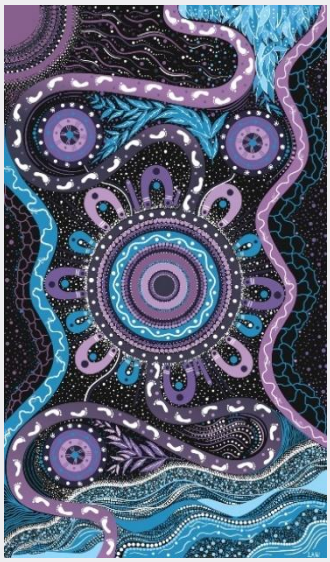
DRAFT Implementation Assessment for WEM Dispatch Training Simulator and SCED Offline Tools

Nov 2025

Ref: IA-2025-07

Preliminary assessment of the changes, impacts and risks to implement a new initiative



We acknowledge the Traditional Custodians of the land, seas and waters across Australia. We honour the wisdom of Aboriginal and Torres Strait Islander Elders past and present and embrace future generations.

We acknowledge that, wherever we work, we do so on Aboriginal and Torres Strait Islander lands. We pay respect to the world's oldest continuing culture and First Nations peoples' deep and continuing connection to Country; and hope that our work can benefit both people and Country.

'Journey of unity: AEMO's Reconciliation Path' by Lani Balzan

AEMO Group is proud to have launched its first Reconciliation Action Plan in May 2024. 'Journey of unity: AEMO's Reconciliation Path' was created by Wiradjuri artist Lani Balzan to visually narrate our ongoing journey towards reconciliation - a collaborative endeavour that honours First Nations cultures, fosters mutual understanding, and paves the way for a brighter, more inclusive future.

Important notice

Purpose

AEMO has prepared this document to provide preliminary information about the implementation of the Wholesale Electricity Market (WEM) Dispatch Training Simulator (DTS) and Security Constrained Economic Dispatch (SCED) Offline Tools project.

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Version control

Version	Release date	Changes
1	24/11/2025	N/A

Contents

1 At a glance

Problem	AEMO does not have an adequate dispatch training simulator (DTS) for the Wholesale Electricity Market (WEM). Power system controllers are therefore limited in the range of tools and processes they can use to simulate market events, conduct training, and help define operational responses for when market events occur. To date, AEMO has only been able to develop operational responses or conduct training via manual simulation of the market or by responding to real-time events in the live market production system. This severely limits the types of scenarios that can be tested. AEMO has no way of recreating complex or unusual market scenarios in the WEM and preparing appropriate responses for when they occur. AEMO's current simulator covers the energy management system (EMS) only and has no WA market systems integrated into it. This makes it extremely difficult to predict how bidding behaviours in the WEM may change during power system events, or how specific dispatch runs (including price signals) would impact power system operation.
Proposed solution	Develop a cloud-based instance of the WEM production environment, which can be integrated into the existing WA control room EMS simulator, allowing full offline simulation of the WEM. This 'sandbox' solution will be used by WA controllers to simulate market events, conduct training, and help define operational responses for when market events occur. The updated WA DTS will: • Allow controllers to simulate periods of real market operation or altered market operation using "base case scenarios" refreshed / streamed from the production environment. • Give AEMO's controllers the ability to stop/pause, fast-forward and rewind simulations. • Integrate the various market, dispatch and real time tools to reflect what controllers would see in real life.
Timing	End of June 2026
Estimated cost	$4.23 million (including contingency of $323k) $60k per year annual operating costs
Impact on market participants	No impacts on market participants or any other external stakeholder arise from this work. The DTS is an internal application only, used solely by AEMO personnel.

1.1 Purpose of the IA

This Implementation Assessment (IA) describes how we (AEMO) propose to implement an offline DTS for the WEM. It outlines the proposed system, process and operations changes and the estimated costs and timeline for implementing these changes. The purpose of this IA is to inform interested parties of our plans and invite feedback on our proposed investment and implementation approach.

