



Wholesale Demand Response

April 2021
V 1.0

Final Industry Testing Strategy

Important notice

PURPOSE

The AEMO Industry Testing Strategy sets out the high-level approach and principles associated with the IT system testing activities that will support the Wholesale Demand Response implementation.

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VERSION CONTROL

Version	Release date	Changes
0.1	25/2/2021	Initial draft issued for discussion with WDR Consultative Group
1.0	01/4/2021	Final strategy published incorporating feedback from participants

Executive summary

The AEMC made a final rule and determination to facilitate Wholesale Demand Response (WDR) in the National Electricity Market (NEM), through implementing a Wholesale Demand Response Mechanism.¹

The key objectives of the WDR implementation are to deliver:

- The new participant category of DRSP (Demand Response Service Provider) which is a registered participant that engages one or more end users to provide Wholesale Demand Response into the National Electricity Market (NEM).
- Wholesale demand-responsive capability classified into the NEM.
- Wholesale Demand Response participation in dispatch through standard bidding and dispatch processes.
- Wholesale Demand Response telemetry and metering requirements for system operations and visibility.
- Wholesale Demand Response visible to market participants and AEMO.
- Simple baseline methodology, with a level of parameterisation, for the start of the WDR mechanism.
- Wholesale Demand Response included in market recovery and compensation mechanisms (for example, ancillary services) where cost-effective and logical to do so.
- Accommodation of Wholesale Demand Response within short-term and pre-dispatch forecasting processes.
- Performance assessment and compliance based on the available data.

AEMO has a key coordination role, through collaboration with its industry consultative groups, to ready industry and itself for the WDR commencement date (24 October 2021).

A key component of market readiness is the industry testing phase – the period where AEMO and NEM participants test their market-interfacing business systems against updated procedures and AEMO's upgraded market systems. It should be noted that although industry testing forms a key component of market readiness and its outcome will help assess the readiness for go live, it will not dictate AEMO's go/no go decision for WDR implementation within AEMO.

At a high level, the Industry Testing Strategy defines the scope, approach, process, responsibilities, and high-level schedule of the industry testing phase for the WDR implementation. It will be supported by a detailed testing plan.

The industry testing phase of WDR has been planned to exercise new functionality and changes introduced by WDR and will provide the opportunity for:

- Intending DRSPs to go through the registration process, exercise the portfolio management capability, test the dispatch and settlement functions, and receive reports.
- Retailers to validate NMI Discovery and test the new reports.
- Distribution Network Service Providers (DNSPs) to receive and validate data for NMIs with the newly created participant role as well as receive reports.

Data model changes implemented as part of WDR may also be validated by participants during industry testing. If the situation arises where applicants/participants are not ready to participate in industry testing during the assigned four-week window, AEMO will carry out testing by registering mock DRSPs to exercise and validate the changes introduced by the WDR implementation.

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1. Introduction

This chapter sets out the purpose, scope, and approach to the development of this Industry Testing Strategy.

1.1 Purpose

The purpose of the Industry Testing Strategy is to set out an approach for managing, coordinating, monitoring, and reporting on AEMO's and NEM participants' industry testing activities and results.

It is a high-level document that describes the testing approach that applies to the WDR implementation industry testing phase. This strategy will be supported by an individual test plan containing specific details about each of the planned industry testing phases.

1.2 Reference documents

The following WDR related documents or web pages are relevant to the industry testing.

Table 1 Reference documents

#	Document name
1	AEMC Final Rule: https://www.aemc.gov.au/rule-changes/wholesale-demand-response-mechanism
2	AEMO WDR High Level Design: https://aemo.com.au/initiatives/submissions/wholesale-demand-response-mechanism-high-level-design

1.3 Related documents

The Industry Test Strategy is a high-level document that defines the approach and scope of WDR Industry Testing. This is further supported by the Industry Test Plan document which will provide details on the implementation and execution of the test levels defined in this Industry Test Strategy document.

1.4 Audience

This Industry Testing Strategy is primarily intended for all NEM participants affected by WDR implementation particularly their:

- Test managers, test leads, test analysts
- Project managers
- Developers and business and functional SMEs.

Secondary audiences within these businesses including:

- Development managers
- IT operations teams
- Change controllers
- Operations teams

2. Industry Testing Framework

This chapter describes the framework that underpins the WDR Industry Testing Strategy. It explains the strategy's objective, scope, and underlying principles. It also defines 'industry testing' for the purposes of the WDR implementation.

2.1 Defining "industry testing"

Throughout this document, "industry testing" refers to the testing performed between NEM participants and AEMO to validate whether the updates made to NEM participants' market interfacing systems and AEMO's market systems comply with the WDR procedural arrangements. Industry testing is conducted in pre-production as a final stage before deployment to production.

Generally, AEMO conducts three different types of industry testing with the industry as explained in Table 2. This is in addition to the pre-production system being available for participants to perform self or bi-lateral testing at any time from when the changes are deployed.

Table 2 Industry testing types

Type of industry testing	Description	WDR example
Industry testing	Self-testing of functionality such as connectivity, and/or coordinated multi-party testing of functional scenarios	B2B accreditation and transactions (MDN, PMD, VMD)
Invitation industry testing	Coordinated testing of business process scenarios with a select number or subset of participants with systems ready for testing.	Testing DRSP Registration Process, Settlements reconciliation process for DRSPs and FRMPs
Market trials	Coordinated multi-party end-to-end testing of business process scenarios	N/A

2.2 Industry testing objectives

Industry testing provides market participants the opportunity and tools to test their updated systems and processes against AEMO's updated electricity retail and wholesale market procedures and systems.

In relation to WDR implementation, the objectives of industry testing are:

- To validate whether the updates made to participants' market interfacing systems and AEMO's market systems comply with the relevant WDR rule and procedural arrangements
- To ensure WDR end-to-end processes implemented by AEMO meet requirements
- To ensure that there are no defects introduced from WDR changes (via regression testing).

