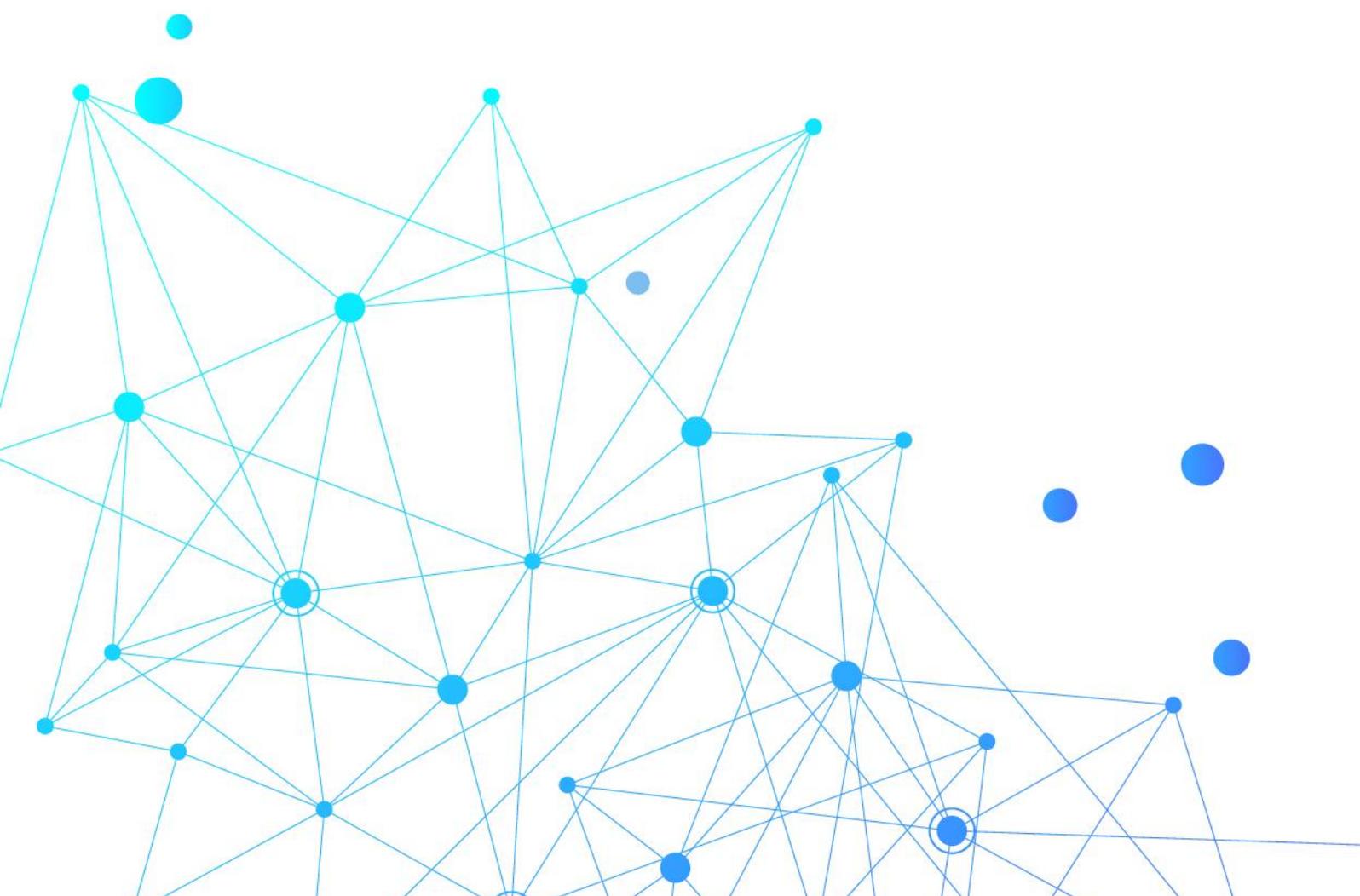




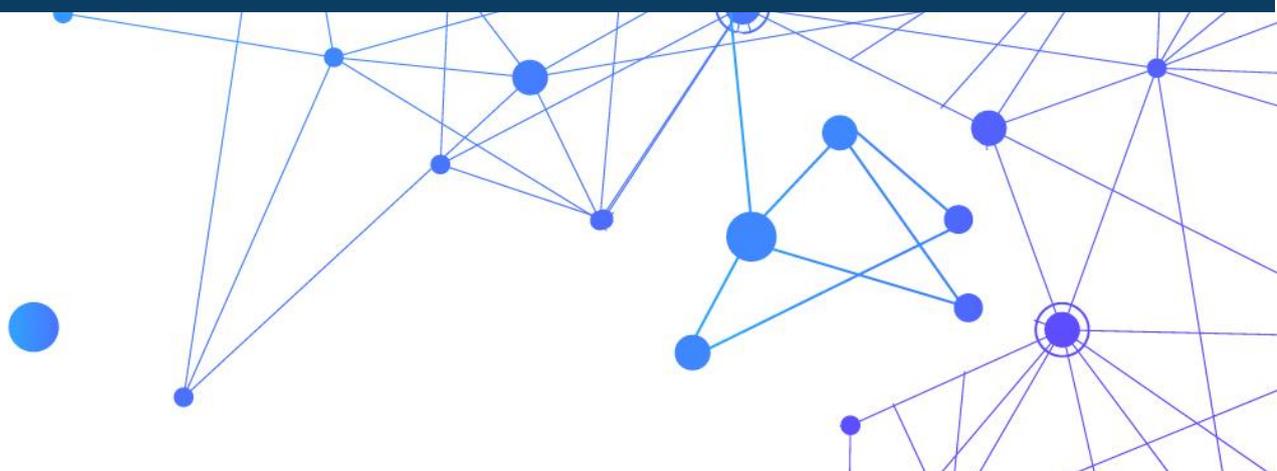
# Energy Transformation Taskforce



## Power System Security and Reliability Regulatory Framework

Information Paper

July 2019



# Contents

1. Introduction.....	1
1.1. Energy Transformation Strategy.....	1
1.2. Purpose and scope .....	1
1.3. Matters outside of scope .....	2
1.4. Consultation .....	4
2. Current situation .....	5
2.1. Regulatory framework .....	5
2.2. Challenges with the current regulatory framework.....	6
3. Modifications to address identified challenges .....	8
3.1. Movement of relevant generator performance standards from the Technical Rules to the WEM Rules .....	8
3.2. Movement of frequency operating standards from the Technical Rules to the WEM Rules .....	10
3.3. Regulatory alignment and coverage .....	10
4. Next Steps .....	11