1.2 Providing feedback

As the development of the DTS and SCED Offline Tools is already underway, there is limited opportunity at this point for material changes in the scope of the current project. Nonetheless, AEMO welcomes any views on the IA or on any related matters. For example, are there DTS functionalities or market dispatch training technique elsewhere that we might consider for inclusion in future rounds of development? Given the ongoing energy transition, are there any scenarios you suggest we might prioritise for simulation?

Stakeholders can share any views or suggestions by email to majorprojects@aemo.com.au.

Please note the key dates **for engagement set out in the table below.**

Table 1 Indicative timings for the IA publication/consultation process

Step	Due date
AEMO distribute Draft IA to MPWG members	24/11/2025
AEMO provide MPWG with Briefing on IA	01/12/2025
Deadline for MPWG feedback on Draft IA	22/12/2025
AEMO publish Final IA	16/01/2026

2 Overview

2.1 The problem / opportunity

The current WEM arrangements commenced on 1 October 2023. Market go-live introduced a new dispatch engine (WEMDE) that enables security constrained economic dispatch (SCED) and was a fundamental shift in the way the market and power system in WA is operated.

The current WA simulator only covers the energy management system and does not have the new market systems (e.g. WEMDE, RTMS, Registration etc) integrated into it. This makes it extremely difficult to predict how bidding behaviours in the WEM may change during power system events, or how specific dispatch runs (including price signals) would impact power system operation.

Our power system controllers are therefore limited in the range of tools and processes they can use to simulate market events, conduct training, and help define operational responses for when market events occur. To date, we have only been able to develop operational responses or conduct training via manual simulation of the market or by responding to real-time events in the live market production system. This severely limits the types of scenarios we can work through. We have no way of recreating complex or unusual market scenarios and preparing appropriate responses for when they occur.

As the power system evolves, particularly given the pending exit of established coal Facilities and growth in new Non-Scheduled Facilities (NSF), the range of new scenarios that might occur will increase. Relying solely on manual processes and the live market production system risks inadequate preparation for controllers, leading to increased risks to power system security or market efficiency. It would therefore be prudent to have an offline 'sandbox' where our controllers can simulate WEMDE production runs to test and understand how the market might behave, and how best to respond.

Development of a WA DTS integrated with the new market systems was originally scheduled for 2024, once the new market arrangements had been bedded in, but resourcing constraints and competing priorities meant the DTS project was deferred until this year (2025).

2.2 Response

We will integrate cloud-based instances of the real-time market applications used in the WEM into the current WA simulator. Integrating WEMDE and other complementary systems will give power system controllers the opportunity to simulate market events, bidding behaviours and adverse WEM/SWIS outcomes.

Work will include modifying the existing WEMDE pre-processing and post-processing systems to allow efficient extraction, modification and redirection of data flows within a training environment. The WA DTS will:

- Give users the ability to stop/pause, fast-forward and rewind in timing.

- Integrate the different market, dispatch and real time tools to simulate what a controller would see during a scenario.
- Allow users to specify either periods of real market operation or altered market operation through the use of "base case scenarios" refreshed / streamed from the Production environment.
- Enable users to utilise the functionality without the requirement of understanding underlying data structures or infrastructure.

Creating and operating the DTS and SCED Offline Tools, including the integration with an instance of WEMDE, will have no impact on any of the actual market or system applications, including those that interface with market participants systems. This is an internal and offline application only.

We considered the alternative option of building an on-premises instance of the WEM production environment in a local data centre. However, an on-premises solution does not offer the same scalability as a cloud solution, with the disadvantage that it would be sunk cost – we would be paying for the WA DTS 24/7 whether we are using it or not. A major advantage of the cloud-based solution is that you only pay for the service when it is being used.

2.3 Energy System and Market Rules considerations

There are currently no regulatory changes impacting this project.

