

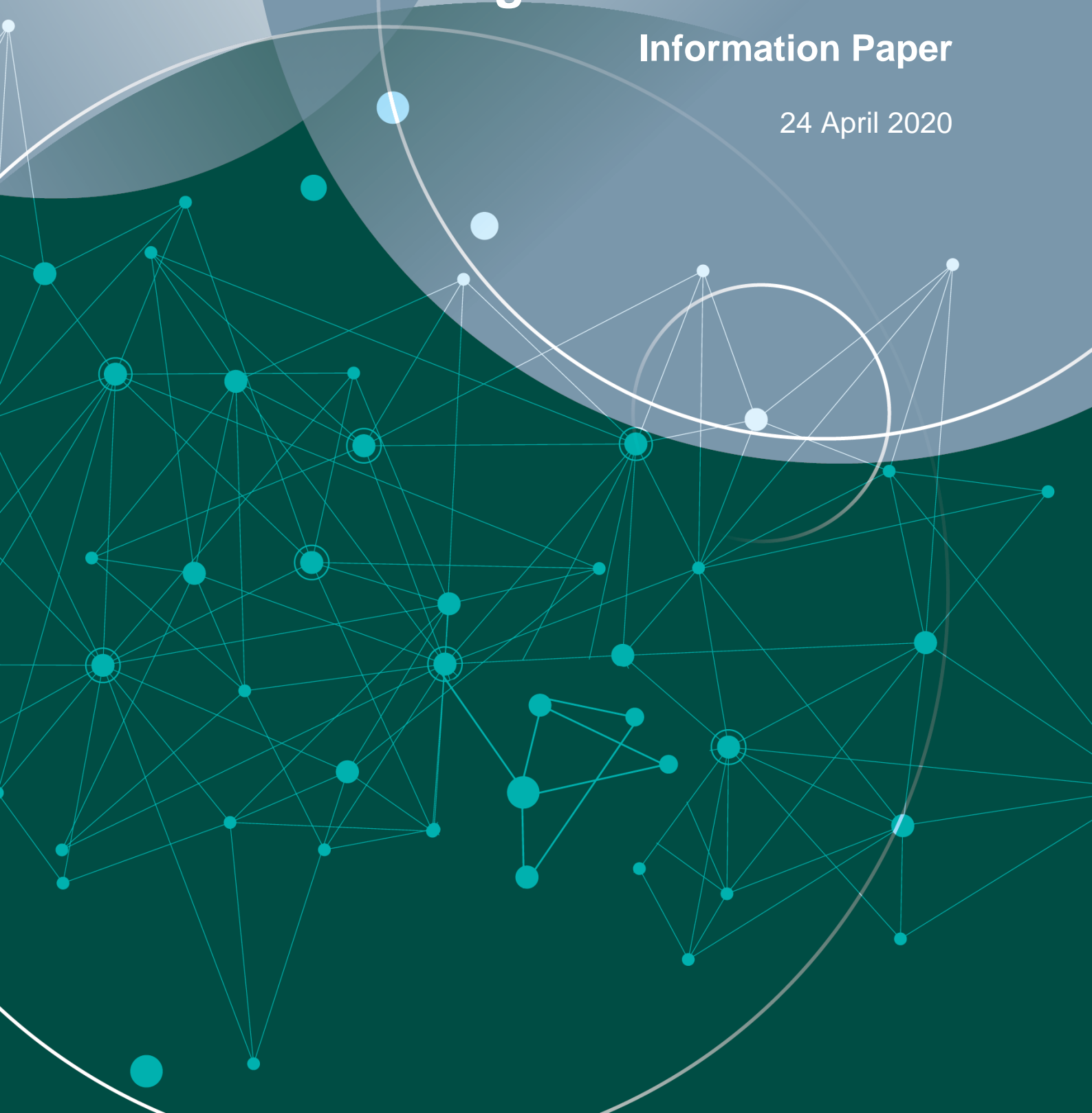


**Energy Transformation  
Taskforce**

# **Generator Performance Standards - Regulatory Framework, Monitoring and Rectification**

**Information Paper**

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# Abbreviations

The following table provides a list of abbreviations and acronyms used throughout this document. Defined terms are identified in this document by capitals.

Term	Definition
Access Code	Electricity Networks Access Code 2004
AEMO	Australian Energy Market Operator
ERA	Economic Regulation Authority
ETIU	Energy Transformation Implementation Unit
PSSR	Power System Security and Reliability
Strategy	Energy Transformation Strategy
SWIS	South West Interconnected System
Taskforce	Energy Transformation Taskforce
TDOWG	Transformation Design and Operation Working Group
WEM	Wholesale Electricity Market

# 1. Introduction

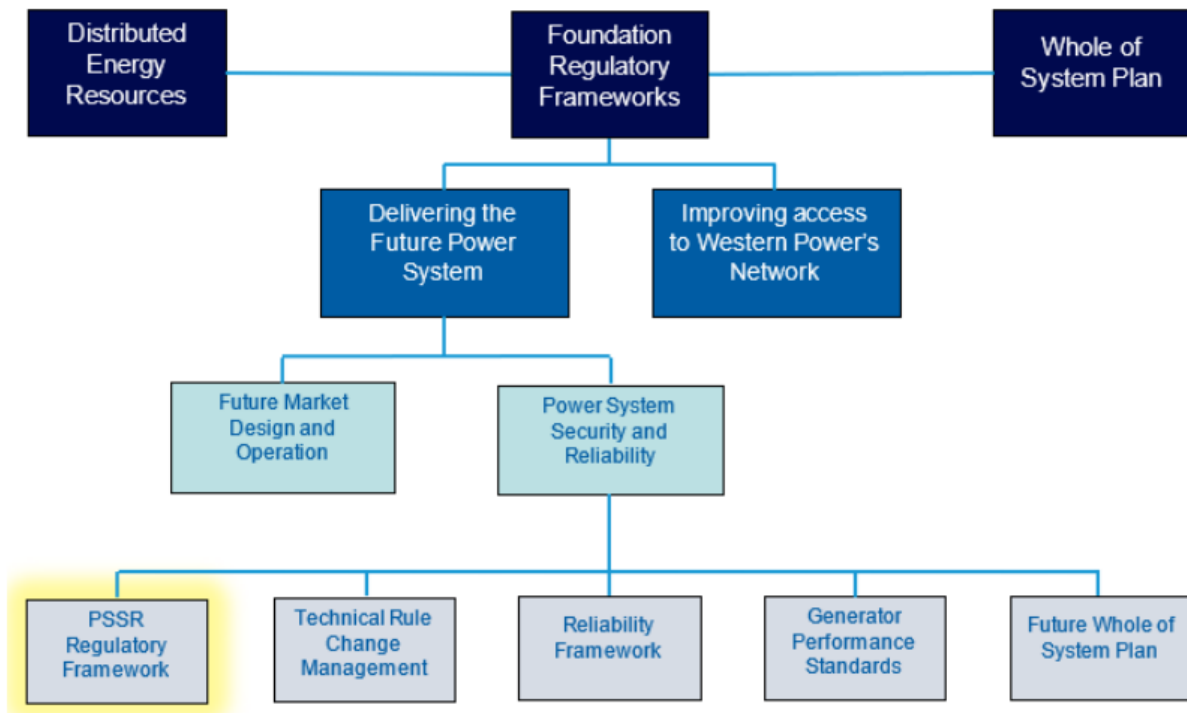
## 1.1 The Energy Transformation Strategy

