AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Five-minute settlement and global settlement

June 2020
v1.0

Final: Industry readiness contingency plan

Important notice

PURPOSE

In relation to five-minute settlement and global settlement implementation, the Industry readiness contingency plan:

- Provides coordinated guidance for AEMO and National Electricity Market participants on contingency responses should an industry readiness risk eventuate
- Is the basis for participants to develop and maintain their own contingency plans.

This publication has been prepared by AEMO using information available at 5 June 2020.

The first draft of the Industry contingency plan was published on 20 December 2019 and reviewed by the Readiness Working Group and its subsidiary the Contingency Focus Group. The second draft published on 28 February 2020 included an additional section (section 3.2) on determining the minimum criteria for commencing 5MS and GS and reflected AEMO's proposed position. It was subject to discussion with the Readiness Working Group and provided to the Contingency Focus Group. Feedback received through those channels has been reflected in this final document, along with additional analysis from AEMO.

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VERSION CONTROL

Version	Release date	Changes
# 0.1	20/12/2019	Draft released to the 5MS/GS Readiness Working Group for comment
# 0.2	28/02/2020	Second draft released to the 5MS/GS Readiness Working Group for comment
# 1.0	05/06/2020	Final document published

Contents

Tables

Figures

1. Introduction

This chapter explains the Australian Energy Market Operator's (AEMO) five-minute settlement (5MS) and global settlement (GS) implementation program in the National Electricity Market (NEM). It then details the purpose and context of the Industry readiness contingency plan.

1.1 AEMO's 5MS and GS implementation program

The Australian Energy Market Commission (AEMC) made the 5MS rule in November 2017 and AEMO's extensive 5MS implementation program began in early 2018. GS activities were incorporated into the program when the GS rule was made in December 2018 because aligning 5MS and GS implementation activities is intended to minimise costs for AEMO and market participants.

The program covers the procedural, IT system and market readiness arrangements needed to implement 5MS and GS using the following workstreams:

- Procedures – defines and implements the required changes to market procedures
- Systems – designs, develops, tests, and implements changes to AEMO's market systems
- Readiness – coordinates, assists and prepares AEMO and participants for the transition to 5MS and GS.

AEMO's 5MS and GS implementation program has entered the market readiness phase of the project. This plan relates to the transition and go-live phases of market readiness.

1.2 Industry readiness contingency plan

Contingency planning involves defining the actions to be taken if an identified risk event should occur despite having applied risk mitigations. Contingency responses are designed to lessen the impact of the risk once it happens.[1]

The Program Consultative Forum (PCF) developed and maintains the 'Industry risks and issues register' for the 5MS/GS implementation program.[2] The register facilitates the monitoring and reporting of industry risks and issues identified within the program.

1.2.1 Document purpose

In relation to 5MS and GS implementation, the Industry readiness contingency plan:

- Provides coordinated guidance for AEMO and NEM participants on contingency responses should an industry readiness risk eventuate
- Is the basis for participants to develop and maintain their own contingency plans.

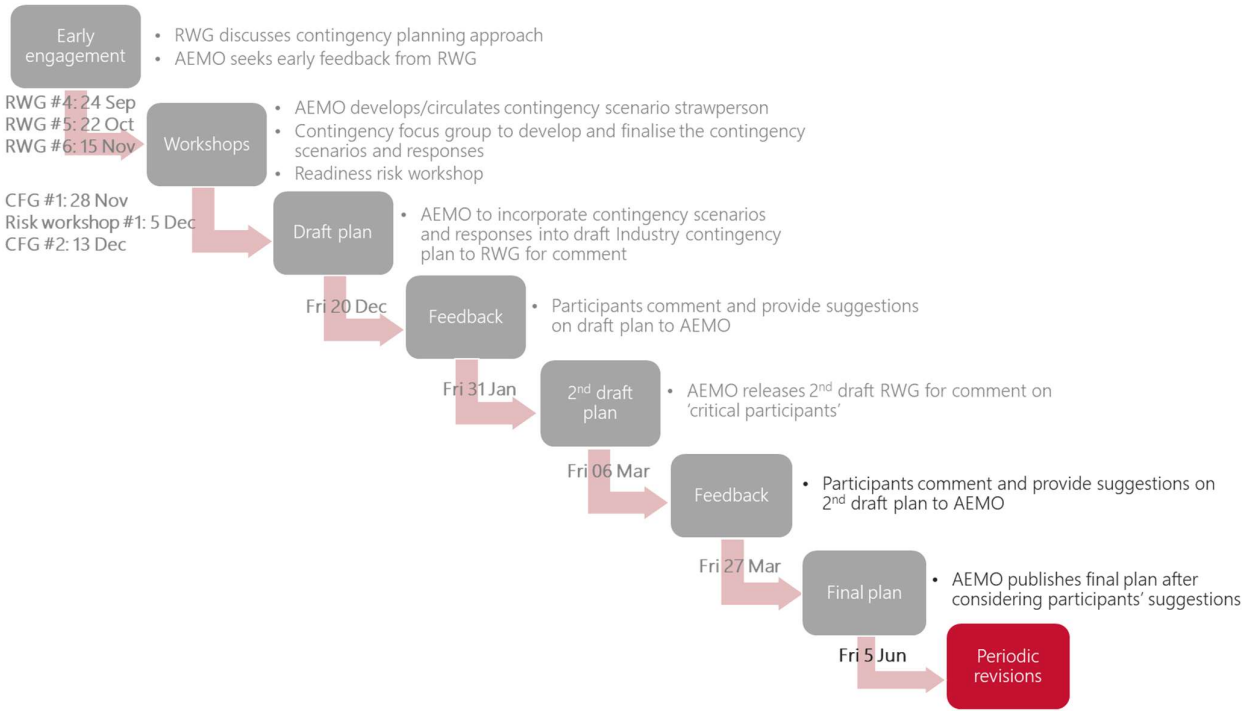
[1] Heimann, J. F. (2000). Contingency planning as a necessity. Project Management Institute. See also: https://www.pmi.org/about

