

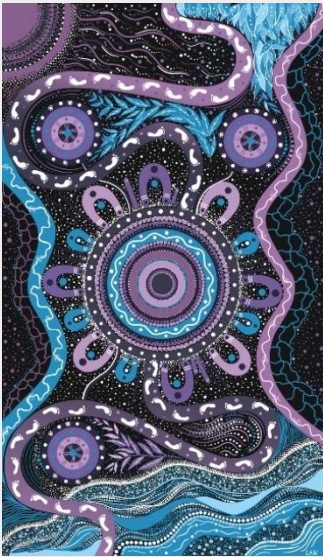
DRAFT Implementation Assessment for WEM & SWIS Power System Modelling

September 2025

Ref: IA-2025#03

Preliminary assessment of the changes, impacts and risks
to establish an inhouse WEM & SWIS Power System
Modelling capability





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 Demand Side Program (DSP) Participation initiative.

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1 At a glance

Problem / challenge	<p>AEMO currently outsources most of its South-West Interconnected System (SWIS) and Wholesale Electricity Market (WEM) modelling which underpin the Wholesale Electricity Market (WEM) Electricity Statement of Opportunities (ESOO) and Gas Statement of Opportunities (GSOO). As the energy transition progresses, more complex and frequent SWIS modelling will be needed to assess power system security and reliability risks explored in the ESOO, GSOO and AEMO's SWIS Engineering Roadmap.</p> <p>Given the need for broader and more frequent modelling, it is proposed to bring modelling in-house and reduce reliance on external consultants. This would allow AEMO to extract more insights and data from the modelling and substantially uplift forecasting and simulation capabilities. It would also allow AEMO to leverage the deep expertise in modelling across the national AEMO business, conduct additional sensitivity analysis, and ad-hoc modelling whenever needed, allow AEMO to share more granular data with market participants and continually improve the quality of the services.</p>
Proposed solution	<p>AEMO will leverage its in-house capabilities in the National Electricity Market (NEM), using the NEM PLEXOS modelling environment and cloud compute services as a basis for WEM / SWIS modelling.</p> <p>WEM subject matter experts will build SWIS and WEM models, leveraging the existing PLEXOS environment. A proof-of-concept assessment has already produced modelling outputs comparable with those currently being provided by the third-party consultants.</p> <p>Leveraging the existing NEM solution will significantly reduce the technology and financial risk. This solution, once modified to work for the WEM, will provide both orchestration and data integration, which will deliver immediate reductions in the marginal cost of studies, as well as establishing a platform for expanding AEMO's modelling capabilities.</p> <p>The first major deliverable is a set of capabilities that allows AEMO to bring the WEM ESOO modelling in-house. The second major deliverable is a set of capabilities that achieves the same outcome for the WA GSOO.</p>
Timing	<ul style="list-style-type: none"> • first modelling capability in place February 2026, to permit inhouse modelling for the 2026 WEM ESOO • second modelling capability to be in place September 2026, to permit inhouse modelling for the 2026 WA GSOO
Estimated cost	<p>\$4.69m in total, of which \$3.04m in FY26. Note: this is higher than the cost previously published in the WEM Implementation Roadmap – see discussion in Section 7.2.</p>
Impact on market participants	<p>No direct impact on market participants.</p> <p>As AEMO's in-house modelling capability matures, more granular and timely modelling data can be shared with participants, including the PLEXOS model and inputs (while ensuring data confidentiality).</p>



2 Introduction

2.1 Background

AEMO currently relies on external consultants to model the future of the SWIS and the WEM. The current SWIS modelling is limited to annual scopes issued to consultants to underpin development of WEM ESOO and the WA GSOO, plus associated ad-hoc modelling.

However, the breadth of modelling required is increasing. As the energy transition progresses, more frequent SWIS modelling will be needed to assess power system security and reliability outcomes, capacity forecasts, WEM outcomes and emerging risks. Given the need to do broader and more frequent modelling, it is proposed to bring modelling in-house and reduce reliance on external consultants.

2.1.1 What needs to be done

AEMO plans to uplift internal SWIS and WEM modelling capability, leveraging existing applications, data sources and solution architecture. The resulting capabilities will allow AEMO first to carry out the modelling required to produce the WEM ESOO and, subsequently the modelling underpinning the GSOO.