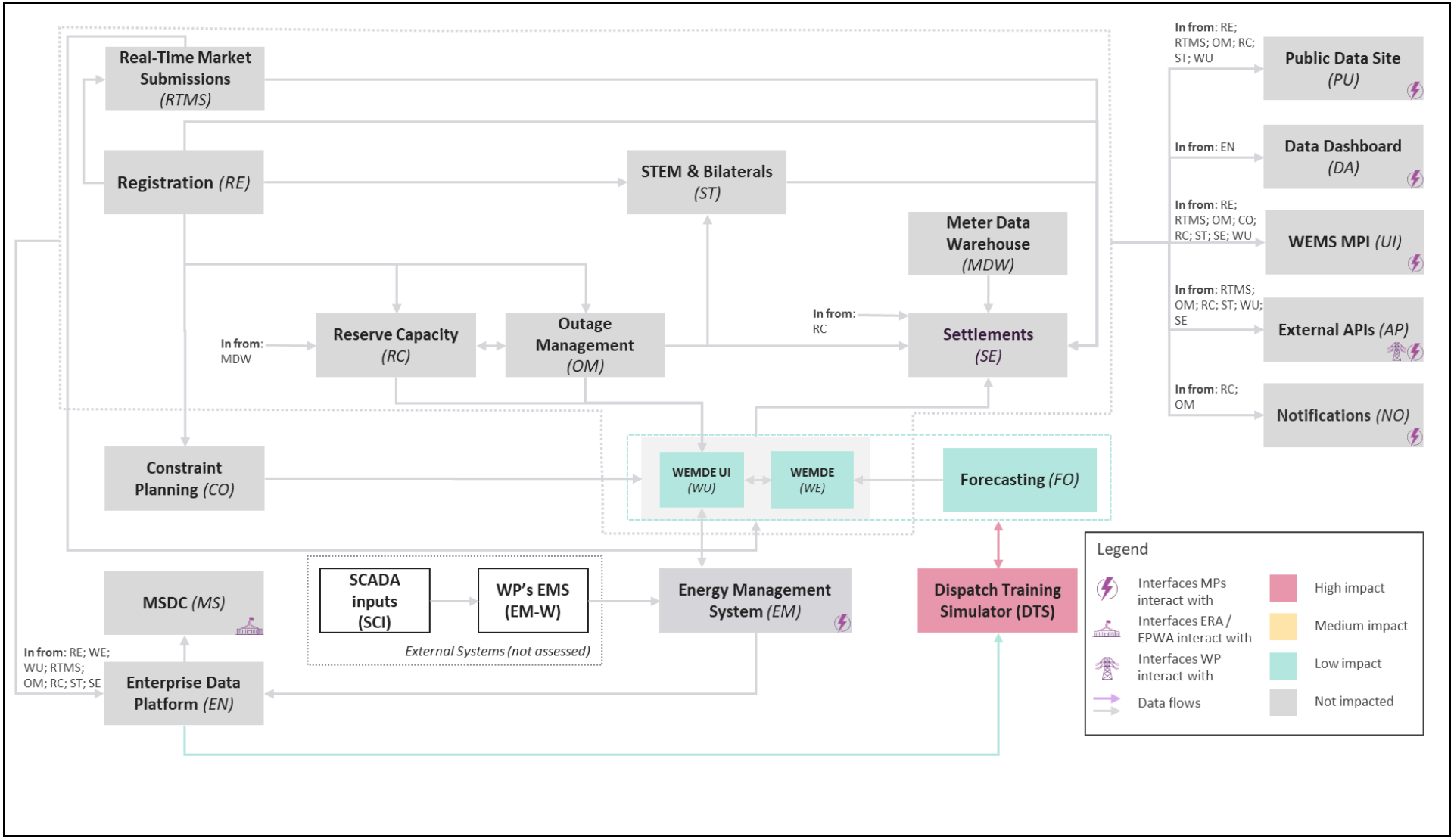
3 System impacts

3.1.1 System impact illustration

Figure 1 on the following page provides a simplified view of the applications and services currently used to support the operation of the SWIS and the WEM. The legend shows the anticipated impact on each system.

