Semi-Scheduled Generator Compliance Bulletin

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AUSTRALIAN ENERGY REGULATOR

Inquiries about this publication should be addressed to:

Australian Energy Regulator
GPO Box 3131
Canberra ACT 2601
Tel: 1300 585 165

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1 Introduction

1.1 Purpose

The AER has published this compliance bulletin to outline to Semi-Scheduled Generators (**SSGs**) our expectations regarding compliance with a number of critical obligations under the National Electricity Rules (**NER** or **the rules**). While these expectations are mostly similar to those for Scheduled Generators, there are some differences due to the reliance of SSGs on specific weather conditions as a fuel source and our observations of SSG participation in the National Electricity Market (**NEM**).

This compliance bulletin sets out key obligations of SSGs relating to various functions such as registration, operational forecasting, dispatch, communication, and the provision of data. It sets out examples of what we consider to be good practice approaches to compliance, which we strongly encourage participants to adopt. Participants should review their practices in light of the information set out in this compliance bulletin and update them as appropriate. We have also created a corresponding checklist to assist participants with their compliance.[1]

A key message of this compliance bulletin is that SSGs are required to ensure that they are able to comply with their offers at all times, and to follow dispatch instructions from the Australian Energy Market Operator (**AEMO**). While SSGs may delegate these functions to third-party contractors through Operation and Maintenance contracts, it is important to note that ultimately, the Registered Participant is liable for contraventions of any relevant obligations under the rules, many of which attract civil penalties.[2] Furthermore, the ownership structures of SSGs are often complex and at times involve overseas parties which may heighten compliance risks and have flow through implications for how participants operate.

While Registered Participants have the freedom to set up their operations in the most effective and efficient way according to business need, our experience is that complex corporate structures and/or extensive outsourcing bring additional challenges that need to be actively managed. Proper systems, processes, and personnel must be in place to manage the 24/7/365 nature of compliance obligations.

Firstly, participants must understand all of their obligations under the rules in order to outsource the compliance functions to a third party and manage their delivery. We also expect third parties who are acting on behalf of the Registered Participant to understand these obligations. While the primary responsibility for compliance remains with the participant, third parties could also be subject to civil penalties where they are knowingly concerned in, or a party to, a breach of a civil penalty provision.[3]

We expect participants to have robust systems, processes and personnel in place to support compliance with their obligations. Where the participant is relying on multiple parties to

[1] Available on the AER's website.

[2] The provisions in the NER that are classified as a civil penalty provision are listed in Schedule 1 of the National Electricity (South Australia) Regulations. Most of the obligations discussed in this Compliance Bulletin are tier 1 civil penalties. More information regarding the penalty tier system can be found on AER's website.

[3] National Electricity Law, section 68.

achieve compliance, we expect that the Registered Participant clearly sets out the roles of all parties involved to achieve compliance with its obligations, clear communication protocols and strong practices and procedures to monitor and ensure that those obligations are met. Lastly, all participants should have a continuous improvement approach to monitoring compliance with their obligations.

Participants often contact the AER seeking clarification of relevant NER obligations. While the AER does not provide legal advice, we encourage participants to continue doing this as these communications, along with our ongoing monitoring and compliance work, will inform our policy position and assist us to determine whether further AER guidance may be appropriate.

1.2 Market impacts of the transitioning energy mix

The NEM is currently in a transition phase, with an increased emergence of intermittent renewable generation plant (or weather-reliant generators) and increased retirement of some traditional generation types. The rules are being adapted to ensure they keep pace with changing requirements around the security and reliability of the power system, ahead of the Energy Security Board's NEM 2025 electricity market redesign which seeks to meet the needs of the energy system's shift to renewables and new technologies.

Under the NER, generating systems with intermittent[4] output (such as wind or solar farms) and an aggregate name plate capacity of 30 megawatts (**MW**), or more, are usually classified as semi-scheduled.[5]

Since 2014, more than 4 gigawatts (**GW**) of coal fired and gas powered generation has left the market and around 12.5 GW of large scale wind and solar capacity has entered.[6] Wind and solar generation relies upon specific weather conditions as a fuel source. The majority of existing wind and solar generation has not been 'firmed up' with co-located batteries. Its output is variable and can at times be difficult to predict. Unlike traditional generation technologies, newer technology like renewable plant are physically capable of decreasing output rapidly in response to economic signals. This has contributed to more variable supply and demand conditions which can materially change over short timeframes. As the proportion of renewable plant has increased, they have moved from being passive price takers to being able to materially influence market price signals by their behaviour.