On 6 March 2019, the Hon Bill Johnston MLA, Minister for Energy announced the McGowan Government's Energy Transformation Strategy (Strategy). This is the Western Australian Government's strategy to respond to the energy transformation underway and to plan for the future of our power system.

The delivery of the Strategy is being overseen by the Energy Transformation Taskforce (Taskforce), which was established on 20 May 2019. The Taskforce is supported by the Energy Transformation Implementation Unit (ETIU), a dedicated unit within Energy Policy WA.

The Strategy is being delivered under three work streams. This paper relates to the Power System Security and Reliability (PSSR) Regulatory Framework work program, which is part of the Delivering the Future Power System project, as shown in Figure 1 below. This project considers a range of measures to improve the regulatory framework to support the future secure and reliable operation of the South West Interconnected System (SWIS), acknowledging the changing generation mix and system load profile, as well as the move to a constrained network access model.

Figure 1.1: The Energy Transformation Strategy program structure



The project is being conducted in three phases.

**Phase 1:** Assessment of suitable high-level frameworks of regulations and rules to address identified problems, concluding with a decision by the Taskforce on a high-level framework for further development under Phase 2. Phase 1 was completed in July 2019 with the publication of the information paper [Power System Security and Reliability Regulatory Framework](#).

**Phase 2:** Further development of the preferred option identified in Phase 1, including a detailed assessment of regulatory and rule changes required, concluding with a decision by the Taskforce on detailed drafting instructions for all relevant instruments within the framework. This paper represents the conclusion of Phase 2.

**Phase 3:** Ministerial approval and implementation of the changes identified within Phase 2, expected to be complete by September 2020, with a commencement date of 1 February 2021 (see section 1.6).

Under Phase 1, it was determined that one of the key elements of the regulatory framework project would be the movement of generator performance standards to the Wholesale Electricity Market (WEM) Rules. The rationale for this change is two-fold. Firstly, it allows the Australian Energy Market Operator (AEMO) to have an equal role (along with Western Power) in the negotiation of generator performance standards for new generators connecting to the SWIS. Secondly, it provides for a greater range of compliance options, to ensure generators are meeting the obligations agreed at the time of connection. This in-turn allows AEMO to be confident in the management of the system that a generator will respond in predictable ways to system disturbances. Further information on the basis for the decision to move generator performance standards is provided in Section 2, and the abovementioned paper.

## 1.2 Scope

This project establishes a revised framework for generator performance standards, including the:

- relocation of revised generator performance standards, as outlined in section 1.3.2, to the WEM Rules;
- establishment of a register of generator-specific performance standards;
- development and implementation of a revised generator performance monitoring program;
- development and implementation of a framework for addressing suspected short-term non-compliance through rectification plans; and
- development and implementation of a clear and efficient framework for testing generator performance.

The revised generator performance standards under the WEM Rules will apply to new generators connecting to the transmission network that are also market participants, or intending to be market participants, as well as existing generators undertaking certain modifications.<sup>1</sup> Generators connecting to the lower-voltage distribution network and those not intending to participate in the WEM will continue to use the framework of performance standards and connection requirements specified in [Western Power's Technical Rules](#).

The register, monitoring framework and framework for addressing suspected short-term non-compliance through rectification plans will apply to both new and existing connections. Notwithstanding, to avoid the imposition of unnecessary costs, allowances will be made for some existing generators to adopt bespoke monitoring plans that take into consideration the generator's age, technology type and presence of existing monitoring equipment. ETIU will work with industry over the next 6 months to ensure a suitable process is in place to allow for such bespoke arrangements (see section 3.5.1). ETIU will also work with existing generators to accurately backfill the register, ensuring individual generator exemptions from technical standards are retained.

A robust compliance regime, including new civil penalties, is currently being developed and is scheduled for completion in late 2020. The first phase of this project was presented to the Transformation Design and Operation Working Group (TDOWG) and approved by the Taskforce in

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<sup>1</sup> Modifications that would trigger the application of the revised standards are specified as part of Western Power's connections process.

March 2020. Further information can be found in the Taskforce information paper [Generator Performance Standards – Compliance and Monitoring](#).

Matters out-of-scope include those being addressed through related projects outlined in section 1.3 below.

## 1.3 Related work

There are three separate projects being undertaken in relation to generator performance standards. Each project is discussed briefly in the subsections below, including the relationship of each project to scope of this paper.

### 1.3.1 Compliance and Monitoring Framework in the WEM

The Compliance and Monitoring Framework in the WEM project is considering an appropriate framework for compliance and monitoring with all obligations under the WEM Rules. All projects related to generator compliance and monitoring are consistent with the over-arching framework consulted-on at TDOWG on 10 March 2020 and described in the Taskforce information Paper *Compliance and Monitoring Framework in the Wholesale Electricity Market* under the Compliance and Monitoring Framework in the WEM project.

### 1.3.2 WEM Generator Performance Guideline

In December 2018, Western Power and AEMO completed a review into generator performance standards for new connections made under the Technical Rules, in light of the changing needs of the system and network. This resulted in the release of proposed standards under the [WEM Generator Performance Guideline](#). The development of the Generator Performance Guideline was informed by strong industry consultation, including workshops and a request for written submissions. The standards contained under the Generator Performance Guideline represent those standards that will be relocated to the WEM Rules. For further information on the Generator Performance Guideline, please contact Western Power at [technical.rules.review@westernpower.com.au](mailto:technical.rules.review@westernpower.com.au).

