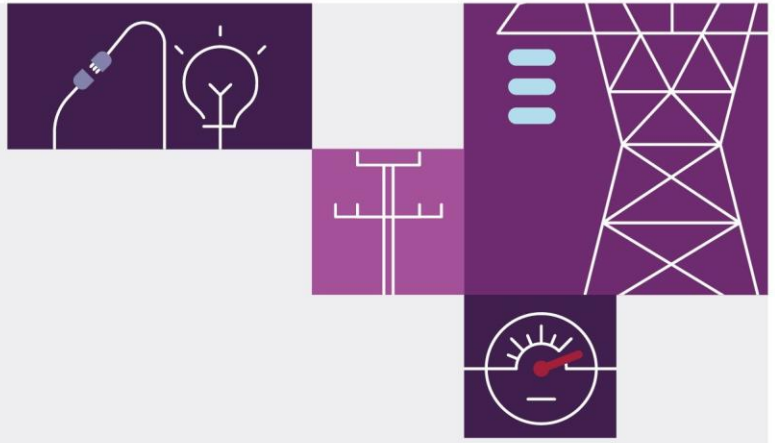


NEM Reform Program Initiative Briefs

April 2024

A reference document for the Post-2025 initiatives
captured in the NEM Reform Implementation Roadmap
Version 4





Important notice

Purpose

The purpose of this publication is to provide further information on each of the Post-2025 initiatives captured in version 4 of the NEM Reform Implementation Roadmap, including key AEMO strategic or foundational initiatives, to help inform stakeholders understand the scope, assumptions and relationships underpinning each of the initiatives.

Disclaimer

The information in this document is provided for explanatory purposes and 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 every effort to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness.

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Version control

Version	Release date	Changes
1	27/04/2022	Initial publication
1.1	28/04/2022	Update to initiative briefs in line with NEM Reform Implementation Roadmap
2	31/08/2022	Update to initiative briefs to update initiative scope, including removal of four initiatives (Operational Decision-Making Tools, Operational Data Store, Business Rules Engine and Forecasting Platform Uplift) and addition of two initiatives (Capacity Mechanism and Congestion Management Mechanism).
3	27/04/2023	Update to initiative briefs to reflect current scope and timing. Removal of Turn-up Services brief following de-scoping from the NEM Reform Program.
4	05/10/2023	Update to initiative briefs to reflect current scope and timing including the following initiatives 2.2, 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.1, 6.2, 6.3, 6.4, 7.1, 7.2, 7.3, 8.1, 8.4.
5	15/12/2023	Update to initiative briefs to reflect current timing including the following initiatives 2.2, 3.3,3.4, 5.2,5.3.
6	30/04/2024	Restructure and/or update of all information briefs to reflect current scope and timing.

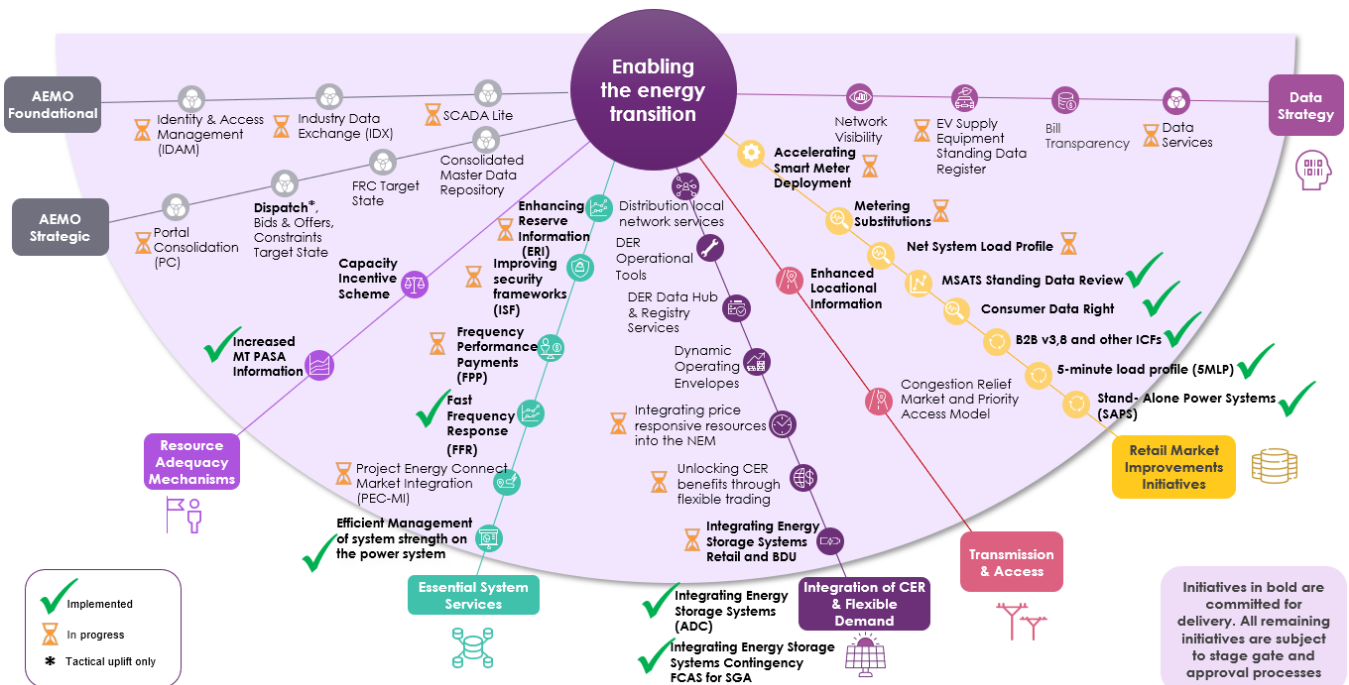
NEM Reform Program

The NEM Reform Program ('the Program') was established by AEMO to collaborate with energy industry participants to deliver many of the Energy Security Board's (ESB) post-2025 reforms along with various other energy market reforms.¹

The ESB's post-2025 electricity market design set out a pathway to transition the National Electricity Market (NEM) into a modern energy system fit to meet the community's evolving wants and needs and move towards a net-zero future for Australia. The designs sought to address essential change as ageing coal-fired generators are retired, replaced by an expanding array of new technologies, including large-scale renewable energy generation and storage systems, complemented by rapid growth in consumer energy options, including rooftop solar.

The Program is a large-scale, complex, industry-wide program, impacting participants across all areas of the NEM. Each initiative that makes up the Program's scope supports the transition of the NEM and brings Australia closer to a net-zero future. To manage the implementation of this significant package of reforms and to deliver the best possible outcomes for consumers, the Program works collaboratively with industry participants from across the energy sector. The Program focuses on delivering solutions that meet the reform objectives as efficiently as possible, leveraging opportunities to bundle, sequence and prioritise initiatives within the Program, and where possible identify and drive out costs through solution design and implementation.

Figure 1. NEM Reform Program Scope



¹ AEMO NEM Reform Program. Website: <https://aemo.com.au/initiatives/major-programs/nem-reform-program>

NEM Reform Implementation Roadmap

AEMO, in partnership with the Reform Delivery Committee (RDC, or the Committee), has compiled the NEM Reform Implementation Roadmap (the Roadmap) which details an integrated timeline for implementing the reform initiatives that comprise the ESB's Post-2025 recommendations, as well as broader NEM and gas related reform initiatives that collectively make up the NEM Reform Program.^{2,3}

The purpose of the Roadmap is to provide AEMO and stakeholders with a holistic view of the reform program impacting national electricity and gas markets across the east coast of Australia. It does so by bringing together AEMO's former Regulatory Implementation Roadmap, NEM2025 Implementation Roadmap and East Coast Gas Reform Implementation Roadmap into one central Roadmap.

Initiative Briefs




This reference document provides a brief description of each of the ESB's post-2025 reform initiatives and those AEMO foundational or strategic enabling initiatives⁴ that are captured within the NEM Reform Program to help stakeholders understand the scope, assumptions and relationships (refer to appendix) underpinning the Roadmap.

Each initiative briefs aims to provide an understanding of the problem statement a reform is seeking to address, the proposed solution and its key benefits, including the known or indicative scope changes proposed. In addition to this, each initiative brief provides a high-level assessment of impacts to market and industry stakeholders and AEMO teams, next steps in the reforms development and where stakeholders may access further information.

In setting out the changes to be implemented or proposed AEMO have sought to provide stakeholders with an understanding of the Procedures & Guidelines, Market Application and Market Interface changes required as per the table below.

Procedures & Guidelines	Market Applications	Market Interfaces
• Example	• Example	• Example

In setting out the indicative impacts to market and industry stakeholders and AEMO teams, a rating has been applied of low, medium, or high based on RDC and participant feedback and AEMO's own assessment of the change impacts as shown below. For those initiatives with impacts across multiple AEMO teams, AEMO has referenced the highest rating impact. Where the impacts are not known, AEMO has called out those participants likely to be impacted based on current designs or assumptions underpinning each initiative.

 Low Impact  Medium Impact  High Impact

² AEMO NEM Reform Implementation Roadmap. Available here: <https://aemo.com.au/en/initiatives/major-programs/nem-reform-implementation-roadmap>.

³ The NEM2025 Implementation Roadmap has been integrated with the Regulatory Implementation Roadmap and East Coast Gas Reform Implementation Roadmap to form the NEM Reform Implementation Roadmap.

⁴ Foundational initiatives represent an investment in an AEMO legacy system to deliver an uplift to base capability on which reforms are dependent. Strategic initiatives represent an investment where system uplift is required at some time in the future and AEMO sees the opportunity for this life-cycle type investment to be brought forward and delivered in the same timeframes as the reforms for efficiency purposes.



The details of each initiative are subject to change arising from further policy work or further analysis. As such, each initiative brief is to be revised periodically to reflect changes in scope or timelines as policy or designs are finalised or as new rule determinations are made.

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Essential System Services

Frequency Performance Payments
Enhancing Reserve Information
Improving security frameworks for the energy transition
Fast Frequency Response



Frequency Performance Payments

Establishing new financial incentives for facilities such as electricity generators, large loads and batteries to provide helpful primary frequency response.

Problem to be solved

Frequency can be thought of as the 'speed' at which a power system operates. System frequency varies whenever the electricity supply does not exactly match consumer demand. Stable frequency is a fundamental requirement to maintain the secure operation of power system. The changing NEM generation mix and increasing number of inverter-based resources such as large-scale wind and solar farms, as well as the high uptake of rooftop PVs, make maintaining the supply-demand balance more challenging.

Consequently, keeping the frequency within a limited range around its nominal value has become more difficult. This means new measures are required to support the operation of the power system in accordance with the standards stipulated in the Frequency Operating Standard (FOS).

Essential System Services

Key Dates

- Final Determination - 8 SEP 2022
- Non-financial Go-live - 9 DEC 2024
- Financial Go-live - 8 JUN 2025

Solution

In September 2022, the AEMC made a final rule determination⁵ that:

- Confirmed the mandatory Primary Frequency Response (PFR) arrangements are to be extended for all scheduled and semi-scheduled generators and scheduled loads (removing an existing June 2023 sunset to such arrangements).
- Introduced the new Frequency Performance Payment (FPP) process, which creates a new double-sided system of incentive payments and penalties based on units' impact on system frequency.
- Established new reporting obligations for AEMO and AER in relation to the levels of aggregate frequency responsiveness in the power system and the costs of frequency performance payments.

This initiative focuses on the second of these changes and the establishment of a new FPP system and associated procedures and guidelines (including Frequency Contribution Factor Procedures) that provide incentives for all facilities to operate in a way that helps maintain power system frequency within the normal operating band, at the lowest cost to consumers.

Key benefits

- Improved valuation and pricing of plant behaviour, providing clear economic signals to participants about the value of good frequency performance (and the cost of poor performance).

⁵ AEMC National Electricity Amendment (Primary Frequency Response Incentive Arrangements) Rule 2022. 8 September 2022. Available here: <https://www.aemc.gov.au/rule-changes/primary-frequency-response-incentive-arrangements>

- Improved transparency and provision of relevant information faster to market participants and stakeholders to assess the effectiveness and efficiency of the frequency control frameworks over time.
- More granular allocation of Regulation Frequency Control Ancillary Services (FCAS) recovery, with the new five-minute Contribution Factors (CF) to replace the current 28-day Causer Pays factors.

Changes proposed

The rule change creates a new system of positive and negative FPP, which will give market participants information on their frequency performance and its dollar value (or cost) in near-real time, replacing the existing Causer Pays arrangements.

Procedures & Guidelines	Market Applications	Market Interfaces
<ul style="list-style-type: none"> • Development and consultation on Frequency Contribution Factors procedure to replace the existing Regulation FCAS Contribution Factor (Causer Pays) procedure. • Consultation on amendments to AEMO's PFR Requirements procedure • Consultation and amendment of AEMO's Energy Market Management System (EMMS) Data Model Technical Specifications – FPP Report and Settlements Reports. 	<ul style="list-style-type: none"> • Design, build and implement a new FPP system, to determine contribution factors and other parameters. • Modifications to existing NEM Settlements system to apply contribution factors 	<ul style="list-style-type: none"> • EMMS Data Model FPP reports and tables including, but not limited to: <ul style="list-style-type: none"> • Report 1 – FPP unit curated 4 second SCADA data • Report 2 – FPP regional frequency and frequency measure (4 second) • Report 3 – FPP unit performance (5 minute) • Report 4 – FPP unit contribution factor (CF) • AEMO intends to provide participants with an additional 15 FPP reports regarding FPP measurement and calculations • Updates to EMMS Settlement table / reports including, but not limited to: <ul style="list-style-type: none"> • Settlement report (SR) – TXT • SET Ancillary Summary • SET FCAS Payment • SET FCAS Recovery • Changes to NEMWEB Settlement Reports and Ancillary Services Reports • Update to AEMO Website AS Payment / Recovery files

Further details on the changes proposed are available via the FPP page of AEMO's website [here](#).

Market, Industry and AEMO impacts

Market & Industry Stakeholders

- Generators (Scheduled & Semi-Scheduled)
- Integrated Resource Providers
- Market Customers (Scheduled Load)

AEMO Teams

- Operations (Systems Capability, Operational Support, Market Operations)
- Digital (Enterprise Application Services (Wholesale Solutions), Data Management, Customer, Engagement & Services,)



Next steps

- Data model technical specification update – Reporting (APR 2024).
- Data model technical specification update – Settlements (SEP 2024).
- AEMO and industry participant implementation and readiness activities in anticipation of Go-live in June 2025, with a six-month period of non-financial operation of the new FPP arrangements, from December 2024 to May 2025.

Where can I find more information?

AEMC Rule Change – Primary frequency response incentive arrangements:

<https://www.aemc.gov.au/rule-changes/primary-frequency-response-incentive-arrangements>

AEMO NEM Reform Program – Frequency Performance Payments: <https://aemo.com.au/initiatives/major-programs/frequency-performance-payments-project>

AEMO – Frequency Contribution Factors Procedure: <https://aemo.com.au/consultations/current-and-closed-consultations/frequency-contribution-factors-procedure>

AEMO – Primary Frequency Response Requirements: <https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements>

Enhancing Reserve Information

Improving transparency to better assess when reserves are needed during the transition.

(formerly Operating Reserve Market)

Problem to be solved

Operating reserve is defined as the capability of electricity suppliers, such as thermal and hydroelectric generators, and grid-scale batteries to respond to large continuing changes in energy requirements.⁶ There is growing forecast uncertainty and variability in net demand over timescales of minutes to hours, contributed to by growing variable renewable energy (VRE) penetrations, weather, participant availability, commitment decisions, storage depth, and coordination of distributed energy resources.⁷ Lack-of-reserve occurrences are increasingly frequent, and participant behaviour does not always respond to reduce system risk.