# 1. Introduction

## 1.1. Energy Transformation Strategy

The energy sector is undergoing an unprecedented transformation in the way electricity is supplied and used. More households and small businesses than ever are installing solar photovoltaic and battery systems to control electricity bills. At the same time, large-scale renewable generators are supplying an increasing amount of our electricity needs.

The intermittent and in some cases uncontrolled nature of these energy sources is presenting challenges to maintain the security, reliability and affordability of the power system, particularly in the South West Interconnected System (SWIS).

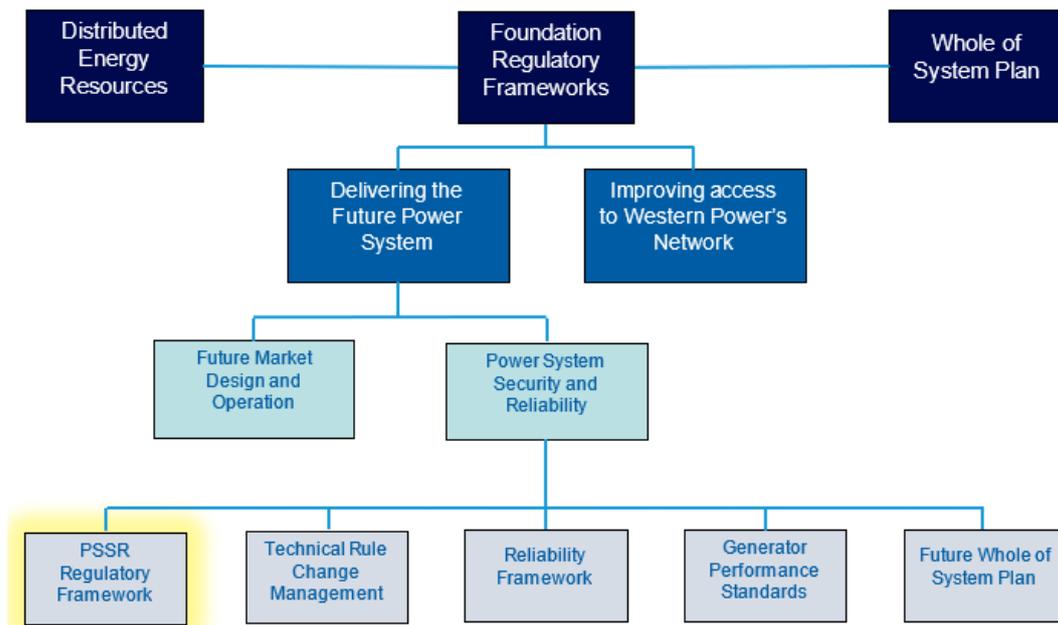
To address these challenges, on 6 March 2019, the Hon Bill Johnston MLA, Minister for Energy announced the McGowan Government’s Energy Transformation Strategy. This is the Western Australian Government’s strategy to respond to the energy transformation underway and to plan for the future of our power 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 the Department of Treasury.