Power system security refers to the power system's technical stability in terms of inertia, frequency, voltage, and similar characteristics. Lower levels of inertia make it harder to keep frequency within an acceptable band, while lower levels of system strength make it harder to

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[4] Under the NER, intermittent is defined as "*a description of a generating unit whose output is not readily predictable, including, without limitation, solar generators, wave turbine generators, wind turbine generators and hydro-generators without any material storage capability*."

[5] The classification of Semi-Scheduled Generators is provided for in NER clause 2.2.7 as follows: *"A generating unit which has a nameplate rating of 30 MW or greater or is part of a group of generating units connected at a common connection point with a combined nameplate rating of 30 MW or greater, must be classified as a Semi-Scheduled Generating unit where the output of the generating unit is intermittent unless AEMO approves its classification as: (1) a scheduled generating unit under clause 2.2.2(b); or (2) a non-scheduled generating unit under clause 2.2.3(b)."*

[6] For more information see State of the Energy Market 2021.

keep voltages stable. Historically, the NEM's synchronous coal, gas and hydro generators have innately provided inertia and system strength services. Wind and solar generators have been less likely to support system security due to the configuration of their generation units and the intermittent nature of their output.

Changes in the NEM's generation portfolio and the increase in distributed energy resources have led to more challenging system conditions around voltage and frequency for AEMO to manage. In this situation, the behaviour of an individual unit can be more likely to influence overall power system security, so it is critical that SSGs are vigilant and operate their plant as instructed by AEMO. Both the Australian Energy Market Commission's (**AEMC or Commission**) Reliability Panel and the Energy Security Board have recognised these challenges and are working towards addressing them through policy changes. While this work is underway, it is important for the industry as a whole to be cognisant of this transition in the generation mix and to ensure that associated risks are managed.

This demonstrates that the issue of what is a risk to power system security is evolving over time, making it essential for participants to take a dynamic approach to assessing such risks. Accordingly, the AER expects participants to take an adaptable approach to assessing and managing numerous risk factors. It is essential that generators meet their technical standards, continuously monitor market conditions, provide accurate information to AEMO and ensure they are always capable of readily responding to AEMO instructions.

The technology used by participants in their operations is also evolving. In recent years, the AER has observed increased adoption by participants of automated systems serving a variety of functions in their operational processes. The reliance on these automated systems, in the absence of additional controls to adequately monitor and respond to market conditions, may in some cases fall short of achieving compliance with relevant obligations under the NER. Examples of how automated systems should be supported are provided in sections 2.4 and 2.5 of this bulletin.

1.3 Strengthened dispatch obligations for SSGs

The rules which originally applied to SSGs allowed them to operate at any level of output except during periods classified as "semi-dispatch intervals",[7] when their output could not exceed a cap level contained in an AEMO dispatch instruction.[8] In September 2020, the AER made a rule change request to clarify that the output of a Semi-Scheduled Generating system must follow the MW dispatch target specified by AEMO. This followed an observation that some SSGs were deviating from their dispatch instructions by significantly more than what could be explained by plausible variations in their resource, and unrelated to existing exceptions provided for in the rules.

[7] A semi-dispatch interval occurs due to a binding network constraint or where the offers made by an SSG make its dispatch uneconomic. During a semi-dispatch interval, AEMO constrains the relevant SSG's output to be at or below its resource availability, which is based on the SSG's unconstrained generation for the relevant period.

[8] Notwithstanding the general requirement to comply with dispatch instructions, other provisions of the NER allowed SSGs to operate at any level except when AEMO declared the relevant interval to be a semi-dispatch interval.

The behaviour the AER was concerned with involved generators rapidly reducing their output to zero, particularly during negative price dispatch intervals, without an instruction from AEMO to do so, or a valid rebid. It was not clear whether the rules that applied at the time prevented SSGs from engaging in such behaviour. We considered this behaviour undermined AEMO's ability to manage power system security as its modelling is based on the assumption that generators will follow dispatch instructions. With substantial wind and solar development proposed, we anticipated the risk and magnitude of this the behaviour would be more significant, further compromising AEMO's ability to manage power system security.