[2] See Industry risks and issues register at: https://aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement/Program-Management/Program-Consultative-Forum

1.2.2 Development approach

The Industry readiness contingency plan was developed in consultation with industry through the 5MS and GS Readiness Working Group (RWG) and its subsidiary Contingency Focus Group (CFG).[3] Figure 1 illustrates AEMO's engagement approach and timeline for developing the plan.

Figure 1 Engagement approach for developing the Industry readiness contingency plan



1.2.3 Related documents

The Industry readiness contingency plan is one of an integrated series of documents that support the 5MS and GS market readiness strategy,[4] as illustrated by Figure 2. More information on each document is provided in the 5MS and GS market readiness strategy. Table 1 then describes how the Industry readiness contingency plan interrelates with other key 5MS/GS readiness documents.

[3] For more information on the RWG see: https://aemo.com.au/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/5ms-readiness-working-group-rwg

[4] For more information and access to 5MS and GS market readiness documents see: https://aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement/Readiness-Workstream/Key-Readiness-Documents

Figure 2 Relationships between 5MS and GS market readiness documents

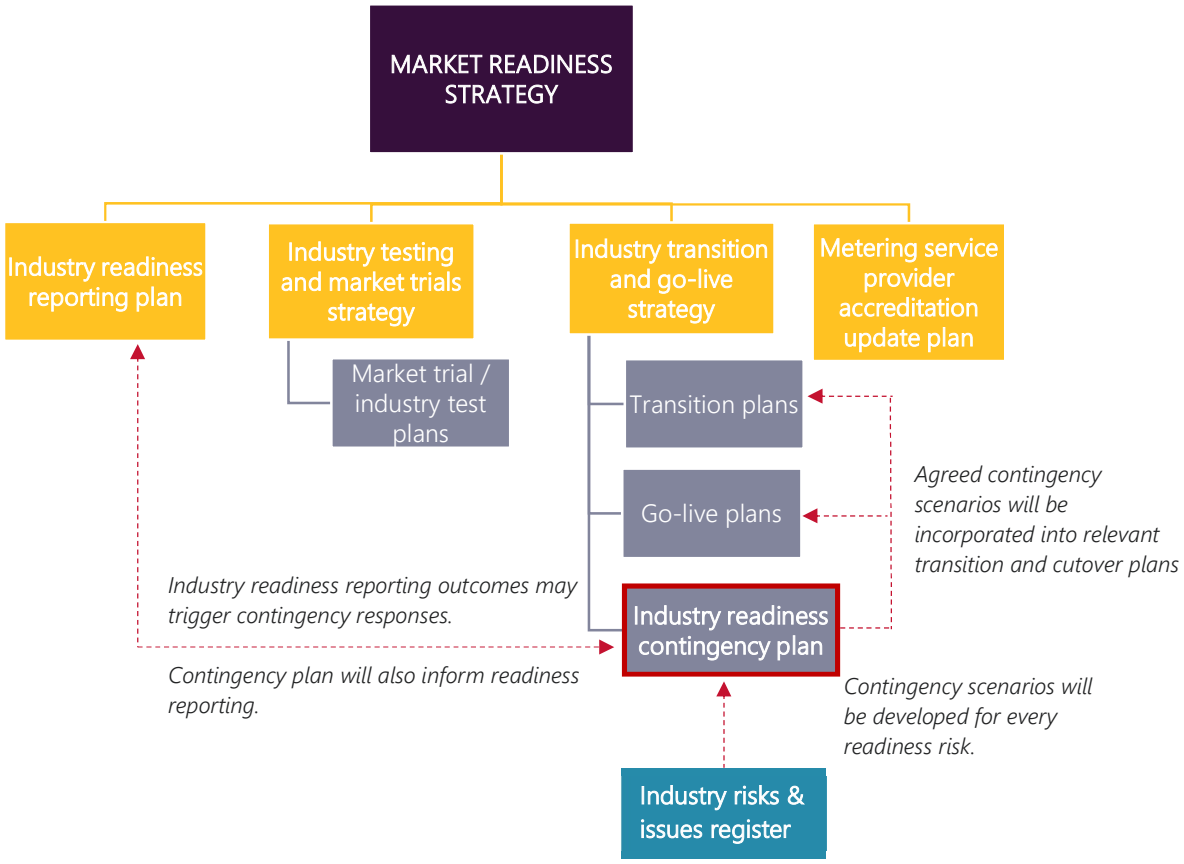


Table 1 Relationship between Industry readiness contingency plan and other key readiness documents

