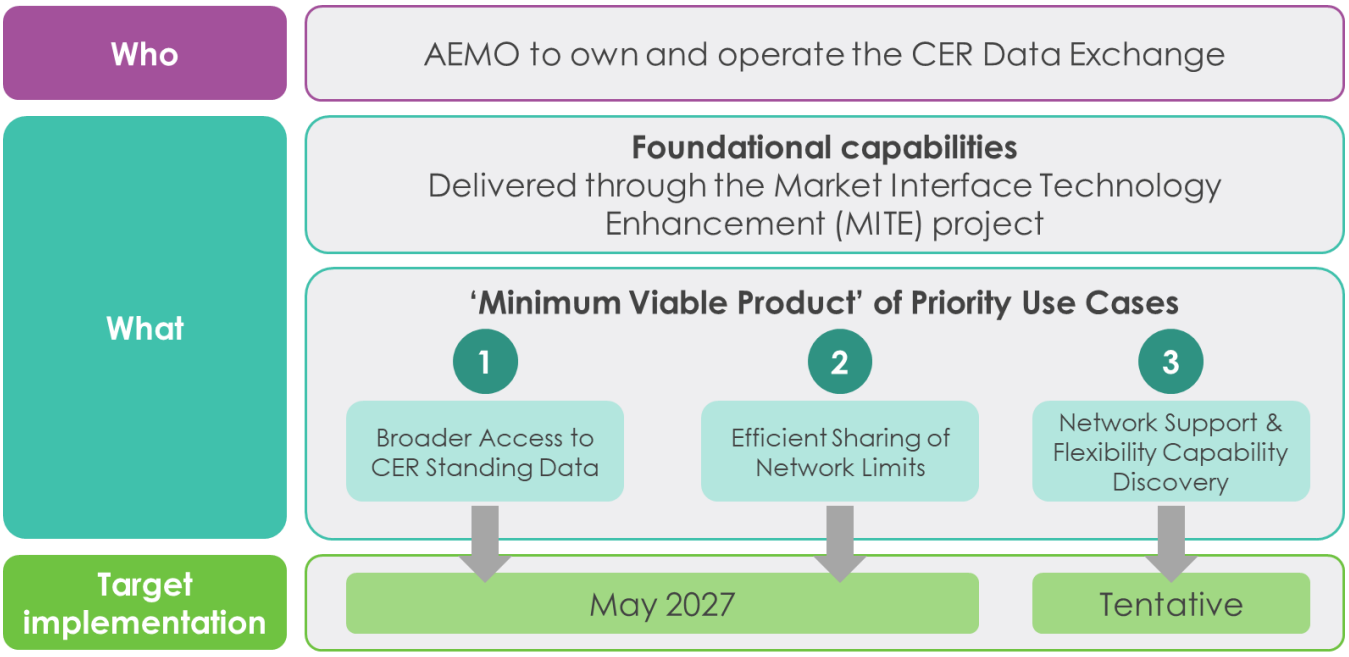
responses to the Consultation paper confirmed broad industry support for the preferred option in Figure 2 below. The stakeholder preferred option reflects stakeholder preference that the CER Data Exchange should leverage existing industry capability where possible and that it should 'start small and grow' so that lessons learned in the initial implementation can be incorporated into future use case and capability development.

High-level reference design developed to guide implementation

In the final public workshop held in March 2025, the Project Team and stakeholders considered trade-offs between full-service and minimum viable products for the priority use cases and the process and timeline for their implementation. The outcomes of the final public workshops are captured in the following documents:

- The ***High-level Design*** document contains details of the priority use case minimum viable products to guide detailed design
- **This document** sets out the key components of the plan for AEMO to undertake the detailed design and implementation phase of the CER Data Exchange project. It will also discuss key implementation considerations.