Operating reserves are currently valued implicitly through the energy spot market. However, current arrangements are not considered sufficient to address increased variability and uncertainty as the power system transitions in a manner that is sufficient to prevent AEMO intervention.

Solution

The AEMC's final rule determination⁸, published 21 March 2024, sets out to increase transparency of energy availability in an operational timeframe through publication of the following:

- State of charge: the energy availability of batteries (i.e., state of charge in MWh) will be published close to real-time, aggregated by region, and the following trading day by dispatchable unit identifier (DUID) to align with existing post-trading day publications.
- Daily energy constraints: the combined energy constraints of other energy-constrained plant (hydro, gas and coal) would be aggregated by region and published daily (at the start of each trading day).
- Maximum storage capacity: storage participants would need to provide their maximum storage capacity (MWh) to AEMO in their bid and offer validation data.

These incremental improvements are to support the current market frameworks and provide for the opportunity to observe the future fleet's response to changes in market signals, before introducing more complex changes. To provide time for additional market entry of batteries before publishing this information and enable consistency with other related rule changes, the Commission's final rule is to commence as follows:

Essential System Services

Key Dates

- Final Determination - 21 MAR 2024
- AEMO High Level Implementation Design - MAY 2024
- Stage 1 Go-live - 1 JUL 2025
- Stage 2 Go-live - 1 JUL 2027

⁶ AEMO Power System Requirements, Reference Paper July 2020.

⁷ AEMO Engineering Framework 2022, AEMO Integrated System Plan 2022, AEMO Renewable Integration Study 2020.

⁸ AEMC National Electricity Amendment (Enhancing reserve information final determination) Rule 2024. 21 March 2024. Available here: <https://www.aemc.gov.au/sites/default/files/2024-03/Enhancing%20reserve%20information%20final%20determination.pdf>

- 1 July 2025: Publishing state of charge information for batteries, at the DUID level, for each trading interval in respect of the previous trading day.
- 1 July 2025: Publishing daily energy limits of other scheduled plant types (e.g., hydro, gas and coal), caused by factors such as fuel availability, at the start of each trading day
- 1 July 2025: Require storage participants to submit their maximum storage capacity as part of their bid and offer validation data
- 1 July 2027: Publishing state of charge information for batteries close to real time.

Key benefits

The provision of additional information on energy availability could better ensure the availability of reserves across all timeframes and allow more efficient decisions about the commitment of reserves at certain times, for example, supporting participants better manage their reserve availability to address shorter-duration flexibility issues.

Changes proposed

The AEMC's final rule requires AEMO to publish information on energy availability in the operational timeframe, including state of charge and daily energy constraints, and for participants to provide maximum storage capacity to AEMO. This information is already provided to AEMO by market participants, either through the SCADA system, daily bids through PASA or as part of the new arrangements to integrate energy storage systems (IESS).

Procedures & Guidelines	Market Applications	Market Interfaces
<ul style="list-style-type: none"> • Registration Guide and Application Form • Schedule 3.1 Bid Validation Data guideline • Amendment to the Pre-dispatch Region Solution table in SCADA 	<ul style="list-style-type: none"> • NEM Report and Participant Data Model • Spot Market Operations Timetable (rules consultation) • Amendment to the Participant Registration tables in MMS Data Model 	<p>Reporting of:</p> <ul style="list-style-type: none"> • Maximum storage capacity - PARTICIPANT_REGISTRATION tables in MMS Data Model (similar approach to the publication of existing bid validation data). • Daily energy constraints - new column in the existing Pre-dispatch Region Solution table in SCADA. • State of charge the next day - publish by DUID the following trading day (to align with existing post-trading day publications). • State of charge real time – publish actual state of charge after each Dispatch run via the participant data model DISPATCHREGIONSUM table in SCADA (this information already currently provided by participants through SCADA).

Market, Industry and AEMO impacts

Market & Industry Stakeholders

- Generators (Scheduled)
- Integrated Resource Providers

AEMO Teams

- Operations (Operational Support (Electricity Market Modelling, Operations Planning))
- Digital (Enterprise Application Services (Wholesale Solutions))



Next steps

- AEMO to publish a high-level implementation design and participant impact assessment (targeting late May 2024).
- Two stage implementation schedule – Stage 1 commencing 1 July 2025 and Stage 2 commencing 1 July 2027.

Where can I find more information?

AEMC Enhancing Reserve Information (formerly Operating reserves): <https://www.aemc.gov.au/rule-changes/enhancing-reserve-information-formerly-operating-reserves>

Improving security frameworks for the energy transition

Improve existing security frameworks to deliver essential system services, through the energy transition. (formerly Operational Security Mechanism)

Problem to be solved

Essential system services (ESS)⁹ are critical to maintaining overall power system security and reliability by meeting core power system requirements. While historically synchronous generators (such as large coal, gas and hydro generators) supplied ESS simply as a by-product of energy, new non-synchronous generators (such as solar PV, wind and batteries) do not automatically provide these services.

Consequently, under the current market design, which does not explicitly value all ESS, the changing generation mix is providing fewer of these services. Further engineering understanding is required to determine the appropriate mix, definition and quantification of the services. There is also a need to co-ordinate the resources providing these security services, accounting for all services that they may provide.

As a result, AEMO is increasingly making operational decisions, such as directing generators to be online to support a secure power system. Directions were designed as a last resort — reliance on them increases costs to consumers, and also places increased risk on system security.

Solution

The AEMC's final rule determination published 28 March 2024 sets out various changes to improve existing security frameworks, including:

- aligning the existing inertia and system strength frameworks (introducing a NEM-wide inertia floor, aligning procurement timeframes with the system strength framework, and removing restrictions on the procurement of synthetic inertia);
- removing the exclusion to procuring inertia network services and system strength in the Network Support and Control Ancillary Services (NSCAS) framework;
- adjusts TNSP cost recovery procedures for non-network security options to support contracting arrangements and minimise volatility for electricity consumers;
- creating a new transitional non-market ancillary services (NMAS) framework for AEMO to procure security services necessary for the energy transition;

Essential System Services

Key Dates

- Final Determination - 28 MAR 2024
- Transitional Services Framework commences - 3 JUN 2024
- Full Enablement Obligations Go-live - 2 DEC 2025

⁹ These are services that help keep the technical parameters of the electricity system within acceptable limits so that it can securely deliver electricity to consumers. These include a suite of services such as inertia, system strength and frequency.

- requiring AEMO to enable (or ‘schedule’) security services with a whole-of-NEM perspective;
- changing the directions reporting; and
- introduces a new annual reporting requirement on AEMO (known as ‘transition plan for system security’).

Key benefits

The AEMC’s final determination highlights the following benefits of the rule change:

- Enhancements to the existing procurement frameworks and expansion to include the transitional NMAS services framework, combined with AEMO’s operational enablement, should improve AEMO’s ability to maintain power system security.
- Procurement of security services provides consumers with better assurance that power system security needs will continue to be met through the transition.
- Should reduce market interventions to maintain system security and improves transparency for participants (plants) that are providing these services.
- The final rule amends existing frameworks, systems and understandings of the power system to keep costs and complexity as low as possible.
- The rule makes a number of improvements to promote transparency and predictability of system security needs and the frameworks to meet these needs.

Changes proposed

The final rule places a complex set of obligations on AEMO to schedule resources that are contracted for system strength, inertia, NSCAS and transitional services. The project includes the development of a scheduler and related procedures for AEMO to enable security services in operational timeframes. The table below sets out a high-level scope for the initiative which is subject to industry consultation as required.

Procedures & Guidelines	Market Applications	Market Interfaces
<p>Update to existing procedures and guidelines:</p> <ul style="list-style-type: none"> • Operating procedures, schedules, timetables for: <ul style="list-style-type: none"> – Constraints – Dispatch and pre-dispatch – Power system security – Directions – Spot market operations • Non-market ancillary service operating procedure • Settlements policies and guides <p>New procedures and guidelines for:</p> <ul style="list-style-type: none"> • Security service enablement procedures • Transitional Services reports and guidelines • Inertia methodologies and specifications 	<p>AEMO to develop a tool or system for enablement which:</p> <ul style="list-style-type: none"> • identifies system security needs close to operational time. • decides which is the lowest-cost set of security contracts to meet these needs. • communicates enablement decisions to participants. 	<p>To be confirmed.</p>

Market, Industry and AEMO impacts

Market & Industry Stakeholders

- Generators (Scheduled and Semi-Scheduled)
- Integrated Resource Providers
- Transmission Network Service Providers

AEMO Teams

- Operations (Energy Market Modelling, Systems Capability, NEM RTO, Settlements & Prudentials)
- Digital (Enterprise Architecture, Enterprise Application Services (Wholesale Solutions))
- System Design (Planning, Engineering, Registrations)

Next steps

- AEMO to publish a high-level implementation design and participant impact assessment (timing to be confirmed).
- The final rule is to be implemented over several stages including:
 - 3 June 2024 – Transitional services framework to commence (AEMO only able to procure transitional services subject to the publication of the transitional services guideline – which must be published by 1 December 2024).
 - 4 July 2024 – Changes to Directions reporting to commence.
 - 1 December 2024 – New inertia framework to commence, Revisions to TNSP cost recovery for non-network system security costs will commence, AEMO to publish first transition plan report for system security.
 - 31 August 2025 – AEMO to publish full security enablement procedures.
 - 2 December 2025 – Full enablement obligations on AEMO will commence (aligns to date by which system strength service providers must meet the new system strength standard).

Where can I find more information?

AEMC Improving security frameworks for the energy transition: <https://www.aemc.gov.au/rule-changes/improving-security-frameworks-energy-transition>

Fast Frequency Response

Introducing two new market ancillary services, very fast raise and very fast lower, to help control system frequency and keep the future electricity system secure.

Problem to be solved

The power system is in the process of transitioning from a system dominated by centralised coal and gas thermal generation to a system comprised of a diverse portfolio of behind-the-meter and grid-scale inverter-based energy resources as well as a more flexible demand side. This transition is leading to a reduction in inertia which presents operational challenges associated with maintaining a secure power system and controlling system frequency following contingency events.

At lower operating levels of inertia, increased volumes or faster acting frequency control services are required to arrest and stabilise the system frequency within the existing system operating standards. This could lead to a significant increase in the costs for fast six-second Frequency Control Ancillary Services (FCAS), which could be partially mitigated by the procurement of faster responding services.

Fast frequency response (FFR) refers to the delivery of a rapid active power increase or decrease by generation or load in a time frame of two seconds or less, to correct a supply demand imbalance and assist in managing power system frequency. FFR is a relatively new service that can be offered by inverter-based technologies such as wind, solar photovoltaics (PV), batteries and demand-side resources.

Solution

To establish two new market ancillary services – very fast raise and very fast lower – to operate alongside the existing contingency FCAS markets.

Key benefits

The establishment of two new market ancillary services:

- may reduce the overall costs of managing power system frequency relative to the status quo or other alternative arrangements. For example, through a reduction in the costs for fast six-second FCAS
- can incentivise investment and encourages innovation and technology development in resources capable of providing very fast FCAS, and
- may support future operation of the power system and the avoidance load shedding or generation curtailment.

Changes proposed

The scope of work implemented via the FFR initiative included:

Essential System Services

Key Dates

- Go-live – 9 October 2023



Procedures & Guidelines	Market Applications	Market Interfaces
<ul style="list-style-type: none"> • Consultation and amendments to the Market Ancillary Service Specification (MASS) on the technical and measurement requirements for VF FCAS. • Registration and technical assessment of VF FCAS providers • Updates to the Constraint Formulation Guidelines and Constraint Implementation Guidelines to implement the approach for VF FCAS in AEMO’s dispatch processes. • Updates to the User Guide for the FCAS Verification tool (FCASVT) to incorporate VF FCAS requirements. • Updates to the Wind Farm and Solar Farm Guide to Contingency FCAS Registration to incorporate the provision of VF FCAS. • Updates to the Battery Energy Storage System (BESS) guide to Contingency FCAS registration to include testing requirements for VF FCAS. 	<ul style="list-style-type: none"> • Updates to EMMS to accommodate new VF FCAS fields (RAISE1SEC and LOWER1SEC) and associated queries. 	<ul style="list-style-type: none"> • Updates to the FCASVT made available to NEM participants to calculate FCAS delivered by their plant in accordance with the updated MASS. • Extension of EMMS Data Model to support private and public reporting of the VF FCAS data.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

- Generation (Scheduled / Semi-Scheduled)
- Market Customers (Scheduled Load)
- Demand Response Service Providers (DRSP), Market Customers and Small Generation Aggregator (SGA) with non-scheduled loads

AEMO Teams

- Operations (RTO, Systems Capability, Systems Performance)
- Operations (Market Management, Electricity Market Monitoring)
- Digital (Wholesale Solutions, Data Management)

Next Steps

The FFR initiative went live on 9 October 2023.

Where can I find more information?

AEMC Rule Change – Fast frequency response market ancillary service: <https://www.aemc.gov.au/rule-changes/fast-frequency-response-market-ancillary-service>

AEMO NEM Reform Program – Fast Frequency Response: <https://aemo.com.au/initiatives/major-programs/fast-frequency-response>

Transmission & Access

Congestion Relief Market & Priority Access Model

Enhanced Locational Information



Congestion Relief Market & Priority Access Model

Establishing mechanisms to address transmission congestion in both investment and operational timeframes.

Problem to be solved

Transmission congestion is expected to increase as the NEM transitions towards higher levels of variable renewable energy and flexible resources. Congestion cannot be addressed by the significant investment in transmission network augmentation alone. Moreover, it would not be efficient for the transmission network to be able to accommodate surplus generation. Nor is removing all congestion a desirable objective because to do so would incur significant costs for consumers. The current access regime does not use a market to ration access to constrained parts of the transmission network.

Transmission and Access

Key Dates

- AEMC TAR Consultation Paper - APR 2024
- AEMC Final recommendations to Energy Ministers - SEP 2024

Solution

In February 2023, Energy Ministers tasked the ESB to work with senior officials and stakeholders on the development of a voluntary Congestion Relief Market (CRM) and Priority Access (PA) model.

- The CRM provides grandfathering of existing access to regional reference prices (RRP), incentives for cost-reflective bidding and so efficient dispatch, and the ability to opt-in to exposure to nodal prices (congestion relief market prices or CRMPs) to manage existing trading or contractual arrangements¹⁰;
- The Priority Access model prioritises access to RRP, based on chronology of entry, and seeks to solve the “cannibalization” problem, whereby entrants can profitably locate in congested areas, by taking access from incumbents.¹¹.

At the November 2023 Energy and Climate Change Ministerial Council (ECMC) meeting, Energy Ministers agreed to progress the agreed transmission access reform and congestion management through further design work to be led by the AEMC having considered advice from the Energy Advisory Panel (EAP) and stakeholders. In March 2024, the AEMC initiated a Transmission Access Reform (TAR) market review with a TAR project plan and Terms of Reference published. This review will build on the design of the model that was developed by the ESB together referred to as ‘hybrid model’.

¹⁰ AEMC. EPR0098 Transmission Access Reform Terms of Reference. Available here: <https://www.aemc.gov.au/sites/default/files/2024-03/Transmission%20access%20reform%20-%20Terms%20of%20reference.pdf>

¹¹ Ibid.

Key benefits

The primary benefits of a voluntary CRM¹² are to:

- improve dispatch efficiency by incentivising bidding behaviours in the CRM that achieve a lower system cost compared to today's market design;
- optimise the use of the transmission network that avoids overspend of the network and maximises the value of investment in interconnectors; and
- create market opportunities for storage and flexible demand by rewarding bidding behaviours that maximise wind and solar investments.

The primary benefits of priority access model¹³ are to improve:

- the locational decisions of generation investments; and
- the ability of investors to manage congestion risk.

Changes proposed

Final project scope remains subject to ongoing policy development via the AEMC's TAR market review.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

Impacts to market and industry stakeholders are to be determined and subject to final policy designs. Based on current designs / assumptions AEMO anticipate these impacts to be significant should a final policy position be determined.