### 1.3.3 Technical Rules Review

Western Power is currently undertaking a review of its Technical Rules. While this project is not part of the Strategy, it does support several projects underway. As part of the Technical Rules Review, Western Power will remove generator standards that are to be relocated to the WEM Rules, roughly corresponding to Technical Rules section 3.3. Western Power will also undertake other modifications to the Technical Rules to support changes to the connections process arising from the relocation of the generator performance standards. For further information on the Technical Rules Review, please contact Western Power at [technical.rules.review@westernpower.com.au](mailto:technical.rules.review@westernpower.com.au).

## 1.4 Design principles

The design principles adopted by all projects relating to compliance and monitoring under the Strategy are that:

- frameworks should be efficient and future-ready;
- obligations should be easy to interpret, using unambiguous and transparent language; and
- compliance frameworks should:
  - ensure decisions are consistent, repeatable and predictable;
  - ensure a risk-based and proportionate approach to enforcing compliance;
  - ensure procedural fairness and natural justice;
  - be responsive, where possible, with minimal time between the occurrence of non-compliance and action to address non-compliance; and
  - be graduated, where possible, with a range of options to address non-compliance.

## 1.5 Consultation

The positions outlined in this paper have been reached by the Taskforce following consultation with Western Power, AEMO, and industry stakeholders. TDOWG was consulted on Phase 1 of the project in July 2019 and on Phase 2 on 6 April 2020. Individual generators were invited to meet with the ETIU project team separately to provide feedback on the proposed design, with a focus on the monitoring framework.

## 1.6 Implementation

Amendments to give effect to the framework outlined in this paper are scheduled to be implemented in the WEM Rules and Electricity Networks Access Code 2004 (Access Code) by September 2020 (see section 3.1). The commencement date for all changes will be 1 February 2021, with the exception of the framework to backfill the register of generator performance standards for existing generators (see section 3.3), which will commence from the time that the new WEM Rules are made. This will help ensure that the standards for existing generators are known prior to the commencement of the new framework.



## 2. The current framework and case for change

This section provides a brief overview of the current framework and outlines the case for change with respect to:

- the relocation of revised generator performance standards to the WEM Rules;
- the establishment of a register of generator-specific performance standards; and
- the development and implementation of a revised generator monitoring program.

The remaining matters within scope are outcomes of the monitoring framework and will be addressed in section 3. These include:

- the development and implementation of a framework for addressing suspected short-term non-compliance through rectification plans; and
- the development and implementation of a clear and efficient framework for testing generator performance.

Further information on the rationale for relocating generator performance standards to the WEM Rules is provided in the Taskforce paper [Power System Security and Reliability Regulatory Framework](#). Further information relating to the rationale for an amended monitoring framework is provided in the Taskforce paper [Generator Performance Standards – Compliance and Monitoring](#).

### 2.1 Negotiating generator performance standards

Generator performance standards are a set of technical standards that generators are required to comply with in order to ensure the safe and secure transfer of power in normal system operation and in response to contingency events. These standards include, among other things, frequency and voltage control and disturbance ride through requirements. The standards also include the requirement to maintain a computer model that accurately models generator performance, and to provide Western Power with an up-to-date version of this model.

In maintaining the security and reliability of the power system and network, AEMO and Western Power rely on generators responding to changes in system conditions in a way that is consistent with their contracted performance standards and performance models. If generators do not respond in accordance with their expected standards, the security and reliability of the power system may be compromised, or the cost of procuring energy and essential system services may increase.

The standards under which generators greater than 10 MW must connect are currently outlined under section 3.3 of Western Power's Technical Rules. If a generator believes it cannot, or should not, comply with one or more standards, under the current framework it may seek an exemption from Western Power under the Access Code. An exemption may be permanent, temporary, or subject to a trigger event.<sup>2</sup> A list of all exemptions approved by Western Power is provided on the Economic Regulation Authority's (ERA) [website](#).

The Technical Rules were developed at a time when Western Power was responsible for both network operation and system management. As such, in negotiating generator exemptions from the Technical Rules, the needs of both the network and the system were taken into consideration.

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<sup>2</sup> A trigger event describes conditions under which previously agreed actions will take place. An example is the specification of a pre-determined date (the trigger) for undertaking certain generator modifications (the action). Trigger events can assist generators in connecting to the network at a lower cost, while recognising the need to maintain system security and reliability in the event that the trigger is reached.

In 2016, system management functions were transferred to AEMO. Under the current regulatory framework, AEMO cannot be provided with obligations under the Technical Rules due to limitations in the heads of power under the *Electricity Industry Act 2004* that gives effect to the Access Code and Technical Rules. This limits the ability for AEMO to have any formal role in the approval of generator exemptions under the Technical Rules.

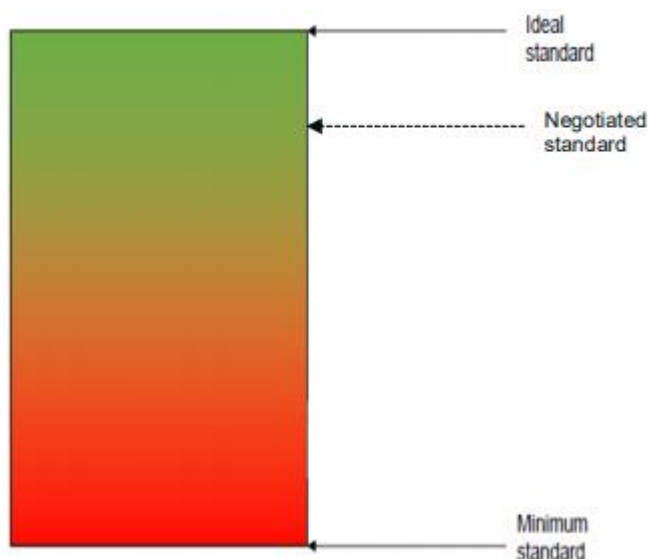
The transformation underway in the energy sector is placing increasing importance on the predictability of generator responses to system disturbances, and hence the role of system management in negotiating the standards under which these generators connect to the SWIS. Relocating the standards to the WEM Rules will enable both Western Power and AEMO to better manage their respective responsibilities of network operation and system management, with a shared role in negotiating generator performance standards and mutual viability of the standards to be maintained.

## 2.2 Revision of generator performance standards

There is currently no minimum level for generator performance standards below which a generator cannot seek an exemption from the Technical Rules. This results in inefficiencies for both generators and Western Power in negotiating generator performance standards. This contrasts with the framework under the National Electricity Market which includes a performance band between an 'ideal' and a 'minimum' standard, with the range between the two extremes representing the scope for negotiation, in the event that meeting the 'ideal' standard is impractical.