2.3 Industry testing scope

Industry testing will consist of system integration testing between NEM participants' systems and AEMO's systems, to test the system changes required to implement WDR. Where required for a test phase, test plans will detail the scope inclusions and exclusions for that phase (see chapter 5).

The Industry Testing Strategy and associated testing plans relate to the various WDR commencements and market system changes as described below.

Relevant WDR commencements are:

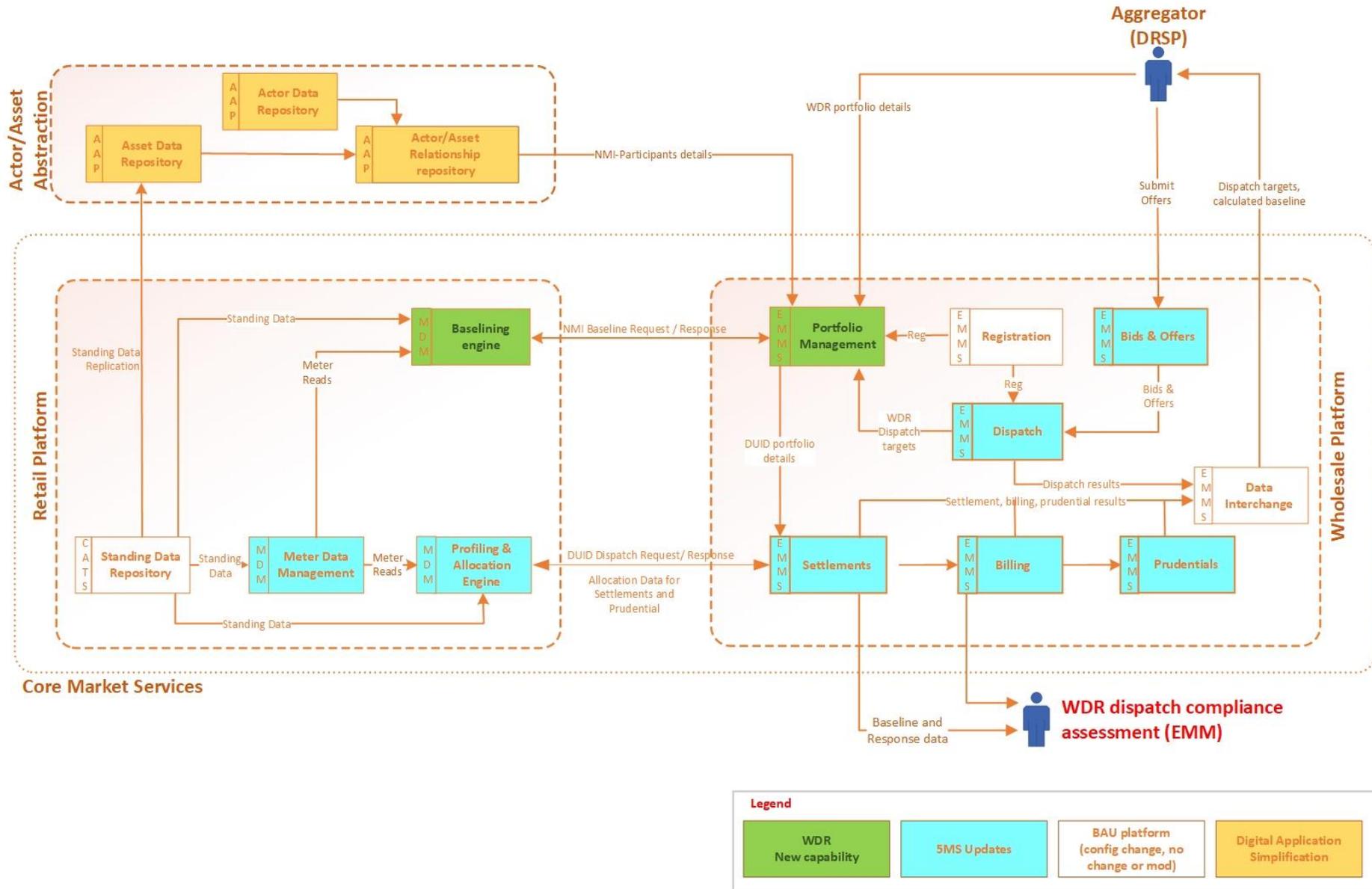
- June 2021 – AEMO Internal Release (for AEMO users only) – Applications for new DRSP Registrations can be submitted to AEMO
- 24 October 2021 – WDR commencement. DRSPs may bid demand response into the NEM and will be settled for dispatched wholesale demand response. New Portfolio Management System available to DRSPs to classify WDR units and manage their portfolios.

AEMO, as the market operator, needs to make the following market system changes to implement WDR:

Table 3 WDR market system changes

Domain	System	Change
Retail	MSATS – B2M	Create the DRSP role in retail systems
	MSATS – B2B	Enable B2B accreditation for DRSPs
Wholesale	Registrations	Enable participants to register as a DRSP and perform classification and aggregation for NMLs.
	EMMS: Settlements	Enable WDRU energy to be settled, billed, and invoiced. Generate reconciliation reports.
	EMMS: Bidding and Dispatch	Enable WDRU energy to be dispatched and forecasted. Changes are required to bid submissions, dispatch, pre-dispatch, MT PASA, ST PASA and operational forecasting
New	Portfolio Management system	Enable participants to classify and manage their WDR portfolios (including aggregations).
	Baselining	Enable PoL (predictability of load) and baseline calculations of NMLs for DRSPs. Generate Baseline calculation reports.

Figure 1 WDR architecture



2.3.1 Portfolio Management System

As part of the WDR implementation, AEMO will introduce the new Portfolio Management System for participants to create and manage their portfolios for WDR. Participants will use the Portfolio Management system to:

- View their portfolio of WDRUs
- Submit new application requests for AEMO's approval such as:
 - Classify new NMIs
 - Declassify existing NMIs
 - Aggregate
 - Disaggregate
 - Update baseline methodologies and parameters
 - Request to reinstate a NMI following suspension due to non-compliance.
 - Continue application(s) from draft
 - View the status of submitted requests
 - Request to withdraw submitted requests
 - Self-assess baselines associated to a NMI or by a Portfolio
 - Identify their NMI as unavailable due to operational issues.