More information on the Energy Transformation Strategy, the Taskforce and ETIU can be found on the Energy Transformation website at <http://www.treasury.wa.gov.au/Energy-Transformation/>.

## 1.2. Purpose and scope

The Power System Security and Reliability (PSSR) Regulatory Framework project forms part of the Delivering the Future Power System work stream of the Energy Transformation Strategy (Figure 1).

Figure 1: The PSSR Regulatory Framework project in the context of the Energy Transformation Strategy program structure.



The project will make improvements to the PSSR regulatory framework to support the future secure and reliable operation of the SWIS, acknowledging the changing generation mix and system load profile, as well as the move to a constrained network access model.

The PSSR Regulatory Framework 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 Energy Transformation Taskforce (the Taskforce) on a high-level framework for further development under Phase 2. The publication of this paper completes Phase 1.

**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. Phase 2 will be completed by the end of 2019.

**Phase 3:** Public consultation, Ministerial approval and implementation of the changes identified within Phase 2. As the changes required will likely affect a range of instruments that have dependencies with other projects, amendments to instruments are expected to be made incrementally and sequentially, rather than in a single 'big bang'. Phase 3, including consultation on specific changes to instruments through the release of draft rules and regulations, will occur throughout 2020.

The following represents the instruments in the current framework which are of relevance to PSSR.

- The *Electricity Networks Access Code 2004* (Access Code)
- The *Electricity Industry (Access Code Enforcement) Regulations 2005*
- Western Power's Technical Rules
- The *Electricity Industry (Wholesale Electricity Market) Regulations 2004* (WEM Regulations)
- Wholesale Electricity Market Rules (WEM Rules)
- The *Electricity Industry (Network Quality and Reliability of Supply) Code 2005* (NQRS Code)

The instruments specified above are within scope for considered amendments, noting that under the current framework, proposals to amend Western Power's Technical Rules can only be made by Western Power. As such, changes required to the Technical Rules will be referred to Western Power for action.

## 1.3. Matters outside of scope

### *Changes to primary legislation*

Addressing identified problems with the PSSR framework through changes to primary legislation presents a risk to the timely implementation of changes needed to address

system security and reliability risks, such as those outlined in the Australian Energy Market Operator's (AEMO) March 2019 paper *Integrating Utility-scale Renewables and Distributed Energy Resources in the SWIS*.<sup>1</sup>

In response to this risk, the Taskforce considered both legislative and non-legislative options to address the problems identified in section 2.2 and has determined that a non-legislative approach can suitably deliver the required outcomes.

### **Review of standards, definitions and other PSSR standards**

The PSSR Regulatory Framework project is limited to the frameworks of regulations and rules underpinning PSSR standards<sup>2</sup>, rather than the standards themselves.

Specific PSSR standards are currently being reviewed by AEMO and Western Power<sup>3</sup>, in collaboration with ETIU. Some proposed changes have already been considered by stakeholders through the Power System Operation Working Group (PSOWG)<sup>4</sup> under the Market Advisory Committee. Additional PSSR standards will continue to be considered through the Transformation Design and Operations Working Group (TDOWG)<sup>5</sup> through the remainder of 2019.