The AEMC considered that negative price curtailment by SSGs without rebidding or waiting for an updated dispatch target materially impacted AEMO's ability to maintain power system security and disrupted market efficiency. Following a consultation process, the Commission made a final determination and final rules regarding SSG dispatch obligations which came into effect on 12 April 2021.

Under the new rules, it continues to be the case that an SSG is required to comply with the MW dispatch level specified in a dispatch instruction at all times (except where to do so would be a hazard to public safety, materially risk damaging equipment or when providing frequency responses[9]). However, an SSG is now taken to have complied with the dispatch level in its dispatch instruction, if its dispatch target only varies from the dispatch level as a result of energy source availability (or in the case of a 'semi-dispatch interval', if it does not exceed the dispatch level, regardless of energy source availability).[10]

Energy source availability is not a defined term under the rules. However, as an example, the AER considers that the energy source for a solar farm may be the solar radiation, and for a wind farm, the energy captured from the moving air.

Our expectations in relation to the new rules, and other critical companion obligations around offers, rebids, and plant availability, is set out below.

[9] NER 4.9.8(a1).

[10] NER 4.9.8(a2).

2 Operational forecasting for SSGs prior to dispatch

2.1 AEMO forecasting

Under the rules, AEMO is required to publish supply-demand forecasts over several different time horizons. This includes pre-dispatch (from 12:30 pm the day before the trading day) and longer time horizons such as for the projected assessment of system adequacy (**PASA**). In producing these forecasts, the rules require both AEMO and registered participants to provide information to each other. Specifically, the spot market operations timetable (**Timetable**) which is made under NER 3.4.3 sets out for AEMO and Registered Participants the actions required to be taken and the time by which they must do this in the spot market.[11]

AEMO forecasts are designed to provide the market with high quality information to allow market participants to respond to market conditions (such as reliability shortfalls) and make commercial decisions. A critical input to these forecasts is high quality inputs from participants about their physical capabilities and commercial intentions. Where participants provide poor quality information, this undermines the integrity of AEMO's forecasts, affecting every participant and AEMO's ability to manage the market and power system efficiently.

This section sets out the various NEM forecasts managed by AEMO and the following sections provide the AER's expectations for SSGs in providing inputs for those forecasts.

Pre-dispatch

According to AEMO's Pre-dispatch procedure (SO_OP_3704), the pre-dispatch process has two major purposes, namely to provide:

- Market Participants with sufficient information to allow them to make informed business decisions.
- AEMO with sufficient information to allow it to fulfil its system reliability and security duties.

This information is calculated in pre-dispatch and published to the market in the form of trading interval (every 5 minutes) and 30-minute period schedules of forecast unit loading, forecast unit ancillary service response and forecast regional prices.

The pre-dispatch schedule is derived from the pre-dispatch bids and offers, forecast load and unconstrained intermittent generation forecast. Market participants must provide daily bids and rebids as part of the pre-dispatch process. The rules require generators to provide bids according to price and availability. This is discussed further in section 2.5.

Projected Assessment of System Adequacy

The PASA is the principal method of forecasting the adequacy of the power system and assessing capacity to meet market demand within the reliability standard. The NER requires AEMO to prepare PASA in two timeframes:

[11] Available on AEMO's website.

- Short Term PASA (**ST PASA**) covers 6 trading days from end of the trading day covered by most recent pre-dispatch schedule with a half hourly resolution;[12] and
- Medium Term PASA (**MT PASA**) covers:
    - 24 months from the Sunday after the day of publication with a daily resolution, for publishing load forecast for each region; and
    - 36 months from the Sunday after the day of publication with a daily resolution, for publishing aggregate generating unit PASA availability for each region and individual scheduled generating unit PASA availability.

The ST PASA process requires availability inputs. These inputs allow market participants to identify cost effective periods during which to take short term maintenance outages and to facilitate plant commitment decisions. It also provides a power system reserve capacity adequacy forecast that covers each trading interval for the coming week.

The MT PASA forecasts demand and reserves (that is, the excess of available supply from generators/imports above demand) for each region on a daily basis over a two year period. AEMO monitors the MT PASA to identify periods where reserves are projected to be less than the specified minimum reserve level for a region. It then uses this information to communicate medium term reliability in the NEM and, in the absence of a sufficient market response, determines whether to contract for additional reserves under the Reliability and Emergency Reserve Trader (**RERT**) mechanism.