Related document	Description of relationship
Industry transition and go-live strategy	The strategy provides an overarching view and structure for the transition to 5MS/ GS across participants and market functions, including provision for contingency measures. The Industry readiness contingency plan provides the detailed support for managing contingency scenarios if risks arise.
Industry risks and issues register	The register, maintained by the PCF, facilitates the monitoring and reporting of industry risks and issues identified within the 5MS/GS program. Contingency scenarios will be developed and maintained for every industry readiness risk in the register.
Industry readiness reporting plan	The reporting plan details the readiness reporting framework and criteria that will enable regular assessments of AEMO's and participants' 5MS/GS readiness. Industry readiness reporting outcomes may trigger contingency responses. The Industry readiness contingency plan will also inform readiness reporting.
Transition plans and go-live plans	These plans provide the detailed support for the transitions and cutovers. Agreed contingency scenarios will be incorporated into relevant transition and cutover plans.

2. Contingency framework

2.1 Objective

The Industry transition and go-live strategy objective for the 5MS and GS market reforms is:

> *to provide coordinated guidance to NEM participants on transition and go-live activities and schedules as they transition from current market arrangements to 5MS and GS.*

This objective supports, and is consistent with, the market readiness objective set out in the overarching 5MS and GS Market readiness strategy.[5] The 5MS and GS Industry readiness contingency plan supports both objectives by providing coordinated guidance on contingency planning and implementation.

2.2 Principles

The Industry transition and go-live strategy principles apply to the Industry readiness contingency plan. These are:

1. Mandated 5MS and GS commencement dates should be met
2. NEM operations should be uninterrupted during periods of transition and go-live
3. Market system go-lives and 5MS and GS commencement risks should be minimised
4. More certainty for participants' project planning should be introduced
5. Participants should be provided with implementation flexibility where possible
6. Participants and AEMO are responsible for their own transition and go-live planning[6]

In addition, the following principles are specific to the Industry readiness contingency plan:

1. NEM participants and AEMO:
   - Will have a collaborative approach to contingency planning
   - Are responsible for developing their own internal contingency plans that have regard to the key activities and dates set out in the Industry readiness contingency plan
   - Must continue to fulfil all regulatory and compliance obligations during transition and system cutover periods
   - Are to communicate contingency issues as early as possible in writing
2. Contingency scenarios will be developed for each readiness risk on the 5MS/GS Industry issues and risks register
3. Where possible, contingency responses will be the existing NEM contingency processes
4. The industry implementation approach will be based on a 'fix-on-fail/roll-forward' objective after systems cutovers and for 5MS and GS rule commencements
   - *System* rollback is an acceptable contingency response during the system go-live process, but not once the system is deployed

[5] For all 5MS and GS readiness documents, see: https://aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement/Readiness-Workstream/Key-Readiness-Documents

[6] Full descriptions of each principle are set out in the Industry transition and go-live strategy at: https://aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement/Readiness-Workstream/Key-Readiness-Documents

- AEMO and participants will commit to cutting over and avoiding *market* rollbacks by addressing any problems as and when they arise

5. Contingency decisions will have regard to:
   - The materiality and impact on the reliable operation of the NEM
   - Impacts on the ability to meet mandated responsibilities
   - The suitability of contingency plans to mitigate the event from an overall market perspective

2.3 Scope

2.3.1 In scope

This Industry readiness contingency plan applies to industry readiness risks that could occur as a result of the:

- transition and cutover to 5MS and GS
- ongoing operation of the NEM under 5MS and GS.

For example, scenarios:

- That may affect the reliable operation of the NEM
- That may affect the ability for the market to meet 5MS and GS commencement dates
- Associated with AEMO's market system go-lives and related transition and cutover activities
- That may occur after AEMO's market system go-lives or the rule commencement dates.

2.3.2 Out of scope

"Non-readiness" industry risks are out of scope. These are the risks in the Industry issues and risks register that are assigned to the 'program', 'procedures' and 'systems' workstreams.

The following types of scenarios are not related to the overall 5MS and GS readiness of the NEM, only to individual participant's own readiness. Therefore, they are *not* within the scope of this contingency plan:

- Commercial issues that do not affect 5MS/GS implementation. For example, a service level agreement between a metering data provider and a retailer
- Operational or 'business as usual' issues that do not affect 5MS/GS implementation. For example, a retailer being unable to consume a new settlement report format
- National Electricity Rules (NER) compliance matters that are the responsibility of individual market participants or AEMO.

2.3.3 Where scope is uncertain

As noted above, the Industry readiness contingency plan applies to the overall 5MS and GS readiness of the NEM, not to an individual participant's own readiness.