For a more detailed explanation on the elements within the diagram, please refer to Appendix A3. In addition to the standard components included in the diagram, a Dispatch Training Simulator box has been added to represent the suite of applications and services that that enable the controllers to simulate market and dispatch outcomes within the WA DTS.

Figure 1 Overview of impacts to AEMO systems



3.1.2 System impact summary

System impacts are summarised in the table below.

Table 2 System impacts

System / Component	Impact rating	Summary of impacts
WEMDE/WEMDE UI	Low	• Ability to configure the system to use the time set in WA DTS rather than system time. This change will only impact the operation of WEMDE/WEMDE UI within the WA DTS environment and will not impact Production. • Required to be deployed to new dedicated DTS environments
Dispatch Training Simulator	High	New components responsible for: • the collection of relevant Market System Data required by WEMDE. • the management and manipulation of input market data • publication of input data required for case file creation. • emulating PI data for the WA DTS environment
Forecasting	Low	• Ability to configure the system to use the time set in WA DTS environment rather than system time. This change will only impact the operation of Forecasting applications and services within the WA DTS environment and will not impact Production. • Required to be deployed to new dedicated WA DTS environments.

4 Impacts on published documentation

We have not identified any impacts on AEMO's published documentation arising from the delivery of this project.

5 External impacts

5.1 Indicative impacts on external stakeholders

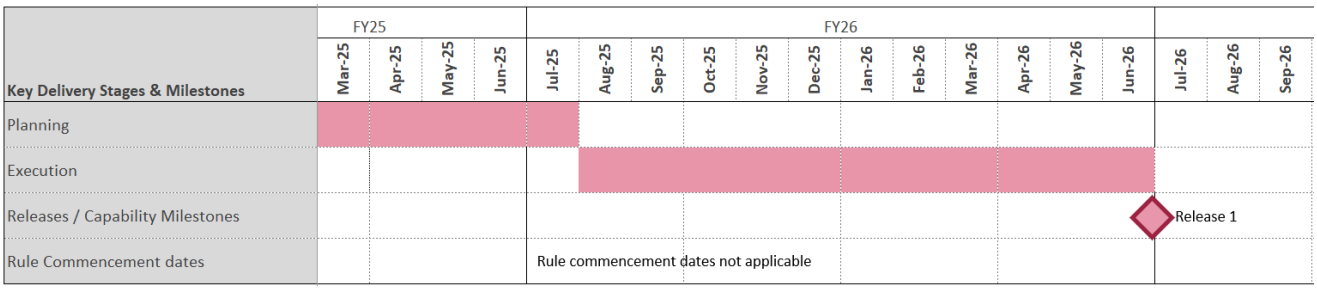
We have not identified any impacts on external stakeholders arising from the integration of the WA market systems with the WA DTS. The DTS and SCED Offline Tools are for use by AEMO only and will not be integrated with market participant facing systems.

6 Implementation

6.1 Indicative implementation timeline

The figure below sets out an indicative implementation pathway for the changes described in this IA to implement this initiative. The initiative intends to deploy a single release, estimated for June 2026.

Figure 2 Indicative delivery timeline



The above timeline reflects resourcing constraints as understood at the time of writing. Actual release date may be affected by the risks identified in section 6.4.

6.2 Market readiness approach

The WA DTS is an internal tool only and will have no impact on external stakeholders or how the market operates. Therefore, no market readiness activities are required.

6.3 Indicative implementation cost – AEMO

The preliminary assessment of the cost over the life of the project to implement this change is $4.0 million (including capex and opex) plus a contingency allowance of around $300k. Some of this budget has already been spent in FY25 and AEMO expects to spend the remainder in FY26.

There will be an uplift in recurrent operating expenditure of $60k per year from FY27 onwards for ongoing storage and back up costs. maintenance, data costs and incremental DTS improvements.

We will report the current approved implementation budget (including contingency) for the project established to implement the changes described in this IA, as part of our reporting on the WEM Implementation Roadmap. As implementation of the changes detailed in this IA has already commenced, we refer the reader to the following project included on the Roadmap: P03106 WEM DTS and SCED Offline Tools.