2.2 Purpose of the IA

The IA is published to help participants understand what changes are being implemented, how it may affect them, and what they might need to do in response. This IA describes how we propose to:

- Leverage the existing PLEXOS modelling environment for WEM / SWIS purposes
- Build an internal modelling capability

This IA outlines the proposed system, process and operational changes and the indicative timeline likely to be required to implement the changes. It also provides an assessment of what these changes may mean for Rule Participants in the WEM.

2.3 Consultation and feedback

AEMO values participant’s input and invites feedback on the proposed implementation approach, particularly on matters set out in Table 1. Please note the key dates set out in Table 2.

Table 1 Specific feedback sought

Chapter of this IA	Suggested feedback topics
Overview	<ul style="list-style-type: none">• Has AEMO fully considered the problem / challenge / opportunity? Is there anything additional that needs to be factored into the solution?• Do you agree with AEMO’s proposed implementation approach?• Is there precedent elsewhere you recommend we could learn from?
System impacts	No specific feedback topics suggested



Chapter of this IA	Suggested feedback topics
Impacts on published documentation	No specific feedback topics suggested
External impacts	No specific feedback topics suggested
Implementation	Have the key implementation risks been adequately captured? If not, what's missing or incorrect?

Comments should be sent via email to majorprojects@aemo.com.au.

Table 2 Indicative timings for the IA publication/consultation process

Step	Due date
AEMO Draft IA distributed to Major Projects Working Group (MPWG) members	15/09/2025
AEMO provide MPWG with Briefing on Draft IA	19/09/2025
Deadline for MPWG feedback on Draft IA	03/10/2025
AEMO Final IA published	24/10/2025

3 Overview

3.1 Problem / opportunity

AEMO currently has limited internal capability to undertake techno-economic modelling of future market and investment scenarios for the WEM and SWIS. To date, AEMO has relied heavily on external consultancies for techno-economic modelling, which imposes the following problems:

- **Limited scope to interrogate and adapt** – the third-party consultant owns and controls proprietary SWIS power system models, which limits the ability to interrogate assumptions, perform sensitivity analyses or adapt models to changing conditions and risks, such as renewable integration, system strength issues and voltage stability concerns.
- **Impaired ability to engage with stakeholders** – because AEMO does not own the model it limits our ability to socialise the model and data with stakeholders at a more granular level.
- **Insufficient frequency / breadth of modelling** – as the power system and market evolves, AEMO, government and industry will need more frequent and a broader range of studies, for example to plan for transition points and to model the requirements from Electric Storage Resources (ESR). AEMO also expects more ad-hoc modelling to be required. Outsourcing modelling leads to limited control over the content of studies, the pace at which they can be delivered, and additional costs, which have been increasing year on year.

3.2 Response

AEMO proposes to uplift SWIS and WEM modelling capability, bringing as much SWIS and WEM modelling in-house as practicable. To achieve this, a new tool will be developed– called the Power System Modelling Orchestrator (PSMO) – to manage data and scenario workflows, integrating that tool with both:

- AEMO’s existing dispatch modelling software (PLEXOS), to solve each modelling case or run; and
- AEMO’s Enterprise Data Platform (EDP), to source input data.

The solution will be independent of, and have no direct impacts on, the operation of the WEM and the SWIS, since it will source data from the EDP (which sits downstream of all the source applications). The modelling outputs will be used to inform system planning, design and advice, not to guide market or system operations. AEMO plans to deliver this capability uplift in two stages.

- The first stage will provide AEMO the internal capability to model the WEM for the purposes of producing the WEM ES00.
- The second stage will provide AEMO the internal capability to forecast the adequacy of gas supplies in Western Australia’s domestic gas market for the purposes of producing the WA GS00.

3.2.1 Why it makes sense

AEMO's proposed approach to developing an in-house WEM and SWIS power system modelling capability offers a range of advantages and benefits.