Figure 2: Stakeholder preferred option for the CER Data Exchange



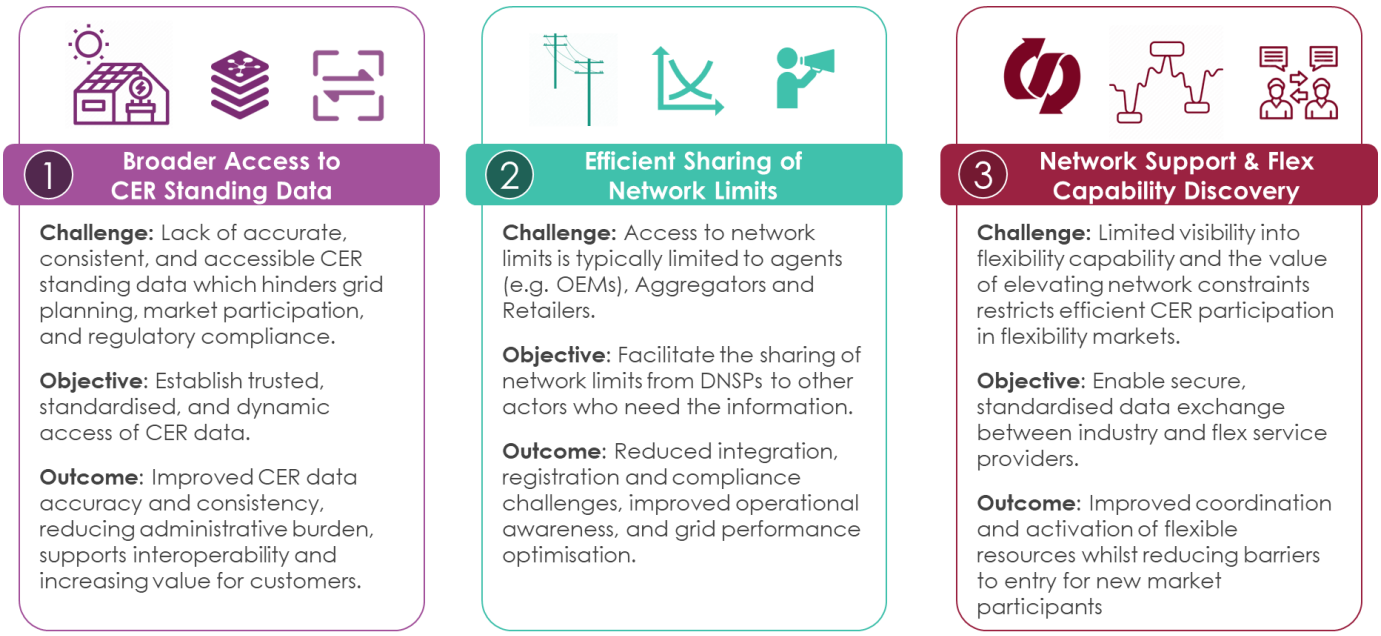
2 Detailed design and implementation of priority use cases

2.1 Key implementation phases

The broader CER Data Exchange development journey

The next phase of the development of the CER Data Exchange will be the detailed design and implementation of the priority use cases (see Figure 3) that stakeholders considered to provide the immediate benefits to industry and customers. This approach reflects stakeholder preference for a phased implementation of the CER Data Exchange where the initial priority use cases focus on developing core capabilities that support early adoption by users and provide the foundation for future enhancements as the priority use cases evolve and new use cases are developed. Figure 3 below shows the detailed design and implementation phase as part of the broader CER Data Exchange development journey.

Figure 3: Overview of priority use cases



See Attachment A: High-Level Design for detailed description and functionalities of the priority use cases.

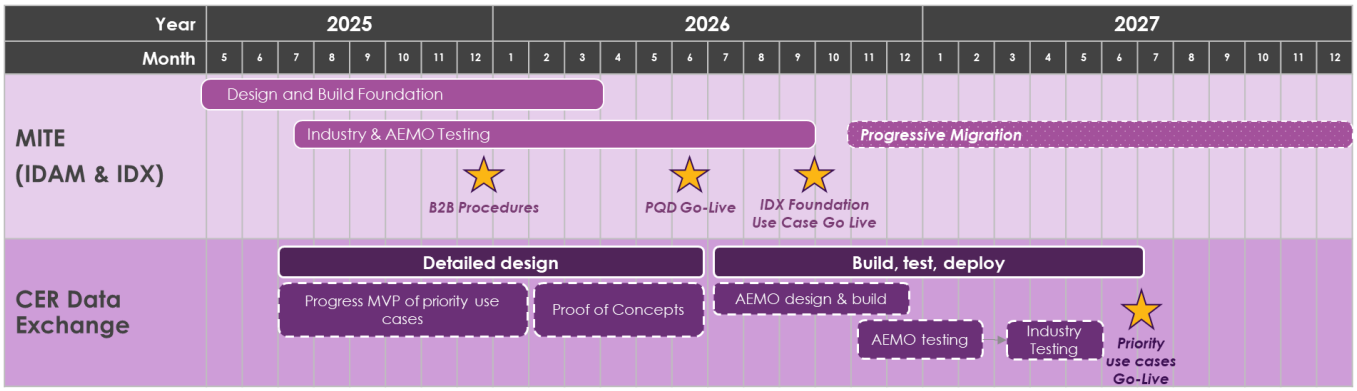
The next phase will consider both the short- and long-term implementation issues according to two horizons. In the near term, we will move through the AEMO governance process and expect to proceed on to Detailed Design in FY 2026. In Detailed Design, we will work with industry stakeholders to resolve the technical and regulatory issues required to enable the implementation and uptake of the priority use cases by May 2027. In the longer term, AEMO will focus on developing the frameworks which will support the operation of the CER Data Exchange beyond the initial establishment phase. Figure 4 below shows the detailed design and implementation phase as part of the broader CER Data Exchange development journey.

Figure 4: Indicative Phases for the CER Data Exchange development

The detailed design and implementation of the CER Data Exchange will occur in parallel to the implementation of the Market Interface Technology Enhancement (MITE) Project

AEMO aims to undertake the detailed design and implementation of the priority use cases in parallel with the MITE Project so that the CER Data Exchange can leverage the MITE foundational capabilities such as the Industry Data Exchange (IDX) and Identity Access and Management (IDAM). Figure 5 shows the relationship between the MITE and CER Data Exchange implementation timeline.