These proposed standards will be considered as inputs for Phase 3 of this project, as well as other projects, such as the Essential System Services work package within the Delivering the Future Power System work stream of the Energy Transformation Strategy.

### **Technical Rules governance**

The governance arrangements for Western Power's Technical Rules are being developed through a related project under the Energy Transformation Strategy, with detail outlined in the information paper titled *Improving Technical Rules Change Management Process*<sup>6</sup>.

### **Rule Change Panel Regulations**

A review of the *Energy Industry (Rule Change Panel) Regulations 2016* (RCP Regulations) is currently being undertaken by the Public Utilities Office (PUO). Changes to the RCP Regulations to support modifications to the PSSR framework outlined in this paper will be considered as part of PUO's review, and hence is not within scope of the PSSR Regulatory Framework project.

---

<sup>1</sup> AEMO (2019) *Integrating Utility-scale Renewables and Distributed Energy Resources in the SWIS* [http://aemo.com.au/-/media/Files/Electricity/WEM/Security\\_and\\_Reliability/2019/Integrating-Utility-scale-Renewables-and-DER-in-the-SWIS.pdf](http://aemo.com.au/-/media/Files/Electricity/WEM/Security_and_Reliability/2019/Integrating-Utility-scale-Renewables-and-DER-in-the-SWIS.pdf)

<sup>2</sup> The term 'standards' is used broadly to encompass all PSSR related standards, definitions, criteria, procedures and other such arrangements.

<sup>3</sup> For example, Western Power is undertaking a review of its Technical Rules and AEMO is reviewing frequency operating standards, definitions of operating states and credible contingency events, in collaboration with industry.

<sup>4</sup> The PSOWG was a working group of the Market Advisory Committee. It consisted of industry participants and interested members of the public. Further information can be found at [www.erawa.com.au/rule-change-panel-psowg](http://www.erawa.com.au/rule-change-panel-psowg)

<sup>5</sup> In August 2019, the ETIU established the TDOWG, replacing the PSOWG and the Market Design and Operations Working Group.

<sup>6</sup> The *Improving Technical Rules Change Management Process* Information Paper is available on the ETIU website at <https://www.treasury.wa.gov.au/Energy-Transformation/Publications/>

## ***Distributed energy resources***

In aggregate, distributed energy resources (DER)<sup>7</sup>, can have a significant effect on PSSR. These issues are primarily being addressed as part of the DER work stream and Essential System Service work package of the Energy Transformation Strategy, and as such are not directly addressed within this paper. Notwithstanding, the PSSR Regulatory Framework project is being pursued with reference to those projects, with project teams being mindful of possible interdependencies.

## ***Microgrids***

There is a growing interest in the potential for microgrids to assist in the management of a range of challenges facing the power system. This is reflected in the several pilot projects underway by Western Power, Synergy, Horizon Power and private network owners. Microgrids are also the subject of the *Inquiry into Microgrids and Associated Technologies in WA* (Microgrids Inquiry) being undertaken by the Economics and Industry Standing Committee of the Legislative Assembly, which is due to deliver its findings in August 2019. As the pilots and the Microgrids Inquiry are still ongoing, microgrids have not been specifically considered within Phase 1 of this project. Matters arising from the Microgrids Inquiry will be considered as part of Phase 2 of this project, once its findings have been handed down.

## **1.4. Consultation**

The modifications to the PSSR regulatory framework outlined in this paper were developed in consultation with AEMO and Western Power. The Economic Regulation Authority (ERA) was consulted in its capacity as the approver of Western Power's Technical Rules, and the Rule Change Panel was consulted in relation to changes that affect the scope of the WEM Rules.

Industry were presented with the proposals outlined in section 3 for comment at the PSOWG meeting of 27 June 2019. Limited feedback on the modifications to the PSSR regulatory framework was received from stakeholders. The Taskforce anticipates that most stakeholder feedback will be received in response to Phase 2 of the project, which comprises detailed proposals for changes to regulations and rules to implement the high-level framework selected.

Draft amendments to the Access Code and WEM Rules are expected to be available for further comment around February 2020. Any party wishing to be consulted individually on detailed design as part of Phase 2 is encouraged to contact the ETIU on (08) 6551 2397 or at [energytransformation@treasury.wa.gov.au](mailto:energytransformation@treasury.wa.gov.au).