To the extent possible, portfolio management system testing will be included in industry testing, noting that AEMO needs to ensure access to confidential data is appropriately managed during the industry testing period.

2.3.2 Scope inclusions

- Market capability based technical, functional, and business operational testing as follows:
 - Market technical verification and validation: Determines the technical state of the solution e.g. schema validations, connectivity and provided interfaces.
 - Market functional verification and validation: Determines the state of solution as matched against required business functionality and business processes. The solution may not mirror production from a complete "go-live" perspective e.g. performed on low volumes of data and accelerated timeframes.
 - Market operational capability verification and validation: Determines the state of the solution from a "go-live" perspective and verifies technical, functional, and operational compliance to obligations. Mirrors as close as possible the "go-live" state of the solution from the perspective of data, timing etc. Covers key business processes essential to the operation of Wholesale Demand Response.
- B2B Accreditation and Registration

2.3.3 Scope exclusions

- Changes to NEM participants' supporting business systems that do not directly interact with AEMO's market systems (i.e. back-end systems). These are addressed by participants own test strategies.
- Any bilateral testing between participants (including B2B transactions). Participants can coordinate bilateral testing between themselves in parallel with industry testing, however any reporting during industry testing will not refer to bilateral testing.
- Downstream business procedures for each industry participant.

- Non-functional testing – this is to be covered within AEMO’s internal test cycles for WDR.

2.4 Industry testing principles

Industry testing of multiple-party interactions requires cooperation between participants to be successful. The following key principles should guide all parties involved in industry testing:

1. Appropriate choice of testing types: For WDR, the recommended test types are industry testing and industry testing by invitation.
2. A detailed test plan will be developed by AEMO in consultation with the WDR CG (or specific working group) to support WDR testing activities, with the level of detail and involvement consistent with type of industry testing being conducted.
3. AEMO will provide timely and suitable test environments: AEMO will facilitate participants testing their updated systems and processes against AEMO’s WDR solution.
4. Adherence to the Industry Testing Strategy and associated tests plans: All parties participating in industry testing must use their best endeavours to adhere to the Industry Testing Strategy and test plan– including meeting key dates, fulfilling entry criteria checklist, adhering to defect management guidelines and reporting guidelines.
5. Appropriately skilled resource capability: All parties participating in industry testing must be appropriately resourced for the test planning and test execution effort.
6. Scope limited to critical business processes: Any coordinated testing that requires interactions between multiple parties will be limited to critical business processes, unless otherwise agreed by the impacted parties.
7. Release notes will be provided for each participant facing system detailing functionality and defects fixes applicable to the release.
8. Test Data Participant Test Data sets will need to be prepared and aligned to AEMO’s Pre-Production environment

3. Industry Testing Strategy

This chapter sets out the Industry Testing Strategy, comprising:

- the approach to industry testing
- high-level test activities and timing
- assumptions underpinning the strategy

3.1 Industry Testing Strategy approach

The following matters were considered in formalising the approach for WDR industry testing:

- The ability to meet WDR testing objectives.
- Affected participant types:
 - DRSPs that choose to participate (either from the commencement date or a later time)
 - Retailers (FRMPs) that are required to fund WDR at their NMI, noting that WDR only applies to large electricity customers
 - Distributors (DNSPs)
- Necessary testing scope/coverage
- Regulatory and project timeframes (see Figure 2)
- Proximity of 5MS/GS and “customer switching” implementations noting that WDR implementation has been consciously planned to dovetail with 5MS implementation where feasible
- Resourcing (internal and external).
- Entry criteria
 - As preprod is a working environment, industry testing will be executed with DRSPs who are registered, or in in the process of registering as a DRSP, to classify WDRU. Applicants are provided access to preprod as part of the BAU pre-registration onboarding process.
 - If the above condition is not met, the alternative is for AEMO to set up a dummy participant to interact with the FRMPs during testing
 - Dummy NMIs may need to be set up and used to avoid the risk of compromising the confidentiality of large NMIs

The Table 4 summarises the test approach and Table 5 shows the test scope by participant type. Figure 2 sets out the indicative test timeline.

Table 4 Test approach

Element	Description
Industry testing timing	Monday 6 September 2021 to Friday, 1 October 2021 (ahead of 24 October go-live)
Eligibility	<p>Participants can take part in industry testing:</p> <ul style="list-style-type: none"> • If they have been registered as a DRSP, or are in the process of registering as a DRSP, to classify WDRU • Completed the required level of B2B accreditation as part of the Registration process if they need to access B2B transactions • Once their systems are ready and connected to AEMO's pre-production environment.
Environment	AEMO pre-production
Testing types	Invitation industry testing and industry testing
Test cases	<p>Participants will be supplied with documentation which will enable them to create their own test cases.</p> <p>Guidance can be provided by the AEMO test team.</p>
Test and defect management tool	PractiTest: Participants will be given the required level of access to this tool which has a web interface.
Non-functional testing	Non-functional testing (e.g. performance, security) will be done by AEMO before industry testing starts