Over the medium to longer term, accurate MT PASA forecasts are essential to provide AEMO with the opportunity to procure appropriate reserve options to maintain system security and minimise the cost of interventions in the market.

Unconstrained Intermittent Generation Forecast

Unlike for Scheduled Generators, available capacity for wind and solar generating units is calculated by AEMO utilising forecasting systems. This is referred to as the Unconstrained Intermittent Generation Forecast (**UIGF**). AEMO is required to prepare the UIGF over different time horizons (that is, forecasts for the period 5 minutes to 3 years ahead)[13] so it can be used as an input into the dispatch, pre-dispatch and PASA processes.

AEMO's UIGF forecasting systems use a range of inputs, some of which are provided by SSGs. When preparing a UIGF, AEMO must take into account the following matters:[14]

- the maximum generation of the Semi-Scheduled Generating unit provided by the SSG as part of its bid and offer validation data;
- the plant availability of the Semi-Scheduled Generating unit submitted by the SSG;

[12] On 5 May 2022, the AEMC made a final rule to update the ST PASA obligations. The final rule provides a specific objective for ST PASA, and introduces principles that are linked to the objective to guide AEMO as it administers ST PASA. The new rules will apply for participants from 31 July 2025.

[13] Per NER clause 3.7B.

[14] Per NER clause 3.7B(c).

- the information obtained for the Semi-Scheduled Generating unit from the remote monitoring equipment;
- the forecasts of the energy available for input into the electrical power conversion process for each Semi-Scheduled Generating unit;
- the energy conversion model for each Semi-Scheduled Generating unit;
- the assumption that there are no network constraints otherwise affecting the generation from that Semi-Scheduled Generating unit; and
- the timeframes of:
    - pre-dispatch;
    - dispatch,
    - medium term PASA; and
    - short term PASA.

AEMO currently uses the Australian Wind Energy Forecasting System (**AWEFS**) and Australian Solar Energy Forecasting System (**ASEFS**) as part of this process.

As outlined in AEMO's overview of AWEFS,[15] in dispatch and pre-dispatch processes, the UIGF values for individual SSGs are used to produce an 'available capacity' calculation. Available capacity refers to the generation capability of an SSG that is available for Dispatch (without consideration of network limitations or price bids).

The ST PASA and MT PASA processes use the UIGF values for individual SSGs as PASA Availability. Similar to available capacity in the dispatch and pre-dispatch processes, PASA Availability in the ST PASA and MT PASA timeframes indicates the generation capability of the SSG without consideration of network limitations, price bids etc. Participant submissions of availability data for UIGF is discussed further in section 2.4.

AWEFS and ASEFS

AWEFS and ASEFS use a combination of statistical and numerical weather prediction-based forecasting models fed by the following inputs:

- Numerical weather prediction data from multiple weather data providers.
- Supervisory Control and Data Acquisition (**SCADA**) measurements from the power station such as active power, control system power set-point and Local Limit.[16]
- Standing data about the SSG as defined in the Energy Conversion Model (**ECM**) such as generator details and historical meteorological measurements.

[15] Australia Wind Energy Forecasting Systems (AWEFS), AEMO, May 2016.

[16] For an intermittent generating unit, the Local Limit refers to the lower of its plant availability and all technical limits on the capacity of its connection assets to export energy, in accordance with its energy conversion model.

- Additional information provided by the Participant through the Electricity Market Management System (**EMMS**) Portal, including inverter/turbine availability and upper MW limit on the facility.

More guidance on the above inputs can be found in AEMO's Guide to Data Requirements for AWEFS and ASEFS.

Participant self-forecasting

SSGs are able to provide dispatch self-forecasts of the UIGF for their Semi-Scheduled Generating units for AEMO to use in dispatch. Since 2018, AEMO has enabled SSGs to consider their self-forecasting capability and if appropriate register for participant self-forecasting for their generating unit.

If participants register, AEMO will work with the SSG (or their delegated third-party forecast provider) to establish secure access to the self-forecasting Application Programming Interface (**API**), where they will be able to submit dispatch self-forecasts.