---

<sup>7</sup> Smaller-scale devices that can either use, generate, or store electricity and form a part of the local distribution system, which serves homes and businesses. DER can include renewable generation, energy storage, electric vehicles, and controlled appliances such as air conditioners and pool pumps. DER are installed on the consumer's side of the meter, or 'behind the meter'.

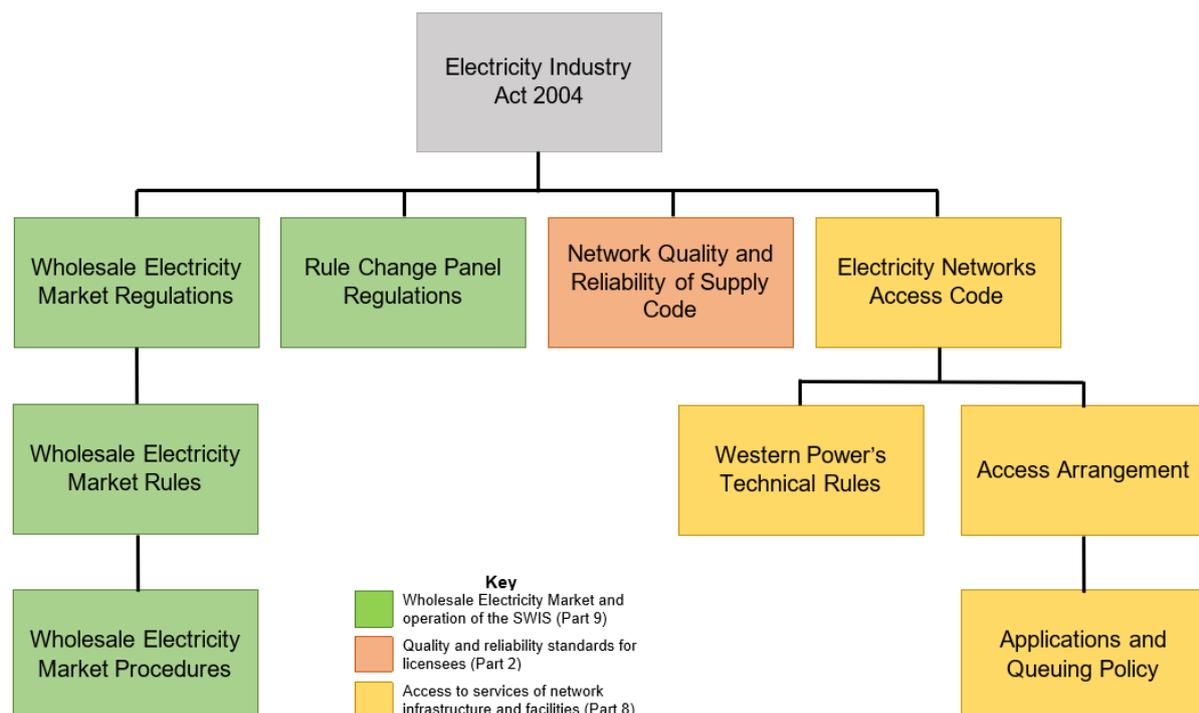
## 2. Current situation

### 2.1. Regulatory framework

An overview of the current PSSR regulatory framework is outlined in **Figure 2** below. Under the *Electricity Industry Act 2004* (EI Act), there are three main areas of operation relating to PSSR.

1. **Wholesale Electricity Market and operation of the SWIS<sup>8</sup>**: This operational area is covered under part 9 of the EI Act and gives effect to the WEM Regulations, the WEM Rules, the WEM Procedures and the RCP Regulations.
2. **Quality and reliability standards for licensees<sup>9</sup>**: This operational area is covered under part 2 of the EI Act and gives effect to the NQRS Code.
3. **Access to services of network infrastructure and facilities<sup>10</sup>**: This operational area is covered under part 8 of the EI Act and gives effect to the Access Code, Western Power's Technical Rules, Western Power's Access Arrangement and the Applications and Queuing Policy.

*Figure 2: Regulatory Framework for Power System Security and Reliability*



The NQRS Code overlaps in scope with other instruments. However, unlike other instruments with PSSR standards, the NQRS Code relates to licensed transmission and distribution operators, both within and outside the SWIS.