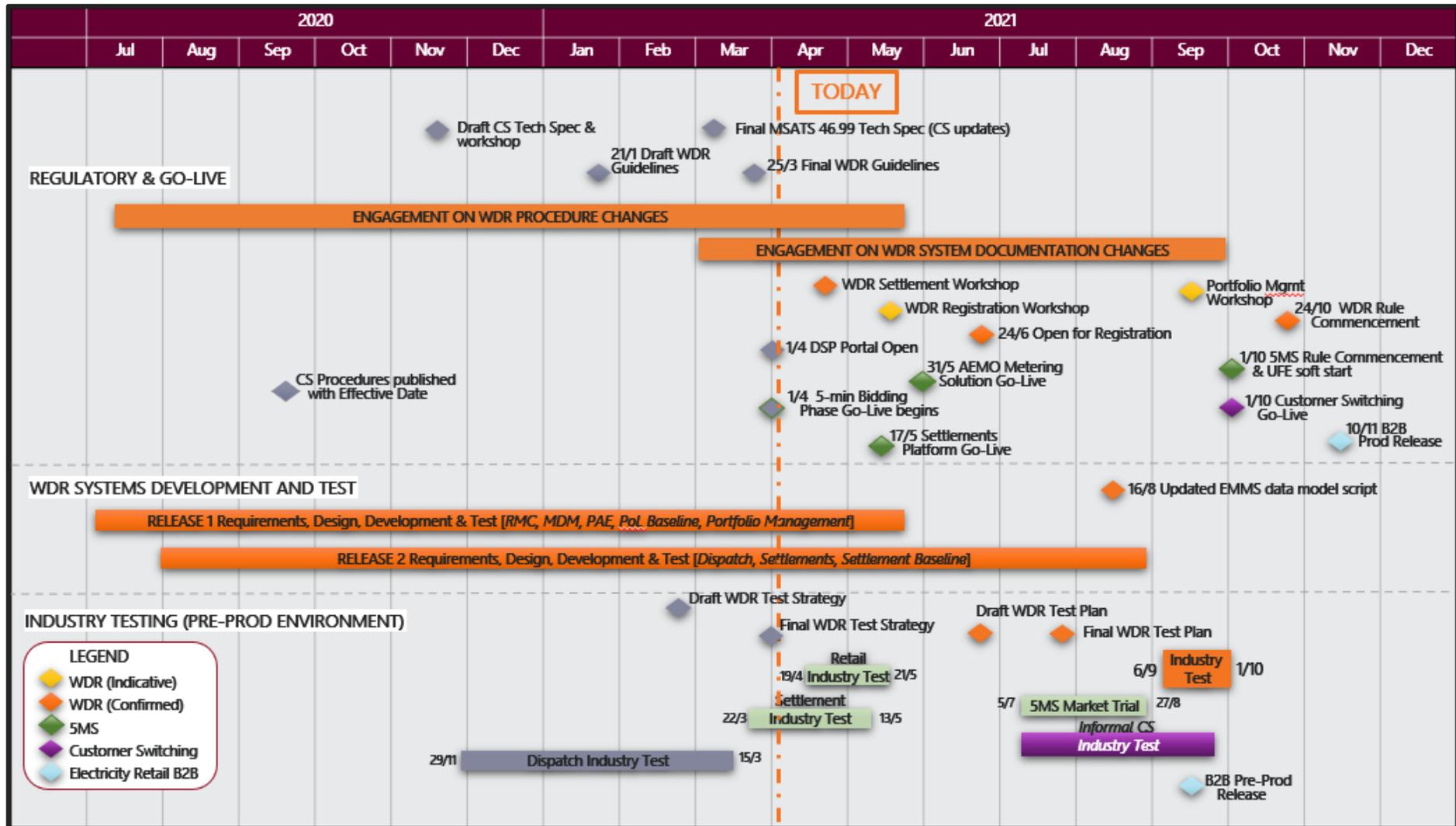
3.2 Test scope

Table 5 Scope by participant type

Participant type	Test coverage
Demand Response Service Provider – new!	<p>Functional test scenarios:</p> <ul style="list-style-type: none"> • Registration • Classification/Aggregation • Standing Data Updates (via CR5100/5101) • De-registration • Trigger Baseline methodology calculations (and receive the Baseline accuracy and bias scores) for eligibility • Exercise Portfolio Management functionality/features • Bidding • Dispatch • Settlements • Initiate B2B Transactions (MDNs, PMD, VMD) via AEMO's B2B eHub (Note that MDPs will not be required for this testing) • Full end to end process (registration, bidding, dispatch, settlement, reporting) via invitation industry testing <p>Receive reports Receive invoices</p>

Participant type	Test coverage
Retailers	Send/receive reports NMI Discovery
Distribution Network Service Providers	Receive and process standing data updates with new participant category (DRSP) Receive reports

Figure 2 Indicative WDR industry test timeline (current as of April 2021)



3.3 Assumptions

The key assumptions underpinning the WDR Industry Testing Strategy are:

- AEMO will provide and maintain the single Pre-Production environment which will be used for all WDR industry testing activities.
- WDR code will be merged with the 5MS code for Settlements, Dispatch, Bidding, and some common components of the Retail system. As such the merged code will be deployed in AEMO's pre-prod environment where WDR industry testing may run in parallel with the 5MS market trials between July 2021 through to September 2021. WDR Industry testing may be impacted if the 5MS Trials are extended. This is a risk and has been noted in the Risk Register.
- As preprod is a working environment, industry testing will be executed with DRSPs who are registered, or in the process of registering as a DRSP, to classify WDRU. Applicants will be provided access to preprod as part of the BAU pre-registration onboarding process. If this condition is not met, the alternative is for AEMO to set up a dummy participant to interact with the FRMPs during testing
- Dummy NMIs may need to be set up and to avoid the risk of compromising the confidentiality of large NMIs
- Any change that is linked to or deployed to support a procedural or technical specification change will ensure the procedure(s) or technical specification(s) are documented and approved prior to the commencement of industry testing.
- AEMO will perform all internal functional testing prior to the release of any changes into pre-production.
- AEMO will perform internal non-functional testing prior to the release of any changes into pre-production for all WDR changes.
- Participants intending to participate in the trial will need to be in the process of registering as a DRSP (or have completed) and classifying WDRU to participate in industry testing, as will be detailed in the test plan.
- Existing MASPs who intend on becoming DRSPs will need to classify the WDRU through the PMS
- Participants who intend on using the B2B hub will apply for accreditation to do so as part of the registration process.
- Participants intending to become DRSPs after the industry testing phase has been completed will follow the BAU process for registrations.
- Participants will perform internal testing prior to connecting to the AEMO pre-production environment.
- Participants will have appropriately skilled resource capability for execution and support requirements during industry testing.
- Participants will ensure that the appropriate access to AEMO's pre-production environment is in place to support their industry testing requirements.
- Participants will ensure that defined test data is prepared and available within their test environments for industry testing and that this data is appropriately baselined and backed up.
- All participants engaging in invitation industry testing will use PractiTest as the central test management tool to:
 - execute test cases
 - undertake defect management
 - produce dashboard reporting.
- AEMO will support participants with resolution of connectivity issues within the Pre-Production environment.