Figure 5: MITE and CER Data Exchange implementation timeline

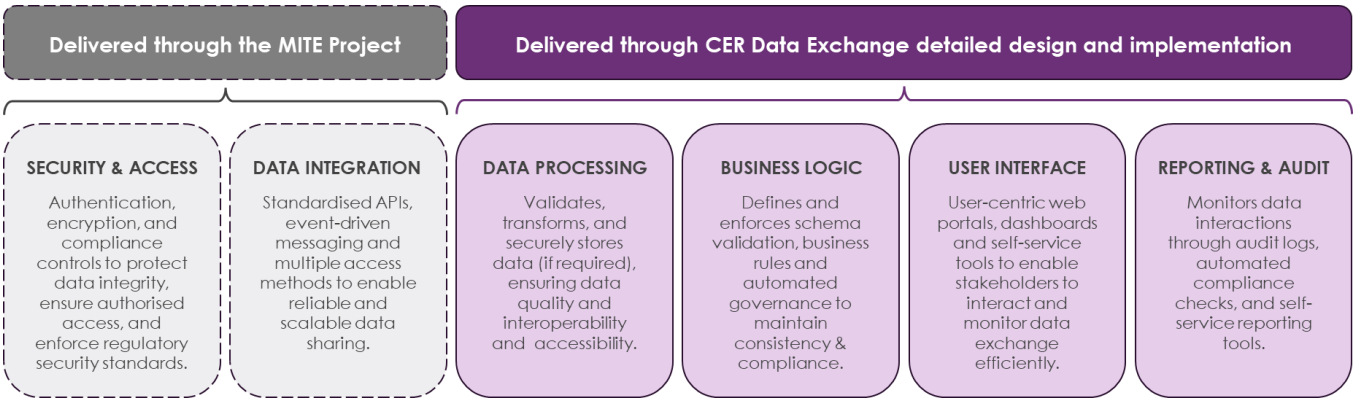


2.2 Detailed design and implementation to be conducted through two working groups

2.2.1 Technical Working Group to develop core digital infrastructure

The Technical Working Group will focus on designing and developing the core digital infrastructure that enables secure data exchange, processing and accessibility, and the technical mechanics of data movement, validation and presentation to users. The technical capabilities can be grouped into functional services shown in Figure 6 below.

Figure 6: Technical capabilities



The functional services of security and access and data integration will be developed and implemented concurrently through the MITE Project while the CER Data Exchange Technical Working Group will design and implement the CER specific functional services of data processing, business logic, user interface and reporting and audit. The concurrent implementation of the CER Data Exchange and MITE Project will enable the IDX and IDAM development to inform the priority use case design. AEMO anticipates the build, test and deploy phase of the priority use cases will begin once the IDX foundational capabilities are built.

Appendix A1 contains a summary description of the minimum viable product for each functional services to be developed for the priority use cases.

2.2.2 Governance workstream to consider operational governance and regulatory enablers

The Operation Governance and Regulatory Enablers Working Group will operate concurrently with the Technical Working Group to develop an operational governance framework that will enable the CER Data Exchange to evolve along with changes in consumer and industry needs. This workstream will also need to establish enduring forums or working groups that support and facilitate industry input beyond the detailed design and implementation phase.

Identifying regulatory enablers for priority use cases

A key priority for this working group will be identifying whether changes to government regulations, the national electricity rules, or AEMO procedures may be required to enable the implementation and uptake of the priority use cases.

The digital infrastructure that enables the physical exchange of data and information between organisations, will need to be a complemented by a regulatory framework that codifies the requirements to exchange certain data and information. Additionally, the regulatory structure will need to provide guidance to organisations that are required to provide and receive data, oversee potential compliance and data integrity framework.

AEMO anticipates four workstreams will need to be established to explore regulatory enablers. These are discussed below.

Workstream 1: regulatory enablers to facilitate access to CER Standing Data

This workstream will identify the organisations that will be responsible for the collection and storage of CER Standing Data and those who are authorised to receive it. It will also need to identify the types of standing data that should be shared and the frequency of update. A key area for investigation will be arrangements that allow organisations that are currently not registered market participants to access the information. This workstream will also need to consider customer privacy implications as well as issues relating to customer consent to share information.

As the DER Register already exists as a repository for CER/DER standing data, the workstream may also need to consider whether (and how) existing data will be available for authorised organisations in the CER Data Exchange.

Workstream 2: longer-term governance arrangements |

The Technical Working Group and the Governance and Regulatory Enablers Working Group are temporary industry working groups created to support the implementation of the priority use cases. Beyond the initial implementation stage, there needs to be an enduring framework that supports the consideration of new use cases, the evolution of the CER Data Exchange's technical capabilities, how industry and consumers (through consumer representative groups) can provide input. Workshop 3 participants expressed a preference for a separate working group to be created under an existing AEMO-convened forum to manage these issues and were open to more formal arrangements with the potential of leveraging existing structures where appropriate.

This workstream will focus on identifying the most appropriate forum for the longer-term working group to reside in and the governance arrangements (organisations represented, arrangements for the nomination and selection of members, advisory vs decision body, voting rights etc) for the working group. It will also need to explore whether regulatory or procedural changes are required for the working group to be created and develop an initial term of reference.

Another governance aspect that this workstream will need to consider is the level of prescription required for the CER Data Exchange and the operation of use cases. For example, documenting data sharing arrangements/requirements for use case in a guidance note would provide a high level of flexibility but may not provide sufficient regulatory coverage for compliance management. In contrast, prescribing arrangements in the national electricity rules may provide regulatory certainty, but less flexibility as changes to the rules generally require a lengthy period.