<sup>8</sup> Sections 122-124 of the *Electricity Industry Act 2004*

<sup>9</sup> Section 39(2)(d) of the *Electricity Industry Act 2004*

<sup>10</sup> Section 104 of the *Electricity Industry Act 2004*

Importantly, each operational area in **Figure 2** exists under different heads of power with a well-defined scope, limiting the options available to address the challenges identified in section 2.2 below.

## 2.2. Challenges with the current regulatory framework

Through the review of relevant instruments, discussions with stakeholders such as AEMO and Western Power, and consideration of work progressed under the former Government's Electricity Market Review (EMR) process, the Taskforce has identified five main challenges within the current PSSR framework that need to be addressed.

1. The current framework does not permit AEMO, as the party responsible for System Management, to have a formal role in the negotiation of generator performance standards affecting the connection of new generators.
2. The current monitoring and compliance regime for large generators is lacking, with the existing means of addressing persisting non-compliance effectively being limited to the disconnection of generators.
3. There is an absence of consistent generator connection standards, visible to both AEMO as system manager and Western Power as Network Operator.<sup>11</sup>
4. The definitions for power system standards (such as the Frequency Operating Standard) are not contained in the instruments that best support their implementation following the move of System Management functions from Western Power to AEMO.
5. Across various instruments in the current regulatory framework there are gaps, duplication, poor coordination and lack of alignment of roles with responsibilities, leading to inefficiency and risk.

The Taskforce has identified three main causes leading to these challenges.

1. Temporary arrangements persisting long-term
2. Regulatory divergence
3. Regulatory gaps

These causes are discussed further below, with modifications to address these challenges outlined in section 3 of this paper.

### ***Temporary arrangements persisting long-term***

The decision not to proceed with the adoption of the national framework for network regulation under the previous Government's EMR reform program has created a situation whereby regulatory arrangements that were intended to be only temporary have persisted

---

<sup>11</sup> While the Technical Rules are publicly accessible, generators generally negotiate exemptions from standards that relate to the generator's ongoing performance, and hence impact on the management of the system. These exemptions form part of contracts between Western Power and the generator, which are not visible to the system manager. This matter also applies to generators connected prior to the commencement of the Technical Rules in July 2007.

over the longer-term, resulting in new challenges. These challenges are most apparent because of the movement of responsibility for System Management from Western Power to AEMO.

Under the EMR, no changes were made to Western Power's Technical Rules and only minimal changes were made to the WEM Rules to accommodate the movement of System Management functions from Western Power to AEMO. This was because the planned adoption of the national framework for the regulation of Western Power's network would have had the practical effect of 'tidying up' the regulatory framework with respect to the separation of roles between Western Power and AEMO.

- The Access Code would have been abolished and Western Power's Technical Rules would have been substantially altered.
- Matters relating to network connection and access, and system security requirements would have been accommodated through the adoption of a modified version of the National Electricity Rules.
- The NQRS Code would have been expanded to encompass distribution and transmission planning and power quality performance standards, with a suitably amended governance process.
- Multiple consequential changes to the WEM Rules would have progressed.

Because of the decision not to move to a national framework for network regulation, the further changes that were planned have not progressed. Western Power's Technical Rules have remained, with accountabilities and obligations now split between Western Power (as Network Operator) and AEMO (as system manager). This has led to sub-optimal outcomes, including poor separation of roles and responsibilities resulting in risks that will exacerbate as time progresses and the system is increasingly operated within tighter parameters (i.e. due to lower levels of inertia and system strength because of changes to the generation mix).

Examples of specific problems include the absence of a coherent framework for network outage planning between Western Power and AEMO, as well as numerous references to 'System Management' within Western Power's Technical Rules, despite these Technical Rules being unable to confer responsibilities on AEMO, even in its role as system manager.

## ***Regulatory divergence***

Instruments under each operational area of the EI Act were developed at different times, by different parties, with different objectives, and have evolved under separate change management processes. As a result, duplication and inconsistency has emerged between instruments, creating inefficiencies in the operation of the network and system.