3.4 Dependencies

To be able to participate in industry testing by invitation, prospective DRSPs must:

- Have applied to register as a DRSP and classify one or more loads as a WDR unit prior to the commencement of Industry Testing. This allows AEMO to establish the applicant in and provide access to the requisite preproduction systems.
- Have completed the B2B accreditation process if they are interested in testing B2B transactions.
- Data model changes implemented as part of WDR may also be validated by participants during industry testing. If the situation arises where applicants/participants are not ready to participate in industry testing during the assigned four-week window, AEMO will carry out testing by registering mock DRSPs to exercise and validate the changes introduced by the WDR implementation.

4. Strategy implementation: Industry Testing Management

4.1 Test management tool

PractiTest will be used to manage the industry testing, including test scenarios, test script development, test execution, test results, the tracking of test defects during all cycles and dashboard reporting.

PractiTest will be configured by AEMO with all required information and will be monitored and supported by AEMO. AEMO will provide one free dedicated licence to each organisation. If any organisation requires additional licences, AEMO will purchase on the organisations' behalf at a cost charged back to the organisation.

This tool is available over the internet and the link will be provided closer to the test commencement date and AEMO will provide training to any participant on request.

4.2 Participant test registration

Each participant will need to register with AEMO as a DRSP after the 24th of June (AEMO's internal go live) and a month prior to the commencement of Industry Testing.

Registration requirements and instructions will be included in the Test Plans. Participants will need to be in the process of registering as a DRSP.

All test registration requests will come through to the on-boarding team via email. The process will start in the PMS but there will be activities done in EMMS. The applicant is entered into in EMMS - preproduction and their portfolio created in PMS. Those participants requiring access to the B2B eHub will need to complete the accreditation process via the AEMO portal as part of the registration process.

4.2.1 Participant ID and roles

The term 'Participant' is used to indicate a unique role that a given business is to adopt for the purpose of testing. For example, where a participating business fulfils the role of LNSP and MDP, these roles are classed as different participants for testing purposes.

- If an organisation has more than one role (i.e. has more than one 'Participant ID', then it may need to separately carry out testing for each role (as each participant role has different B2B and B2M transactions).
- If an organisation has more than one Participant ID but they are all for the same role, then as long as the participant is using the same set of systems for each ID, the participant would only need to perform testing one for those IDs.
- Participants will detail which participant roles and ID they will be testing under as part of their Test Registration.

4.3 Communication and status reporting

Commencement of status reporting will be aligned with the test execution for invitation industry testing. Commencement of weekly/daily status meetings will align with test execution periods for all test phases.

Table 6 describes how the progress of industry testing will be monitored and reported. Communications and status reporting will involve both AEMO and participants.

Table 6 **Communication and status reporting**

Frequency	Type	Responsible
1. Continuous	Updates in PractiTest for status of test cases and defects	AEMO and Participants
2. Weekly	Status reports & Traffic light reports readiness reports. Test status meetings (AEMO and Participants)	AEMO
3. Milestone based	Milestone reports, Test Completion Reports	AEMO

5. Strategy implementation: market test planning and preparation

The strategy sets out the approach and high-level timing for WDR industry testing. To operationalise the strategy, a detailed test plan will be developed by AEMO in consultation with participants to set out the details associated with the industry testing activities.

5.1 Test plan

The Test Plan will include:

- Test objectives
- Detailed scope of testing
- Pre-requisite activities
- Entry and exit criteria
- Test cycle approach and dates
- Data management
- Defect management
- Test reporting requirements.

As defined in the high-level timeline a draft Test Plan will be released to the participants for feedback towards the end of June 2021 and the final version will be published end of July.

5.2 Test data

5.2.1 Data requirements

Data requirements will be developed during the test planning stage, and the approach to data management will be detailed in the Test Plan document.

At a high-level:

- Data requirements will be identified for each test scenario as part of the test scenario development. These data requirements will be detailed in the Test Plan.
- Participants will be responsible for identifying data from their systems that fulfils those data requirements. It is suggested that participants select a range of NMI's for each test case.
- Participants will then align their scenario data with AEMO's pre-production data.

Multiple test data sets should be identified for each test scenario to allow for multiple executions of that test scenario in case of defects or problems in execution. Data identified will be mapped against every scenario in the Description field in PractiTest.

Participants are responsible for ensuring that any required data is available within their test environments for industry testing and market trials test execution.

5.2.2 Data refresh

AEMO may undertake a data refresh activity prior to the application deployment into pre-production for industry testing. The details of which will be included in the Test Plan. Given the scope of industry testing, the current expectation is that more data refreshes will not be required. Participants are encouraged to align their pre-production data with AEMO where possible and practical.

5.3 Industry test environment: AEMO's pre-production

AEMO will prepare and maintain the single pre-production environment prior to the commencement of industry testing. All participants with valid participant IDs will have access to the pre-production environment for industry testing. AEMO will back-up and refresh the data and support the pre-production environment. For avoidance of doubt, the 5MS staging environment will not be used for any WDR industry testing.

All participant test environments will be maintained and managed by the respective participants. Figure 1 shows the architecture diagram of the WDR Industry testing environment.