However, individual participant readiness will be considered as part of market readiness if a contingency matter arises that:

- is systemic and affects multiple participants
- affects overall NEM operations.

In these situations, the Readiness Working Group (RWG) will assess the contingency problem, decide whether it is a market readiness matter and recommend next steps for its resolution.

3. Industry readiness contingency plan

This chapter sets out:

- Structure of the Industry readiness contingency plan
- Approach to rollbacks
- Determining the minimum criteria for 5MS and GS commencements
- Approach to maintaining the Industry readiness contingency plan

3.1 Structure of the Industry readiness contingency plan

The Industry readiness contingency plan is set out in the attached spreadsheet.

In keeping with the Transition and go-live strategy objective and specific contingency principles, the Industry readiness contingency plan provides coordinated guidance for AEMO and participants on 5MS and GS contingency responses.

Participants will individually develop and maintain their own contingency activities based on the Industry contingency plan.

For every 5MS/GS industry risk, the Industry readiness contingency plan outlines related contingency scenarios. Each scenario is supported by several elements, as illustrated in Figure 3 and described further in Table 2.

Figure 3 Industry readiness contingency plan structure

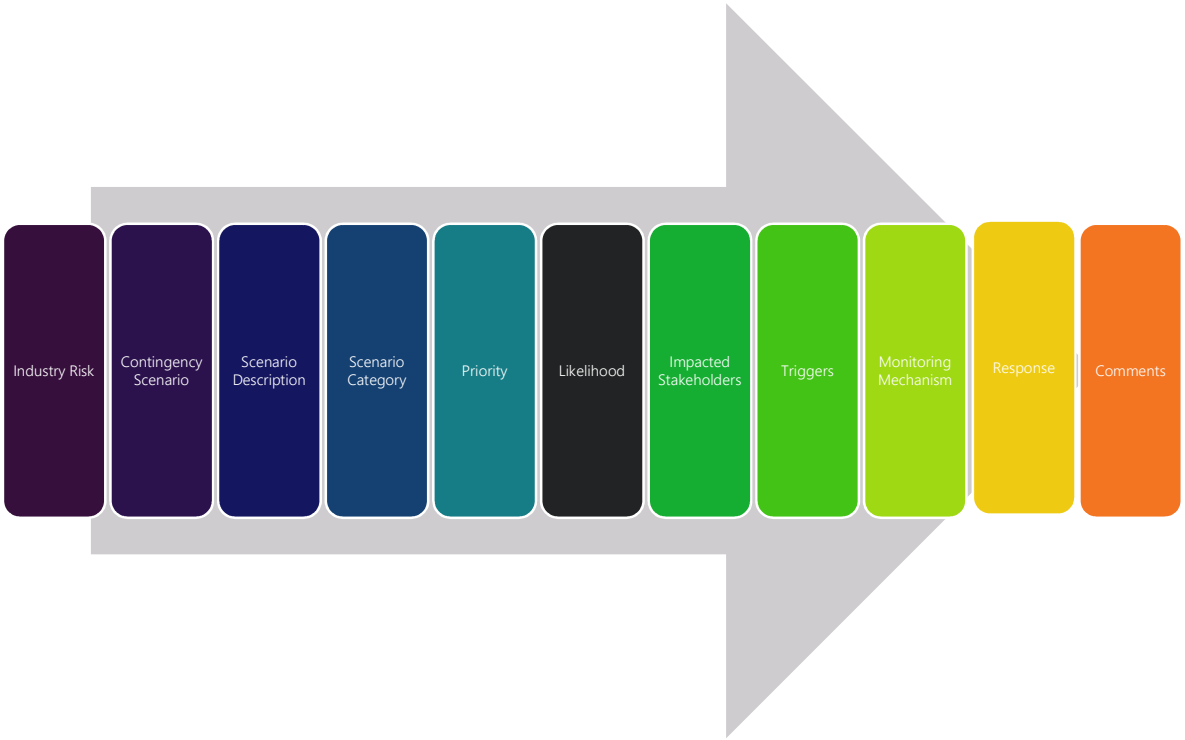


Table 2 Description of Industry readiness contingency plan elements

Industry readiness contingency plan element	Description
Industry risk	References the industry readiness risk to which the contingency scenario relates
Description	Explains the scenario
Category	Assigns the scenario to either readiness, system implementation or production depending on its timing (through transition, at cutover or as part of ongoing NEM operation)
Priority	Reflects the scenario's participant impact and consequence
Likelihood	Indicates the probability of the scenario occurring
Impacted stakeholders	Lists the stakeholders affected by the contingency scenario
Trigger	Describes the conditions for activating the contingency scenario's response
Monitoring mechanism	The method by which the triggers are identified. The monitoring mechanism is different for each implementation phase, generally: • Transition phase: monitoring through industry readiness reporting • Market system go-lives: monitoring through the related cutover plan and escalation where necessary • Ongoing operation (system production): AEMO and participant monitoring incorporated into existing processes.
Responses	Describes the necessary actions to mitigate the contingency event and the parties responsible for these actions. Where possible and appropriate, existing 'business as usual' contingency processes and procedures will apply. These processes and procedures are explicitly referenced in the plan. The timing of the responses will reflect the criticality of the contingency scenario and will be implemented immediately.
Comments	Provides additional context for the scenario

3.2 Rollbacks

The Industry readiness contingency plan allows for *system* rollbacks to address *cutover/go-live* contingency scenarios as a last resort. However, none of the contingency responses consider a *market* rollback because:

- The NER require 5MS and GS to operate from their respective commencement dates
- Market system go-lives are scheduled to occur prior to the rule commencement dates, providing a level of scheduling contingency
- BAU contingency processes are expected to be effective in managing identified contingency scenarios when 5MS and GS become operational.