6.4 Implementation risks

Table 3 summarises the risks associated with implementing the WA DTS.

Table 3 Initial assessment of implementation risks

Identified risk	Current rating	Mitigation strategies	Residual rating
If additional scope is identified during execution, then this may result in additional development affecting project cost and timeline	Medium	Review additions and re-prioritise scope, revising the project deliverables to those that can be delivered within the current budget and/or timeline. If scope cannot be constrained to existing budget/ timeframe, test with Steering Committee on whether budget/timeframe increase is merited.	Low
If there are changes needed to the digital environment because of a change in policy (e.g. cyber or service transition), then this will impact project timelines and cost.	Medium	Review required changes to digital environment and refine project deliverables to those that can be delivered within the current budget and/or timeline. If scope cannot be constrained to existing budget/ timeframe, test with Steering Committee on whether budget/timeframe increase is merited.	Low
If resources allocated to the project are unable to meet their commitments in the allocated time, then this will impact project critical path activities	High	AEMO will continue to identify suitable resources (via internal/external procurement) to undertake work and backfill SMEs where possible, noting that there is an ongoing shortage of resources in the WA labour market. Given the WA labour market constraints, resourcing issues are real, and it is unreasonable to assume the risk can be reduced any lower than Medium over the duration of this project.	Medium

A1. Glossary

This document uses many terms that have meanings defined in the Electricity System and Market Rules (ESM Rules). The ESM Rules meanings are adopted unless otherwise specified.

Note further explanation of the terms used in the system impact illustration is provided in Appendix A3.

Table 4 Glossary of terms and acronyms

Term	Definition
Capex	Capital Expenditure: Funds used by an organization to acquire, upgrade, and maintain depreciable assets such as infrastructure and equipment.
DTS	Dispatch Training Simulator: A specialised software and system environment designed to replicate the operational conditions of a power system and electricity market.
EMS	Energy Management System: A software and hardware platform used by power system operators to monitor, control, and optimise the performance of the electricity grid in real time
IA	Implementation Assessment: a summary of AEMO's proposed or settled approach to implementing an initiative, to explain the changes or the benefit of external stakeholders.
MP	Market Participant: An entity registered to participate in the Wholesale Electricity Market, including generators, retailers, and network operators. (ESM Rules, Clause 2.28)
MPWG	Major Projects Working Group: A consultative forum for engagement with industry stakeholders regarding the work program of AEMO's WA Reform Program - the delivery vehicle for AEMO's WA-focussed projects.
NEM	National Electricity Market: The electricity market covering the eastern and south-eastern states of Australia.
NSF	Non-Scheduled Facility: A facility that is not subject to central dispatch and operates independently within the market. (ESM Rules, Clause 2.29)
Opex	Operating Expenditure: The ongoing cost for running a product, business, or system.
PI	Plant Information: Time series data collected from SCADA, Distributed Control Systems and Programmable Logic Controllers.
RTMS	Real-Time Market Submission: A notice submitted by a Market Participant to AEMO setting out the parameters under which it intends to have a Registered Facility participate in the Real-Time Market. (ESM Rules, Chapter 11)
SCADA	Supervisory Control and Data Acquisition: A system used for monitoring and controlling power system operations in real time. (ESM Rules, Clause 2.36A)
SCED	Security Constrained Economic Dispatch supports secure and reliable power system operation by incorporating consideration of physical power system characteristics (such as network limitations, supply/demand balance, and ESS requirements) into the scheduling and dispatch process. These characteristics are represented in the Dispatch Algorithm by 'Constraint Equations', which must be respected by the software while scheduling and dispatching Facilities.
SWIS	South-West Interconnected System: The interconnected electricity network in the south-west of Western Australia. (ESM Rules, Clause 1.1.2)
WEM	Wholesale Electricity Market: The market for the wholesale sale and purchase of electricity in the SWIS. (ESM Rules, Clause 1.1.2)
WEMDE	WEM Dispatch Engine: The collection of services that are responsible for input data management, the determination of co-optimised dispatch and the provision of dispatch data to downstream applications.
WEMDE UI	WEM Dispatch Engine User Interface: The user interface of WEMDE, predominantly used by the control room to monitor dispatch outcomes and intervene where necessary.