5.3.1 Test support

Test support for WDR during the test execution phase in pre-production environment will be provided between 09:00 and 17:00 Hrs (AEST) on business days during the industry testing period. Any testing conducted in AEMO's pre-production environment after the completion of the WDR industry test period will be supported by AEMO's support hub. Further details will be provided in the test plan.

6. Strategy implementation: market test execution approach

Participants are responsible for supplying their own teams for test execution for the duration of industry testing.

6.1 Industry Test Entry and Exit Criteria

The entry and exit criteria for industry test phase will be defined in the Test Plan document. Depending on the testing defined, the criteria are likely to be based on those listed below. Reporting on readiness to participate, based on entry criteria for all registered parties will be published in the lead up to test execution.

6.1.1 Entry criteria

AEMO and participants will be asked to complete and submit entry criteria checklists prior to the commencement of industry testing. This may include, but is not limited to the following criteria:

- Participants internal testing completed
- Pre-production participant ID received for new participants (via registration and accreditation process), if relevant
- Connectivity testing complete (aseXML validation)
- Test data preparation (in line with test scripts/cases, i.e. roles and NMI ranges) is complete
- Appropriately skilled resource capability available to execute and support testing

AEMO will confirm the following:

- Pre-production environment available
- The relevant Industry Test Plan is complete, agreed and delivered to the participants
- PractiTest is configured with all required test information (including agreed test cases) and is accessible and useable by all testing participants
- Registration of participants in the test phase with nominated participant IDs to be used in testing
- Testing participants have confirmed readiness (through the submission of completed entry criteria checklist)

6.1.2 Exit criteria

Exit criteria for the text execution phase may include:

- Successful completion of all high-priority test scenarios
- No outstanding Priority 1 or Priority 2 defects
- Any open defects (Priority 3 or 4) have agreed resolutions or work around in place and published
- Final Test Summary Report completed

6.2 Test scenario and script execution

Test execution will be undertaken as follows:

- Respective test sets will be created in PractiTest's Test Execution module for all participants to facilitate testing.
- Tests scenarios and cases that are in scope for participants will be set-up in their respective test sets
- Execution of the testing will be undertaken according to execution calendar made available as part of the preparation activities.
- Test execution information will be updated in PractiTest on dashboards as it occurs, i.e. in as close to real time as possible. This will include test progress, status and data used.
- An audit trail of test execution is to be undertaken by participants. This includes capture of positive results to prove that a test met expected results as well as capture of negative results for defect resolution. For example, participants can use MSATS screens as evidence of their test results. Where applicable, this information will be maintained in PractiTest. Where this is not applicable, e.g. particularly large files, participants should store the required information accordingly, so it can be referenced as positive proof of testing.

6.2.1 Test status

The following statuses are applicable to a test case instance in PractiTest:

- No Run
- In progress
- Blocked
- Failed
- Passed
- Not Applicable

AEMO will use these test statuses to generate the status traffic light reports.

6.2.2 Test metrics

Test measurement during industry testing will be based on but not limited to the following metrics:

- Number of test scenarios/test cases executed versus the number planned
- Status of the test cases executed (Passed, Failed, Blocked, Deferred etc) in each test cycle
- Number of failed test scenarios/cases in each test cycle
- Number of defects raised during the test cycle according to the priority and severity
- Number of defects raised during the test cycle according to the status (Open, Close, Re-test failed etc)
- Outstanding defects including the impact and agreed date of resolution.

These metrics will be reported as appropriate in the test status reports which AEMO will generate and circulate via meetings/emails.

6.3 Process Management

Industry testing PractiTest management activities.

Table 7 shows the activities which will occur during industry testing and who is responsible for them.

Table 7 Activities

Activities	Description	Timing	Responsibility
Prepare tests	Add test scenarios and test cases to PractiTest	Prior to the commencement of test phase execution	AEMO, Participants
Identify data	Identify data sets for each test scenario, enter in PractiTest and confirm with testing partners.	Prior to the commencement of test phase execution	Participants, AEMO
Execute tests	Individual testers to perform test execution and capture actual results of testing in PractiTest.	Daily	Participants
Update progress	Progressively update the status of each test case instance and test results in PractiTest.	Daily	Participants
Raising defects	Raising defects from failed scripts or any other root cause in PractiTest.	Real time immediate as soon as the script has failed.	AEMO and Participants
Managing defects	Review defects logged in the PractiTest to identify major defects and determine the impact of those defects.	Daily	AEMO and Impacted Participants
Retesting defects	Retesting defects once they are available to testers is a priority.	Defect retests are to be completed prior to commencing new scripts.	AEMO and Participants
Test phase entry criteria assessment	Complete entry criteria checklist	Prior to the commencement of test phase execution	AEMO and Participants
Test phase exit criteria assessment	Complete exit criteria check	At the completion of test phase execution	AEMO and Participants
Test status meetings	Test status meeting to be attended by test representatives from all participants to discuss progress, issues, and defects.	Twice weekly (or as detailed in the Test Plan)	AEMO and Participants
Update Risks and Issues Log	Risks and Issues that arise and negatively affect testing progress will be recorded as identified.	As required	AEMO and Participants

7. Strategy implementation: Defect management

7.1 Defect management approach

Industry testing defect management will be a collaborative effort, principally involving AEMO's and participants' testing teams, development teams and business analysis teams. There will, at times, be a need to consult other projects' team members for advice and assistance on the resolution of defects. Defect management will be managed entirely within PractiTest.

The objective of defect management is to resolve all defects within the project lifecycle. However, this objective must be balanced against other project objectives, such as achieving the schedule and the system impact and priority of the defect (discussed below). The acceptable level of defects within each stage of testing is typically defined as part of the 'exit criteria' for that stage.

AEMO will manage and report on all defects identified during test execution. AEMO will not manage defects that are discovered to be on the participants' systems.

A template will be provided to assist participants with the creation of defects.

7.1.1 Raising defects

Defects raised during industry testing will be captured in PractiTest, with the following information:

- Description of defect
- The test scenario and/or test script associated with the defect
- Who detected it and the date it was detected
- Defect owner (entered after gaining agreement between testing counterparties as to who owns the defect)
- Target fix date (entered by defect owner)
- Defect priority
- Defect status
- Defect root cause (entered by defect owner).