- **Cost efficiency** – Preliminary evaluation suggests bringing this modelling capability in-house will be more cost efficient than expanding the range and frequency of studies procured from consultants.¹ We will test this assumption at the end of the planning phase for this project (~late October 2025), prior to seeking approval to commence execution.
- **Proven technology** – The approach to orchestration, the underlying dispatch modelling package and the data integration patterns will be built on an existing solution developed for the NEM – significantly reducing the technology and financial risk. The NEM solution, once modified to work for the WEM, will provide both orchestration and data integration, which will deliver immediate reductions in the marginal cost of studies, as well as establishing a platform for expanding AEMO's modelling capabilities.
- **Scalability** – the data pipelines will be designed to be scalable, allowing additional modelling scenarios and functionality to be integrated into it as AEMO's and market participants' data requirements evolve.²
- **Traceability and reproducibility** – the EDP will make it much easier to trace back and reproduce all assumptions and input data used in any modelling run. This will become increasingly important as the number and diversity of studies grow.
- **Flexibility** – an in-house SWIS / WEM modelling capability will allow AEMO to extract more insights and data from the model and substantially uplift forecasting and simulation capabilities. It would also allow additional sensitivity analysis and ad-hoc modelling whenever needed, with faster turnaround times.
- **Data sharing** – greater control of modelling enables more granular data to be shared with market participants providing a better quality of service.

3.3 Energy System and Market Rules considerations

Not applicable. The changes described here, to uplift our SWIS and WEM modelling capability, are initiated by AEMO to better manage existing obligations while limiting operating costs. They are not driven by specific changes to the Electricity Market and System Rules (ESM Rules), however previous amending rules introducing changes to Capability Class Assessment and the tightening of the Planning Criterion for unserved energy, have increased the scope and complexity of modelling requirements for the WEM ESOO. Outcomes of the WA Domestic Gas enquiry have highlighted uplift for the WA GSOO, for which additional scope (including extending the WA GSOO to a 20-year forecast) will increase modelling requirements for gas powered generation.

¹ Note that AEMO anticipates that overall expenditure on modelling will increase due to the increasing volume of SWIS and WEM modelling required in the future. The point here is that bringing this work in house will keep costs lower than they otherwise would be.

² For example, AEMO's engineers already use DigSILENT PowerFactory to investigate power system phenomena. By integrating with PowerFactory, later updates to the PMSO would allow AEMO to complement the dispatch modelling with detailed network analysis; system strength assessments; voltage stability studies and technical validation of dispatch outcomes. These kinds of engineering-level insights into grid behaviour will be increasingly important for managing the energy transition.