As part of the [WEM Generator Performance Guideline](#) (see section 1.3.2), Western Power and AEMO proposed that such a range also apply in the SWIS (see Figure 2.1). The 'minimum' range under the revised standards within the WEM Generator Performance Guideline reflects the lowest level of exemption provided under the Technical Rules to-date. Western Power and AEMO are careful to specify that the minimum should not be considered the starting point of negotiation, rather, a generator should be able to adequately justify any standard it proposes that falls below the 'ideal'.

Figure 2.1: Illustration of proposed performance band (supplied: Western Power)



The Generator Performance Guideline includes both revised standards under the current Technical Rules, as well as new standards that respond to the emerging needs of the system, as outlined in Table 2.1 below.

Table 2.1: Proposed standards under Western Power and AEMO's Generator Performance Guideline

Proposed standard	New/revised/unchanged
Reactive power capability	Revised
Voltage and reactive power control	Revised
Active power control	Revised
System strength	New
Inertia and frequency control	Revised
Disturbance ride-through (frequency)	Revised
Disturbance ride-through (voltage)	Revised
Disturbance ride-through (multiple contingencies)	New
Disturbance ride-through (partial load rejection)	Revised
Disturbance ride-through (quality of supply)	New
Generator protection systems	Unchanged
Quality of electricity generated	Revised, with new elements
Impact on network transfer capability	Revised
Model provision	Revised

The WEM Generator Performance Guideline currently has no legal effect, although several generators currently seeking connection are choosing to voluntarily comply with the standards. In responding to the emerging needs of the system, it is important that the revised standards are implemented as quickly as possible so that they apply to a range of new generators that are expected to begin negotiating connection to the SWIS over the coming year.

## 2.3 Compliance and enforcement

Under the current framework, once a generator has connected, the enforcement options for non-performance available to Western Power and AEMO are effectively limited to requiring the generator to reduce its output or disconnect from the network.

With respect to reducing a generator's output, there is a difference between the powers that accrue to Western Power under the Technical Rules and AEMO under the WEM Rules:

- the Technical Rules allow Western Power to direct the generator to operate at a particular output where it has reason to believe a generator is non-compliant; while
- the WEM Rules require AEMO to be both satisfied that the generator's computer model does not represent actual performance and hold a reasonable opinion that the inadequacy of this data impedes its ability to carry out its functions in relation to power system security and power system reliability.

In effect, the ability for AEMO to undertake a direction as described above is limited by AEMO's ability to demonstrate firstly that the generator's computer model is inaccurate (this requires observation of actual events under specific scenarios) and that the model inaccuracy has a direct impact on power system security. In addition, the impact of some types of non-compliance with generator performance standards can be masked by the procurement of additional essential system services (such as frequency regulation) which results in additional costs to the market. Furthermore,

the use of directions to reduce output to manage non-compliance with generator performance standards may be disproportional to the effect that the non-compliance has on the power system and may, in fact, expose the system to other security and reliability risks. As such, the use of directions is not considered the best mechanism for the overall management of non-compliance with generator performance standards.

Under the Technical Rules, Western Power can disconnect a generator from the network if it gives a direction to a generator to operate at a certain level of output and the generator neglects or fails or comply with that direction, or if Western Power is unable to communicate a direction to operate at a certain output within a reasonable timeframe. While the ability to disconnect a generator is an important feature of a compliance framework, this is an extreme course or action that can itself jeopardise power system security or reliability. As a result, this option is not suitable for the majority of non-compliance matters.

An effective compliance framework for generator performance standards is important to ensure that AEMO and Western Power can rely on the expected response of generators, based on agreed performance standards. Relocating generator performance standards to the WEM Rules provides a greater range of proportional and responsive compliance options that are readily enforceable.

## **2.4 Visibility of generator performance standards**

The Technical Rules apply to generators that connected from 2007, with a Western Power Technical Code applying to generators that connected between 1997 and 2007. Those generators that connected prior to 1997 connected under internal planning standards within the former State Energy Commission of Western Australia.

While the reference standards for all generators are reasonably similar, only exemptions from 2007 are required to be made publicly available (see section 2.1). Exemptions prior to 2007 are only contained within individual generator contracts. This creates a problem whereby all the standards for existing generators are not known across both Western Power and AEMO, despite both parties requiring such information in their respective functions as network operator and system manager. This lack of a 'single source of truth' also creates challenges for ensuring compliance with generator performance standards, as the standard to which a generator should be performing is difficult to obtain.

A register of all generator performance standards, assessable by Western Power, AEMO and the ERA will assist all parties to undertake their functions effectively and enable generators to be held accountable to their specific performance standards.

## **2.5 Monitoring framework**

Section 3.3.4 of the Technical Rules sets out the monitoring regime for generators connecting to Western Power's network. Generators already connected at the time the Technical Rules were established are subject to a general exemption under clause 1.9.4. Notwithstanding, clause 1.9.5 obliges existing generators to ensure that generation equipment is monitored on an ongoing basis and ensure its continued safety and suitability as the conditions on the power system change.

Very few generators connected to Western Power's network currently have an agreed monitoring program in place. Those that do report to Western Power periodically, with Western Power undertaking tests to verify the monitoring reports provided.

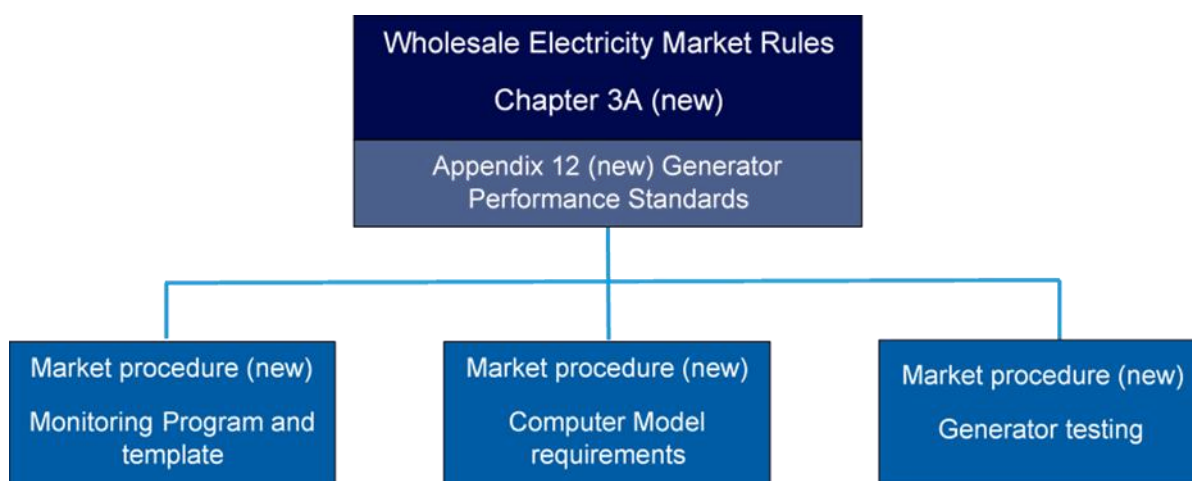
Transparency of ongoing generator performance through a suitable monitoring program for all generators covered under the framework is essential in managing the emerging needs of the power system. Given the limitations in enforcing non-compliance under the Technical Rules, it is desirable for the future monitoring regime to be located within the WEM Rules, which provides for a more appropriate range of compliance options.