3.3 Determining the minimum criteria for 5MS/GS commencements

All participants are responsible for complying with the 5MS and GS rules by the regulated dates. However, AEMO and the industry consider that there is a risk that not all participants will have completed their programs ahead of key milestones. Therefore, some elements of the contingency plan refer to the concept of 'minimum criteria', for 5MS and GS to commence.

This section sets out the approach and rationale for establishing the minimum criteria for 5MS and GS commencement.

- First, essential capabilities for 5MS and GS commencements are identified. 'Essential' capabilities represent the minimum metering capabilities and participant/AEMO capabilities for 5MS and GS to function in the NEM.
- Second, an approach to establishing the 'critical mass' of each participant group that has essential capabilities is described.

Together, essential capabilities and critical mass form the minimum criteria for 5MS and GS commencement.

Relationship between contingency planning and compliance

Essential capabilities are distinct from the metering that needs to be in place and the activities that participants need to perform to be compliant with the NER. NER compliance is the responsibility of individual participants and is monitored by the Australian Energy Regulator. However, this distinction is important when considering how to determine 5MS and GS minimum criteria for the purpose of industry readiness contingency planning.

3.3.1 Essential metering capabilities

The table in Appendix 1 sets out the "essential meters" that are needed to deliver 5-minute data for minimum viable 5MS and GS operations. In summary, the essential 5MS and GS meters are:

- Transmission connected types 1-4 meters
- Distribution to distribution cross-boundary types 1-4 meters

Five-minute data from these meters is essential because it enables System Load Profile calculations on a 5-minute basis as a starting point for the subsequent calculation of Net System Load Profiles. Net System Load Profiles enable the disaggregation of 15-minute, 30-minute and accumulation metering data into the required 5-minute granularity required for wholesale market settlement.

AEMO would be unable to commence 5MS and GS without sufficient 5-minute metering data being delivered from the essential meters. Installation and reconfiguration of and 5-minute metering data delivery from essential meters are being monitored through 5MS readiness reporting. If it becomes apparent through this

monitoring that some essential meters may not be ready, then the relevant contingency responses[7] within the contingency plan would be applied to enable 5MS and GS to commence.

Note that while 5MS and GS could function with 5-minute data from only these essential meters, settlement accuracy would be compromised without the 5-minute data from the full complement of meters that are required under the NER. Further details are provided in Appendix 1.

3.3.2 Essential participant capabilities

The table in the Appendix 2 sets out the essential 5MS and GS capabilities by participant type. In summary, these essential capabilities for 5MS and GS are:

- Generators and Market network service providers (MNSPs) need to submit 5-minute granularity offers from their own systems via FTP, API or through AEMO's web bidding interface.
- MPs/MCs need to ensure that essential meters can produce and store 5-minute data.
- MDPs need to ensure delivery of 5-minute metering data from essential meters.

3.3.3 Essential AEMO capabilities

For completeness, it is noted that AEMO, as the market operator, is essential to both the 5MS and GS commencements and uninterrupted wholesale market operation. For 5MS and GS to commence, AEMO needs to have deployed its:

- Metering Data Management (MDM) solution
- 5-minute settlements solution
- 5-minute bidding and dispatch solution, including the web bidding interface (AEMO's basic bidding offering)

AEMO's 5MS/GS readiness is tracked via readiness reporting and the contingency plan also applies to it.

[7] The relevant contingency scenarios and associated contingency responses are:

- C2: Essential meters not fully compliant at 5MS commencement
- C3: 5-min Essential meter(s) metering data delivery issues

3.3.4 Establishing the suitability of 'critical mass' for 5MS/GS contingency planning

For the purposes of 5MS/GS industry readiness contingency planning, the table below examines whether a 'critical mass' of participants with essential capabilities needed for 5MS and GS commencements.