For WDR implementation, the term "defect" is used broadly to include defects that would ordinarily fall outside of a narrow "IT" definition. For example:

- Information could be captured regarding lack of required support. This affects test execution from a timing perspective; and
- Testing may indicate that an automated business process needs manual intervention to work correctly and given constrained timings an automated fix cannot be developed and tested in time for go-live. Information such as this can feed into the deployment\cutover planning for go-live.

As a general principle, any information that occurs during industry testing and assists with risk mitigation for the "go-live" solution may be captured.

Defect statuses and progress on defect fixes will be discussed in the test execution progress meeting.

7.1.2 Defect triage

Defect triage occurs during the test execution progress meeting. Test scenarios or scripts that are blocked with critical or high priority defects will be discussed in the meeting. The defect owner and the target fix time will be agreed for critical and high priority defects blocking test execution.

Participants and AEMO should review defects frequently on daily basis and update the target fix date/time in PractiTest for everyone’s reference.

Appendix A1 contains a workflow of the Testing issue triage process.

7.1.3 Defect escalation

All open defects will be discussed in the test execution progress meeting. If a critical/high priority defect can’t be resolved within the agreed timeframes, it can be escalated in the test execution progress meeting. If required AEMO will arrange a separate defect triage meeting with the relevant participants to see that the defect is resolved quickly to progress test execution.

7.1.4 Defect prioritisation

Defects will be classified according to severity and where there are multiple within a severity, they will be address based on priority by the participant test leads in consultation with other affected participants. Priority will indicate the degree to which the defect affects both the system capability, testing execution and the overall project. Priority is determined by assessing probability of system and the business impacts. Table 9 describes each priority classification.

Table 8 Defect severity classification

Severity	Definition
1- Showstopper	Defect is considered critical to business operations and/or testing. Core business and project impact. Fix/resolution turnaround time best endeavour effort in first 4 hours or provide update on impact.
2-Major	Defect is considered high impact to the business operations and/or testing. However, core business processes are still able to be completed (possibly via workarounds, etc.) and testing is still able to continue.
3-Moderate	Defect is considered moderate impact to the business operations and/or testing. Core business processes are unaffected, and testing is still able to continue.
4-Minor	Defect is considered low impact to the business operations and/or testing. Core business processes are unaffected, and testing is still able to continue.

Table 9 Defect priority classification

Priority	Definition
1- Critical	Total loss of the system, infrastructure, or connectivity. Requires urgent fix. No testing can be performed without the defect being resolved.
2-High	Partial loss of the system, infrastructure, connectivity, or functionality. Requires urgent fix. Testing is severely impacted, and the system or infrastructure is prevented from moving to the production stage without the defect being fixed.
3-Moderate	Minimal impacts to the system function. Minor Loss of a smaller component of the system but there is manual work around and has no business impact. Testing can proceed but an acceptable business work around must be documented and approved
4-Low	Minimal impacts (cosmetic) to the system function. No loss of the system and has little or no business impact. Testing can proceed but defect must be documented and approved

Post triage and acceptance of a defect, a resolution date will be added and published in the daily status report for all identified defects.

7.1.5 Defect management status

Table 10 shows the valid defect management statuses to be selected in PractiTest.