A specific example of this problem is the inconsistent requirements relating to reliability standards between the NQRS Code and Western Power's Access Arrangement. The NQRS standards are defined differently and exceed the service standard benchmarks set in Western Power's network Access Arrangement, which are based on recent performance. This means Western Power must comply with two sets of standards that are inconsistent, causing operational and decision-making difficulties.

## **Regulatory gaps**

Technology changes have created new challenges and opportunities for managing PSSR. Notable examples include the increasing penetration of solar photovoltaic systems; the arrival and reducing cost of storage technologies; and the emergence of cost-effective alternatives to traditional network connection.

In most cases, these technologies present as ‘gaps’ in the current regulatory framework, which contains multiple instruments with various governance and change processes. These instruments have not responded in a way that allows for opportunities to be fully leveraged and risks to be effectively managed. An example of this problem is battery connection and operation standards, which are currently absent from Western Power’s Technical Rules.

## **3. Modifications to address identified challenges**

The changes outlined in this paper relate to a high-level framework under Phase 1 of the project. Further work will be undertaken on the detailed design of the selected framework under Phase 2 of the project. ETIU will consult on elements of Phase 2 through TDOWG as the work is progressed. To address the five challenges identified in Section 2 of this paper, three main types of modifications will be made to instruments existing under the current legislative framework.

1. Movement of select generator performance standards from Western Power’s Technical Rules to the WEM Rules to improve compliance options and allow for the system manager to have a role in the negotiation of new generator connections and visibility over generation connection standards.
2. Movement of frequency operating standards from Western Power’s Technical Rules to the WEM Rules to improve consistency and better align roles and responsibilities.
3. Undertake a suite of minor changes to various instruments to improve regulatory consistency and coverage, with the objective of driving improvements to the operation of instruments and their ability to respond to emerging risks to the power system.

The high-level changes and outcomes to be achieved through modifications to each instrument are outlined below. Detailed design of these modifications will occur under Phase 2 of the Regulatory Framework project.

### **3.1. Movement of relevant generator performance standards from the Technical Rules to the WEM Rules**

A generator’s response to changes on the power system and the technical capability that it can provide have a direct impact on the management of power system security.

Generator performance standards are located largely under section 3.3 of Western Power’s Technical Rules. The location of the standards was appropriate at a time when Western Power was responsible for both the connection of generation and the ongoing management of the system. However, with the movement of System

Management functions to AEMO, the responsibilities associated with the connection and ongoing performance of generators now relate to both AEMO (as system manager) and Western Power (as Network Operator).

Notwithstanding these shared responsibilities, under the current framework AEMO does not have a formal role in the negotiation of new generator connections, and limitations in the legislative heads of power that give effect to the Access Code do not allow for such a role to be accommodated under the Technical Rules.

Relocating relevant performance standards to the WEM Rules will enable both Western Power and AEMO to better manage their respective responsibilities of network and System Management, with a shared role in negotiating ongoing performance standards and mutual visibility of the standards to be maintained.

The heads of power under Part 9 the EI Act that provide for the WEM Rules limit the range of performance standards that can be relocated to the WEM Rules to those that can affect the management of the system<sup>12</sup>. While the specific standards will be detailed in Phase 2, these will broadly encompass those outlined within the recently released Western Power and AEMO document *WEM Generator Performance Guideline* (the Guideline)<sup>13</sup>.

It is intended that standards under the WEM Rules will apply only to transmission-connected market generators (including those registered as facilities), reflecting the risk profile and differences in standards between transmission and distribution connections<sup>14</sup>. A negotiation framework will be developed to outline the process for generators, Western Power and AEMO to negotiate the performance standards for new connections, within the ranges outlined in the Guideline. This negotiation framework may be contained within the WEM Rules or could form a new Market Procedure.

The movement of generator performance standards between the Technical Rules and WEM Rules also allows for the adoption of a more appropriate compliance framework for market generators. Under the current framework, once a generator is connected to the network, Western Power can require monitoring of performance. However, where non-compliance is identified and not resolved, disconnection from the network is the only clear legal option for enforcing compliance. This is an impractical response to most types of non-compliance that creates its own risks to the management of the system. As such, Western Power is unlikely to take this action.