Table 3 Applicability of 'critical mass' to 5MS/GS industry readiness contingency planning

Participant type	Critical mass
Generators/ MNSPs	To be dispatched effectively under 5MS, generators/MNSPs will need to be able to make 5-minute offers into the NEM: • Sophisticated and high frequency bids and rebids can be made from participants' own systems via FTP or API to AEMO's market system, or • Basic, low-frequency bids and rebids can be made via AEMO's web bidding interface. There is no critical mass of generators/MNSPs required to be ready for 5MS commencement. This is because any generators/MNSPs whose systems are not ready for 5-minute bidding are able to use AEMO's basic bidding service – the web bidding interface. This method of bidding is rudimentary but still enables bids to be placed. If there are insufficient generators placing 5-minute offers at 5MS commencement, then "business as usual" market intervention processes would apply.
MPs/MCs/MDPs	Installation and reconfiguration of and 5-minute metering data delivery from essential meters are being monitored through 5MS readiness reporting. If it becomes apparent through this monitoring that some essential meters may not be ready for 5MS commencement, then the relevant contingency responses[8] within the contingency plan would be applied to enable 5MS and GS to commence. These responses include MCs shifting responsibility for meters and/or metering data to alternative metering service providers. Therefore, there is no critical mass of MPs/MCs/MDPs required to be ready for 5MS commencement because the contingency arrangements will support 5MS and GS commencements if any essential meters are not ready.

3.3.5 Minimum criteria for 5MS and GS

As discussed above, essential capabilities and critical mass form the minimum criteria for 5MS and GS commencements. Section 3.4.2 establishes that there is no critical mass of participant types required to be ready for 5MS/GS.

Therefore, the minimum criteria for these commencements are that:

- Essential meters must be ready to produce and communicate 5-minute metering data.
- AEMO must be ready by providing market systems (bidding, metering, settlements) to support 5MS and GS.

[8] The relevant contingency scenarios and associated contingency responses are:

- C2: Essential meters not fully compliant at 5MS commencement
- C3: 5-min Essential meter(s) metering data delivery issues

3.4 Maintaining the Industry readiness contingency plan

The Industry readiness reporting plan details the readiness reporting framework and criteria that will enable regular assessments of AEMO's and participants' 5MS/GS readiness. As described above, Industry readiness reporting outcomes may be triggers for contingency responses, especially for transition phase contingencies. The Industry readiness contingency plan also informs readiness reporting criteria by identifying the triggers that need to be monitored.

Additionally, the Industry issues and risks register will be reviewed after each round of readiness reporting to ensure emerging readiness risks and issues are identified and managed. These points in time are also appropriate for reviewing and adjusting the Industry readiness contingency plan in response to any new or changed readiness risks so that contingency scenarios are appropriately developed or updated. Review dates will be identified through the PCF.

Glossary

Term	Definition
5MS	Five-minute settlement
AEMO	Australian Energy Market Operator
DNSP	Distribution network service provider
FRMP	Financially responsible market participant
GS	Global settlement
MDP	Metering data provider
MNSP	Market network service provider
MP	Metering provider
MSATS	AEMO's Market Settlement and Transfer Solution IT system
MSP	Metering service provider. Includes MCs, MDPs and MPs.
NEM	National electricity market
NER	National electricity rules
NMI	National metering identifier
PCF	5MS/GS program consultative forum
RWG	Readiness working group
SGA	Small generation aggregator
Transition	Process of shifting from current to future operating state
TNSP	Transmission service network provider
UFE	Unaccounted for energy

A1. Essential metering capability for 5MS and GS commencements

The table below sets out essential metering capabilities for 5MS and GS commencements. In summary, the 'essential' meters for 5MS are:

- Types 1-4 transmission-connected meters
- Types 1-4 'distribution network to distribution network' cross-boundary meters.

For clarity, and consistent with the 5MS rule, "subset of type 4 meters" means type 4 metering installations at a:

- Transmission network connection point; or
- Distribution network connection point where the relevant financially responsible Market Participant (FRMP) is a Market Generator or Small Generation Aggregator (SGA).

Metering installation type	Affected by 5MS/GS rules?	Essential 5MS capability?	Essential GS capability?	Comments
Types 1-4: **Transmission connected**	5MS rule: Yes. Must be capable of producing and communicating 5-minute metering data	Yes	No	Essential for 5MS as they enable the calculation of System Load Profiles and subsequent Net System Load Profiles (NSLP) on a 5-minute basis. As profiling is not applicable to transmission network connected metering, these meters are also essential for the settlement of interconnectors, generators and market customers.
Types 1-3: **Distribution connected**	5MS rule: Yes. Must be capable of producing and communicating 5-minute metering data	No	No	Not essential for 5MS to operate because these meters are not required for the calculation of System Load Profiles or NSLPs. If one of these metering installations was not producing and/or communicating 5-minute metering data by the 5MS commencement date: • The responsible MC, MP and MDP would be non-compliant with the NER, and