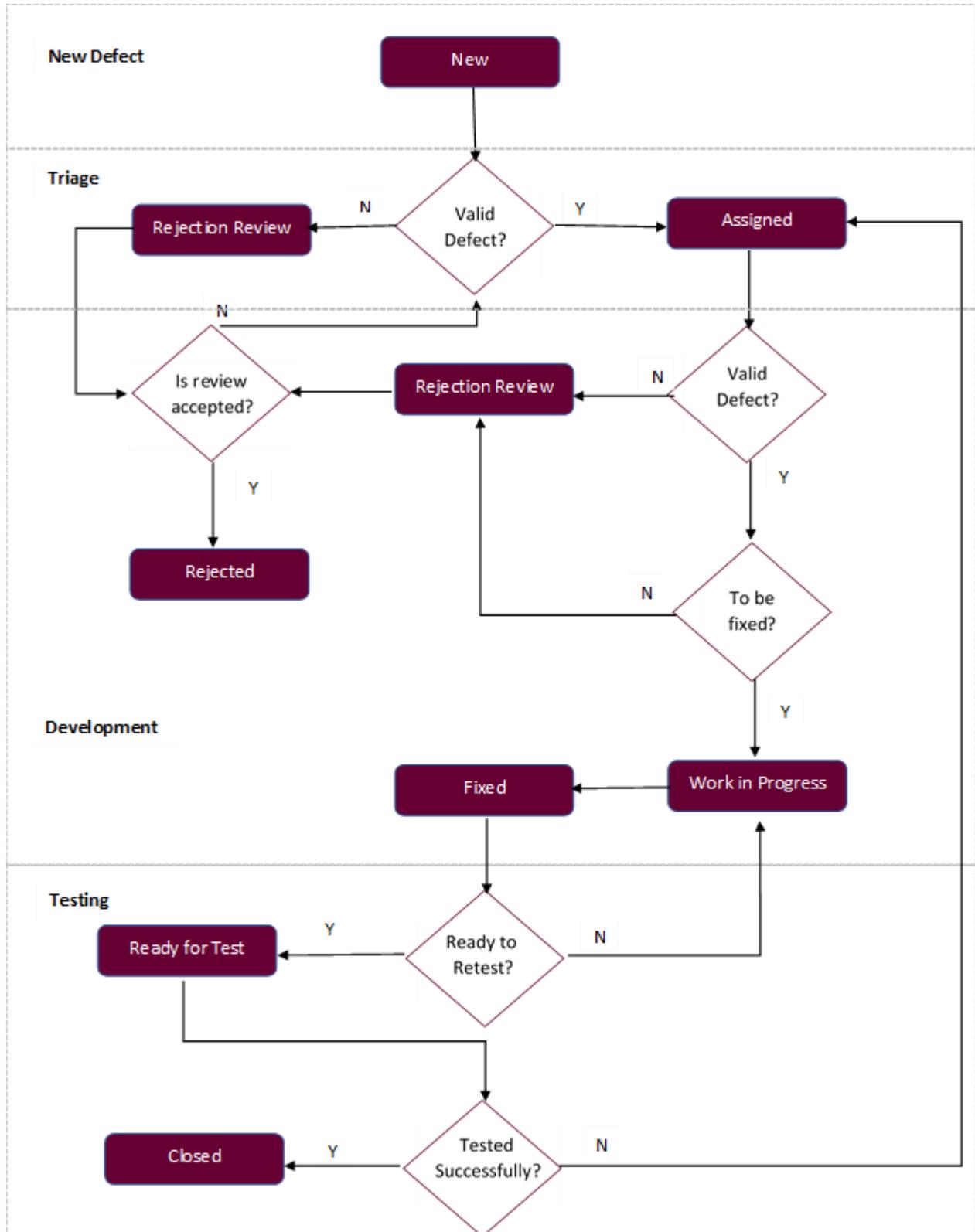
Table 10 Defect management status

Priority	Definition
New	Initial defect raised but will require a triage to determine if further analysis is required and whether it is a true defect as such to move to an assigned status.
Assigned	Defect will be assigned to the appropriate development team to be addressed further assessed and progressed.
Work in Progress	PractiTest item that is considered valid to be set to 'Work in Progress' to be fixed by development. This status means, a team is working on the PractiTest item (analysis or fixing)
Rejection Review	After Triage or review by developer the defect is not considered valid the defect will be assigned to the status of 'Rejection Review' and assigned to the participant whom raised the defect to accept rejection or update defect to allow it to be 'assigned'..
Rejected	PractiTest item that is in a 'Rejection Review' status can be progressed to this state. If a participant accepts a defect is not valid they can confirm the acceptance of the defect by changing the status to 'Rejected'.
Fixed	Once PractiTest item has been fixed and unit tested by developer the status is set to 'fixed'. This indicates the release of the fix is ready for deployment to a test environment.
Test Ready	Once the fix is released to test environment successfully the status is set to 'Test Ready' and assigned to the participant whom raised it.
Closed	If the participant (defect originator) is satisfied that the testing of the defect is successful they should update the defect

7.1.6 Defect process flow

Figure 3 below shows the defect management process throughout the various defect management statuses of the defect lifecycle from its inception through to its closure.

Figure 3 Defect Management Cycle



7.1.7 Defect cause

Defect root cause will be updated in PractiTest once the defect cause is identified. This will help with the defect metrics to identify the impacted area of the issues/defects identified in the testing. Table 11 shows the available defect causes and their descriptions.

Table 11 Defect causes and descriptions

Priority	Definition
Design	The design of the solution does not meet the requirements specified. Defect may include for example, algorithm (incorrect calculation), error handling, creation/release of object or memory, decision logic error, loop control, procedure call, failing to validate data values before being used.
Configuration	The intended outcome of the configuration is not meet.
Data	There are system data issues for the process that may prevent test completion.
Requirements	Unclear or incorrect requirement, Functional and Business specification documentation.
Infrastructure/Hardware	Defect is not in the object being tested but, in the test, set up, for example the wrong configuration or version control of platform, operating system, browser, hardware or networking, system is down, or the environment is down.

7.2 Suspension criteria and resumption requirements

AEMO will determine if a complete or partial suspension of testing is required during industry testing and will also determine when testing will continue. Suspension and resumption criteria and actions are described below.

7.2.1 Suspension criteria

Complete or partial suspension of testing may be required if:

- High density of defects is open impacting the number of test cases that can be executed
- High severity (i.e. showstopper) or combination of defects open
- Significant change to specifications (delaying release of software to the pre-production)
- Quality of software (rated by number of test cases failing).
- If these circumstances arise, the following actions will be taken:
- AEMO will make a recommendation to suspend the test activities
- AEMO will advise the industry participants of the potential delays due to the test suspension, and the impact of defect / defects concerned
- AEMO will support and coordinate the development and test efforts to resolve the defects raised.

7.2.2 Resumption criteria

Test resumption can occur after the issues that caused the suspension of testing have been resolved.

If these circumstances arise, the following actions will be taken:

- AEMO will inform the testing participants of the successful deployment of the defect fix(s) and its successful verification
- AEMO will inform the testing participants that the test environment is in a suitable condition to resume the suspended testing
- AEMO in consultation with the participant who raised the defect, will inform the participants of the impact(s) of the defect fix on the previously executed test cases and suggest if any re-execution must be done.

Glossary

This document uses many terms that have meanings defined in the National Electricity Rules (NER). The NER meanings are adopted unless otherwise specified.

Term	Definition
5MS	Five-minute settlement
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
B2M	Business to market i.e. business to AEMO transactions
CR	Change request
Cutover	System implementation event
DNSP	Distribution network service provider
DRSP	Demand response service provider
DUID	Dispatch Unit ID
FRMP	Financially responsible market participant
GS	Global settlement
Industry testing	Informal, uncoordinated testing by participants in AEMO's IT environments. Self-testing of functionality such as connectivity, and/or coordinated multi-party testing of functional scenarios.
Invitation industry testing	Coordinated testing of business process scenarios with a select number or subset of participants with systems ready for testing.
Market trials	Formal, industry coordinated test activities between participants' and AEMO's IT environments. Involves coordinated multi-party end-to-end testing of business process scenarios.
MSATS	Metering, settlement, and transfer solution
NEM	National electricity market
NER	National electricity rules
NF	Non-functional
Participant	Applicant wanting to participate in Industry Testing
Transition	Process of shifting from current to future operating state
WDR	Wholesale demand response
WDRU	Wholesale demand response unit