A2. Impact rating guidance

AEMO's approach for rating impacts from No Impact, Low, Medium or High applies a predefined matrix of impact types, summarised in Table (see next page).

Table 5 Impact assessment guidance

Dimension considered	Question	High	Medium	Low	None
Impact on documentation	What is the change to a given internal process, WEM Procedure or technical document that AEMO must maintain and/or publish?	Major changes to documentation. E.g. creating a significant new document (or extensively rewriting existing). E.g. document drafting and review extensively involves multiple AEMO teams.	Moderate changes to an existing document. E.g. addition, elimination or reorder of multiple process steps. E.g. document drafting and review involves multiple AEMO teams to some extent.	Minimal change to an existing document. E.g. addition, elimination or reorder of small number of process steps. E.g. document drafting and review is primarily carried out within a single AEMO team.	No changes to documentation
Systems impact – market applications (internal only)	How extensively will the change affect the underlying market applications?	Involves a major change to, or addition of, a market application. E.g. introduction of a new application or decommissioning of existing system	Moderate change to existing market applications. E.g. introducing many new features or significantly increasing non-functional requirements	Minor change to existing market applications. E.g. adding one or several minor new features. E.g. expanding system functionality with only minor adjustments to the application's data and processing frameworks.	No change market applications
Systems impact – user interfaces (internal and external)	How is the change affecting user interfaces? How easily will the change be integrated by users?	Major changes to user interface(s) e.g. introduction of significant new or decommissioning of existing UI tabs. E.g. manyu users may not understand the UI without training.	Moderate change to existing interfaces. E.g. significantly expanded range of controls within an existing UI tab. E.g. many users will understand the UI relatively quickly on their own, but without training, some many not.	Minor change to existing interfaces. E.g. small addition of controls within an existing UI tab. E.g. almost all users will understand the UI quickly on their own, even in the absence of training.	No change to user interfaces
Systems impact – system to system interfaces (internal-internal and internal-external)	How is the change affecting the interactions between systems? How easily will changes be accommodated by systems up or downstream?	Major systems interface change. E.g. entirely new machine interface, with unfamiliar data schema or transfer formats must be negotiated or understood. E.g. upstream or downstream limitations significantly constrain or complicate the implementation of the core application changes.	Moderate systems interface change. E.g. the change involves significantly expanding the number of parameters or data-streams to be exchanged, but closely follows established patterns, formats and schemas. E.g. upstream or downstream systems require many changes, but these closely follow established patterns, logic or structures.	Minor system interface change. E.g. the change involves adding a small number of parameters or data-streams, adhering to established patterns, formats and schemas. E.g. upstream or downstream systems require several minor changes.	No system to system interface impacts

A3. System impact illustration: Explanatory notes

The appendix provides a description of each box used in the system impact illustration in Figure 1.