AEMO conducts weekly assessments of an SSG's dispatch self-forecasts to ensure they meet reliability and performance requirements. Once the SSG's dispatch self-forecasts meet the minimum performance criteria, they will be accredited and used in dispatch. Where AEMO assesses that the self-forecasts fall below the minimum performance criteria or AEMO determines it these forecasts to be impacting system security, AEMO will suppress the self-forecasts. More information on participant self-forecasting and relevant assessment procedure can be found on AEMO's website. The AER considers that self-forecasts are not commercial parameters.

The AER expects SSGs to have systems, processes and personnel in place to assess the performance of their self-forecasts (that is, by comparing the self-forecasts to observed capability after the fact) and where the self-forecasts are not accurate, assess the causes of the inaccuracy and build learnings into future self-forecasts. This will ensure continual improvement of self-forecasts.

2.2 NEM registration inputs

Registration with AEMO as an SSG is a prerequisite to connecting, energising and commissioning a generating system, and participating in the NEM (by submitting availability and bids, receiving dispatch instructions, and selling the energy output).

SSG registration and connection is complex and involves the provision of extensive information to AEMO and the connecting Network Service Provider (**NSP**). As part of the registration process, prospective SSGs must submit for AEMO assessment:

- data in accordance with schedule 3.1 of the NER;
- an ECM; and
- demonstration of adequate communications and/or telemetry to support the issuing of dispatch instructions and the audit of responses.

An ECM is a model that defines how an intermittent input energy source (such as wind or solar radiation) is converted by the generating unit into electrical output. The ECM must be

reviewed and approved by AEMO. The information in the ECM is used by AEMO's AWEFS and ASEFS to create the UIGF.

The pre-dispatch and ST PASA forecasts are critical for providing accurate forecasts of wind and solar generation used by AEMO in preparing the pre-dispatch price schedules and assessing short term capacity reserves over the next seven days. If the information in the ECM for Semi-Scheduled Generating unit does not reflect its actual design, there is a risk that forecast accuracy (and hence the generator's UIGF) will be impacted.

The AER expects SSGs to work constructively with AEMO during the registration phase. This includes by being responsive to requests from AEMO and building an ECM which accurately reflects the capability of the relevant Semi-Scheduled Generating units.

2.3 ECM SCADA signals

SSGs must have remote monitoring equipment (i.e., SCADA) to transmit information to AEMO's control centres in real time (NER S5.2.6.1). AEMO's Guide to Data Requirements for AWEFS and ASEFS outlines a list of SCADA signals that must be provided by SSGs for AEMO's operational and forecasting purposes. The list comprises of ECM and non-ECM SCADA signals which are reviewed and approved by AEMO as part of the registration process. ECM SCADA data is a key input for dispatch UIGF for an SSG. It communicates to AEMO critical information such as the generator's real-time available capacity and on-site weather conditions.

AEMO's NEM Operational Forecasting and Dispatch Handbook for wind and solar generators (**the handbook**) provides further guidance on configuration and checks for critical ECM SCADA signals for wind and solar farms. Additional SCADA quality requirements are further discussed in section 4.1.

The AER expects SSGs to have systems, processes and personnel to monitor ECM SCADA signals to ensure they reflect actual generator available capacity and site conditions at all times. Where there are discrepancies or other issues with ECM SCADA signals, personnel should communicate this promptly to AEMO. This is critical in ensuring AEMO's dispatch forecasts and targets are accurate.

2.4 Submitting plant availability

Under the rules, plant availability refers to the active power capability of a generating unit based on its electrical power conversion process and assuming no fuel supply limitations on the energy available for input to that electrical power conversion process. It is a key input to AEMO's forecasting model when preparing the UIGF in the pre-dispatch and PASA timeframes.

For PASA timeframes, in accordance with the schedules set out in the Timetable, participants submit availability information for:

- pre-dispatch and ST PASA forecasts, on a 30-minute interval basis over the next eight days. Availability information can be submitted for any interval in the future, even if beyond the pre-dispatch and ST PASA forecast horizons.

- MT PASA forecasts, on a daily peak basis. Availability information can be submitted for any day in the future, even if beyond the MT PASA forecast horizon.

SSGs must submit to AEMO the plant availability for each Semi-Scheduled Generating unit as soon as the SSG is aware that the plant availability is at least 6 MW below or above the nameplate rating of the unit. The SSG must also notify AEMO of changes to submitted plant availability until the plant availability is no longer at least 6 MW below or above the nameplate rating (NER 3.7B(b)).