AEMO Teams

Impacts to AEMO's teams are to be determined and subject to final policy designs. Based on current designs / assumptions AEMO anticipate these impacts to be significant should a final policy position be determined.

Next steps

- The AEMC published its Transmission Access Reform Consultation paper on 24 April 2024. Responses to the paper are due by 6 June 2024.
- Final recommendations to Energy Ministers in September 2024. If a decision is made to proceed, the development of draft rules and consultation would commence in 2025.

Where can I find more information?

AEMC Market Review - Transmission Access Reform: <https://www.aemc.gov.au/market-reviews-advice/transmission-access-reform>

ESB Transmission and Access: <https://esb-post2025-market-design.aemc.gov.au/transmission-and-access>

¹² Ibid.

¹³ ESB. Transmission Access Reform. Consultation Paper. May 2023. Last accessed 07 August 2023. Available [here](#).

Enhanced Locational Information

Providing participants with better information on the optimal location for new generation and storage.

Problem to be solved

While there are currently a variety of locational investment signals available in the NEM, some of these can be inconsistent across jurisdictions, incomplete, and difficult for smaller and newer stakeholders to engage with.¹⁴ A complete set of information on locational factors is not currently available publicly from a single location.¹⁵ Without this information, stakeholders are limited in their ability to undertake meaningful analyses, which would be informative for regulatory, connection location, and transmission augmentation decisions.¹⁶

Transmission and Access

Key Dates

- ESB Final Recommendations – JUN 2023
- AEMO to publish first report – Q2 2024

Solution

In February 2023, Ministers agreed to immediately implement ‘enhanced information’ reforms to provide NEM participants with better information on the optimal location for new generation and storage. In June 2023, the ESB set out its final recommendations to implement the enhanced information reforms.¹⁷

In accordance with the ESB’s final recommendations, AEMO is to develop ‘enhanced locational information’ as an annual report which will be published on AEMO’s website upon completion.

Key benefits

Enhanced locational information can help deliver a least cost energy transition by:

- supporting investments in the right places, ensuring investors aren’t exposed to unnecessary risk,
- making sure that Renewable Energy Zones (REZ) schemes deliver expected benefits, facilitate investment in storage and flexible loads, and
- optimising the size of the transmission network and ensuring the use of the least cost combination of available resources.

Changes proposed

AEMO to develop ‘enhanced locational information’ as an annual report and published on AEMO’s website. Initially, enhanced locational information will draw from and consolidate existing sources of locational information in an annual report publication and accompanying data set.

¹⁴ ESB. Transmission Access Reform. Enhance Locational Information. June 2023. Last accessed 07 August 2023. Available [here](#).

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Ibid.



Report requirements	Information sources
Information to be included in the enhanced locational information report	<ul style="list-style-type: none"> • REZ scorecards from ISP (resource quality, renewable potential, Marginal Lost Factor (MLF) robustness, temperature and bushfire hazard scores, generation outlook, transmission curtailment, economic spill) • Transmission augmentation page, Generator information page, NEM generation maps, MLF, ESOO reliability outlook, Congestion information resource, System strength charges • System security shortfalls and requirements (system strength requirements, Inertia shortfalls and requirements, NSCAS gaps).
Information excluded from the enhanced locational information report	<ul style="list-style-type: none"> • Power system data and modelling – Participants and intending participants can access technical data and models through AEMOs data request process. • Distribution network information – Information on available distribution networks capacity is available on the National map (previously named the Australian Renewable Energy Mapping Infrastructure map).

AEMO will work with Transmission Network Service Providers (TNSPs) to consider opportunities for alignment of inputs, assumptions and methodologies for congestion and network capacity information provided through Transmission Annual Planning Reports (TAPRs). AEMO is also in discussions with TNSPs on the timing of publishing network constraint information for future augmentations considering the trade-offs between accuracy of information, efficiency impacts and optimal timing.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

The annual report draws from and consolidates existing sources of information therefore has no direct impact on stakeholders. AEMO will be working with TNSPs on TARP improvements.

 TNSPs

AEMO Teams

AEMO intends to deliver the ‘enhanced locational information’ report as part of its BAU activities through its System Design teams, therefore not part of the NEM Reform Program.

 System Design (System Planning)

Next steps

- AEMO to publish the first report by Q2 2024.
- The scope of enhanced locational information will be consulted on every two years to allow the report to evolve with stakeholder needs including potential additions such as hosting capacity.

Where can I find more information?

ESB Transmission and Access: <https://esb-post2025-market-design.aemc.gov.au/transmission-and-access>

ESB Final Recommendation. Transmission Access Reform – Enhanced Locational Information. June 2023 <https://www.datocms-assets.com/32572/1688514855-enhanced-locational-information-final-decision-paper.pdf>

Integrating DER and Flexible Demand

Integrating Energy Storage Systems
Unlocking CER resources through flexible trading
Integrating price responsive resources into the NEM
Dynamic Operating Envelopes
Distribution Local Network Services
DER Data Hub & Registry Services
DER Operational Tools



Integrating Energy Storage Systems

Better integration of energy storage and aggregate systems into the NEM.

Problem to be solved

As our electricity system transitions to a net zero system with very high proportions of variable renewable energy, energy storage is set to play an increasingly important role to firm up the expanding volume of renewable energy and deliver the growing need for critical system security services as thermal generators retire. This requires changes to the regulatory framework, as well as to various AEMO systems and processes to remove barriers and accommodate more and improved ways for storage and hybrid facilities to participate in the NEM.

Solution

The Integrating Energy Storage Systems (IESS) rule (among other changes) establishes an Integrated Resource Provider registration category to allow storage to register and participate in a single registration category, as well as allow aggregators for small generators and bi-directional units to register as an IRP and provide ancillary services. The rule requires significant changes to registration and dispatch arrangements as well as in areas such as non-energy cost recovery, performance standards, and participation options for aggregation of small resources, including batteries. The IESS rule change is to be implemented over three releases.

- March 2023 (Complete) – Small Generation Aggregators (SGAs) can elect to register to provide ancillary services.
- August 2023 (Complete) – Aggregate systems can choose to register for aggregated dispatch conformance (ADC). This allows an aggregate system the flexibility to conform to its dispatch instructions by dispatching energy at the connection point from any combination of its units (with some restrictions), rather than individually on a unit-by-unit basis.
- June 2024 – Final releases comprising:
 - a new way of calculating non-energy cost recovery (NECR), changing the way participants pay for non-energy services.
 - a new unit type the 'bi-directional units' (BDU) for plant such as a battery, that can act as a generator and a consumer of electricity. New approaches to bidding will also be introduced.
 - a new, near universal participant type – IRP. The IRP will be able to classify a wide range of units. The new category will help simplify registration, particularly for battery participants who currently need to register as both a customer and a generator.
 - new/updated National Meter Identifier (NMI) Classification Codes. Through Retail Procedures, three (3) new codes and amendments to two (2) further codes will be implemented.

Integrating DER and Flexible Demand

Key Dates

- Final Determination - 2 DEC 2021
- Market Trial - 3 APR to 24 MAY 2024
- IESS Final Releases - 2 and 3 JUN 2024

Key benefits

The IESS initiative seeks to:

- Remove barriers to entry for more flexible resources and services in the future power system, including emerging participants with grid-scale batteries of different sizes and capabilities, such as simplifying registration process.
- Provide participants access to additional value streams through opening contingency FCAS markets to Small Generation Aggregators, which in turn promotes increased competition in the contingency FCAS markets.¹⁸
- Provide operational flexibility for aggregate systems to dispatch energy at the connection point from a combination of its units rather than on a unit-by-unit basis (with some restrictions).
- Better reflect how participants use and benefit from AEMO’s non-energy services by changing the way non-energy costs are recovered. These costs are currently recovered according to formulas based on participant category. The IESS changes will see non-energy costs being calculated on the share of gross measurements of consumed and sent-out energy, for all participant categories.

Changes proposed

The IESS delivery scope is complex, given the substantial changes across the National Electricity Rules (NER), industry procedures and guidelines, which in turn drive changes across AEMO’s and participants’ processes and systems.

Procedures & Guidelines	Market Applications	Market Interfaces
<ul style="list-style-type: none"> • Consultation with industry on the various changes to documentation relating to registration, metering & retail (e.g., MSATS), B2B procedures, settlement & prudential • Updates to various AEMO policies, processes, guidelines. AEMO has identified more than 50 affected procedures and guidelines 	<ul style="list-style-type: none"> • Major settlements database structure changes • Changes to the dispatch engine to handle the new IPR category • Updates to NEM Bidding & Dispatch APIs to cater for changes to support extended JSON format • Extend existing FTP capabilities support providing additional information required for BDUs • MSATS updates to support IRP, NCC & BDU changes 	<ul style="list-style-type: none"> • Registration systems and business processes will require changes to cater for the new IRP and BDU classification • Updates to Market Portals – Market Info, View offers, Settlements, Offers and submissions web interfaces on the Markets Portal • EMMS Data Model v5.3 update

Market, Industry and AEMO impacts

Market & Industry Stakeholders

- Generators (Scheduled, Semi -Scheduled and Non-Scheduled)
- Integrated Resource Providers / Small Generation Aggregators

AEMO Teams

- Operations (Settlements & Prudential, Metering, Systems Commercial & Performance, Electricity Market Monitoring, Planning, Grid Modelling & Engineering, RTO)
- System Design (National Connections, Registrations)

¹⁸ For more information on Small Generation Aggregators see: <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/participate-in-the-market/registration/register-as-a-small-generation-aggregator-sga-in-the-nem>



Market & Industry Stakeholders

- Market Customers
- Network Service Providers and Embedded Network Managers
- Metering Coordinators and Providers

AEMO Teams

- Digital (Enterprise Application Services, Customer, Engagement & Services)

Next steps

- Market trials 3 April 2024 to 24 May 2024 (Industry go-live checkpoint on 1 May 2024).
- The IESS final release is scheduled for 2 June (NECR, Small generation aggregators become IRPs and new NMI classification codes) and 3 June 2024 (BDU and remaining IRP changes).

Where can I find more information?

AEMC Rule Change IESS (December 2021): <https://www.aemc.gov.au/rule-changes/integrating-energy-storage-systems-nem>

AEMC Rule Change Implementing IESS (May 2023): <https://www.aemc.gov.au/rule-changes/implementing-integrated-energy-storage-systems>

AEMO NEM Reform Program – IESS Project: <https://aemo.com.au/initiatives/submissions/integrating-energy-storage-systems-iess-into-the-nem>

AEMO | Integrating Energy Storage Systems Participant Toolbox: <https://aemo.com.au/initiatives/major-programs/integrating-energy-storage-systems-project/integrating-energy-storage-systems-faqs>

Unlocking CER benefits through flexible trading

Establishing flexible trading arrangements to help consumers realise additional value from their customer energy resources. (formerly Flexible Trading Arrangements Model 2)

Problem to be solved

There are material barriers which prevent or deter customers from accessing services which separate active, price-responsive resources from passive loads, so that they can be aggregated and traded in the market. For example, the establishment of second connection points to the Distribution Network Service Provider (DNSP) network are often blocked via DNSP's policy or costs, upfront and ongoing. Customers are prevented from obtaining competitive products and services for Consumer Energy Resources (CER), and CER is less able to actively participate in the market.

Integrating DER and Flexible Demand

Key Dates

- Draft Determination - 29 FEB 2024
- AEMO Draft High Level Implementation Design - 11 APR 2024
- Final Determination - 11 JUL 2024

Solution

Flexible trading arrangements enable the separation of controllable electrical resources (e.g., battery, solar system and electric vehicle charging) from passively connected electrical resources (e.g., household lighting and general appliances) in an end user's home or business. The AEMC's draft determination provides new arrangements supporting the use and integration of flexible CER in the NEM, covering three areas:

- Flexible trading with multiple energy service providers at large customer premises – the framework aims to leverage arrangements used under the current embedded network framework (voluntary, no regulated contractual relationship between financially responsible market participant (FRMPs) and there is a secondary settlement point and subtractive settlement).
- Opportunities to optimise CER flexibility for small customers – establishment of a secondary settlement point/s (SSP) at small customer premises, while maintaining existing consumer protections. Provides the opportunity for household and small business to use their CER assets to generate, consume, store, and trade energy.
- Measuring energy flows from in-built technology (streetlights, EV chargers, other street furniture) – creating a new meter type, similar to a type 4 meter, but with lower minimum specifications. The new meter types are proposed to be meter type 8 and meter type 9. This would enable technology with in-built measurement capability to be used for settlement and billing.¹⁹

Key benefits

The unlocking CER benefits through flexible trading initiative seeks to:

¹⁹ This technology requires National Measurement Institute approval.

- Provide large customers with increased choice from greater competition as energy providers could offer prices or incentives for these customers to operate their flexible load at lower cost. Similar benefits may be realised at a single property via increased competition, innovation and choice of network or retail pricing offers.
- Reduced barriers to entry for traders of CER that can help consumers obtain value from their DER assets or their flexible demand through participation in the wholesale market or provision of network support services.
- The management of controllable resources can also provide a market-driven response to issues affecting the energy system, such as minimum system load and directly benefiting the customer.

Changes proposed

AEMO's draft high-level implementation plan highlights the following changes to be implemented:

Procedures & Guidelines	Market Applications	Market Interfaces
<p>Consultation and updates to various procedures including:</p> <ul style="list-style-type: none"> • Registration (Register as a DRSP, MC, IRP, Customer) • Metering and Retail <ul style="list-style-type: none"> – Market Settlement and Transfer Solutions (CATS/WIGS, Standing Data for MSATS, MDM, NEM RoLR) – Metering Procedures and Guidelines (Service Level Procedures (ENM, MDP, MP Services), NMI Procedure) – Metrology Procedures (Part A and Part B), Unmetered Loads and Clarification of National Measurement Act Guidelines – Accreditation and Registration (Accreditation Checklists (MP, MDP & EMN), Guide to the Role of MC) – B2B Procedures (IEC) – Customer and Site Details Notification, Meter Data Process, One Way Notification process, Service Order process, Technical Delivery Specification) 	<p>High level system impacts include:</p> <ul style="list-style-type: none"> • MSATS CATS (Change request process and new attributes to support SSP, new installation Type Codes, changes to various displays, RoLR) • eMDM (Profile Allocation Engine, Settlement Allocation, Energy Allocation – PoL and RERT) • B2B (Possible impacts to B2B. Assessments need to be undertaken by IEC and B2BWG to evaluate impacts. Any identified impacts will form part of the final implementation impact.) • DERR (Impacts to be assessed through consultation with Networks. None currently identified.) • PMS (No impacts identified. Potential impacts may be uncovered when developing the detailed requirements.) • Integration (aseXML Schema changes to include SSP attributes. Transformation and management of schema versions for B2B and B2M data exchange.) • Capacity Uplift (Increased transaction volumes expected based on the estimated additional SSP devices added per year.) 	<ul style="list-style-type: none"> • No new market interfaces or interactions are expected. • No new data exchange mechanisms to be introduced as it will be a change to an existing service. • B2M (and possibly the B2B Retail) payload formats for current exchange mechanisms will be enhanced as defined in Procedure updates. • Updates required throughout the MSATS Browser UI to reflect the additional fields added to CATS to support Secondary Settlement Points. • Reports impacted – Snapshot, CATS and SDQ Reports. • API – No changes to API or FTP protocols. Payload schema changes expected to include required attributes related to PMAs. Participant Batchers and B2B Validation Module impacts expected from B2M & B2B schema changes. • MSATS Data Model Impacts – Additional attributes to record CP and SSPs in a PMA arrangement. • Schema Impacts to aseXML (B2M, B2B) and DERR.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

- Local Network Service Providers / Embedded Network Managers
- Market Customers / FRMPs (retailers or aggregators)
- Metering Providers

AEMO Teams

- Operations (Metering)
- Digital (Retail Solutions)



Market & Industry Stakeholders

AEMO Teams

- Metering Data Providers and Metering Coordinators

Next steps

- AEMO draft high-level implementation design and participant impact assessment published on 11 April 2024 (proposed go-live late-2026 (November)).
- Final determination anticipated in July 2024.