Workstream 3: Regulatory enablers to facilitate the sharing of network limits to multiple parties

A significant amount of detailed design work will be required to bring to life the broad stakeholder support for distribution network service providers (DNSPs) to share network limits with a wider range of organisations. DNSPs are at different stages of maturity in developing and implementing dynamic operating envelopes/dynamic network limits and there is currently no standardised format between DNSPs on how the information should be shared more broadly with a range of organisations. This workstream will need to work closely with the Technical Working Group to consider the parameters of data to be shared, the cost trade-offs between different frequency of update and how a staged approach (e.g. dynamic limits for 'active CER' to be shared first) could support the use case's uptake. It is important to note that this workstream is focused on the *sharing* of network limits only. The transmission of the actual limits between DNSPs and CER devices, and the devices' response to the commands is not in scope of the CER Data Exchange.

Workstream 4: Cost recovery arrangements

This workstream will focus on arrangements for AEMO specifically to recover costs associated with the initial design and development, and the ongoing cost of operating the CER Data Exchange. AEMO acknowledges that other organisations will also incur their own integration and ongoing costs for exchanging data through the CER Data Exchange, however, industry cost recovery arrangements will not be included in this workstream.

While AEMO will endeavour to determine least the cost solutions when implementing the CER Data Exchange use cases, it is not within its remit to determine how costs should be recovered for other participants. For example, there is a well-established framework in place for DNSPs to recover the cost of providing distribution network services to customers through the AER revenue determination process.

In the near term, AEMO will incur an estimated $8.8 million in incremental cost to implement the priority use cases. Stakeholders provided feedback through this co-design process that they generally prefer a hybrid approach where some government support is provided to reduce the level of user contributions. They considered this would help make the CER Data Exchange accessible to all market participants, including smaller players, while providing a fair mechanism for recouping costs. The cost recovery arrangement for the initial implementation costs, including whether governments should provide a contribution is a priority area for this workstream.

For longer-term (business-as-usual) cost recovery, this workstream will need to develop a cost recovery framework that support the uptake of CER Data Exchange services in the most efficient way and avoid imposing disproportionate cost on smaller organisations as per stakeholder feedback. Other cost recovery issues to be considered include charges for organisations that are not market participants, and organisations that may wish to use some of parts of CER Data Exchange services for commercial purposes.

2.3 Implementation timeline

AEMO estimates that the detailed design and implementation phase will be conducted over a 24-month period. After progressing through the AEMO governance process, we will look to commence implementation from July 2025. This next phase will consider issues over both the near- (2025 – 2027) and long-term (202+) horizons in response to stakeholder feedback that the CER Data Exchange should ‘start small, then grow’. The objective of the near-term phase is to resolve the technical and regulatory issues required to implement at least the *Broader Access to CER Standing Data* and the *Efficient Sharing of Network Limits* priority use cases by July 2027.

This timeline aligns with the deployment of the MITE project and delivers key capabilities (through the priority use cases) to support on-going reforms such as the implementation of the *Integrating Price Responsive* Resources final rule. The IPRR rule change is one of numerous other interrelated reforms in progress or anticipated in the energy sector (see Appendix A1.3 in the Co-Design Summary). The implementation timeline acknowledges that the CER Data Exchange is a key enabler for several parallel reforms and is part of a much larger effort to achieve a consistent national coordinate response to CER, as outlined in the CER Roadmap.

Key stakeholder engagement activities

AEMO will continue to work collaboratively with industry to undertake this phase of the CER Data Exchange initiative. The key stakeholder engagement activities for this phase includes:

- **Working group meetings |** AEMO plans to hold monthly meetings for the Technical Working Group and the Governance and Regulatory Enablers Working Group. The working groups are forums for stakeholders to provide inputs and industry perspectives into the detailed design and implementation process and enable AEMO to discuss potential options and stress test solutions.
- **Public consultations and forums |** AEMO also intends to hold public consultation activities during this phase. This is likely to include a combination of public in-person workshops, webinars, targeted mini forums as well as consultation papers. Public consultations are likely to occur at key milestones of this phase, such as the conclusion of detailed design of priority use cases.

2025-2026: Detailed Design

Technical focus

The main effort of this period will be the detailed design of the *Broader Access to CER Standing Data* and the *Efficient Sharing of Network Limits* priority use cases. A key outcome of this period is building industry alignment and documenting the technical aspects of the priority use cases, in preparation of the build, test and deploy activities planned for 2026-27. As the CER Data Exchange will rely heavily on foundational capabilities delivered by IDX and IDAM, members of the MITE project team are expected to be closely involved in discussions with the Technical Working Group.