Table 6 System descriptions

Systems	Definition
Constraint Planning	The application and services used by AEMO to create and manage the constraint equations and sets used by WEMDE. This box includes the integration responsible for publishing the constraint equation and set data to WEMDE.
Data Dashboard	A webpage on AEMO's corporate website used visualise Market Data (see AEMO | WEM data dashboard).
Energy Management System	The application that provides key functionality relating to SCADA telemetry and data retention, AGC control, network modelling and the dispatch of facilities, while also providing a real time visual representation of the current power system conditions. It provides data to and consumes data from WEMDE and WEMDE UI.
Enterprise Data Platform	A centralised system for managing, storing and retrieving AEMO's data At present, AEMO ingests all market data to the Enterprise Data Platform with a few exceptions. This data is used for internal reporting and provision of the MSDC Requirements List through the MSDC to the ERA and EPWA
External APIs	The suite of APIs used by Market Participants to make submissions to or extract market data from AEMO. This includes functionality relating to Real-Time Market Submissions, Outage Management, Reserve Capacity, STEM & Bllaterals, Settlements and WEMDE UI.
Forecasting	The suite of applications and services responsible for the collection of input data (e.g. from external weather providers, SCADA etc), creation and management of forecasting models and the integration to downstream consumers of forecast data such as WEMDE and WEMDE UI.
Meter Data Warehouse	The application responsible for collecting meter data from the Meter Data Agent and performing calculations to ensure the data is settlement ready. This box also represents the integration from the Meter Data Warehouse to Settlements.
Notifications	The service used by various applications to issue automated email notifications to Market Participants to confirm the status or progress of applications/submissions (e.g. Outage Plan submissions)
Outage Management	The application and services manage Outage Plans and Outage Intention Plans. AEMO also uses this system to manage the Approval / Rejection of the Outage Plans. This box also represents the integration from Outage Management to Reserve Capacity, STEM & Bilaterals and WEMDE UI, but excludes the user interface and APIs that Market Participants use to make or obtain Outage Plan or Outage Intention Plan submissions from AEMO.
Public Data Site	A webpage on AEMO's corporate website used to publish public Market Data as required under the ESM Rules (see AEMO | Market data).
Real-Time Market Submissions	The application and services responsible for the management of Market Participant Real-Time Market Submissions to be used by WEMDE in the co-optimisation of the six Market Services (i.e. energy and five types of FCESS). This box excludes the user interface and APIs that Market Participants use to make or obtain submissions from AEMO.
Registration	The application and services used by Market Participants to maintain their participant and facility level registration information, including standing data. This box also encompasses the APIs and services that facilitate the sharing of registration data to downstream systems but excludes the user interface that Market Participants use to update and obtain their Registration data.
Reserve Capacity	The suite of applications and services responsible for supporting the Reserve Capacity Mechanism including areas such as Certified Reserve Capacity, Capacity Credit Allocations, Individual Reserve Capacity Requirement, Network Access Quantities, and Reserve Capacity Testing. This box also represents the integration from Reserve Capacity to Outage Management and WEMDE UI but excludes the user interface and APIs that Market Participants use to make or obtain Outage Plan or Outage Intention Plan submissions from AEMO.
SCADA Inputs	The collection of systems and infrastructure within the SWIS that enable to provision of SCADA data to WP's EMS **The systems and infrastructure that form SCADA Inputs are not owned or controlled by AEMO.**

Systems	Definition
Settlements	The collection of applications and services that enable AEMO to perform its settlement function as prescribed by the ESM rules. This box excludes the user interface and APIs that market participants use to obtain settlement data.
STEM & Bilaterals	The application and services responsible for the management of Bilateral and STEM submissions from Market Participants and the calculation of the STEM Auction. This box is also responsible for the provision of the STEM Auction results to Settlements but excludes the user interface and APIs that Market Participants use to make or obtain Outage Plan or Outage Intention Plan submissions from AEMO.
WEMDE	The collection of services that are responsible for input data management, the determination of co-optimisation dispatch and the provision of dispatch data to downstream applications.
WEMDE UI	The user interface of WEMDE, predominantly used by the control room to monitor dispatch outcomes and intervene where necessary. This application and associated services are also responsible for the provision of settlement data to Settlements but excludes the APIs that Market Participants use to obtain dispatch related data.
WEMS MPI	The WEM User Interface (i.e the WEMS MPI) used by Market Participants to make submissions to or extract market data from AEMO. This includes functionality relating to Registration, Real-Time Market Submissions, Outage Management, Constraint Planning (AEMO only), Reserve Capacity, STEM & Bilaterals, Settlements and WEMDE UI.
WP's EMS	The Energy Management System used by Western Power and the source of SCADA data for AEMO's systems that support the operation of the SWIS and the WEM. **This system is not owned or controlled by AEMO.**