Where can I find more information?

AEMC Rule Change Unlocking CER benefits through flexible trading: <https://www.aemc.gov.au/rule-changes/unlocking-CER-benefits-through-flexible-trading>

AEMO Unlocking CER benefits through flexible trading – Draft High-level Implementation Design & Participant Impact Assessment: <https://aemo.com.au/-/media/files/initiatives/unlocking-cer-benefits-through-flexible-trading/unlocking-cer-benefits-through-flexible-trading---draft-high-level-implementation-design.pdf?la=en>

Integrating price responsive resources into the NEM

Establishing a voluntary mechanism to incentivise price-responsive DER to provide visibility and participate in the market scheduling process of the NEM. (formerly Scheduled Lite)

Problem to be solved

The forecast rapid growth in distributed resources, particularly those owned by household and business consumers, is drastically changing the energy landscape of the NEM. These resources are increasingly being aggregated into large portfolios and operated in response to price signals in a manner that is not visible to the market operator. Specifically, these resources currently operate outside the NEM dispatch and scheduling processes. This creates a range of operational challenges for AEMO for which its existing toolkit was not designed, particularly in managing complex operational conditions.

Solution

Integrating price responsive resources into the NEM is an initiative within the ESB CER Implementation Plan as a voluntary mechanism to incentivise price-responsive, distributed resources to provide visibility and participate in the market scheduling process of the NEM. The reform assesses two complementary models as part of the high-level design:

- **Visibility model:** the Visibility model is designed to provide visibility of price-responsive, distributed resources and their market intentions, leading to more accurate short-term load and price forecasting. Participating traders will be required to provide a forecast of generation and consumption at various price points over the short-term operational horizon called 'indicative bids'.
- **Dispatch model:** the Dispatch model will integrate unscheduled price-responsive resources (price-responsive CER and flexible demand) into the NEM central dispatch and scheduling processes. Traders will be able to provide bids for their generation and load, receive and follow dispatch targets. Through participation in dispatch, traders could also access existing or potential future markets that require services from scheduled resources.

Integrating DER and Flexible Demand

Key Dates

- Draft Determination - JUL 2024 (TBC)
- Final Determination - DEC 2024 (TBC)



Key benefits

The following potential benefits have been identified should a final rule determination be made²⁰:

- Dispatch costs in the NEM – knowing when these resources will be used to reduce demand (particularly at higher cost times) improves demand forecasting and reduces the cost of resources that AEMO dispatches to meet demand.
- Energy prices in the NEM – by better matching supply and demand, the price of energy would be more efficient, likely reducing price volatility.
- Cost of security of supply in the NEM – by reducing the need for additional, potentially more expensive generation reserves to balance the market, system security will be achieved at lower cost.
- Reliability of supply in the NEM – the ability to schedule these available resources could improve planning and the use of lower-cost lower-emission generation and lower intervention costs.
- Operation of distribution and transmission networks – longer-term accurate forecasts would improve network investments and planning, reducing network costs to consumers.

Changes proposed

The final scope and solution are subject to the AEMC's final rule determination.

- The Visibility model may include amendments to AEMO systems and processes including registration, ST PASA process, demand forecasting systems/processes, control room displays and tools, as well as updates to the existing corresponding procedures and guidelines, and developing new procedures.
- The Dispatchability model builds on the Visibility model and may include amendments to dispatch and pre-dispatch systems, bidding interfaces, compliance monitoring and reporting, settlement and prudential systems, MASS, as well as updates to corresponding procedures and guidelines.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

- Retailers, Aggregators and VPPs
- Integrated Resource Providers
- Non-scheduled generating and bi-directional units
- Market Customers

AEMO Teams

- Operations (Planning, Forecasting, Electricity Market Monitoring, Settlements)
- System Design (Forecasting, Planning)
- Digital (Cloud, Platforms, Infrastructure & Networks), Cyber Security, Strategy, Insights & Architecture, Enterprise Application Services)

²⁰ AEMC. Update Paper. National Electricity Amendment (Integrating price-responsive resources into the NEM) Rule 2024. Available here: <https://www.aemc.gov.au/sites/default/files/2023-12/ERC0352%20-%20Integrating%20price-responsive%20resources%20into%20the%20NEM.pdf>



Next steps

- Technical Working Groups to assist the AEMC in developing the draft determination for integrating price-responsive resources into the NEM rule change.
- AEMC draft and final determination anticipated July 2024 and December 2024 respectively.
- If the above AEMC draft determination date holds, AEMO will draft high-level implementation design and participant impact assessment (targeting August 2024)

Where can I find more information?

AEMC Rule Change Integrating price responsive resources into the NEM: <https://www.aemc.gov.au/rule-changes/integrating-price-responsive-resources-nem>

Dynamic Operating Envelopes

Setting export and import limits dynamically (instead of static) to better manage distribution network utilisation and congestion.

Problem to be solved

There is a need for a system-wide standard to manage the bi-directional energy flows into the NEM from CER to help manage known issues across the power system such as (but not limited to) minimum system load and local congestion. At present, these limits are static (or fixed) which is likely to result in lower export limits for newer connections as networks become increasingly congested. Dynamic limits have the potential to better manage congestion on the distribution network and allow for more flexibility in exporting. These are referred to as dynamic operating envelopes (DOEs) that provide upper and lower bounds on the import and export of power during a given time interval.

Solution

To date, DOEs have been considered through a number of industry trials and market reviews including by AEMO (Project EDGE, Project Symphony), market reviews (DEIP DOE Whitepaper, DSPI, Review of the Regulatory Framework for Metering Services). Further, certain DNSPs have started deploying DOEs as flexible export limits (FELs) across different jurisdictions (QLD, SA, WA). The Australian Energy Regulator (AER) is working on a guidance note for flexible export limits, which is intended to provide clarity on policy objectives and design principles for DNSPs when implementing and using flexible export limits as a tool for managing network congestion and increasing available hosting capacity.

To implement DOEs as a mandatory requirement for all new DERs connecting to the grid would require the coordination of several key reforms, including:


- Establishing new connection agreements with customers that refer to these dynamic limits, and the obligations of the customer, via the retailer / aggregator to maintain these limits.
- DNSPs to develop capacity allocation principles on how to fairly allocate these limits to different customers at times when constraints are required.
- New obligations on the retailer / aggregator to operate DER within these limits, where they are operating DER on behalf of customers.
- Creating new standards for interoperability and cyber security so that DER devices communicate in a standard manner, support a simple process to switch from one provider to another, and enable any provider to ensure compliance with DOEs.

At the Energy and Climate Change Ministerial Council (ECMC) meeting in November 2023, Ministers agreed to develop a National CER Roadmap; consider implementing a national approach to technical regulatory settings for

Integrating DER and Flexible Demand

Key Dates

- Finalisation of AER Interim Export Limit Guidance Note - TBC
- Subject to the establishment and workings of the National CER Roadmap and Taskforce



CER; and establish an expert taskforce to deliver priorities under the CER Roadmap. The development of DOEs in the future will be subject to outcomes of this work.

Key benefits

There are various benefits that may be realised from the establishment of DOEs including increased network utilisation, improved coordination of access, improved CER optimisation, improved investment cases for network investment, efficient operation of the power system and market, and unlocking value for those customers with CER.

Changes proposed

The project scope remains subject to ongoing policy development and design but may entail:

- Establishing DER technical standards (e.g., communications and interoperability)
- Developing capacity allocation rules, monitoring and compliance advice, and
- Establishing a connection agreement framework.

At this stage it is expected that AEMO's scope of work is limited to the receipt and sharing of DOE related information.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

Impacts to market and industry stakeholders are to be determined and subject to final policy designs. Based on current designs / assumptions AEMO anticipate these impacts to be limited to distribution network service providers, retailers, aggregators and VPPs.

AEMO Teams

Impacts AEMO teams are to be determined and subject to final policy designs. Based on current designs / assumptions AEMO anticipate impacts to its Operational and System Design teams. AEMO's exact level of involvement is subject to final scope.

Next steps

Finalisation of AER interim export limit guidance note.

Where can I find more information?

DCCEEW CER Roadmap and Taskforce, ECMC meeting 24 November 2023:

<https://www.energy.gov.au/energy-and-climate-change-ministerial-council/meetings-and-communiqués>

AEMO Project EDGE Final Report (Chapter 4): <https://aemo.com.au/-/media/files/initiatives/der/2023/project-edge-final-report.pdf?la=en>

AER Draft Export Limit Interim Guidance note: <https://www.aer.gov.au/system/files/2023-11/Draft%20export%20limit%20interim%20guidance%20note%20-%20November%202023.pdf>

AER Review of regulatory framework for flexible export limit implementation:

<https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-regulatory-framework-for-flexible-export-limit-implementation>

Distribution Local Network Services

Efficient provision of local network service between DER aggregators and distribution system operators.

Problem to be solved

Large scale penetration of DERs could be utilised by networks to defer, or displace network augmentations, and assist them in actively managing power flows on their network. Currently, however, DNSPs rarely procure services from DER and do so in bespoke bilateral contracts that lead to high transaction costs.

Solution

To identify ways to make it easier for DER aggregators to trade local network support services with DNSPs / Distribution System Operators (DSOs), through greater visibility of local network constraints aligning the definitions of local services and how they are traded between regions.

At the Energy and Climate Change Ministerial Council (ECMC) meeting in November 2023, Ministers agreed to develop a National CER Roadmap; consider implementing a national approach to technical regulatory settings for consumer energy resources; and establish an expert taskforce to deliver priorities under the CER Roadmap. Future consideration of distribution local network services will be subject to the scope and outcomes of this work.

Key benefits

Potential benefits from efficient provision of local network services may include increased network utilisation and potential deferral of network augmentation, improved DER optimisation, improved investment cases for network investment through being able to identify the cost of managing constrained parts of the network, efficient operation of the power system and market and unlocking value for those customers with DER.

Changes proposed

The project scope remains subject to ongoing policy development and design but may entail:

- Development of guidelines to align the definition of local services and how they are traded (for instance via standardised bilateral contacts) between regions to make it easier for aggregators operating across regions to engage and deliver local network services for DNSPs as DER penetrations grow.

The guideline could also outline the information DNSPs should publish, over and above what is required in the Distribution Annual Planning Reports (DAPRs), in relation to network constraints and network service requirements, and how that information should be made available.

- Evaluation of how local services interact with dynamic operating envelopes and dynamic network tariffs – for instance networks could utilise DOE and dynamic tariffs in the first instance to manage power flows but could then procure a service to give them greater certainty when managing persistent constraints.

At this stage it is assumed that scope relating to AEMO is limited to a simple platform for DSO and aggregators to exchange information on local service requirements and supply.

Integrating DER and Flexible
Demand

Key Dates

- Subject to the establishment and workings of the National CER Roadmap and Taskforce



Market, Industry and AEMO impacts

Market & Industry Stakeholders

Impacts to market and industry stakeholders are to be determined and subject to final policy designs. Based on current designs / assumptions AEMO anticipate these impacts to be limited to distribution network service providers, distribution system operators, retailers, aggregators and VPPS.

AEMO Teams

Impacts to AEMO teams are to be determined and subject to final policy designs.

Next steps

Subject to the establishment and workings of the National CER Roadmap and Taskforce.

Where can I find more information?

DCCEEW CER Roadmap and Taskforce, ECMC meeting 24 November 2023:

<https://www.energy.gov.au/energy-and-climate-change-ministerial-council/meetings-and-communiques>

AEMO, Mondo, AusNet Services. Project Edge: <https://aemo.com.au/en/initiatives/major-programs/nem-distributed-energy-resources-der-program/der-demonstrations/project-edge>

DER Data Hub and Registry Services

Establishing a central platform for data exchange between DNSPs, aggregators and AEMO.

Problem to be solved

DER coordination at scale requires high volumes of data and control signals to be exchanged between many parties. For instance, DNSPs sending DOEs or dynamic tariffs to customer agents, and retailers sending exports limits to customer agents to manage negative spot price exposures.

Exchanging data relating to significant volumes of DER without consistent data models, and commands would add unnecessary and material costs to consumers, whilst restricting innovation and raising barriers to entry. Efficient and scalable DER coordination requires systems thinking and consistent approaches.

Integrating DER and Flexible Demand

Key Dates

- Subject to the establishment and workings of the National CER Roadmap and Taskforce

Solution

Establishment of a DER Data Hub to provide efficient and scalable data exchange and registry services for DER between industry actors (Customer Agents, DNSPs, retailers, AEMO where Customer Agent to device communications is addressed in technical standards processes). The DER Data Hub could also use digital identities to enable more efficient and permission-based sharing and access to information, which could link to an augmented DER Register that contains more than just standing data.


At the Energy and Climate Change Ministerial Council (ECMC) meeting in November 2023, Ministers agreed to develop a National CER Roadmap; consider implementing a national approach to technical regulatory settings for consumer energy resources; and establish an expert taskforce to deliver priorities under the CER Roadmap. Future consideration of DER data hub will be subject to outcomes of this work and future trials.

Key benefits

Potential benefits from establishing a DER data hub include more efficient and scalable exchange of data between distribution level actors through standardised exchange and communication standards; ability for customer agents / aggregators operating to receive DOEs from all DNSPs or export limits from retailers through one connection, allowing for consistent command signals to be sent from DNSPs to customer agents for dispatch / delivery of local network services.

Changes proposed

The DER Data Hub would be a central platform for data exchange between DNSPs, aggregators and AEMO as well as enhanced registry services for DER. The project scope remains subject to ongoing policy development / design and future industry trials.



For example, Project EDGE²¹ (a collaboration between AEMO, AusNet Services and Mondo) trialled a proof-of-concept DER Data Hub based on a common, open-access messaging infrastructure that:

- Allowed multiple participants (retailers and DER aggregators) and DNSPs to send, receive, and authenticate messages based on the roles that have been issued to and associated with their self-managed identity;
- Allowed participants, DNSPs, and AEMO to exchange diverse datasets, ranging from real-time telemetry to bulk file uploads, in support of multiple DER use cases; and
- Required only a single integration mechanism with a central infrastructure in order to communicate via one:one (bilateral), one:many (broadcast), and many:many (multicast) channels.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

Impacts to market and industry stakeholders are to be determined and subject to final policy designs. Based on current designs / assumptions AEMO anticipate these impacts to be limited to distribution network service providers, distribution system operators, retailers, aggregators and VPPS.

AEMO Teams

Impacts to AEMO teams are to be determined and subject to final policy designs.

Next steps

Subject to the future industry trials and establishment and workings of the National CER Roadmap and Taskforce.

Where can I find more information?

DCCEEW CER Roadmap and Taskforce, ECMC meeting 24 November 2023:

<https://www.energy.gov.au/energy-and-climate-change-ministerial-council/meetings-and-communiqués>

AEMO Project EDGE Final Report: <https://aemo.com.au/-/media/files/initiatives/der/2023/project-edge-final-report.pdf?la=en>

AEMO, Mondo, AusNet Services. Project Edge – DER Data Hub Lessons Learnt. <https://aemo.com.au/-/media/files/initiatives/der/2023/project-edge-der-data-hub-lessons-learnt-final-june-2023.pdf?la=en>

²¹ AEMO, Mondo, AusNet Services. Project Edge – DER Data Hub Lessons Learnt Report. June 2023. Available here: <https://aemo.com.au/-/media/files/initiatives/der/2023/project-edge-der-data-hub-lessons-learnt-final-june-2023.pdf?la=en>

DER Operational Tools

New DER operational tools to support interactions between AEMO and DNSPs.