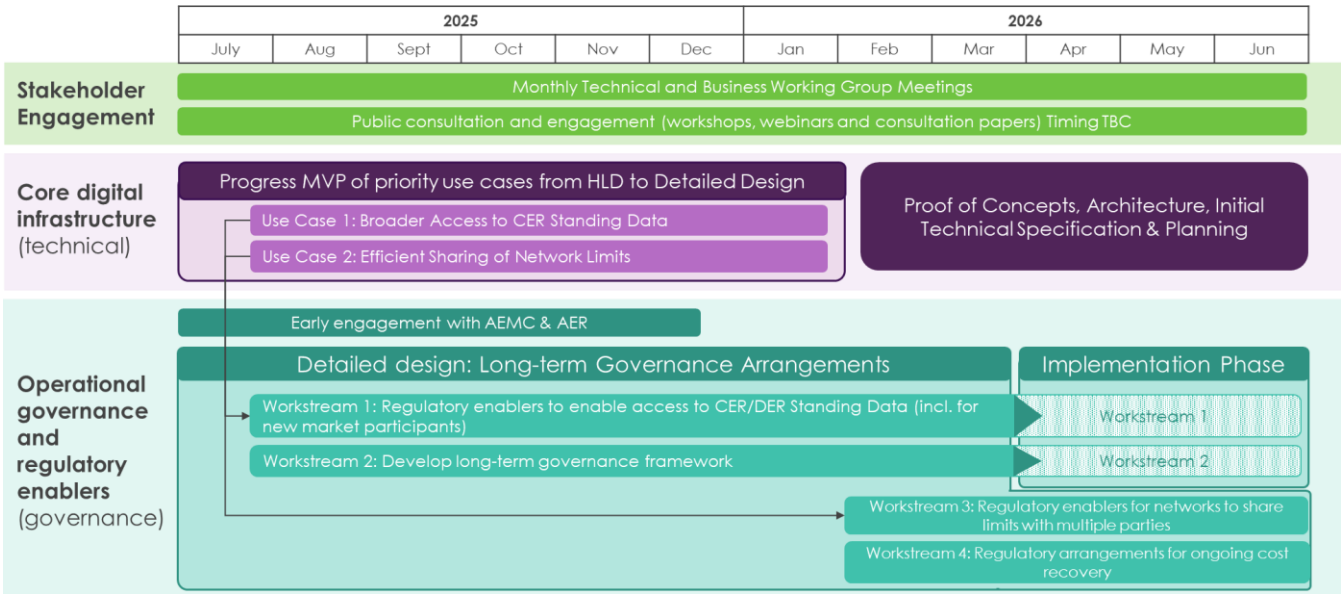
Governance focus

This period will see the 'detailed design' of enabling regulatory arrangements through a staged approach. AEMO will commence examining regulatory enablers for the *Broader Access to CER Standing Data* use case and longer-term governance arrangements as they are likely to identify changes that are foundational to other use cases. Where rule changes are required, AEMO will work with industry to identify potential regulatory options and identify proponent(s) for rule change requests. Rule change requests that are essential to support the priority use case will need to be submitted to the Australian Energy Market Commission (AEMC) in the first quarter of 2026 to allow the sufficient time for the rule change process to be conducted.

AEMO will also undertake early engagement with the AEMC and the Australian Energy Regulator (AER) on potential regulatory changes.

Figure 7 below shows the expected key activities between July 2025 and June 2026.