4 System impacts

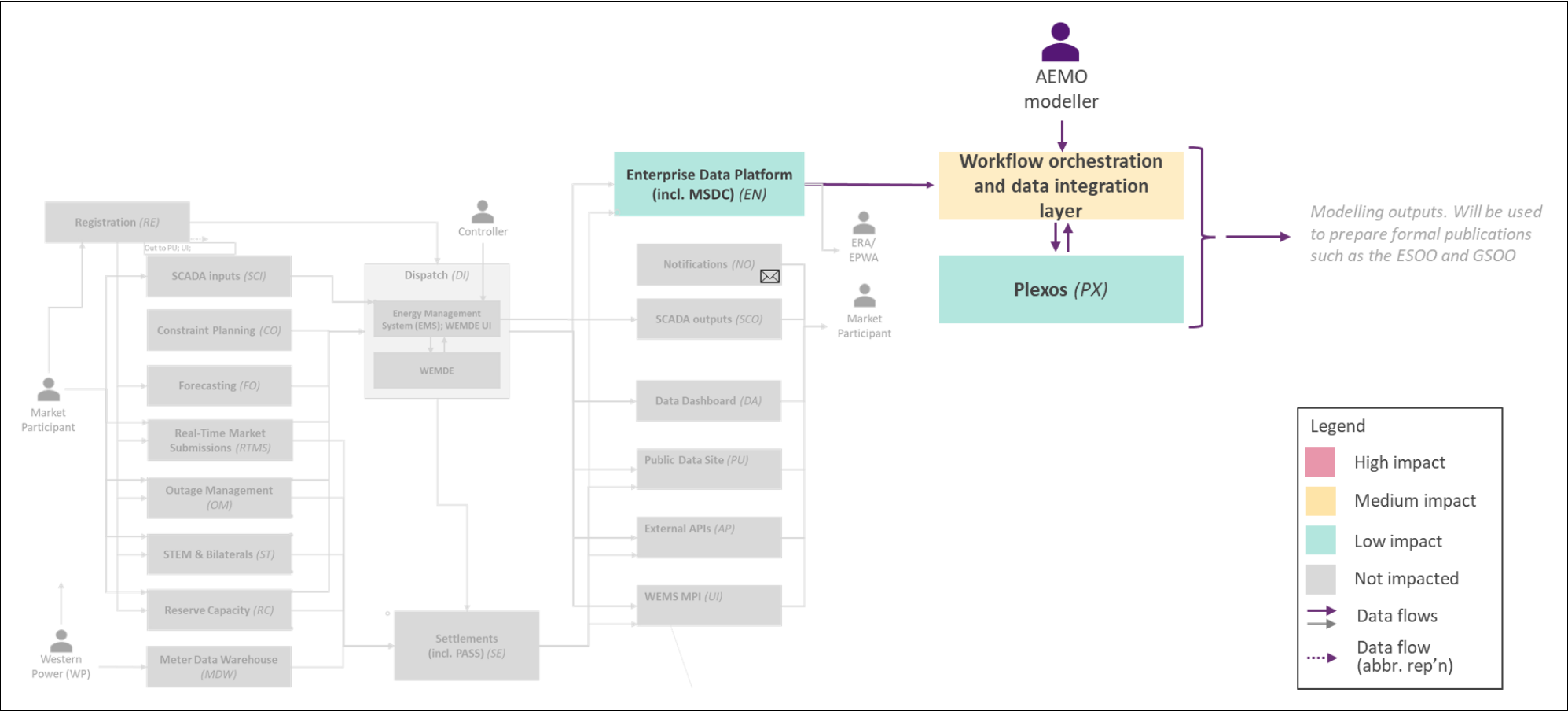
4.1 System changes

4.1.1 System Impact Illustration

The high-level system impacts are illustrated in Figure 1, over page. The left-hand side of the diagram shows low resolution image of the standard application architecture diagram used in IAs. Of all the applications normally represented, only the EDP is affected by plans to uplift our SWIS and WEM modelling capability.

Note that PLEXOS isn't normally represented in the application architecture diagrams we use for IAs. This reflects the fact that PLEXOS doesn't sit upstream of any applications used to actually operate the WEM and PLEXOS modelling outputs are not currently exposed for external systems to directly consume. This should further reassure external stakeholders that the changes proposed will not directly impact their processes or systems.

Figure 1 Overview of impacts to AEMO systems





4.1.2 System Impact Summary

System impacts are summarised in the table below.

Table 3 System impacts

System / Component	Impact rating	Summary of impacts
Enterprise Data Platform (EDP), incorporating the Market Surveillance Data Catalogue (MSDC)	Low	<ul style="list-style-type: none">Establish integrations to provide relevant market and system data to the downstream modelling elements –PLEXOS.
PLEXOS modelling software	Low	<ul style="list-style-type: none">New input and control integrations with PLEXOS will leave existing PLEXOS functionality unchanged, but greatly improve AEMO’s ability to efficiently exploit the software’s capabilities.



5 Impacts on published documentation

Not applicable. The changes described in this IA will require no new published documentation and no changes to existing published documentation.



6 External impacts

This section sets out AEMO’s assessment of the specific impacts on Market Participants, Western Power, Energy Policy WA and the ERA.

Note: AEMO cannot predict the exact scale or nature of responses required for each external stakeholder. Therefore, this IA does not identify what specific changes stakeholders may need to make. We recommend each stakeholder performs its own assessment based on the information in this IA and any additional information provided in advance of each release.

6.1 Indicative impacts on external stakeholders

AEMO has not identified any impacts on external stakeholders arising from the changes to uplift our SWIS and WEM modelling capability. These changes will not expose any outputs for consumption by external systems. The inhouse modelling system is intended to consume data already available to AEMO. If additional information is required from Market Participants for future modelling activities, AEMO will define the process to request and obtain the data at the required time.

7 Implementation

This section provides a high-level summary of the timeline and cost to implement the initiative and sets out the main implementation risks.

7.1 Indicative implementation timeline

The figure below sets out an indicative implementation pathway to uplift AEMO’s SWIS and WEM modelling capability.

- The estimated date for Release 1 is around end of February 2026. This release will establish AEMO’s internal capability to model the WEM for the purposes of producing the WA ES00.
- The estimated date for Release 2 is around end of September 2026. This release will establish AEMO’s internal capability to forecast the adequacy of gas supplies in Western Australia’s domestic gas market for the purposes of producing the WA GSOO.