## 3. Changes to the generator performance standards framework

### 3.1 The new regulatory framework

The new regulatory framework for generator performance standards (including monitoring and compliance) will be implemented through a new Chapter 3A and Appendix 12 of the WEM Rules, as well as several new Market Procedures (Figure 3.1). Changes to the Access Code will also be required.

Figure 3.1: Overview of the regulatory framework for generator performance standards and monitoring



The new Chapter 3A of the WEM Rules will include:

- the framework for the negotiation of generator performance standards;
- a requirement to establish and maintain a register of generator performance standards;
- a requirement for a generator self-monitoring program, including heads of powers for a Market Procedure to specify the detailed requirements;
- the framework for addressing early suspected non-compliance through rectification plans;
- the ability for AEMO and Western Power to undertake non-invasive, centralised monitoring of generator performance;
- heads of power for a Market Procedure, outlining testing requirements for generators; and
- heads of power to establish a Market Procedure that provides detailed information of generator computer model requirements, and any other items that require specification under Appendix 12.

Appendix 12 will specify individual generator performance standards as described in the [WEM Generator Performance Guideline](#) (summarised in Table 2.1) that generators must comply with in order to connect.

The new Market Procedures include:

- an AEMO Market Procedure outlining the detailed requirements for a generator self-monitoring program, including a template self-monitoring plan (see section 2.5);
- an AEMO Market Procedure providing generator testing requirements during the connection process and monitoring framework; and

- a Western Power Market Procedure specifying the detailed requirements for generator computer models. This Market Procedure supports the Appendix 12 requirement for computer models, and replaces the [Western Power Generator and Load Model Guidelines](#).

Amendments are also required to Appendix 6 of the Access Code to limit the range of matters to be addressed by the Technical Rules. This will ensure that, following the relocation of the performance standards for new connections of market participants with transmission connected generation systems to the WEM Rules, the overlapping standards can be removed from the Technical Rules. These changes are expected to be released for public consultation shortly.

#### Taskforce decisions

- A new Chapter 3A, Appendix 12 and new market procedures will be developed, establishing a framework for the application of revised performance standards and monitoring programs for market participants with transmission connected generation.
- Amendments to the Access Code will be progressed to limit the scope of the Technical Rules to exclude those standards that will now be covered under the WEM Rules.

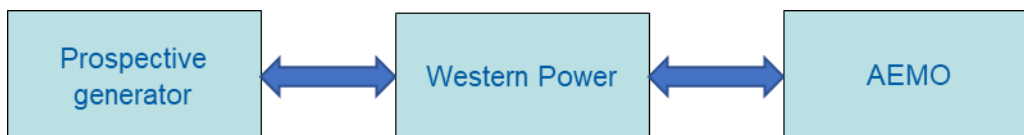
## 3.2 Connection and negotiation

### 3.2.1 Negotiation process

A key feature of the connection framework is that both AEMO and Western Power will have a shared role in the approval of any proposed negotiated generator performance standards.<sup>3</sup> Notwithstanding this shared role, prospective generators will continue to undertake the connection process directly with Western Power, including the proposal and negotiation of standards.

While nothing in the framework will prevent the prospective generator from directly discussing the proposed connection with AEMO (or Western Power and AEMO jointly), Western Power will undertake an intermediary role in formal negotiations, as per Figure 3.2 below.

Figure 3.2: Negotiation between prospective generators, Western Power and AEMO



This framework provides a more efficient outcome by ensuring that all parties have access to the same information, and that generators are not required to engage with multiple parties in relation to the same matters.

### 3.2.2 Obligations on the prospective generator

For most of the generator performance standards specified in Appendix 12, prospective generators may accept the ideal standard, or may propose a negotiated standard. Negotiated standards must not be less onerous than the minimum standard, and must be as close to possible to the ideal standard, having regard to:

- the need to protect the generator from damage;

<sup>3</sup> A negotiated standard is a standard proposed by a prospective generator that is above the 'minimum' but below the 'ideal' standard, as outlined in the new Appendix 12 of the WEM Rules.

- power system conditions at the location of the proposed connection; and
- the commercial and technical feasibility of complying with the ideal standard.

Where a standard allows for negotiation, and the generator wishes to negotiate that standard, it must provide reasons why it believes it should not meet the ideal standard, including supporting evidence. It must also supply any information required by Western Power to demonstrate that the proposed negotiated standard is appropriate, taking into consideration Western Power's obligations in relation to approving negotiated standards (see section 3.2.4).

### 3.2.3 Trigger events

As part of a negotiated standard, trigger events may be proposed by the prospective generator, Western Power or AEMO. Trigger events are conditions on which negotiated standards are dependent. This may cover a particular negotiated standard or group of negotiated standards. Trigger events may include time (e.g. a specified future date), the connection of additional generation, changes in system or network conditions, or any other mutually agreed event. Upon reaching the trigger event, generators are generally required to undertake certain actions, for example, ensuring compliance with a higher standard or providing for additional network investment. When negotiating trigger events, the following must be specified:

- the conditions for determining whether the trigger event has occurred;
- the party responsible for determining that the trigger event has occurred;
- actions to be taken, including any revised generator performance standards that apply, and any timeframes for completing the actions;
- information or supporting evidence to demonstrate that any agreed investment will occur and will deliver the level of performance agreed; and
- any testing requirements to verify compliance with any revised standards.

If a negotiated standard includes a trigger event, and that trigger event subsequently occurs, all actions agreed as part of that trigger event must be undertaken within the required timeframe.