The handbook outlines that participants must update AEMO when there is an expected or actual change in plant availability due to events including, but not limited to:

- An unplanned or planned outage of the generator or its elements.
- Environmental conditions such as forecast high ambient temperatures causing possible de-rating effects on turbines, modules, and inverters, in addition to forecast high wind speeds causing possible de-rating or cut-out effects on turbines.
- Generator Performance Standards (**GPS**) requirements,[17] operational arrangements between the generator and NSP or AEMO, and changes in commissioning hold point levels.
- Transformer outages or provision of reactive power.
- Changes in the number of elements connected and available to generate.

Further information on these requirements can be found in the handbook, which includes specific examples relating to generator commissioning, hold point testing and normal operating conditions where participants must meet mandatory requirements to actively manage forecast conditions of their plant in the dispatch, pre-dispatch and PASA timeframes.

The AER expects SSGs to familiarise themselves with the handbook, be aware of factors that affect the availability of their individual plant and have systems and personnel in place to monitor those factors to ensure that any changes in availability are identified and notified to AEMO in a timely manner. It is important that participants also consider all of these elements when submitting anticipated availability over a forward time horizon and update as new information comes to light or as conditions change. SSGs should have both manual monitoring practices, and automated systems to actively monitor influential factors such as energy source availability and ambient conditions and alert the relevant staff to any changes.

Availability submission methods

In accordance with its processes, AEMO implements a default intermittent generation availability entry as part of the registration process, with a default availability of 0 MW generation capacity and all elements (turbines/inverters) considered as unavailable. SSGs are expected to submit an availability entry to match their obligation as described above.

[17] GPS requirements are further discussed in section 4.4.

Availability is then submitted through different methods based on the relevant timeframes. Plant availability for pre-dispatch and PASA are submitted using the EMMS portal. Available capacity is submitted as an Upper MW Limit/Elements Available value. Note that these fields should only be used to reflect changes in availability due to technical limitations, and SSG commercial availability should be reflected in bids.

Unlike Scheduled Generators, SSGs cannot manage their physical availability during dispatch by bidding the Maximum Availability (Max Avail) in their energy offer. This is because AEMO's systems do not consider Max Avail for Semi-Scheduled Generating units and instead, replace it with the dispatch UIGF from applicable forecasting systems.

The handbook outlines that for the dispatch timeframe, SSGs must also reflect their physical availability via their ECM SCADA signals, such as SCADA Local Limit and SCADA Turbines/Inverters Available. If these signals do not reflect the actual availability or are unavailable, participants can withdraw band capacity in their energy bid to achieve the desired dispatch outcome.

The intermittent generation availability does not need to take into account limits on the transmission networks that are managed by AEMO through the central dispatch process (for example, via constraints). However, distribution outages are typically not included in AEMO's dispatch process. Participants should have systems, processes and personnel in place to liaise with the relevant:

- Transmission Network Service Provider (**TNSP**) whether network outages and generator runbacks have been communicated to, and managed by, AEMO through the central dispatch process; and
- Distribution Network Service Provider (**DNSP**) to determine whether network outages and generator runbacks have been communicated to AEMO and ensure that DNSP outages are actively managed by SSGs in their availability information unless instructed otherwise by AEMO.

SSGs should use the following methods to communicate these events to AEMO in the dispatch, pre-dispatch and PASA timeframes:

- Dispatch timeframe – updating the SCADA Local Limit signal to reflect the reduced export limit.
- Pre-dispatch and ST PASA timeframes – updating the intermittent generation availability (Upper MW Limit, Elements Available) in EMMS.

For more details on availability submission methods please see AEMO's Guide to Intermittent Generation.

Automation of Plant Availability submission

The AER has observed that some participants rely solely on automated systems to submit plant availability and automated alarms to notify operational staff of potential errors in plant availability submissions.

In one such case, the participant engaged separate third-party contractors to undertake plant operation, monitoring and trading functions. The contracted plant operators were inexperienced and failed to update the trading team of plant commissioning and testing activities that affected plant availability. The participant had in place a communications protocol requiring operators to notify their trading team of any planned or unplanned outages. However, these processes were inadequate, and the trading team was often not informed when the actual plant availability varied from that submitted by the automated system. As a result, the participant often continued submitting the plant as fully available when it was not, for example, during commissioning and testing of the plant. The AER considers this behaviour to have potentially contravened clause 3.7B(b) obligations.