Figure 2 Indicative delivery timeline

Key Delivery Stages & Milestones	Jun-25	FY26											FY27												
		Jul-25	Aug-25	Sep-25	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27			
Planning		█																							
Execution						█																			
Releases / Capability Milestones																									
Rule Commencement dates		None applicable - modelling capability used to meet existing obligations																							

The above timeline reflects AEMO’s resourcing constraints as understood at the time of writing. Actual release dates may be affected by resource contention and the ongoing prioritisation of initiatives.

7.2 Indicative implementation cost – AEMO

The preliminary assessment of the cost to implement this change is \$4.69m (including capex and opex, excluding contingency) over the life of the project. Of this, AEMO expects to spend \$3.04m in FY26. AEMO notes that this cost forecast is higher than the estimates included against this initiative in the [WEM Implementation Roadmap](#) in July 2025. This reflects the fact that the modelling approach approved by the Steering Committee in July 2025 (after the current Roadmap figures were finalised) had changed significantly from the original approach (involving a standalone WEM-specific solution). The approved approach was adopted over the earlier iteration as it is expected to lead to lower lifecycle costs for reasons including:

- significantly reduced technology and implementation risk;
- improved supportability due to enterprise-wide consistency; and
- increased efficiency and flexibility benefits due to better alignment with AEMO’s EDP.

AEMO will update the WEM Implementation Roadmap with the approved budget for this initiative at its next refresh, currently scheduled for November 2025 and future approved budget changes for this project will also be updated in subsequent refreshes of the Roadmap. As implementation of the changes detailed in this IA has already commenced, the reader is referred to the following project included on the Roadmap: P03112 WEM Market and SWIS PS Modelling.

7.3 Implementation Risks

Risks identified by through this IA arising from the changes associated with uplifting our SWIS and WEM modelling capability are outlined in the following table.

Table 4 Initial assessment of implementation risks

Identified risk	Current rating	Mitigation strategies	Residual rating
<p>Delay in achieving capabilities Unanticipated challenges prevent AEMO delivering the capabilities in time to undertake modelling to support either the ESOO or the GSOO.</p>	Medium	<ul style="list-style-type: none"> Fall back on the current model of using external provider to deliver the modelling 	Low

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.

Table 5 Glossary of terms and acronyms used in this IA

Term	Definition
AEMO	Australian Energy Market Operator: The entity responsible for operating the Wholesale Electricity Market and managing power system security in the SWIS. (ESM Rules, Clause 2.1A)
EDP	Enterprise Data Platform: A centralised system for managing, storing and retrieving AEMO's data.
ESM Rules	Electricity System and Market Rules. The WEM and the SWIS are governed by the Electricity System and Market Rules. See https://www.wa.gov.au/government/document-collections/electricity-system-and-market-rules
ESR	Electricity Storage Resources: A flexible energy asset that receives electricity from the grid or localised generation and stores that electricity using technologies such as batteries, flywheels, compressed air or pumped hydro. The electricity can then be dispatched back into the grid as required. The majority of ESR are batteries
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.
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.
MSDC	Market Surveillance Data Catalogue: A catalogue of data used for monitoring and analysing market performance and compliance. (ESM Rules, Clause 10.6)
NEM	National Electricity Market: The electricity market covering the eastern and south-eastern states of Australia.
Orchestration	The automated coordination and management of complex workflows and data.
PLEXOS	A commercial dispatch modelling software product used by AEMO for energy market simulation and forecasting.
SWIS	South-West Interconnected System: The interconnected electricity network in the south-west of Western Australia. (ESM Rules, Clause 1.1.2)
Techno-economic modelling	Modelling that combines technical engineering analysis with economic evaluation.
WA GSOO	The WA Gas Statement of Opportunities is AEMO's annual report forecasting gas supply and demand for Western Australia.
WEM	Wholesale Electricity Market: The market for the wholesale sale and purchase of electricity in the SWIS. (ESM Rules, Clause 1.1.2)
WEM ESOO	The WEM Electricity Statement of Opportunities is an annual publication that provides forecasts for the WEM over the 10-year outlook period. See https://www.aemo.com.au/energy-systems/electricity/wholesale-electricity-market-wem/wem-forecasting-and-planning/wem-electricity-statement-of-opportunities-wem-esoo



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 the table below (see next page).

Table 6 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. many 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