Problem to be solved

New operational tools relating to DER, and interactions between AEMO and DNSPs, will be required to maintain power system security at times when the entire NEM demand could be met with distribution connected resources. AEMO, transmission network operators and DSOs will need to collaborate and communicate in a greater capacity to ensure the system services required to maintain security will be provided in the most cost-effective manner.²²

Solution

To identify and develop, in collaboration with DNSPs, new DER operational tools that may be required by each party, which can work together to maintain efficient and secure power system operations at times when up to 100% of system load can be met with DER. For AEMO, this project builds on the work of the Operations Technology Roadmap and consideration of the operational tools that control room staff will need in future.

Further, at the Energy and Climate Change Ministerial Council (ECMC) meeting in November 2023, Ministers agreed to develop a National CER Roadmap; give consideration to implementing a national approach to technical regulatory settings for consumer energy resources; and establish an expert taskforce to deliver priorities under the CER Roadmap. The progression of the DER Operational Tools initiative will be subject to the scope and outcomes of this work.

Key benefits

The key benefits from this initiative will be the continued power system security when operating at very high penetrations of DER potentially lowering overall costs for all consumers. As well as the enablement of more dynamic operations of the distribution network by DNSPs (with visibility shared with AEMO) allowing for continued local network security and the hosting capacity of the distribution network maximised.

Changes proposed

The project scope remains subject to future engagement between AEMO and DNSPs to understand what DER operational tools/capabilities they will each need to fulfil their respective roles in future, and how those tools/capabilities will need to interact to maintain local and overall power system security.

Integrating DER and Flexible Demand

Key Dates

- Subject to future collaboration between AEMO & DNSPs and progression of AEMO's Operations Technology Roadmap

²² AEMO submission to parliamentary inquiry on Modernising Australia's Electricity Grid. Available: https://www.aph.gov.au/Parliamentary_Business/Committees/House/Environment_and_Energy/modernelectricitygrid/Submissions



Market, Industry and AEMO impacts

Market & Industry Stakeholders

Impacts to market and industry stakeholders are to be determined and subject to final policy designs. Based on current assumptions AEMO anticipate these distribution network service providers only.

AEMO Teams

Impacts to AEMO teams are to be determined and subject to final policy designs.

Next steps

Subject to progression of AEMO's Operations Technology Roadmap and the establishment and workings of the National CER Roadmap and Taskforce.

Where can I find more information?

DCCEEW CER Roadmap and Taskforce, ECMC meeting 24 November 2023:

<https://www.energy.gov.au/energy-and-climate-change-ministerial-council/meetings-and-communicues>

AEMO Operations Technology Roadmap: <https://aemo.com.au/en/initiatives/major-programs/operations-technology-program/operations-technology-roadmap>

Data Strategy

Data Services

Electric Vehicle Supply Equipment
Standing Data Register

Bill Transparency

Network Visibility



Data Services

Establishing a new Data Services unit within AEMO to share protected data between trusted “prescribed” bodies.

Problem to be solved

Access to data is rarely sufficient to increase its value and impact, as safely sharing or analysing large-scale data sets requires access to advanced skills and systems, as well as clear data curation, management, and approvals processes. These organisational barriers can limit and delay benefits to a range of stakeholders, including consumers, policymakers and Market Participants.

Solution

Establishment of a Data Services unit within AEMO and supported by a Stakeholder Advisory Group to share protected data safely with trusted “prescribed” bodies Class A and B.²³

Key benefits

Establishment of a data services unit can address key identified barriers to sharing data with policy makers, planners and researchers, to support more informed evidenced-based policy, particularly critical in managing the energy transition. Further, data is critical to better understand how different consumer behaviours and needs are changing and being impacted by the energy transition, informing forecasting, investments, new services, and consumer protections.

Changes proposed

AEMO are in the early stages of the initiation and planning phase assessing how it would implement its new legislated functions as documented in the National Energy Laws Amendment (Data Access) Bill 2023 should it be passed.²⁴ AEMO note, additional non-legislative controls to be implemented would include:

- Publication of standard terms and conditions that apply to each class of body that may receive protected information from AEMO.
- Publication of supporting guidelines with principles and processes relating to, for example, data release, data management and curation, technical matters and standards and emerging technologies.
- A register of data AEMO has shared, to support robust tracking and compliance, as well as publicly accessible summary information to support transparency; and

²³ Class A – those who have prescribed statutory functions either specific to the energy industry, who work with energy data for public purposes, or who are already listed in the NEL and NGL, and Class B – Public bodies and researchers who can create clear benefits for energy consumers through greater access to data but require clear data protection obligations to ensure security. Refer <https://www.datocms-assets.com/32572/1681166615-esb-data-strategy-initial-reforms-draft-legislation-consultation-paper-april-2023.pdf> for the ESB’s proposed list of Class A and B bodies.

²⁴ Parliamentary Counsel’s Committee. National Energy Laws Amendment (Data Access) Bill 2023. Available here: <https://www.datocms-assets.com/32572/1681166642-esb-data-strategy-initial-reforms-draft-bill-april-2023.pdf>

Data Strategy

Key Dates

- Subject to passing of South Australia National Energy Laws Amendment (Data Access) Bill 2023

- AEMO may also consider appropriate accreditation requirements for data requesters in some cases.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

Impacts to market and industry stakeholders are to be determined and subject to final law changes. Based on current assumptions AEMO anticipate no impacts to market or industry stakeholders.

AEMO Teams

Impacts to AEMO teams are to be determined and subject to final law changes and AEMO's internal initiation and planning assessment.

Next steps

Implementation of these reforms are subject to the South Australian parliament passing the National Energy Laws Amendment (Data Access) Bill 2023.

Where can I find more information?

ESB Data Services Policy Position Paper: <https://www.datocms-assets.com/32572/1688102997-esb-data-strategy-initial-reforms-policy-positions.pdf>

ESB National Energy Laws Amendment (Data Access) Bill 2023: <https://www.datocms-assets.com/32572/1681166642-esb-data-strategy-initial-reforms-draft-bill-april-2023.pdf>

Electric Vehicles Supply Equipment Standing Data Register

Extending AEMO's DER Register to include electric vehicle supply equipment.

Problem to be solved

Electric vehicle (EV) charging is set to transform our electricity systems. While there is some uncertainty regarding the exact pace of adoption of EVs and the technology and charging choices of EV owners (including the use of public charging infrastructure), there is broad consensus that EV integration presents both major opportunities and challenges for the electricity grid.²⁵

Currently, networks and AEMO do not have access to reliable data on the size, location, and characteristics of electric vehicle supply equipment (EVSE) to enable them to determine and manage these opportunities and challenges effectively.²⁶ The opportunity is to provide a solution for reporting installation, location, and characteristics of EVSE.

Solution

In December 2023, AEMO submitted a rule change request for the AEMC's consideration providing for extension of the DER Register to include EVSE data.²⁷

Key benefits

The inclusion of EVSE data into AEMO's DER Register can support the energy transition by supporting network and system planning and forecasting, managing the risks associated with different types of charging devices, and providing a better understanding of EV charging to help unlock their inherent flexibility. The information in the DER Register is also available to emergency services agencies, who could benefit from understanding the location of EVSE installations to improve the effectiveness of their emergency responses.

Proposed changes

Extension of the DER Register data collection and reporting framework to require DNSPs to collect and provide specified standing data for EVSE within scope (to be defined in AEMO's guidelines).

Data Strategy

Key Dates

- Subject to commencement of AEMC rule change consultation

²⁵ ESB. Electric Vehicle Supply Equipment Standing Data. Consultation Paper. December 2022. Available here: <https://www.datocms-assets.com/32572/1670367035-esb-electric-vehicle-supply-equipment-standing-data-consultation-paper-december-2022.pdf>

²⁶ Ibid.

²⁷ AEMC Rule Change Pending. Electric vehicle charger data in DER register. Available here: <https://www.aemc.gov.au/rule-changes/electric-vehicle-charger-data-der-register>



Procedures & Guidelines	Market Applications	Market Interfaces
<ul style="list-style-type: none">• Extension of DER Register Information Guidelines to include requirement on DNSPs for EVSE data collection• Development of required data specification and expansion of existing data collection frameworks and systems	<ul style="list-style-type: none">• To be confirmed	<ul style="list-style-type: none">• Extension of DER Register to facilitate collection and reporting of EVSE

Market, Industry and AEMO impacts

Market & Industry Stakeholders

Impacts to market and industry stakeholders are to be determined and subject to final design. Based on current assumptions AEMO anticipate these impacts to be DNSPs and, indirectly, to EVSE installers.

AEMO Teams

Impacts to AEMO teams are to be determined and subject to final design. Based on current assumptions AEMO anticipate impacts to Reform (DER Delivery) and Digital who would implement the project, and information would be used by Operations and System Design.

Next steps

Subject to the AEMC commencing consultation on the rule change.

Where can I find more information?

AEMC Electric vehicle charger data in DER register – Rule change pending:

<https://www.aemc.gov.au/rule-changes/electric-vehicle-charger-data-der-register>

ESB Electric Vehicle Supply Equipment Standing Data – Consultation Outcomes Report June 2023

<https://www.datocms-assets.com/32572/1688103470-attachment-b-evse-standing-data-consultation-paper-final-june-2023.pdf>

Bill Transparency

Addressing priority gaps in energy information required for government policy makers, regulators and market bodies, to inform decision making to support better consumer outcomes.

Problem to be solved

Electricity is an essential service – it is a core input into economic production and impacts living standards. This means that electricity costs and affordability will always be of central concern to governments. Rising electricity bills contribute to cost-of-living pressures on consumers and inflation, government and regulatory decision makers need to better understand financial billing outcomes, whether markets are driving efficient outcomes and how vulnerable groups are being impacted.

In June 2023 the ESB published its Consultation Paper which emphasis the increasing importance of understanding, what drives consumer behaviour, what consumers pay for electricity, and how different services impact bills and choices.²⁸ This is a high priority gap in energy information required for government policy makers, regulators and market bodies, to inform decision making to support better consumer outcomes.

Solution

The ESB had considered and consulted on the current approach to collection and use of billing data, as well as potential alternative approaches that could improve transparency of electricity billing data. This work will now be taken forward by the AEMC with a final solution to be determined as part of its market review into Billing Data Transparency.²⁹

AEMO note, one of the four options considered by the ESB was to empower a single body (possibly AER or AEMO) is to gather retailer-held billing data in a cost-efficient and timely way and share it safely with approved trusted data users, including jurisdictional and market bodies.

Key benefit

Increasing bill transparency data for government policy makers, regulators and market bodies can:

- support retail energy market policy development and associated outcomes, including reducing costs and affordability through more transparency in competition and reforms.
- provide for more effective and less costly consumer protections, particularly associated with new technologies and services, such as flexible trading arrangements.
- streamline price reporting, reducing duplication.

Data Strategy

Key Dates

- ESB Consultation Paper - JUL 2023
- AEMC Market Review Draft Report - SEP 2024

²⁸ Energy Security Board. Bill Transparency Consultation Paper. July 2023. Available here: <https://www.aemc.gov.au/sites/default/files/2023-08/esb-billing-transparency-consultation-paper-final-july-2023.pdf>

²⁹ AEMC Market Review – Billing Data Transparency. Last Accessed 22 April 2024. Available here <https://www.aemc.gov.au/market-reviews-advice/billing-data-transparency>

- support for more accurate forecasting through greater awareness of how consumers respond to price signals.

Changes proposed

The project scope remains subject to the outcomes of the AEMC's market review into billing data transparency.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

Impacts to market and industry stakeholders are to be determined and subject to final policy designs. Based on current assumptions AEMO anticipate these impacts to be limited to Retailers only.

AEMO Teams

Impacts to AEMO teams are to be determined and subject to final policy designs.

Next steps

The AEMC have signalled their intention to progress this project in 2024/25 having received submissions on the Consultation paper. A draft report is currently anticipated in September 2024.

Where can I find more information?

AEMC Market Review – Billing Data Transparency: <https://www.aemc.gov.au/market-reviews-advice/billing-data-transparency>

ESB Bill Transparency Consultation Paper (July 2023): <https://www.datocms-assets.com/32572/1688619055-esb-billing-transparency-consultation-paper-final-july-2023.pdf>

Network Visibility

Provision of greater access to data on the performance of low voltage networks.

Problem to be solved

Consumer-driven rapid growth of CER (such as roof-top solar, batteries, electric vehicles, and active demand management) is creating a range of new benefits and choices for consumers and CER investors.³⁰ But at the same time, it is creating new challenges for managing the low-voltage distribution (LV) networks, where historically there has been little visibility or control.

While work continues to progress on improving how LV networks are monitored and managed, to ensure that networks and system operators have the capabilities they need to securely manage the system, decision-makers outside of the network (e.g., CER investors) still have limited visibility to make their own planning decisions and therefore are unable to manage their own network related risks.

Solution

The ESB set out to develop a pathway to deliver visibility of the low-voltage network to the market, including clear use cases and benefits, definitions of the data needed and appropriate arrangements for it to be delivered.³¹ This initiative is to be undertaken in three phases:

- Phase 1 seeks to define the data sets concerning the performance of the LV network and CER that is needed by market and policy stakeholders making CER planning decisions and managing network-related risks, through examining the needs and use cases for this data and considering related challenges in accessing it.
- Phase 2 will test the challenges and value in delivering the data sets identified in Phase 1 through a range of real-world trials.
- Phase 3 will propose a pathway for ongoing delivery of priority data sets to the market, informed by the trials and considering varied opportunities and challenges for different networks.

This work will now be taken forward by the AER with a final solution to be determined as part of its review into Network Visibility.³²

Key benefits

Greater visibility of the LV network will support the energy transition by:

- Enabling greater use of existing network capacity – existing data allowing DER and network service providers to target development around emerging constraints, managing their own risks and optimising local outcomes.

Data Strategy


Key Dates

- ESB Consultation Paper - JUL 2023
- Subject to the AER's Network Visibility review

³⁰ Energy Security Board. Network Visibility Consultation Paper. July 2023. Available here: <https://www.aer.gov.au/system/files/ESB%20-%20Network%20Visibility%20-%20July%202023.pdf>

³¹ Ibid.

³² AER. Review – Network Visibility. Last Accessed 22 April 2024. Available here: <https://www.aer.gov.au/industry/registers/resources/reviews/network-visibility>

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- Lowering DER constraints – empowering consumers, DER providers, and regulators to better engage with network to increase efficiency, understanding and acceptance of any DER constraints deemed necessary.
 - Better targeting of network expansion – allowing for constraints and DER impacts of localised issues to be more transparently considered by alternative service providers and regulators.

Changes proposed

The project scope remains subject to the outcomes of the AER's market review into network visibility.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

Impacts to market and industry stakeholders are to be determined and subject to final policy designs. Based on current assumptions AEMO anticipate these impacts to be limited to distribution network service providers only.

AEMO Teams

Impacts to AEMO teams are to be determined and subject to final policy designs.

Next steps

Subject to the AER's assessment of submissions to the ESB consultation paper as part of its ongoing Network Visibility review.

Where can I find more information?

AER Review – Network Visibility: <https://www.aer.gov.au/industry/registers/resources/reviews/network-visibility>

ESB Network Visibility Consultation Paper (July 2023): <https://www.datocms-assets.com/32572/1688618798-esb-network-visibility-consultation-paper-final-july-2023.pdf>

Resource Adequacy Mechanisms

Increased MT PASA Information
Capacity Incentive Scheme



Increased MT PASA Information

Enhancing transparency in relation to generator medium term availability.

Problem to be solved

A lack of detailed information on generator availability is becoming an issue due to the ongoing transition in the power system.³³ As the NEM generation fleet transitions towards renewable energy sources, it causes changes in the operating regimes of ageing thermal generation plants. This could include mothballing of units for prolonged periods of time, seasonal shutdowns, or cyclical running regimes, e.g., weekday/weekend, day/night. As a result of such changes and the lack of transparency of the changes, the challenge of operating the power system to deliver reliable, secure supply is expected to grow.