### 3.2.4 Obligations on Western Power

Obligations will be placed on Western Power to ensure that its connections process is consistent with the framework. Under these obligations Western Power will:

- be obliged to use the generator performance standards under the new Appendix 12 for market participants<sup>4</sup> proposing to connect generation to Western Power's transmission network;
- not be permitted to accept a negotiated standard below the minimum standard under Appendix 12 and must accept a standard that meets the ideal requirements;
- be required to consult with AEMO on any negotiated standard under Appendix 12 that it does not reject<sup>5</sup>, and will not be permitted to approve a negotiated standard unless AEMO also approves the standard;

<sup>4</sup> Including those intending to register as a market participant in relation to the generator connection.

<sup>5</sup> For example, in instances where Western Power would not accept a negotiated standard, it would not be required to consult with AEMO on that negotiated standard.



- not be permitted to accept a negotiated standard if it believes that the negotiated standard will adversely affect power system security or reliability, or negatively affect the quality of supply for other users; and
- be required to provide a generator the reasons for rejection of a proposed standard; any recommendations provided by AEMO; and an alternative standard that would be acceptable. An alternative standard may be the ideal standard.

In consulting with AEMO, Western Power will be required to provide all information necessary for AEMO to undertake its assessment of the suitability of the negotiated standard. This may also require Western Power to provide additional analysis, or request additional data or supporting information from the generator.

### 3.2.5 Obligations on AEMO

Obligations placed on AEMO in relation to negotiating generator performance standards include that:

- AEMO must consider all proposed negotiated standards received by Western Power and must use best endeavours to respond in a reasonable timeframe; and
- following consideration, AEMO may accept the proposed standard, reject the proposed standard, or request further information:
  - AEMO must reject a negotiated standard if it believes that it will adversely affect power system security or power system reliability.
  - If rejecting the proposed standard, AEMO must state the reasons for rejecting the standard, and an alternative standard that it would accept. An alternative standard may be the ideal standard.

As noted in section 3.2.1, prospective generators may informally discuss the proposed negotiated standards directly with AEMO (or with Western Power and AEMO jointly) and AEMO will be permitted to use all information available to it in assessing the suitability of a proposed negotiated standard.

#### Taskforce decisions

- The negotiation and connection framework as described in section 3.2 will be included within a new Chapter 3A of the WEM Rules.

## 3.3 Register of generator performance standards

A central register of generator performance standards will be created and maintained by Western Power. For each transmission connected generating unit, the register will include the:

- status of connection;<sup>6</sup>
- performance standards related to Appendix 12, including any negotiated performance standards and trigger events;
- generator's computer model; and
- AEMO approved generator monitoring plan (see section 3.5).

While the above are minimum requirements, Western Power may choose to include additional information relevant to any generator, including generators that are not subject to the new framework under the WEM Rules, such as distribution connected generators.

<sup>6</sup> For example, it will indicate whether the generator has received final approval to operate, or is still undertaking the connections process.

The register will initially be populated at the time the connection contract is agreed, but will be updated to include the monitoring plan prior to the generator being provided with final approval to operate (see section 3.4).

Existing generators will be included in the register, although as noted in section 1.2, further work is required to determine the applicable standards for some older generators and ensure appropriate monitoring plans are in place. In some cases, existing generators may be required to provide additional information on generator performance that was not necessary to collect at the time the generator connected to the network, or information that may have changed over time<sup>7</sup>. A process for backfilling the register will be developed for commencement around September 2020, in preparation for the commencement of the new framework in February 2021.

Over time, it may be necessary to update the register, for example, where generators undertake certain modifications to the generating unit, update computer models, or make changes to its market registration. While Western Power will be responsible for all undertaking all such updates to the register, it will be the generator's responsibility to advise Western Power of changes to the generating unit or market registration that require subsequent changes to the register.

While the register will not be publicly available, Western Power will be required to share the minimum contents of the register with AEMO in accordance with agreed processes. The information will be considered Rule Participant Market Restricted.<sup>8</sup>

Western Power must also share the minimum contents of the register with the ERA to assist it in undertaking future compliance functions noted in section 1.2. If requested by a generator, Western Power will be required to provide the contents of the register that is relevant to that generator.

#### **Taskforce decisions**

- Western Power will be required to establish and maintain a register, including minimum information requirements for market participants with transmission connected generating systems.
- Western Power will be required to share the minimum contents of the register with AEMO and the ERA, as well as market participants who request information on their generating system.
- Further work will be undertaken to develop a process for backfilling the register for existing generators.

### **3.4 Testing and commissioning**

As part of the current connection process, generators must undertake certain testing to verify performance with the agreed standards. Under the new framework, AEMO will develop a Market Procedure which will include the testing requirements for generators to verify performance, including those that may relate to the self-monitoring program (see section 3.5.1). Generators will then be required to undertake the relevant tests outlined in the procedure.

Prior to granting final approval to operate, the framework will support an interim approval to operate which will allow the generator to operate in the WEM, subject to review of commissioning test results.

Following the testing and commissioning phase, Western Power may grant the generator final approval to operate. However, it can only do so if:

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<sup>7</sup> It is expected that this will include updated computer models.

<sup>8</sup> See WEM Rule 10.2.2.

- a monitoring plan has been approved by AEMO and has been applied to the register (see sections 3.3 and 3.5.1);
- the operational performance of the generator is considered satisfactory by both Western Power and AEMO; and
- the generator has demonstrated compliance to Western Power and AEMO's satisfaction with the applicable generator performance standards.

If, during the testing and commissioning phase, and prior to being granted final approval to operate, a generator is unable to meet the agreed standard, the generator must undertake remedial works to perform to the agreed standards. Where it can be demonstrated by the generator that remedial works are not feasible, the generator may be permitted to renegotiate the relevant standards. However, renegotiation of standards will only be permitted by agreement with Western Power and AEMO.

Where all parties agree to renegotiate, the framework for negotiation outlined in section 3.2 will apply. In instances where Western Power or AEMO do not agree to renegotiate, the generator must make the appropriate modifications required in order to comply with the agreed standards.

#### **Taskforce decisions**

- The framework for testing to confirm compliance with agreed performance standards as described in section 3.4 will be included within a new Chapter 3A of the WEM Rules and a Testing Market Procedure.

## **3.5 Monitoring framework**

### **3.5.1 Self-monitoring**

Under the new framework, all market participants with transmission-connected generating facilities will be required to have a suitable self-monitoring plan in place. As discussed previously, further work will be undertaken with industry to develop a process for ensuring existing generators have a suitable self-monitoring plan. This will include the potential for bespoke monitoring plans, where it can be demonstrated that the implementation of the self-monitoring template will impose unnecessary costs on the generator, given the age and technology type of the generator, as well as existing monitoring equipment already in place. As such, the remainder of this section applies only to Market Participants connecting new generation to Western Power's transmission network.