By relocating these standards to the WEM Rules, an expanded range of options are available to manage monitoring and compliance. The ETIU is currently assessing options for a suitable compliance framework and is expected to consult through TDOWG in October 2019. The framework is expected to cover compliance for both existing and new generators. It is acknowledged that generators comply with a range of differing standards,

---

<sup>12</sup> There are around 250,000 distribution-connected household and commercial photovoltaic generators connected under Western Power's Technical Rules. While these systems collectively can have a significant effect on system security, most are insignificant on an individual basis and therefore unsuitable to reside in the WEM Rules. The collective impact of DER characteristics will be considered as part of the DER work stream, the Whole of System Plan, and work within the Delivering the Future Power System work stream on Essential System Services.

<sup>13</sup> Available at: <https://westernpower.com.au/media/3226/generator-performance-guideline.pdf>

<sup>14</sup> Standards for non-market generators and those connecting to the distribution network are to remain in the Technical Rules.

depending on the time at which they connected and the terms of their connection contracts. How these differences in connection and performance standards may be reflected within the WEM Rules will be determined under Phase 2 of the project.

### 3.2. Movement of frequency operating standards from the Technical Rules to the WEM Rules

System security standards are used both in operational timeframes (i.e. scheduling and dispatch) and in system and network planning. In the SWIS, AEMO has primary accountability for ensuring the power system is operated within relevant operating standards (e.g. in the operational timeframe for frequency and voltage). Western Power is also required to conduct operational activities on its network in a secure and reliable manner, coordinating activities with AEMO to do so, and is expected to plan the network to meet operating standards, ensuring that sufficient voltage control capability exists.

Frequency operating standards currently reside in Western Power's Technical Rules. However, management of them under different operating states is set out under the WEM Rules. This separation has led to some inconsistency between the specification of the standards in Western Power's Technical Rules and their interpretation and use in the WEM Rules and associated procedures. Furthermore, the current location of these standards within Western Power's Technical Rules would appear to be inconsistent with the scope provided under the EI Act with respect to the Access Code and Western Power's Technical Rules, which relates to network connection and access.<sup>15</sup>

Frequency operating standards are to be moved to the WEM Rules. However, it is acknowledged that there will remain a need for the Technical Rules to refer to the frequency operating standards, and in some cases it may be appropriate for the Technical Rules to specify such standards separately.<sup>16</sup> Such detail will form part of Phase 2 of this project.

### 3.3. Regulatory alignment and coverage

A range of minor changes to better align regulatory instruments relating to PSSR are required to address gaps, clarify roles and responsibilities, remove duplication and improve coordination, with the goal of improving efficiency and managing emerging risks.

The full range of minor changes required will be scoped and consulted on as part of Phase 2 of the project. Examples include the removal of duplicated reporting requirements between the NQRS Code and Western Power's Access Arrangement; the alignment (where appropriate) of definitions between instruments; and greater specification of operational coordination matters between Western Power and AEMO, as system manager, required for secure and reliable operation of the SWIS (e.g. voltage

---

<sup>15</sup> Section 104(1) of the *Electricity Industry Act 2004* requires the Minister for Energy to establish a Code for the purpose of, and in accordance with, the access to services of network infrastructure facilities. Further, section 104(2)(l) provides the only reference to Western Power's Technical Rules in the Act, specifying that "Provision is to be made in the Code - for the formulation by a network service provider, and approval by the Authority, of technical codes for the purpose of access to services that are to be complied with by access users and other persons specified in the Code".

<sup>16</sup> For example, in situations where Western Power is responsible for the operation of islanded parts of the SWIS.

management, information sharing to support network planning, power system stability, identification and notification of security and reliability matters, etc.).

## 4. Next Steps

The publication of this paper represents the end of Phase 1 and the commencement of Phase 2 of the PSSR Regulatory Framework project. Detailed assessment of the changes required to implement each of the recommendations will be undertaken over the coming months, with recommendations provided to the Taskforce by the end of 2019. An Information Paper is expected to be published shortly thereafter. Draft amendments to the Access Code and WEM Rules will be provided for public comment early in 2020.

During Phase 2 of the project, further targeted consultation will be undertaken with stakeholders affected by the recommendations to ensure that the detailed policy development is fit-for-purpose and delivers efficient outcomes.

Those wishing to engage the policy team throughout Phase 2 are encouraged to contact the ETIU on (08) 6551 2397 or at [energytransformation@treasury.wa.gov.au](mailto:energytransformation@treasury.wa.gov.au).