Resource Adequacy Mechanisms

Key Dates

- Go-live – 9 October 2023

Solution

Currently there are limitations in MT PASA reporting and a lack of standardised information around when generators are available to supply, and the lead time required for recall from an outage makes it difficult for AEMO to effectively plan and participants to coordinating maintenance schedules. The Increased MT PASA Information initiative seeks to:

- establish the reporting of a unit's status through reason codes to indicate a scheduled generating unit's availability or unavailability and the reason for its availability or unavailability.
- establish the reporting of unit recall times when triggered through a reason code to indicate the period in which the plant could be made available under normal conditions after a period of unavailability.

Reason codes and recall times would be collected and published for the same 36-month timeframe as part of the existing MT PASA process.

Key benefits

The objectives of the Increased MT PASA Information are to:

- Address the reliability and security problems associated with a lack of consistent, standardised, public information about generator availability over the medium term; and
- Allow for better informed and efficient decision making (e.g., planning and operation of the power system, maintenance schedules, or new investment) and thus reliability at a lower cost to consumers.

Changes proposed

The scope of work implemented via the Increased MT PASA Information initiative included:

³³ AEMC ERC0338 – Information sheet – enhancing information on generator availability in MT PASA. 18 August 2022.



Procedures & Guidelines	Market Applications	Market Interfaces
<ul style="list-style-type: none">• Consultation and amendments to Reliability Standard Implementation Guidelines (RSIG), and MT PASA Process Description• Consultation and amendment of AEMO's Energy Market Management System (EMMS) Technical Specifications and On-line Help	Updates to EMMS to accommodate new MT PASA fields and associated queries including the MTPASA_OFFERDATA Report and MTPASA_DUIDAVAILABILITY Report	<ul style="list-style-type: none">• Updates to AEMO's existing MT PASA interfaces to collect additional data (reason codes and recall times) via three channels (FTP, new API and Market Portal).• Extension of EMMS data Model to support private and public reporting of the expanded MTPASA data

Market, Industry and AEMO impacts

Market & Industry Stakeholders

- Generation (Scheduled)
- Integrated Resource Providers
- Market Customers

AEMO Teams

- System Design (Reliability forecasting)

Next steps

The Increased MT PASA Initiative went live on 9 October 2023.

Where can I find more information?

AEMC Rule Change – Enhancing information on generator availability in MT PASA:
<https://www.aemc.gov.au/rule-changes/enhancing-information-generator-availability-mt-pasa>

AEMO Increased MT PASA Information: <https://aemo.com.au/initiatives/trials-and-initiatives/enhanced-mt-pasa-information>

Capacity Investment Scheme

Establishing a national framework encouraging new investment in renewable and clean dispatchable capacity through revenue underwriting.

Problem to be solved

The NEM is rapidly transitioning to a lower-emissions generation profile, characterised by higher levels of near-zero marginal cost variable renewable generation.³⁴ To encourage investors to take long-term capacity risk, the ESB noted in its final recommendations to Energy Ministers the need for market arrangements that explicitly value capacity, separately from the energy price, to support the quantum of build required over the next decade.³⁵

Solution

The aim of a capacity mechanism is to provide a clear price signal for capacity that incentivises timely entry and orderly exit of resources by reducing investment uncertainty. In December 2022, Energy Ministers endorsed the establishment of a Capacity Investment Scheme (CIS).³⁶ The CIS provides a national framework to encourage new investment in renewable capacity, such as wind and solar, as well as clean dispatchable capacity, such as battery storage. Under the CIS, the Commonwealth Government will provide revenue underwriting for successful CIS tender projects, with an agreed revenue ‘floor’ and ‘ceiling’.

The CIS is to complement rather than overlap with existing State schemes such as the NSW Electricity Infrastructure Roadmap, and therefore not alter competitive tenders currently underway.³⁷ Further, the scheme will work alongside the National Energy Transformation Partnership underway, and the Rewiring the Nation plan – these policies will work in unison to ease power prices and make energy cleaner and more secure.³⁸

Key benefits

The CIS framework provides:

- A long-term revenue safety-net that decreases financial risks for investors incentivising investment in clean dispatchable power; and

Resource Adequacy Mechanisms

Key Dates

- Stage 1 of the CIS (NSW and SA/VIC tenders) underway
- Consultation on an expanded CIS design commenced February 2024
- Consultation on CIS design of the WEM commenced April 2024

³⁴ Energy Security Board. Website: Resource Adequacy Mechanisms and Ageing thermal Retirement. Last accessed February 2023. Available here: <https://esb-post2025-market-design.aemc.gov.au/resource-adequacy-mechanisms-and-ageing-thermal-retirement>.

³⁵ Ibid.

³⁶ Department of Climate Change, Energy, the Environment and Water. Website: Capacity Investment Scheme to power Australian energy market transformation. Last accessed February 2023. Available here: <https://www.energy.gov.au/news-media/news/capacity-investment-scheme-power-australian-energy-market-transformation>.

³⁷ Ibid.

³⁸ Department of Climate Change, Energy, the Environment and Water. Website: Media Releases. Capacity Investment Scheme to power Australian energy market transformation – 8 December 2022. Available here: <https://minister.dcceew.gov.au/bowen/media-releases/capacity-investment-scheme-power-australian-energy-market-transformation>.

- Confidence to investors, governments and consumers that reliable power will be delivered as the transition continues, placing downward pressure on prices and avoiding price shocks from unexpected retirements and future market interventions.

Changes proposed

Stage 1³⁹ of the CIS commenced in late 2023 and involved:

- A Commonwealth / New South Wales tender in partnership with NSW Electricity Infrastructure Roadmap; and
- A South Australia / Victoria tender for dispatchable capacity.

Stage 1 CIS tenders are to be progressively rolled out from 2023 to 2027 so that reliability needs can be addressed between FY26 and FY30 targeting approximately 6 GW of clean dispatchable capacity.⁴⁰ AEMO's subsidiary, AEMO Services Limited (ASL), administered the competitive South Australia / Victoria tender on behalf of the Commonwealth Government and undertakes contract management activities for selected projects. ASL perform a similar role in NSW, having been appointed the Consumer Trustee in 2021. As Consumer Trustee, ASL co-ordinate planning of long-term investment in generation, storage and transmission in New South Wales, design and conduct competitive tenders to facilitate this investment, undertake authorisation of Renewable Energy Zone transmission infrastructure, and provide financial risk management and advice.

On 23 November 2023, the Commonwealth Government announced an expansion of the CIS to target 9 GW of clean dispatchable capacity and 23 GW of variable capacity nationally – for a total of 32 GW nationally by 2030.⁴¹ The expanded CIS is to be rolled out from 2024 with regular, competitive tenders held, until 2027. On 29 February 2024, to support this expansion, the Commonwealth Government published its implementation design paper for stakeholder consultation.⁴² The paper sets out both the Commonwealth Governments implementation plan, as well as the proposed design of the two revenue underwriting agreements to be offered.

On 12 April 2024 as a part of the expanded CIS national rollout, the Commonwealth Government published a design paper and commenced stakeholder consultation on the design of the CIS specific to the Western Australia Wholesale Electricity Market (WEM).⁴³ The consultation paper notes the WEM's different market design, specifically the existing Reserve Capacity Mechanism, and aims ensuring alignment with existing WEM processes when implementing the CIS in the WEM.

On 22 April 2024, the Commonwealth Government announced a new national CIS tender with the first auction expected in late May as part of the Reliable Renewables Plan. The tender seeks 6 GW of new variable renewable energy projects. The Commonwealth and New South Wales Governments also signed a new deal with at least 2.2 GW of renewable energy specifically for NSW. The aim is to advance this expansion as a single combined tender

³⁹ The Commonwealth Government consulted on the design and delivery of Stage 1 of the CIS in August 2023. This consultation is available on the Department of Climate Change, Energy, the Environment and Water website at: [Consultation hub | Capacity Investment Scheme – Public Consultation paper - Climate Change \(dcccceew.gov.au\)](https://www.dccceew.gov.au/energy/renewable/capacity-investment-scheme)

⁴⁰ Ibid.

⁴¹ Department of Climate Change, Energy, the Environment and Water. Website: Capacity Incentive Scheme. Last accessed 13 December 2023. <https://www.dcccceew.gov.au/energy/renewable/capacity-investment-scheme>

⁴² Department of Climate Change, Energy, the Environment and Water. Website. Expanded Capacity Incentive Scheme Design Paper. Last accessed 26 March 2024. Available here: <https://consult.dcccceew.gov.au/expanded-capacity-investment-scheme-cis-design-paper>

⁴³ Department of Climate Change, Energy, the Environment and Water. Website. Capacity Incentive Scheme Western Australia Design Paper. Last accessed 12 April 2024. Available here: <https://consult.dcccceew.gov.au/capacity-investment-scheme-western-australia-design-paper>

process under the CIS and NSW Roadmap from November 2024.⁴⁴ The inclusion of NSW projects in this first CIS tender will replace the scheduled Q2 2024 generation Long-Term Energy Service Agreements (LTESA) tender under the NSW Roadmap.⁴⁵

Market, Industry and AEMO impacts

Market & Industry Stakeholders

- Generation (renewable / clean dispatchable)
- Integrated Resource Providers

AEMO Teams

- AEMO Services Limited

Next steps

- The South Australia / Victoria tender closed on 23 February 2024 and is seeking bids for up to 600 MW of 4-hour equivalent (or 2,400 MWh) of dispatchable capacity. Projects must be located in South Australia or Victoria, be able to continuously discharge for a minimum of 2 hours duration at its nameplate capacity and be a minimum size of 30 MW.

For timing and process regarding future tenders across all jurisdictions refer to ASL website.

- Submissions to the Commonwealth Government implementation design consultation paper on an expanded CIS close 25 March 2024.
- Submissions to the Commonwealth Government on the CIS design of the WEM close 6 May 2024.
- National CIS tender scheduled for May 2024.

Where can I find more information?

DCCEEW – About the Capacity Investment Scheme:
<https://www.dcceew.gov.au/energy/renewable/capacity-investment-scheme>

AEMO Services Limited – Our Tenders: <https://aemoservices.com.au/tenders>

⁴⁴ Department of Climate Change, Energy, the Environment and Water. Website. Joint media release: big boost to reliable renewables in NSW. Last accessed 22 April 2024. Available here: <https://minister.dcceew.gov.au/bowen/media-releases/joint-media-release-big-boost-reliable-renewables-nsw>

⁴⁵ Ibid.

Foundational and Strategic Initiatives

Identity and Access Management

Industry Data Exchange

Portal Consolidation

SCADA Lite

FRC Target State

Dispatch, Bids/Offers, and
Constraints Target State



Identity and Access Management

Uplifting AEMO's foundational capabilities by providing a unified mechanism to authenticate and authorise external identity of participants accessing AEMO services.

Problem to be solved

AEMO's Identity and Access Management (IDAM) services are disparate, requiring users to retain multiple sets of credentials to access AEMO business services. The legacy IDAM services do not implement best practices in cyber security controls (e.g., multifactor authentication) and are insufficient to meet new industry obligations introduced under the Security of Critical Infrastructure (SOI) Act.⁴⁶

Solution

A unified mechanism to authenticate and authorise external identity when accessing AEMO services, consolidating and improving overall cyber security controls.

Key benefits

The IDAM initiative seeks to achieve a number of objectives including providing unified identification and authorisation for participants, greater scalability and adaptability in light of future reforms, improved user experience, enhanced security and compliance, enhanced self-service auditing and reporting and improved resilience and speed overall.

Changes proposed

AEMO has completed its consultation with stakeholders on the Draft Business Case Package for its IDAM, Industry Data Exchange and Portal Consolidation initiatives.⁴⁷ The scope for the IDAM initiative would include⁴⁸:

- Define & implement target state identity and access management solution.
- Implement mandatory cybersecurity uplifts (such as SOCI) and advanced security capabilities such as identity federation, context-based authentication.
- Unify the identity and entitlement management stores within the NEM and lay the foundation to extend this capability to other markets such as Gas and WEM through other market initiatives.

Foundational and Strategic Initiatives

Key Dates

- AEMO Draft Business Case Package v0.2 – FEB 2024
- Tranche 0: Foundational Phase (TBC) JUN 2025

⁴⁶ AEMO. Draft Business Case Package (IDAM, IDX and PC). February 2024. Available here: https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/other_meetings/nem-reform-foundational-and-strategic-initiatives-focus-group/fs-business-case-v02.pdf?la=en

⁴⁷ Ibid.

⁴⁸ AEMO. Business Case Discussion – Session 6A. 22 January 2024. Available here: https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/other_meetings/nem-reform-foundational-and-strategic-initiatives-focus-group/session-6a--draft-business-case-discussion-idx-idam-pc-for-combined-business-and-technical-focus-gro.pdf?la=en

- De-duplicate / consolidate the user accounts, providing the capability to use a single account to access business functions across multiple markets.
- Build organisation hierarchy.
- Enhance data-sharing capabilities to provide advanced data-sharing permissions.
- Enhance Participant Admin experience e.g., Assign multiple PIDs to a role minimising creating duplicate roles at an organisation level when an organisation has multiple PIDs.
- Basic and advanced Identity & Entitlement Management Governance & Assurance.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

Moderate impacts on all market and industry stakeholders who access AEMO's services.

AEMO Teams

The IDAM initiative will have high impacts on AEMO's Digital teams (including Enterprise Application Services, Cyber Security, and Cloud Platform Infrastructure & Networks).

Next steps

- Industry support for the Business Case and its recommendations was sought and received at the Executive Forum 28th March 2024.
- Final business case and confirmed AEMO investment decision expected May / June 2024.
- Further collaboration with industry on implementation timeframes to be completed post AEMO investment decision.

Where can I find more information?

AEMO NEM Reform Foundational and Strategic Initiatives Focus Group:

<https://aemo.com.au/en/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/nem-reform-foundational-and-strategic-initiatives-focus-group>

AEMO Draft Business Case Package (IDAM, IDX and PC) February 2024: https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/other_meetings/nem-reform-foundational-and-strategic-initiatives-focus-group/fs-business-case-v02.pdf?la=en

Industry Data Exchange

Uplifting AEMO's foundational capabilities by providing a unified data exchange mechanism to support the secure and efficient exchange of data between energy stakeholders for new services.

Problem to be solved

AEMO's existing data exchange systems have been variously acquired over the last 10-15 years, and use inconsistent standards, protocols and formats. AEMO's markets are also undergoing significant transformation, resulting in new data exchange needs. AEMO introducing new data exchange patterns without a unified target state and roadmap is inhibiting participants from modernising their systems and quantifying the benefits of their investments.

Solution

The Industry Data Exchange (IDX) initiative seeks to establish 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.

Key Benefits

The IDX initiative will provide industry standardized channels, protocols, and capabilities to provide a seamless integration of data exchange. In doing so, the initiative seeks to.

- efficiently consolidates the development of data exchange protocols for new business services – avoiding protocol 'bloat', minimising siloed development & improving speed to market for new reforms
- align with changing participant systems and cyber security obligations
- improves transaction timeliness and reduce incidences of stop files
- enable the scalable extension of existing business services [IDX Transition], and
- enable compartmentalisation of schema changes, thereby reducing regression testing costs of twice-yearly market changes [IDX Transition].

Changes proposed

AEMO has completed its consultation with stakeholders on the Draft Business Case Package for its IDAM, Industry Data Exchange and Portal Consolidation initiatives.⁴⁹ The scope for the IDX initiative would include⁵⁰: The Draft Business Case recommendation is to phase IDX investment decision and scope across two decision points (DP):

⁴⁹ Ibid.