The new Chapter 3A of the WEM Rules (see section 3.1) will require AEMO to develop a Market Procedure specifying the requirements of the self-monitoring program, including a template self-monitoring plan.

The self-monitoring program will include:

- AEMO's process for the assessment of self-monitoring plans submitted by generators;
- AEMO's process for generator's seeking to modify a previously approved self-monitoring plan;
- the processes that generators must undertake when reporting suspected non-compliance, including rectification plans (see section 3.6); and
- the requirements (e.g. timeframes, data) in relation to providing information to the ERA, Western Power or AEMO when requested, and in relation to self-reporting suspected non-compliance.

The self-monitoring template will include:

- how the generator must monitor performance against each of the applicable generator performance standards; and
- the information a generator must retain in relation to the monitoring of each generator performance standard.

New generators will be required to adopt a self-monitoring plan consistent with a template for AEMO's approval. AEMO will be obliged to approve a self-monitoring plan if it believes it is consistent with the template, and may reject a self-monitoring plan if it does not believe it is consistent with the template. Once approved, generators will be required to provide the plan to Western Power for recording on the register (see section 3.3). Western Power will be prohibited from providing final approval to operate (see section 3.4) unless AEMO has approved the generator's self-monitoring plan, and this is recorded on the register.

The framework allows for flexibility in the template, such that different timeframes may apply to the testing or monitoring of each generator performance standard. Furthermore, any standards that are tested or monitored through other mechanisms can be taken as compliant with the template, reducing the potential for duplication.

Once a self-monitoring plan is in place, a generator will be required to monitor its compliance in accordance with that plan and inform AEMO of any suspected non-compliance with any of its generator performance standards. Generators that are unable to carry-out the requirements of the monitoring plan, must also advise AEMO on becoming aware of the inability to comply with the requirements, and may negotiate a rectification plan (see section 3.6.1).

While generators are not required to provide the outcomes of self-monitoring plans on a regular basis, this information must be provided if requested at any time by AEMO, Western Power or the ERA. AEMO will be permitted to request this information if it believes that receiving the information would assist it in undertaking its system management functions. Similarly, Western Power will be permitted to request this information if it believes that receiving the information would assist it in undertaking its role as network operator. Finally, the ERA will be permitted to request this information at any time, for the purposes of monitoring compliance with the self-monitoring plan, or any other generator requirement under the WEM Rules.<sup>9</sup>

Where AEMO seeks to make changes to the Market Procedure, including to the self-monitoring plan template, retrospective application will be permitted. This may require modifications to a generator's existing self-monitoring plan. In such instances, changes to the self-monitoring plan must be undertaken and submitted to AEMO for approval within six months from the date that the Market Procedure is amended. Generators may also wish to request changes to the generator's self-monitoring plan, although any modifications must continue to be consistent with the template self-monitoring plan, and be approved by AEMO. The process by which generators submit changes to the self-monitoring plan (whether at the generator's own discretion, or to reflect changes to the self-monitoring plan template) will be included within the Market Procedure.

### 3.5.2 Centralised monitoring

While self-monitoring plans are the primary means by which generator monitoring will be undertaken under the new framework, central non-invasive monitoring will be permitted as a complimentary measure to provide an additional, cost-effective way of ensuring compliance.

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<sup>9</sup> For example, the ERA may request this information following an incident, to assist in demonstrating that a generator was compliant with its generator performance standards at the time of the incident.

Some relatively simple, non-invasive methods can be used to monitor a subset the generator performance standards that affect the day-to-day operation of the power system. This includes the use of SCADA, which collects data under normal conditions and high-speed data recorders which can provide post system event monitoring. Active and reactive power and voltage is measured at the terminal of most generators.

The Taskforce does not consider it necessary for the WEM Rules to mandate that Western Power or AEMO carry out centralised monitoring on a specified schedule. However, the new Chapter 3A of the WEM Rules will allow AEMO and Western Power to undertake centralised monitoring, as required, of generator performance across the system and network for the purposes of managing power system security and reliability.

#### **Taskforce decisions**

- The self-monitoring framework, as described in section 3.5.1 will be included within a new Chapter 3A of the WEM Rules and an AEMO Monitoring Program Market Procedure.
- AEMO and Western Power will be permitted to undertake centralised monitoring.

## **3.6 Addressing early non-compliance**

Generators will be required to report suspected non-compliance with generator performance standards or monitoring plans to AEMO immediately after detecting the suspected non-compliance. This applies whether the suspected non-compliance was detected as part of the self-monitoring plan, or through other means.

### **3.6.1 Rectification plans**

At the time of reporting suspected non-compliance, generators will be able to request the negotiation of a rectification plan with AEMO. If agreed, generators will be required to submit the rectification plan within 10 business days for AEMO approval, unless an alternative timeframe is agreed between the generator and AEMO. One of the key benefits of negotiating a rectification plan is that an amnesty period will apply, whereby the ERA will not investigate the alleged breach while action is taken to address the suspected non-compliance in accordance with the plan (see section 3.6.2).

In addition to self-reporting of suspected non-compliance, rectification plans may be negotiated where suspected non-compliance is detected by AEMO or Western Power through centralised monitoring (see section 3.5.2) or any other means.

At a minimum, rectification plans must include:

- the actions to be taken to rectify the suspected non-compliance;
- the timeframes for the generator to become compliant; and
- any testing required to establish compliance with applicable generator performance standards.

AEMO must undertake best endeavours to assess a generator's rectification plan within 10 business days. Where the rectification plan relates to suspected non-compliance with generator performance standards, AEMO will be required to consult with Western Power and will not be permitted to approve a rectification plan unless Western Power also approves. This is because non-compliance may affect network operation, or the testing requirements as part of the rectification plan may require Western Power to undertake certain actions.

If Western Power does not approve a rectification plan, it must provide AEMO with the reasons for its decision. Where a rectification plan is not agreed, AEMO must advise the generator of the reasons for its decision, and where the reason is due to a Western Power decision, provide the generator with the reasons for Western Power's decision.

If a rectification plan is agreed, generators must undertake rectification of suspected non-compliance in accordance with the plan. If it becomes apparent that a generator cannot comply with the terms of the rectification plan, it must advise AEMO as soon as reasonably practicable.

A generator may wish to seek a modification to the rectification plan, for example, to seek additional time to undertake the required activities. The framework will allow for changes to a rectification plan to be made by agreement with AEMO and Western Power. Changes could be proposed at any stage in the process, including following testing, if performance is not as expected.