Figure 7: Expected key detailed design and implementation activities in 2025-26



2026-2027: Build, test, deploy

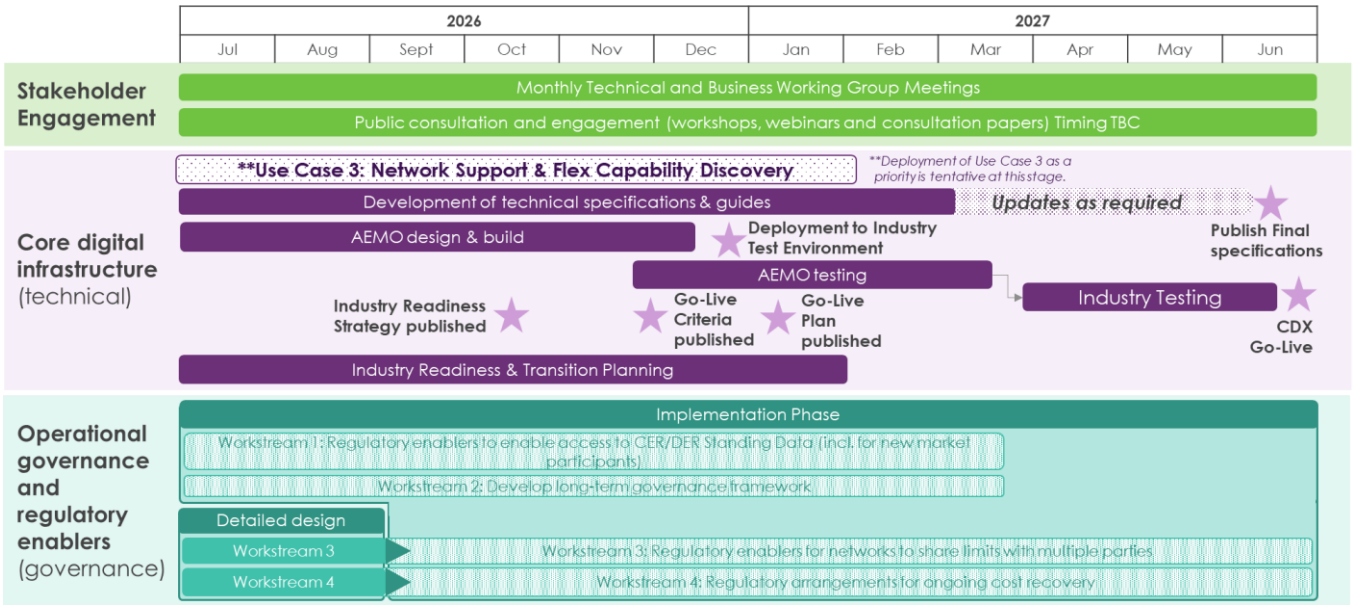
Technical focus

For the 2026-27 activities, the focus of the technical workstream will be the building of the technical infrastructure for the priority use cases. This will include both AEMO and industry testing and industry readiness and transition planning. AEMO will also progress the development of the *Network Support & Flexibility Capability Discovery* priority use case as need and market maturity for the capability surfaces. Stakeholders considered that more time and effort is needed further develop the services and potential benefits that this use case will provide to customers.

Governance focus

If rule change requests are required to enable CER Data Exchange functionalities, AEMO anticipates that this period will be focused on supporting the AEMC's rule change process. AEMO may also progress procedure changes in parallel to the rule change process during this period where required if the AEMC has indicated a clear direction on aspects of the rule change proposal.

Figure 8: Expected key detailed design and implementation activities in 2026-27



3 Further implementation considerations identified by stakeholders

Throughout the co-design process, stakeholders highlighted key issues, challenges and questions that require further consideration at the detailed design stage. Beyond the data exchange, stakeholders raised concerns about data quality, collection processes and the need for complementary business rules, compliance frameworks and regulations.

There were calls for better integration of roles and responsibilities, clearer definitions of use cases, and the need to address DOE policy variability. Additionally, suggestions included improving scalability and security measures and ensuring compliance with evolving regulatory standards. Most notably, stakeholders repeatedly expressed the need to ensure alignment and connection with other projects across industry, including the National CER Roadmap, rule changes, and updates to standards.

Some of these issues are discussed below and will be considered by AEMO in the following stages.

3.1 Integration challenges

The proposed implementation activities for the CER Data Exchange focus on achieving a comprehensive level of standardisation, automation, and scalability to address the diverse challenges of the *Broader Access to CER Standing Data*, *Efficient Sharing of Network Limits*, and *Network Support & Flexibility Capability Discovery* Use Cases. These activities aim to create a unified, efficient, and secure ecosystem capable of supporting the NEM's transition to a decentralised energy landscape.

In this context, it will be important in the detailed design phase to consider:

- **Standardised Data Framework** | It will be important to develop and implement a unified data model encompassing CER standing data, dynamic network limits, and local network service parameters, ensuring alignment with technological advancements and market needs. This includes aligning data practices with regulatory requirements, international best practices, and industry standards to support interoperability and operational consistency across DNSPs, aggregators, and marketplaces. The detailed design phase will need to define consistent schema structures for dispatch signals, telemetry, and compliance reporting, reducing integration complexity and fostering scalability.
- **Enhanced System Integration** | Utilising the IDX platform can facilitate seamless connectivity between DNSPs, the DER Register, and external marketplaces like Piclo – creating a harmonised operational ecosystem. This could include standardising APIs while supporting a variety of protocols (e.g., RESTful APIs, GraphQL, gRPC) to enable future-proof data exchange capabilities. An additional feature could be robust sandbox environments for stakeholders to test integrations, validate compliance, and optimise system performance before full deployment.
- **Secure and Scalable Infrastructure** | It will be important to build an elastic and secure infrastructure capable of managing growing data volumes, transaction rates and service complexities as CER adoption scales. This could include implementing cutting-edge security measures, such as Identity and Access

Management (IDAM), granular role-based access controls, and advanced encryption protocols to safeguard sensitive data. Another option is to deploy predictive scaling tools to optimise resource allocation during peak usage periods, ensuring seamless service delivery and cost efficiency.

3.2 Broader implementation challenges

Implementing the CER Data Exchange requires addressing significant challenges that span across the technical, operational, and regulatory domains. These challenges must be navigated to ensure the platform's effectiveness and scalability. For example:

- **Data Quality and Consistency** | Harmonising data standards and formats across DNSPs, aggregators, and marketplaces would minimise inconsistencies and enable seamless interoperability. It will be important to ensure the accuracy, completeness, and timeliness of data inputs, particularly for telemetry, dispatch signals, and compliance reports.
- **Stakeholder Alignment** | It will be important to balance the diverse priorities, operational capabilities and market roles of DNSPs, aggregators, technology providers, and regulators. This requires the establishment of collaborative frameworks to promote consensus on schemas, integration protocols, and service definitions, reduce friction, and foster adoption.
- **System Integration** | Overcoming legacy system limitations while ensuring compatibility with cutting-edge technologies and evolving integration standards is a major challenge. Addressing discrepancies in security requirements, data-sharing protocols, and verification mechanisms will support seamless system integration.
- **Regulatory Compliance** | A work program will be needed to navigate complex regulatory landscapes across jurisdictions to align with both existing mandates and emerging standards. Comprehensive, auditable records of data transactions, service operations, and compliance metrics will be needed to support regulatory reporting and oversight.
- **Scalability and Security** | Designing systems to handle increasing data volumes, transaction rates, and service complexities driven by CER penetration and market evolution is another major challenge. This requires mitigating cybersecurity risks through advanced encryption, continuous threat monitoring, and adaptive security controls capable of responding dynamically to emerging threats.