⁵⁰ AEMO. Business Case Discussion – Session 6A. 22 January 2024. Available here: https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/other_meetings/nem-reform-foundational-and-strategic-initiatives-focus-group/session-6a--draft-business-case-discussion-idx-idam-pc-for-combined-business-and-technical-focus-gro.pdf?la=en

Foundational and Strategic Initiatives

Key Dates

- AEMO Draft Business Case Package v0.2 - FEB 2024
- Tranche 0: Core Foundational Phase - OCT 2025 (TBC)
- Decision Point 2 new business case for IDX Transition - Q4 2025

- **DP1: IDX Foundational** – scope is to build capability that efficiently supports upcoming new reforms in a secure and extensible way. As part of this foundational phase the scope would include:
 - Enhance data exchange cyber controls implementing the legislative driven requirements and obligations such as SOCI, Australian Energy Sector Cyber Security Framework (AESCSF).
 - Define and implement target state channels, protocols, patterns and payload standards.
 - Unify the data exchange mechanisms across markets and fuels. Define the unified data exchange mechanisms for future Reforms.
 - AEMO data exchange software is enhanced to provide data exchange mechanisms that are defined in the target state architecture; minimising the gateway development costs for the industry covering all the channels that are defined in the target state architecture.
 - Transition the current state NEM interfaces to target state; sunset after an industry agreed timeframe.
- **DP2: IDX Transitional**⁵¹ – assess options to address legacy IDX services taking into account learnings and exit criteria from delivery of the foundation and experience in the delivery of new business services. As part of this transitional phase the scope would include assessing options to transition existing NEM Retail, Wholesale and Transmission business services to the new foundational IDX patterns, protocols and payload formats.

Market, Industry and AEMO impacts

Market & Industry Stakeholders

Moderate to high impacts on all market and industry stakeholders who access AEMO's services.

AEMO Teams

High impacts on AEMO's Digital (e.g., Enterprise Application Services, Cyber Security, and Cloud Platform Infrastructure & Networks) and Operations teams (e.g., Metering).

Next steps

- Industry support for the Business Case and its recommendations was sought and received at the Executive Forum 28 March 2024.
- Final business case and confirmed AEMO investment decision expected May / June 2024.
- Further collaboration with industry on implementation timeframes to be completed post AEMO investment decision.

⁵¹ For this second phase and second decision point and new standalone business case is to be developed (target Q4 2025).



Where can I find more information?

AEMO NEM Reform Foundational and Strategic Initiatives Focus Group:

<https://aemo.com.au/en/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/nem-reform-foundational-and-strategic-initiatives-focus-group>

AEMO Draft Business Case Package (IDAM, IDX and PC) February 2024: https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/other_meetings/nem-reform-foundational-and-strategic-initiatives-focus-group/fs-business-case-v02.pdf?la=en

Portal Consolidation

Establishing a new web and mobile user portal to provide a unified stakeholder experience.

Problem to be solved

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.

Solution

The Portal Consolidation (PC) initiative seeks to establish 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.

Key benefits

The Portal Consolidation solution will provide a consistent and unified user experience allowing for a standardised experience to consume AEMO browser services, enhanced self-service capabilities for market participants, integration with the enterprise identity management and user authentication solutions and overall improved user experience by establishing standards for navigation, look and feel and help menus.

Changes proposed

AEMO has completed its consultation with stakeholders on the Draft Business Case Package for its IDAM, Industry Data Exchange and Portal Consolidation initiatives.⁵² The scope for the PC initiative would include⁵³:

- Enable a single pane of glass, providing a pathway for future unification across fuels and markets.
- Implement the capabilities defined in target state architecture e.g., self-serve capabilities, personalised features.
- Enable browser services to be accessible via the internet.
- Single identity for various browser services/web apps.
- Unify the user experience.
- Enhance user documentation.

Foundational and Strategic Initiatives

Key Dates

- AEMO Draft Business Case Package v0.2 – FEB 2024
- Tranche 0: Foundational Phase (TBC) JUN 2025

⁵² Ibid.

⁵³ AEMO. Business Case Discussion – Session 6A. 22 January 2024. Available here: https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/other_meetings/nem-reform-foundational-and-strategic-initiatives-focus-group/session-6a--draft-business-case-discussion-idx-idam-pc-for-combined-business-and-technical-focus-gro.pdf?la=en

Market, Industry and AEMO impacts

Market & Industry Stakeholders

Moderate impacts on all market and industry stakeholders who access AEMO's services.

AEMO Teams

Moderate impacts on AEMO's Operations (e.g., Energy Market Monitoring, Systems Capability) and Digital (e.g., Enterprise Application Services) teams.

Next steps

- Industry support for the Business Case and its recommendations was sought and received at the Executive Forum 28th March 2024.
- Final business case and confirmed AEMO investment decision expected May / June 2024.
- Further collaboration with industry on implementation timeframes to be completed post AEMO investment decision.

Where can I find more information?

AEMO NEM Reform Foundational and Strategic Initiatives Focus Group:

<https://aemo.com.au/en/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/nem-reform-foundational-and-strategic-initiatives-focus-group>

AEMO Draft Business Case Package (IDAM, IDX and PC) February 2024: https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/other_meetings/nem-reform-foundational-and-strategic-initiatives-focus-group/fs-business-case-v02.pdf?la=en

SCADA Lite

Establishing a bi-directional connection for non-NSP participants to exchange operational information (telemetry and control) with AEMO.

Problem to be solved

The evolving and transitional NEM market will involve several new non-NSP (Network Service Provider) participants in addition to the already existing traditional ones (such as NSPs and Generators). While Supervisory Control and Data Acquisition (SCADA) systems are critical to the operation of the NEM's current scheduling framework, they are a significant entry barrier for smaller participants into central dispatch due to the granularity of data they communicate with AEMO's control rooms.

It has been onerous for these non-NSP participants to establish a telemetry connection with AEMO using the ICCP (Inter-control Centre Communications Protocol) protocol that AEMO currently supports.

Solution

SCADA Lite will enable NEM non-NSP participants to establish a bi-directional connection to exchange operational information (telemetry and control) with AEMO. Specifically, those requirements defined in both the Wholesale Demand Response Guidelines (Version 1.0, Effective Date: 24 June 2021) and Power System Data Communication Standard (Version 3.0, Effective Date: 3 April 2023).

Key benefits

Beyond enabling the exchange of operational information with AEMO, the SCADA Lite initiative offers a range of benefits to market stakeholders, consumers and AEMO, including:

- Providing greater visibility and operational control of network generation and ancillary service resources.
- Encouraging greater market participation of renewable energy sources into the market.
- Lowering barriers to entry into the market for NEM non-NSP participants.
- Access to additional revenue streams for non-NSP participants
- Greater opportunities for CER to participate in the NEM through dispatch or load management contracts by upstream aggregators.

Changes proposed

Procedures & Guidelines	Market Applications	Market Interfaces
<ul style="list-style-type: none">• SCADA Lite solution will deliver the requirements defined in both the WDR Guidelines (Version 1.0, Effective Date: 24	<ul style="list-style-type: none">• Business Process - No new processes are required. Modification to existing processes is expected such as	<ul style="list-style-type: none">• The solution will support both cloud-hosted (major Australian cloud providers) and physical infrastructure based non-

Foundational and Strategic Initiatives

Key Dates

- Go-live - NOV 2024 (subject to completion of Proof of Concept)

Procedures & Guidelines	Market Applications	Market Interfaces
June 2021) and Power System Data Communication Standard (Version 3.0, Effective Date: 3 April 2023)	<p>registration of new non-NSP participants, utilisation of SCADA Lite data in grid modelling and dispatch process, creation of annual invoicing process for SCADA Lite users.</p> <ul style="list-style-type: none"> • Technology Solution - Changes include configuration and implementation of new components in networks and real time operations. 	<p>NSP Participant Intervening Facilities (endpoints).</p> <ul style="list-style-type: none"> • Protocols supported will be ICCP (Inter-control Centre Communications Protocol), as well as the Secure DNP3.0 protocol (agreed with the industry participants through the Power System Data Communication Standard consultation) to establish this connection.

Market, Industry and AEMO impacts

Market & Industry Stakeholders⁵⁴

- Demand Response Service Providers
- Virtual Power Plants
- Small Generation Aggregators
- Operators of remote grid scale assets (e.g., solar and wind farms)

AEMO Teams

- Operations (Operational Support (Settlements & Prudentials), RTO Grid Systems and Modelling)
- System Design (Onboarding & Connections)
- Digital (Cloud, Platforms, Instructure & Networks, Customer, Engagement & Services, Enterprise Application Services)

Next steps

- AEMO Proof of Concept (POC) assessment confirming implementation activities and schedule for external milestone reporting.
- AEMO proposes to implement this capability via a pilot test with a selected participant to prove the service option. When correctly working the SCADA Lite service will be made available in Production to all eligible participants.

Where can I find more information?

AEMO NEM Reform Program – SCADA Lite: <https://aemo.com.au/initiatives/trials-and-initiatives/scada-lite>

⁵⁴ For those participants who choose to utilise this capability.

FRC Target State

Implement a consolidated Asset and Participant Relationship Management system (APRM) that enables unification of services onto a shared platform.

Note the Consolidated Master Data Repository initiative has now merged into this initiative. The FRC Target State initiative is currently subject to review as part of AEMO's ongoing Future State Architecture assessment.

Problem to be solved

AEMO currently maintains multiple applications to manage assets and participant relationships in the Retail Markets. Standing Data from these systems are copied (duplicated) to other downstream systems causing data latency and quality issues. The majority of these systems are bespoke with point-to-point integration and all of the Full Retail Competition (FRC) platforms are at the end of their technical life and require renewal. These applications also maintain their own and / or leverage multiple Master and Reference data repositories across the organisation. This has potentially adverse business implications for Participant experience and efficiency.

There are significant regulatory changes on the horizon that require significant investment to enhance and maintain these systems and new market reforms continue to introduce additional assets and/or additional characteristics of the assets requiring smart investments.

Solution

- Implement a consolidated Asset and Participant Relationship Management system (APRM) that enables unification of services onto a shared platform and simplification of Participants' and AEMO processes.
- Provide single access to AEMO's Retail systems (network, portal, hub, data access and system architecture) for Participants and potentially to non-Participants such as 3rd parties (e.g., under the Consumer Data Right for Energy reforms).
- Accommodate new market assets such as DER, and EV into AEMO grid and market solutions.
- Provide the foundation for unifying the procedure definitions, business processes, data exchange patterns and mechanisms, and AEMO systems across jurisdictions, markets and fuels.
- Implement systems changes to improve delivery of consolidated processes at lower cost to both Market Participants and AEMO.
- Simplify and consolidate disparate data through centralisation of Master Data. AEMO to provide Master Data as a service (in batch and real time).


Key benefits

The initiative seeks to improve operational performance by leveraging unified interface protocols and methodologies removing duplication efforts and costs for AEMO and Participants across the industry. Further, it

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Key Dates

- Subject to AEMO's Future State Architecture assessment



provides for easier market changes through reduced dependency on code changes allowing for more efficient and reduced costs of implementation of procedure changes, enabling third parties to provide system solutions at lower prices.

Finally, the initiative will align to AEMO's cyber security standards and minimised data movement across the organisation, improving data security, quality, latency, and accuracy.

From a Master Data perspective, this will further:

- Provide Participants the ability to access a single source of truth for all of their data allowing Participants to be able to provide one update that will map across various AEMO applications and remove the need for Participants to engage with multiple AEMO business units.
- Provide data as a service and simplify access for Participants to consistent quality data and simplified, unified information improving service and time efficiencies.

Changes proposed

The project scope remains subject to the outcomes of AEMO's Future State Architecture assessment.⁵⁵ AEMO has published an Expression of Interest (EOI) to scan the Market to determine what platform/product are available as well as to refine the target state architecture. The responses to this EOI are to be factored into the design and implementation an Actor and Asset Management platform, including the solution architecture, and its technology stack.

The platform needs to enable consolidated procedures, interfaces, security standards, protocols, and support processes across all Retail Markets (the integration for non-NEM retail markets is outside the NEM Reform Program scope). The platform will extend to new assets such as DER, EVs and integrating it with the grid and other market systems. Following an assessment of initiative synergies, this now includes consideration of Master and reference data previously articulated as a separate initiative (Consolidated Master Data Repository).

Key steppingstones to get to the target state include Actor-Asset platform: NEM CATS; NEM wholesale registration process; Bring other processes and applications onto platform (e.g., DER Register).

Market, Industry and AEMO impacts

Market & Industry Stakeholders

Impacts to market and industry stakeholders are to be determined and subject to AEMO's ongoing Future State Architecture assessment. Based on current assumptions AEMO anticipate impacts on all market and industry stakeholders who wholesale, retail and gas market participants.

AEMO Teams

Impacts to AEMO teams are to be determined and subject to its Future State Architecture assessment. Based on current assumptions AEMO anticipate impacts to its Operations and Digital teams.

⁵⁵ The Future State Architecture is a strategic blueprint for a contemporary digital ecosystem, encompassing processes, applications, technology, data and importantly security that will enable AEMO to deliver on our strategy across all functions and jurisdictions.



Next steps

- AEMO has published an Expression of Interest (EOI) to scan the market to determine what platform /product are available as well as to refine the target state architecture.
- Options assessment to be completed to determine if DER related initiatives should be on the platform (as opposed to other available options) and to sequence the changes on the platform.
- As per the IDAM, IDX and PC initiatives, AEMO seek to collaborate with industry to progress a business case assessment of the FRC Target State initiative in due course.

Where can I find more information?

Additional information to be made available subject to monitoring and assessment of target state requirements at various 'Checkpoints'.

Dispatch, Bids/Offers, and Constraints

Target State

A technology uplift of AEMO backend market platform services to replace legacy technology.

Problem to be solved

AEMO's core market dispatch and constraints platform is at the end of its technical life and the technologies which underpin this platform are legacy. There is a rapidly diminishing footprint of resources in the contract market with skills in these technologies available.

Solution

To modernise the core market dispatch and short-term market systems to align it with modern technologies that are widely supported in AEMO and for which external resources with those skill sets readily exist.

Key benefits

This initiative seeks to ensure the ongoing viability and maintainability of the core market dispatch and constraints platform – which are mission critical to enable secure and optimised participation by actors in various markets in the NEM.

The adoption of modern delivery frameworks will improve the ability of AEMO to deliver changes to these platforms which will be increasingly required as the energy transition continues. This will provide cost efficiency benefits and value to Participants through reduced implementation costs.

Changes proposed

This initiative will employ a phased approach subject to various Checkpoints. The final scope of each phase will be subject to review.

Tranche 1 – A tactical incremental solution to transition from end-of-life technology to a supported platform in order to eliminate immediate technology risks and provide an opportunity to apply more readily available technology personnel, thereby enhancing scalability and organisational delivery capability. This solution can be implemented without affecting regulatory reform initiatives related to NEM Reform Program.

Once this tactical uplift is completed, the dispatch ecosystem will be fit for purpose as a base solution for implementation of further reforms for the remainder of the NEM Reform Program, subject to defined checkpoints to assess i) any fundamental changes in the reform requirements (e.g., nodal pricing) and ii) performance and scalability requirements that may be impacted by forthcoming DER growth and initiatives.

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Key Dates

- Subject to ongoing monitoring and assessment of target state requirements



Market, Industry and AEMO impacts

Market & Industry Stakeholders

Impacts to market and industry stakeholders are subject to future checkpoints. Tranche 1 changes have no market and industry stakeholder impacts.

AEMO Teams

Future impacts to AEMO teams are subject to future checkpoints. Tranche 1 changes have low impacts to its Digital teams.

Next steps

- Dispatch tactical uplift to be completed as per Changes Proposed.
- Ongoing monitoring and assessment of target state requirements at various 'Checkpoints' to assess i) any fundamental changes in the reform requirements (e.g., nodal pricing) and ii) performance and scalability requirements that may be impacted by forthcoming DER growth and initiatives.