There may be instances where a generator fails to meet the requirements of the rectification plan, and modifications to the plan cannot be agreed. In such cases, AEMO will cancel the rectification plan and will be required to notify the ERA of an alleged breach of the generator's generator performance standards.

The framework described diagrammatically in appendix A.1.

### 3.6.2 Amnesty period

While it is expected that most early suspected non-compliance will be remedied through rectification plans under an amnesty arrangement, the amnesty period will not apply if, in AEMO's view, the suspected non-compliance:

- would threaten system security or system reliability; or
- justifies the ERA commencing an investigation in accordance with clause 2.13.10 of the WEM Rules.

In such instances, AEMO will immediately allege a breach of the WEM Rules, with the ERA commencing an investigation.

Notwithstanding the above, in most cases it is expected that a generator and AEMO will agree to the development of a rectification plan, and an amnesty period will commence. Under this scenario, no action will be taken by the ERA in relation to the suspected non-compliance. The amnesty period ceases when the rectification plan is:

- successfully completed, with the suspected non-compliance addressed;
- not developed within the required timeframe;
- submitted, but not agreed by AEMO or Western Power; or
- cancelled by AEMO, because:
  - the generator did not adhere to the rectification plan (and appropriate amendments to the rectification plan were not agreed); or
  - actions under the agreed rectification plan were completed, but testing showed that the generator remained non-compliant with its generator performance standards (and appropriate amendments to the rectification plan were not agreed).

The amnesty period is also represented in appendix A.1.

While there are clear benefits to negotiating a rectification plan, nothing will prevent a generator from taking action to rectify suspected non-compliance, even if a rectification plan is not agreed, or if a rectification plan is still in negotiation.

### 3.6.3 Communication

AEMO will be required to notify the ERA, as soon as practicable, under the following circumstances:

- after becoming aware of a generator's suspected non-compliance, whether through self-reporting by a generator, reporting by Western Power, or through other means. At this time AEMO will also notify if a rectification plan is to be developed;
- if, after advising of the intention to develop a rectification plan, a plan is not subsequently agreed<sup>10</sup>;
- after a rectification plan is agreed. A copy of the plan must also be provided;
- if any amendments to an existing rectification plan are agreed. A copy of the amended rectification plan must also be provided;
- after cancelling a rectification plan; and
- following the successful completion of a rectification plan.

AEMO will allege a breach of the WEM Rules in instances where the rectification plan is either not approved, or an approved rectification plan is cancelled due to a generator failing to meet the requirements of the rectification plan. The ERA will investigate all alleged breaches in accordance with clause 2.13.10 of the WEM Rules.

AEMO must advise Western Power, as soon as practicable, after becoming aware of suspected non-compliance of a generator with its generator performance standards, whether through self-reporting by a generator, or through other means. Similarly, Western Power must advise AEMO, after becoming aware of suspected non-compliance.

#### **Taskforce decisions**

- The framework for addressing early suspected non-compliance, as described in section 3.6 will be included within a new Chapter 3A of the WEM Rules and a Monitoring Program Market Procedure.

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<sup>10</sup> For example, due to a failure to meet the timeframes for submitting a rectification plan, or because the generator and AEMO cannot agree to the terms of the rectification plan.

## 4. Next steps

Public consultation on draft amendments to the WEM Rules and Access Code (see section 3.1) to implement the framework outlined in this paper is anticipated in May 2020, with the final changes to implemented in September 2020.

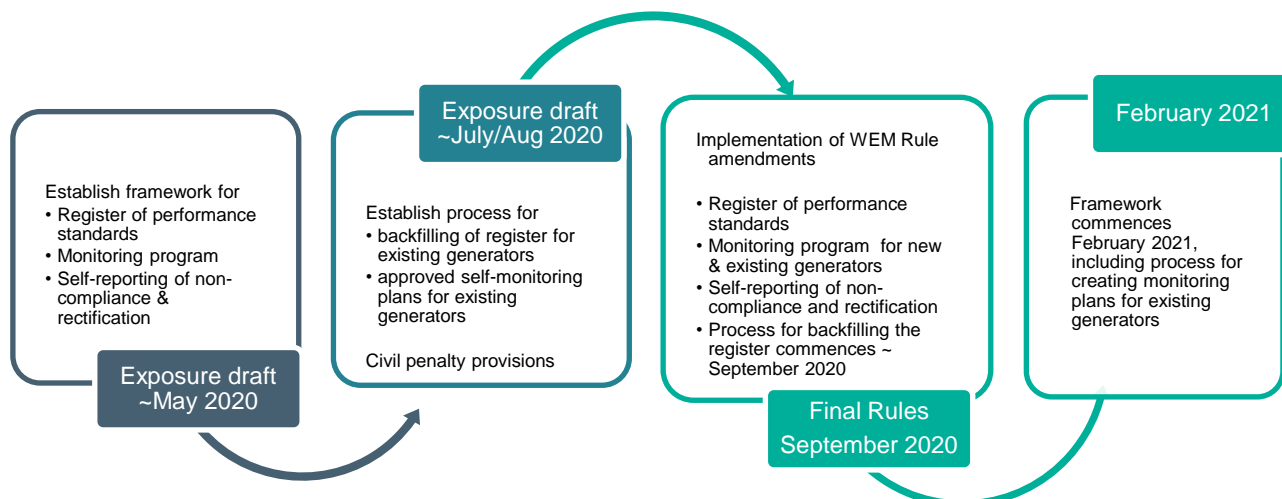
Work is currently underway on the means by which the register is backfilled for existing generators. This includes targeted consultation with generators connecting prior to 2007, where exemptions from the Technical Rules are not publicly available. Similarly, ETIU will work with industry, AEMO and Western Power on the development of an alternative framework for the adoption of monitoring plans for existing generators. The final design of this work is expected around September 2020, including relevant amendments to the WEM Rules.

As noted in section 1.2, a compliance framework is currently in development, including the implementation of new civil penalty provisions to be associated with certain rules under the new Chapter 3A of the WEM Rules. This work is also expected to be complete around September 2020. For further information on the compliance framework, please refer to the paper [Generator Performance Standards- Compliance and Monitoring](#).

Industry consultation on the development of new Market Procedures is expected to commence towards the end of 2020, prior to the commencement date for the new framework on 1 February 2021.

The anticipated timeframes for each work package is represented in Figure 4.1.

Figure 4.1: Implementation timeframes





# A.1 Rectification plan process