3.3 The case for government support on the initial investment cost

Stakeholders provided substantial support for government funding to help establish the CER Data Exchange as a public good and ensure equitable cost recovery, especially in the initial rollout phase. Stakeholders recognised the need to transition to a user-pays model over time but emphasised the importance of government support to get the CER Data Exchange off the ground and mitigate the financial impacts on early participants.[2]

The CER Data Exchange may be considered a public good, given industry participants will gain access to the same amount and the same types of benefits from exchanging CER data. So, there is a risk that participants

[2] AEMO, CER Data Exchange Industry Co-Design: Consultation Summary Report, December 2024.

default to point-to-point solutions regardless of the benefits of collective investment in and use of an exchange. Government or ARENA funding to support the initial investment would reduce the costs of market participants adopting the CER Data Exchange.

3.4 Implementation Risks

Throughout the co-design process, industry stakeholders warned against overinvesting in capabilities early on. The risk is that a full-service exchange would require a lengthy build time and by the time it is deployed, it utilises out-of-date technology or has limited applicability to the future energy market. In the meantime, organisations may also choose to develop their own, localised solutions to address immediate needs, propagating more point-to-point connections. Further, many workshop participants were concerned about the cost of implementing the CER Data Exchange.

Participants broadly preferred the CER Data Exchange to start with a narrow focus to accelerate implementation of the immediate use cases. However, there was recognition of the need to design for broader functionality based on a wider set of potential use cases – enabling the scope to expand over time as industry needs evolve. Participants suggested that the CER Data Exchange should focus on quick wins with near term use cases, but be designed with an end state in mind, with implementation staged in a way that supports that future whilst remaining agile to market changes. To further manage cost and risk, stakeholder preference was to leverage existing capabilities in the energy market. By building upon the MITE business case, specifically IDAM and IDX, provided much of the foundational capabilities required, thus reducing upfront cost of the CER Data Exchange, the time period to deploy the priority use cases and the scale of investment.

The implementation plan has incorporated this feedback with a streamlined the deployment of capabilities and staggered progression of use cases. Further risks and corresponding mitigations have been outlined in Table 1. Risks specific to each priority use case are outlined in Attachment A: High-Level Design.

Table 1: Implementation Risks and Mitigation Strategies

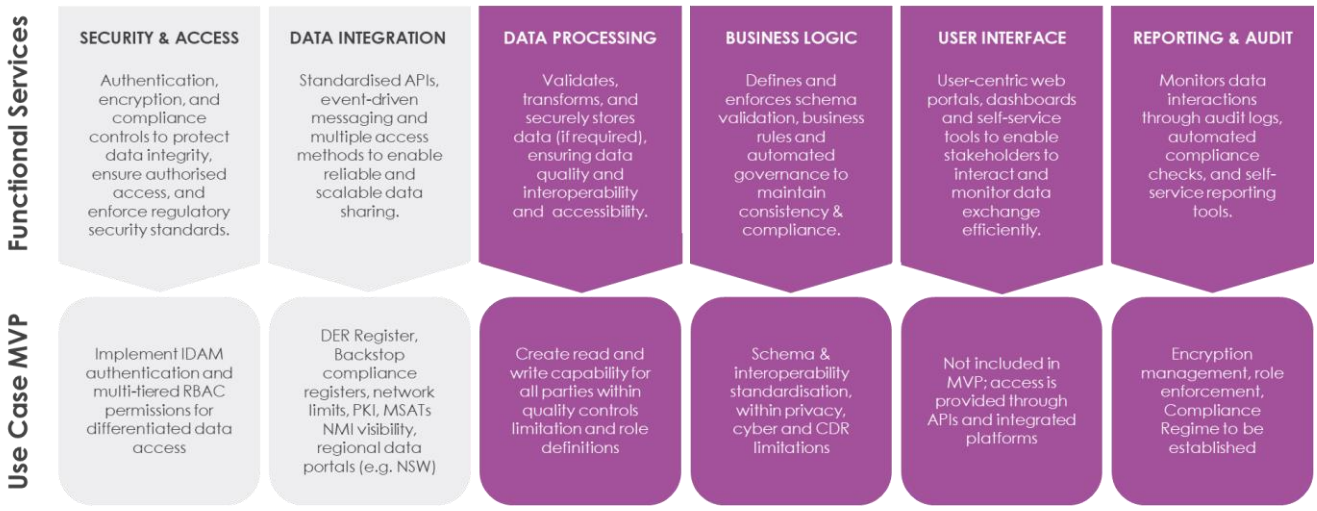
Risk	Details	Proposed Recommendation
Funding	• AEMO will explore government / ARENA support for all or part of the **initial** capital expenditure costs. This government support was seen as important by stakeholders to recover the initial costs and establish the CER Data Exchange as a public good.	• Without this funding, there is a risk that participants default to point-to-point solutions regardless of the benefits of collective investment in and use of an exchange.
Misalignment with market and technology needs	• Concurrent software upgrades (i.e. DER Register uplift) do not occur, which means the value provided by the CER Data Exchange under-delivers.	• Maintain conversations with relevant teams responsible for concurrent reforms and ensure alignment on timing.
Technical Challenges	• Participant technological maturity is below the appropriate level to integrate with the CER Data Exchange. • Subsequently, stakeholder integration with the platform is delayed and early users are subjected to higher costs due to low uptake.	• By leveraging the MITE capabilities, this risk will be inherently smaller as participants will be gradually migrating on to the platform. • Undertake an industry readiness plan during the build, test, deploy phase, and see stakeholder feedback to confirm organisations are adequately prepared (on the whole) to ensure effective deployment of the CER Data Exchange.