Where can I find more information?

Additional information to be made available subject to AEMO's ongoing Future State Architecture assessment.

Appendices

Program Relationships / Dependencies
ESB Post-2025 Program Pathway Overview
References



Program Relationships / Dependencies

AEMO, the RDC and wider participant cohort continue to collaborate on managing the implementation risks and challenges associated with delivering the breadth of initiatives across the Program including identifying opportunities to bundle and sequence where possible. The table below provides an example of the potential bundling and sequencing opportunities under consideration in development of the Roadmap and delivery of the Program. Further assessment is to be completed, particularly in relation to the delivery of AEMO strategic and foundational initiatives (IDAM, IDX and PC) and how bundling and/or sequencing these initiatives may drive wider efficiencies across the Program.

Initiatives	Timing	Functional Overlap	Rationale	Next Steps
Unlocking CER benefits through flexible trading & Integrating price responsive resources into the NEM	Aligned	Medium	<ul style="list-style-type: none"> Unlocking CER benefits through flexible trading enables the management of controllable resources through a second connection point. The framework developed for flexible trading arrangements to support the management of controllable resources will be used by the Integrating price responsive resources into the NEM initiative 	<ul style="list-style-type: none"> Sequencing opportunity reflected in the Roadmap
SCADA Lite & Integrating price responsive resources into the NEM	Aligned	Medium	<ul style="list-style-type: none"> SCADA Lite will provide a platform for participants, such as VPPs, to communicate with AEMO and provide visibility of their DER device activities a component of the Integrating price responsive resources into the NEM initiative 	<ul style="list-style-type: none"> Sequencing opportunity reflected in the Roadmap
Unlocking CER benefits through flexible trading & Accelerating smart meter deployment & NEW Retail market improvements	Aligned	Strong	<ul style="list-style-type: none"> Delivery of Unlocking CER benefits through flexible trading in late 2026, could create opportunities to bundle new retail market improvement initiatives that arise during this time. 	<ul style="list-style-type: none"> Opportunity to be monitored
Enhancing Reserve Information & IDX Transition	Potential alignment	Low	<ul style="list-style-type: none"> IDX Transition could enable faster release of reporting data to participants alongside Dispatch 	<ul style="list-style-type: none"> Further assessment to be completed during planning phase subject to IDX investment approval and consultation with industry
Accelerated smart meter deployment & IDX Foundation	Potential alignment	Medium	<ul style="list-style-type: none"> Accelerated smart meter deployment PQ data could utilise IDX Foundation capability to enable PQ data to be delivered on a strategic platform, meaning data able to be provided more frequently and with less impact on existing market transactional systems 	<ul style="list-style-type: none"> Further assessment to be completed during planning phase subject to final rules determination, IDX investment approval and consultation with industry
DER Data Hub & Registry Services & IDX Foundation	TBC	Strong	<ul style="list-style-type: none"> DER Data Hub & Registry Services will need to transact DER-related information between existing and new participants. IDX Foundation could provide the foundational capability to do this 	<ul style="list-style-type: none"> Further assessment to be completed subject to future industry trials, IDX investment approval and consultation with industry

Initiatives	Timing	Functional Overlap	Rationale	Next Steps
DER Data Hub & Registry Services & IDAM	TBC	Strong	<ul style="list-style-type: none"> DER Data Hub & Registry Services may require management of the identities of parties who are not existing market participants, and their relationships to DER assets. IDAM solution could support this. 	<ul style="list-style-type: none"> Further assessment to be completed subject to future industry trials, IDAM investment approval and consultation with industry
Dispatch Target State and IDX Transition (Wholesale)	TBC	Strong	<ul style="list-style-type: none"> Bundling IDX Transition for Wholesale to future Dispatch Target State would likely result in efficiencies to delivery for participants (e.g., retailers and generators). However, it may increase the risk of delivery. 	<ul style="list-style-type: none"> Dispatch Target State on-hold subject to future checkpoints. Potential opportunities to be reassessed at a future point in time
FRC Target State & IDX Transition (Retail)	TBC	Strong	<ul style="list-style-type: none"> Bundling IDX Transition for Retail to FRC target state could result in high efficiencies for retailers, distributors and metering providers due to almost full functional overlap from FRC target state 	<ul style="list-style-type: none"> FRC Target State on-hold subject to future checkpoints / assessment. Potential opportunities to be reassessed at a future point in time

ESB Post-2025 Program Pathway Overview

The following table provides a summary of each of the four major reform pathways put forward by the ESB and those reform initiatives (in bold) considered within that will form the basis of the NEM Reform Implementation Roadmap.

Pathway	Objective	This means	Reform Initiative*
Resource Adequacy Mechanisms	<ul style="list-style-type: none"> Establish new market-based arrangements to explicitly value capacity to provide an ‘investable’ and enduring long-term signal. Establish market arrangements that support efficient allocation of investment risk between participants, jurisdictions, and consumers. Establish tools that provide jurisdictions sufficient confidence that reliability will be maintained in a way that preserves market signals. 	We have investment in the right mix of resources (generation, storage and demand response) in place prior to anticipated plant closures, and that plant exit does not cause significant price or reliability shocks to consumers through the transition.	<ul style="list-style-type: none"> Investment principles for jurisdictional schemes Increased MT PASA Information Jurisdictional Strategic Reserve Ministerial RRO Trigger Capacity Incentive Scheme Ongoing Monitoring
Essential System Services	<ul style="list-style-type: none"> Establish new market-based arrangements to value the services needed to support the changing mix of resources in the NEM (frequency, inertia, system strength, and operating reserves). Establish new market mechanisms to support efficient scheduling and dispatch by AEMO. Deliver a range of supply and demand-based technologies and resources with capabilities to deliver these essential services. 	We have the resources and services when needed to manage the complexity of dispatch and to deliver a secure supply to customers.	<ul style="list-style-type: none"> Fast Frequency Response Frequency Performance Payments (part of PFR Incentive Arrangements rule) Enhancing Reserve Information System Strength (Planning) Improving security frameworks for the energy transition Unbundling system services Integrated ahead market
Integration of DER and Flexible Demand	<ul style="list-style-type: none"> Establish frameworks that enable consumers to be rewarded for their flexible demand and generation, facilitate options for how they want to engage and remain protected by a fit-for-purpose consumer protections framework. Establish wholesale market arrangements that support innovation, the integration of new business models and a more efficient supply and demand balance. Establish networks with the ability to accommodate the continued update of DER, two-way energy flows, and manage the security of the network in a cost-effective way. Provide AEMO with the visibility and tools it needs to continue to operate a safe, secure, and reliable system, including maintaining system security associated with low minimum system load conditions. 	We create new opportunities for consumers about how they receive and use energy and are rewarded for doing so flexibly.	<ul style="list-style-type: none"> Integrating Energy Storage Systems Unlocking Consumer Energy Resources (CER) benefits through flexible trading Integrating price responsive resources into the NEM Dynamic Operating Envelopes Distribution Local Network Services Turn-up Services DER Data Hub and Registry Services DER Operational Tools
Transmission and Access	<ul style="list-style-type: none"> Establish better signals for generators to locate in areas where there is available generation capacity - namely in the REZs. Reduced uncertainty for investors, through measures that give rise to more predictable future patterns of congestion, and a more orderly and predictable connections process. 	We have a network to meet future needs, renewable energy zones, and a targeted set of investments that can deliver the energy transition at lower cost.	<ul style="list-style-type: none"> Dedicated connection assets and system strength Interim REZ framework Enhanced Locational Information Congestion Relief Market & Priority Access Model

Pathway	Objective	This means	Reform Initiative*
	<ul style="list-style-type: none"> Establish better use of the network, resulting in more efficient dispatch outcomes and lower costs for consumers. Ensure batteries are locating where they are needed most and being paid to operate in ways that benefit the broader system. 		<ul style="list-style-type: none"> Transmission Planning and Investment Review Enhanced congestion information LMP and FTR

References

Workstream	Reform Initiative	Reference (link to rule change, market review, or latest ESB publication)
RAMS	Increased MT-PASA Information	<p>AEMC Rule Determination: https://www.aemc.gov.au/rule-changes/enhancing-information-generator-availability-mt-pasa</p> <p>AEMO Guidelines and Methodology Consultation: https://www.aemo.com.au/consultations/current-and-closed-consultations/2022-reliability-forecasting-guidelines-and-methodology</p>
	Capacity Investment Scheme	<p>DCCEEW – About the Capacity Investment Scheme: https://www.dcceew.gov.au/energy/renewable/capacity-investment-scheme</p> <p>AEMO Services Limited – Our Tenders: https://aemoservices.com.au/tenders</p>
ESS	Fast Frequency Response	<p>AEMC Rule Change – Fast frequency response market ancillary service: https://www.aemc.gov.au/rule-changes/fast-frequency-response-market-ancillary-service</p> <p>AEMO NEM Reform Program – Fast Frequency Response: https://aemo.com.au/initiatives/major-programs/fast-frequency-response</p>
	Frequency Performance Payments (part of PFR Incentive Arrangements rule)	<p>AEMC Rule Change: https://www.aemc.gov.au/rule-changes/primary-frequency-response-incentive-arrangements</p> <p>AEMO FPP Project: https://aemo.com.au/initiatives/major-programs/frequency-performance-payments-project</p> <p>AEMO FCFP Consultation: https://aemo.com.au/consultations/current-and-closed-consultations/frequency-contribution-factors-procedure</p> <p>AEMO PFR Requirements Consultation: https://aemo.com.au/consultations/current-and-closed-consultations/primary-frequency-response-requirements</p>
	Enhancing Reserve Information	<p>AEMC Rule Change: https://www.aemc.gov.au/rule-changes/enhancing-reserve-information-formerly-operating-reserves</p>
	Improving security frameworks for the energy transition	<p>AEMC Rule Change: https://www.aemc.gov.au/rule-changes/improving-security-frameworks-energy-transition</p>
TA	Enhanced Locational Information	<p>ESB Transmission and Access: https://esb-post2025-market-design.aemc.gov.au/transmission-and-access</p> <p>ESB Final Recommendation. Transmission Access Reform – Enhanced Locational Information June 2023: https://www.datocms-assets.com/32572/1688514855-enhanced-locational-information-final-decision-paper.pdf</p>
	Congestion Relief Market & Priority Access Model	<p>ESB Transmission and Access: https://esb-post2025-market-design.aemc.gov.au/transmission-and-access</p> <p>AEMC Market Review - Transmission Access Reform: https://www.aemc.gov.au/market-reviews-advice/transmission-access-reform</p>
DER & FD	Integrating Energy Storage Systems	<p>AEMC Rule Change IESS (December 2021): https://www.aemc.gov.au/rule-changes/integrating-energy-storage-systems-nem</p> <p>AEMC Rule Change Implementing IESS (May 2023): https://www.aemc.gov.au/rule-changes/implementing-integrated-energy-storage-systems</p> <p>AEMO NEM Reform Program – IESS Project: https://aemo.com.au/initiatives/submissions/integrating-energy-storage-systems-iless-into-the-nem</p> <p>AEMO Integrating Energy Storage Systems Participant Toolbox: https://aemo.com.au/initiatives/major-programs/integrating-energy-storage-systems-project/integrating-energy-storage-systems-faqs</p>

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	Unlocking Consumer Energy Resources (CER) benefits through flexible trading	AEMC Rule Change Unlocking CER benefits through flexible trading: https://www.aemc.gov.au/rule-changes/unlocking-CER-benefits-through-flexible-trading AEMO Unlocking CER benefits through flexible trading – Draft High-level Implementation Design and Participant Impact Assessment: https://aemo.com.au/-/media/files/initiatives/unlocking-cer-benefits-through-flexible-trading/unlocking-cer-benefits-through-flexible-trading---draft-high-level-implementation-design.pdf?la=en
	Integrating price responsive resources into the NEM	AEMC Rule Change Consultation: https://www.aemc.gov.au/rule-changes/integrating-price-responsive-resources-nem
	Dynamic Operating Envelops	DCCEEW CER Roadmap and Taskforce, ECMC meeting 24 November 2023: https://www.energy.gov.au/energy-and-climate-change-ministerial-council/meetings-and-communicues Project EDGE final report, Chapter 4: https://aemo.com.au/-/media/files/initiatives/der/2023/project-edge-final-report.pdf?la=en AER Draft Export Limit Interim Guidance note: https://www.aer.gov.au/system/files/2023-11/Draft%20export%20limit%20interim%20guidance%20note%20-%20November%202023.pdf AER Review of regulatory framework for flexible export limit implementation: https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-regulatory-framework-for-flexible-export-limit-implementation
	Distribution Local Network Services	DCCEEW CER Roadmap and Taskforce, ECMC meeting 24 November 2023: https://www.energy.gov.au/energy-and-climate-change-ministerial-council/meetings-and-communicues AEMO Mondo, AusNet Services. Project Edge: https://aemo.com.au/en/initiatives/major-programs/nem-distributed-energy-resources-der-program/der-demonstrations/project-edge
	DER Data Hub and Registry Services	DCCEEW CER Roadmap and Taskforce, ECMC meeting 24 November 2023: https://www.energy.gov.au/energy-and-climate-change-ministerial-council/meetings-and-communicues AEMO, Mondo, AusNet Services. Project Edge – DER Data Hub Lessons Learnt. https://aemo.com.au/-/media/files/initiatives/der/2023/project-edge-der-data-hub-lessons-learnt-final-june-2023.pdf?la=en
	DER Operational Tools	DCCEEW CER Roadmap and Taskforce, ECMC meeting 24 November 2023: Meetings and communicues energy.gov.au AEMO Operations Technology Roadmap: https://aemo.com.au/en/initiatives/major-programs/operations-technology-program/operations-technology-roadmap
Data Strategy	Data Services	ESB National Energy Laws Amendment (Data Access) Bill 2023: https://www.datocms-assets.com/32572/1681166642-esb-data-strategy-initial-reforms-draft-bill-april-2023.pdf ESB Data Services Policy Position Paper: https://www.datocms-assets.com/32572/1688102997-esb-data-strategy-initial-reforms-policy-positions.pdf
	Electric Vehicles Supply Equipment Standing Data Register	AEMC Electric vehicle charger data in DER register – Rule change pending: https://www.aemc.gov.au/rule-changes/electric-vehicle-charger-data-der-register ESB Electric Vehicle Supply Equipment Standing Data – Consultation Outcomes Report June 2023: https://www.datocms-assets.com/32572/1688103470-attachment-b-evse-standing-data-consultation-paper-final-june-2023.pdf
	Bill Transparency	AEMC Market Review – Billing Data Transparency: https://www.aemc.gov.au/market-reviews-advice/billing-data-transparency ESB Bill Transparency Consultation Paper (July 2023): https://www.datocms-assets.com/32572/1688619055-esb-billing-transparency-consultation-paper-final-july-2023.pdf

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	Network Visibility	AER Review – Network Visibility: https://www.aer.gov.au/industry/registers/resources/reviews/network-visibility ESB Network Visibility Consultation Paper (July 2023): https://www.datocms-assets.com/32572/1688618798-esb-network-visibility-consultation-paper-final-july-2023.pdf
AEMO Foundational	Identity and access management	AEMO NEM Reform Foundational and Strategic Initiatives Focus Group: https://aemo.com.au/en/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/nem-reform-foundational-and-strategic-initiatives-focus-group AEMO Draft Business Case Package (IDAM, IDX and PC) February 2024: https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/other_meetings/nem-reform-foundational-and-strategic-initiatives-focus-group/fs-business-case-v02.pdf?la=en
	Industry Data Exchange	As above.
	Portal Consolidation	As above.
	SCADA Lite	AEMO NEM Reform Program – SCADA Lite: https://aemo.com.au/initiatives/trials-and-initiatives/scada-lite
	FRC Target State	To be developed.