Metering installation type	Affected by 5MS/GS rules?	Essential 5MS capability?	Essential GS capability?	Comments
				• Settlement accuracy would be compromised but settlement could still occur.
Types 1-3: Distribution to distribution cross boundary	5MS rule: Yes. Must be capable of producing and communicating 5-minute metering data	Yes	No	Essential for 5MS so that the System Load Profiles can be calculated on a 5-minute basis for the receiving distribution network, including calculation of Local Retailer load under settlement by difference These meters are not essential for GS to commence. However if they are not ready: • the accuracy of UFE allocation between the supplying and receiving Local/Distribution Areas would be compromised • the responsible MC, MP and MDP would be non-compliant with the NER
Type 4: Distribution to distribution cross boundary	5MS rule: No GS rule: Yes	Yes	No	Essential for 5MS so that the System Load Profile can be calculated on a 5-minute basis for the receiving distribution network, including calculation of Local Retailer load under settlement by difference. However, these meters are not currently captured by the 5MS rule. These meters are not essential for GS to commence. However if they are not ready: • the accuracy of UFE allocation between the supplying and receiving Local/Distribution Areas would be compromised • the responsible MC, MP and MDP would be non-compliant with the NER
Subset of type 4: Distribution connected where FRMP is a market generator or SGA	5MS rule: Yes. Must be capable of producing and communicating 5-minute metering data	No	No	Not essential for 5MS to operate because these metering installations are not required for profiling purposes. However, if a metering installation was not producing and/or communicating 5-minute metering data by the 5MS commencement date, the responsible MC, MP and MDP would be non-compliant with the NER.

Metering installation type	Affected by 5MS/GS rules?	Essential 5MS capability?	Essential GS capability?	Comments
Type 7	5MS rule: Yes: Must be calculated and communicated on a 5-minute basis	No	No	Not essential for 5MS to operate because these metering installations are not required for profiling purposes. However, if a metering installation was not producing and/or communicating 5-minute metering data by the 5MS commencement date, the responsible MC and MDP would be non-compliant with the NER.
Non-contestable unmetered loads	GS rule: Yes: Must be calculated and communicated on a 5-minute basis for 5MS.	No	No	Not essential for 5MS to operate because these metering installations are not required for profiling purposes. Non-contestable unmetered loads are allocated to determine the residual UFE for a Local Area. GS can function without this input to the calculation, however UFE volumes would be overstated and the responsible MDP would be non-compliant with the NER.

A2. Essential participant capabilities for 5MS and GS commencements

Participant type	Main NEM functions	Affected by 5MS/GS?	Essential 5MS capability?	Essential GS capability?	Comments
Generator	Generator offers	Yes: Submit 5-minute offers	Yes	n/a	Generators needs to be capable of developing and submitting 5-min granularity offers for 5MS to function. Generators can submit 5-minute bids from their own systems via FTP or API or through AEMO's web bidding interface.
	Generator dispatch	No change	n/a		Already dispatched on a 5-minute basis
	Sells electricity supplied through the spot market	Yes: 5-min trading interval prices and volumes	No		
	Manage metering data	Yes: Manage 5-min metering data	No		
	Reallocations	Yes: 5-minute trading interval reallocations	No		Reallocations is an important aspect of the wholesale market, allowing participants to hedge their cash flow risk and reduce prudential volatility. This functionality is not essential for 5MS commencement.

Participant type	Main NEM functions	Affected by 5MS/GS?	Essential 5MS capability?	Essential GS capability?	Comments
	Reconcile settlement statements	Yes: Reconcile 5-min trading interval prices and volumes	No		While it may be preferable to be able to reconcile settlements statements, reconciliation *is not* a pre-requisite for 5MS/GS to commence.
Small generation aggregator, Scheduled Load	SGA/Scheduled load bids	Yes: 5-minute bids	No	n/a	SGA energy /scheduled loads are small component of NEM supply/demand volumes and therefore their ability to perform 5-minute bidding is not critical to 5MS. However, SGAs must make 5-minute offers under 5MS or they will be non-compliant with the NER.
	SGA/Scheduled load dispatch	No change	n/a		
	Manage metering data	Yes: Manage 5-min metering data	No		
	Reconcile settlement statements	Yes	No		
Market customer: End user	Purchases electricity through the spot market	Yes: 5-min trading interval prices and volumes	No	n/a	Market customers receive the spot price which is determined by AEMO's dispatch processes using generator offers as an input.
	Manage metering data	Yes: manage 5-min metering data	No	n/a	
Market customer: Retailer	Purchases electricity through the spot market	Yes: 5-min trading interval prices and volumes	No	No	Retailers do not perform any functions other than 'business as usual' activities that are essential to 5MS and GS commencements. Reallocations is an important aspect of the wholesale market, allowing participants to hedge their cash flow risk and reduce prudential volatility. However, this
	Provide energy services to end use customers	Optional: offer new electricity services based on 5-min metering data	No	No	
	Manage metering data	Yes: manage 5-min metering data	No	No	

Participant type	Main NEM functions	Affected by 5MS/GS?	Essential 5MS capability?	Essential GS capability?	Comments
	Bill customers	No	No	No	functionality is not essential for 5MS commencement. While it may be preferable to be able to reconcile settlements statements, reconciliation is not a pre-requisite 5MS/GS to commence.
	Reallocations	Yes: 5-minute trading interval reallocations	No	n/a	
	Reconcile settlement statements	Yes: Reconcile 5-min trading interval prices and volumes Validate and reconcile UFE	No n/a	n/a No	
Metering Provider	Install, operate and maintain metering installations	Yes: All type 1-3, and subset type 4 meters to be capable of producing and communicating 5-minute metering data	Yes	n/a	Essential meters to be capable of producing and storing 5-minute metering data
Metering Data Provider	Collect, process and store metering data:				
	• Metering data granularity	Yes: Deliver 5-minute data relating to all Type 1-3 and subset of type 4 meters	Yes	n/a	MDPs need to deliver 5-min data from Essential meters for 5MS to function.
	• Metering data file format	Yes: Deliver interval meter metering data in MDFF file format	Yes	n/a	Interval meter reads can only be delivered to AEMO via MDMF for reads relating to dates prior to the 5MS commencement date. From 5MS commencement, interval metering data must be delivered in MDFF. Accumulation meter reads can continue to be delivered via MDMF or via MDFF NEM13.