Risk	Details	Proposed Recommendation
Inadequate resourcing	• Insufficient resources (time, budget, personnel) to deliver against the proposed timeframes. Project loses momentum, incurs extraneous costs or stagnates. • Stakeholders are resource constrained and unable to contribute sufficiently to working groups, and subsequently design reflects limited stakeholder input. • Lack of stakeholder bandwidth to dedicate time to this project • AEMO and/or industry cannot prioritise	• AEMO to undertake resource planning (utilising the resourcing estimates included in the High-Level Cost Assessment) and allocate resources accordingly. • Specifically design stakeholder engagements to maximise effective use of stakeholder's time. • Provide multiple different mechanisms for stakeholders to provide feedback (e.g. industry workshops, consultation papers, email)
Dependency on MITE	• The CER Data Exchange is inherently linked to the development of the MITE business case. • The build, test, deploy phase cannot be initiated prior to the foundational capabilities being completed.	• Maintain discussions with the MITE team and provide support where needed.
Enabling rule changes do not proceed	• Depending on the outcomes of the Longer-term governance workstreams, rule changes may be required to establish governance arrangements within AEMO's remit or to enable a broader range of participants to have access to CER data, for example. • There is a risk that the rule change processes are drawn out, and / or the AEMC rejects or makes a preferrable decision that inconsistent with the intent.	• Early engagement with the AEMC and AER to increase understanding and gain feedback. • Continue in-depth stakeholder engagement with all of industry, addressing stakeholder concerns to ensure all stakeholders' feedback is considered in the next stage.
Rule changes that undermine the CER Data Exchange	• The CER Data Exchange is a crucial enabler for CER integration at scale in the NEM and is highly complementary to several other reforms – such as the Integrating Price Responsive Resources (IPRR) and Integrated Distribution System Planning (IDSP) rule changes. AEMO will closely monitor whether any new reform initiatives would create arrangements that duplicate or act as a substitute to the functions of the CER Data Exchange.	• Maintain communications and discussions with market bodies and organisations across the energy sector.

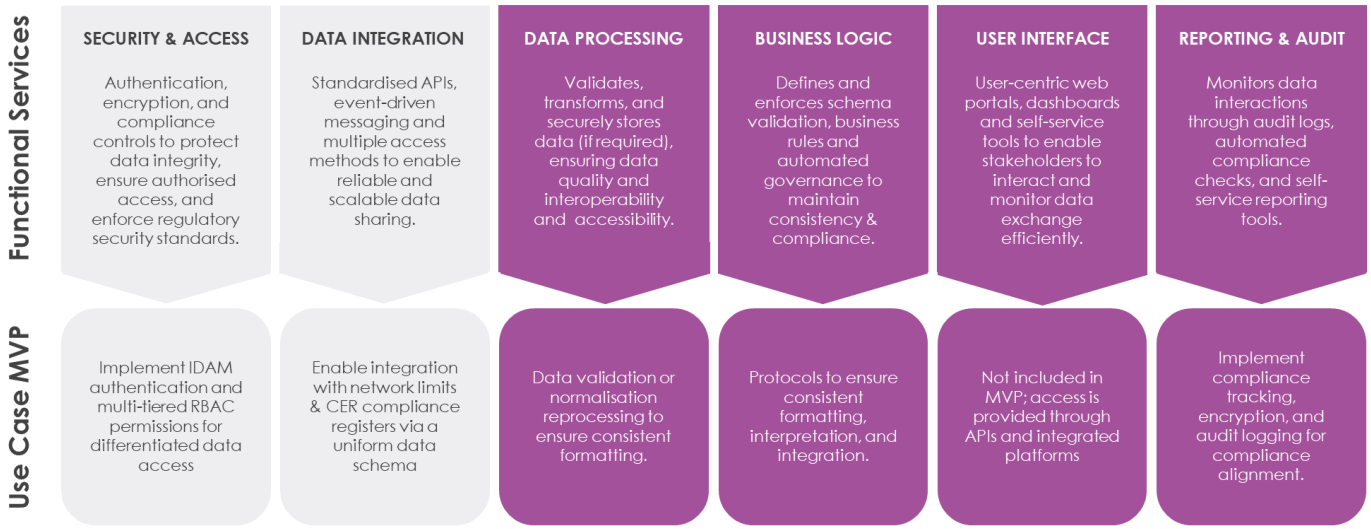
Appendices

A1. Proposed Minimum Viable Product for priority use cases

A1.1 Broader Access to CER Standing Data



A1.2 Efficient Sharing of Network Limits



A1.3 Network Support and Flexibility Capability Discovery