Participant type	Main NEM functions	Affected by 5MS/GS?	Essential 5MS capability?	Essential GS capability?	Comments
	• Metering data resolution	Yes: Deliver active and reactive register level metering data	Yes	Yes	Register level metering data will be used by AEMO to support critical market functions such as market settlements, UFE Trend reporting and VIC TUoS Billing. Register level metering data is necessary from 'essential meters' for 5MS and GS. It is non-essential for remaining meters.
	• Non-contestable unmetered loads and type 7 meter installations	Yes: Deliver non-contestable unmetered load and type 7 5-minute metering data	No	No	Non-contestable and type 7 unmetered loads are used to settle the market and to calculate UFE. GS can function without this input to the calculation, however UFE volumes will be less accurate and the MDP would be non-compliant with the NER.
Metering Co-ordinator	Overall responsibility for coordinating and providing metering services at a connection point in the NEM.	Yes: All type 1-3, and subset type 4 meters to be capable of producing and communicating 5-minute metering data	Yes	No	Essential meters must be capable of producing and storing 5-minute metering data.
Distribution Network Service Provider	Owns, operates or controls a distribution system	No	n/a	n/a	DNSP functions are not essential to 5MS and GS commencements.
	Manage metering data	Yes: Manage 5-min metering data Calculate Type 7 loads on a 5-minute basis.	 No No	 n/a n/a	Non-contestable unmetered loads and cross-boundary supplies are used to calculate UFE. GS can function without these inputs to the calculation, however UFE volumes will be less accurate and the DNSP would be non-compliant with the NER.

Participant type	Main NEM functions	Affected by 5MS/GS?	Essential 5MS capability?	Essential GS capability?	Comments
					GS can function if the NMI classification codes for cross-boundary meters are not updated. However, UFE volumes will be less accurate and the DNSP would be non-compliant with AEMO's procedures.
	Manages cross-boundary supplies	Yes: Appointment of the Metering Coordinator for cross-boundary supplies	No	No	
	Update cross boundary supply NMI Classification Code to "XBOUNDRY"	Yes: GS rule requires cross boundary supply energy flows to be included in UFE calculations	No	No	
	Non-contestable unmetered loads	Yes: GS rule requires Non-contestable unmetered loads NMIs to be created and maintained in MSATS	n/a	No	
Transmission Network Service Provider	Owns, operates or controls a transmission system		n/a	n/a	
	Manage metering data	Yes: Manage 5-min metering data	No	n/a	
	Update NMI Classification Code to "BULK" for transmission network to distribution network connection points	Yes: All type 1-3, and subset type 4 meters to be capable of producing and communicating 5-minute metering data	No	No	
Market network service provider	Owns, operates or controls a transmission system	Yes: 5-min trading interval prices and volumes	No	n/a	Generators need to be capable of developing and submitting 5-min granularity offers for 5MS to function.
	Earn revenue from the spot market	Yes: submit 5-min bids and offers	Yes		

Participant type	Main NEM functions	Affected by 5MS/GS?	Essential 5MS capability?	Essential GS capability?	Comments
	Participate in central dispatch	No change	No		MNSPs can submit 5-minute bids from their own systems via FTP or API or through AEMO's web bidding interface. For the purposes of 5MS contingency planning, MNSPs will be considered as a generator in the regions they supply.
	Manage metering data	Yes: Manage 5-min metering data	No		
	Reconcile settlement statements	Yes: Reconcile 5-min trading interval prices and volumes	No		
Reallocator	Takes part in reallocation transactions	Yes: manage reallocations on a 5-minute trading interval basis	No	n/a	Reallocations is an important aspect of the wholesale market, allowing participants to hedge their cash flow risk and reduce prudentials volatility. This functionality is not essential for 5MS commencement.
SRA Trader	Takes part in Settlements Residue Auctions,[9] but is not a market customer, retailer or a generator.	Yes: SRAs on a 5-minute trading interval basis	No	n/a	Participation in SRAs is voluntary
Market ancillary service provider	Offers a customer's load, or aggregation of loads, into the Frequency Control Ancillary Services markets.[10]	No: FCAS services are already delivered on a 5-minute basis	n/a	n/a	Unaffected by 5MS and GS

[9] For more information on Settlements Residue Auctions, see:: https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/market-operations/settlements-and-payments/settlements/settlements-residue-auction

[10] For more information on FCAS markets see: https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/ancillary-services