The AER considers that where there has been a change to plant availability, the participant will generally become aware of this change the same time that its agent or third party contractor (who it has engage to provide the relevant plant operation, monitoring and trading functions) first becomes aware of this change. The AER expects participants to have processes and personnel in place to ensure the active monitoring of market and plant conditions and effective communication between plant operators and trading staff to verify that availability is accurately reflected in automated submissions. Even when third party contractors are engaged, it is the SSG's responsibility to ensure that adequate processes and personnel are in place to have relevant personnel monitoring and updating any errors in plant availability. The use of automated software alone is unlikely to represent sufficient compliance processes and practices, for the purposes of ensuring that participants can meet the relevant NER obligations.

2.5 Bids and offers

Update default bids and active bidding

According to AEMO processes,[18] it implements a default energy bid as part of the registration process; the default bid is the registered Maximum Capacity allocated in Price Band 10 priced at $256 per megawatt hour (**MWh**). Energy bids can be updated in the 'Offers & Submission' tab of the EMMS, via API, or in the participant file server (**FTP**).

As required under NER 3.8.2(a) and 3.8.6(g), SSGs are required to submit dispatch offers containing 10 price bands and must specify for each trading interval and trading day:

- an incremental MW amount for each price band specified in the dispatch offer; and
- an up ramp rate and down ramp rate.

Generators who wish to change their availability for commercial reasons, including in response to low or negative spot prices or exposure to frequency control ancillary services (**FCAS**) prices must do so by submitting an amended offer – called a 'rebid' – to ensure they receive an appropriate dispatch level prior to changing their energy output. SSGs may do this by moving MW in price bands to the price at which they would be available for dispatch. If the

[18] NEM Operational Forecasting and Dispatch Handbook for wind and solar generators, AEMO.

SSG is not available at any price in the dispatch timeframe, it can update the SCADA Local Limit to reflect the reduced export limit.[19]

The NER requires every rebid to be accompanied by a brief, verifiable and specific reason to AEMO, as well as the time when the generator became aware of the reason for the rebid (NER 3.8.22(c)). Additionally, NER 3.8.22A(d) requires a relevant participant to make a rebid as soon as practicable after becoming aware of the change in material conditions and circumstances on the basis of which it decides to vary its dispatch offer or dispatch bid.

Where generators submit a rebid less than 30 minutes before the commencement of the trading interval to which the offer relates, it is considered to be a late rebid. NER 3.8.22(ca) provides that an SSG must make a contemporaneous record for a rebid made in the late rebidding period including a record of:

- the material conditions and circumstances giving rise to the rebid;
- the reasons for making the rebid;
- the time at which the relevant event(s) or other occurrence(s) occurred; and
- the time at which the SSG first became aware of the relevant event(s) or other occurrence(s).

NER 3.8.22A requires that participants must not make a dispatch offer, dispatch bid or rebid that is false, misleading or likely to mislead. Further, NER 3.8.22A(b) provides that an offer/bid or rebid is taken to be false or misleading if the party making it does not have a genuine intention to honour, or does not have a reasonable basis for making, the representations contained within the offer. As an example, the AER considers that rebidding for the purpose of testing connectivity of the system, without having a genuine intention to honour the offer as rebid, would not be in line with the intent of the rules.

Further, it is the SSG's responsibility to check that the data contained in its generation dispatch offer or market ancillary service offer, as received and to be used by AEMO in the central dispatch process, is correct (NER 3.8.8(b)).

The AER monitors the offers, bids and rebids for submissions which do not meet the relevant NER requirements. When participants fail to meet these requirements, the quality of information available to relevant participants and AEMO is reduced, which in turn reduces market efficiency and AEMO's ability to manage power system security. Poor quality information also affects the AER's ability to monitor and enforce compliance with the NER.

The AER expects participants to be aware of, and monitor, operational and commercial factors that affect their offers, bids and rebids. SSGs should have systems, processes and personnel in place to monitor the accuracy of offers, bids and rebids and update these with AEMO if they are no longer accurate. We also expect SSGs to ensure that they maintain relevant records such as rebid reasons and contemporaneous records in accordance with the relevant NER requirements. Where SSGs have automated systems in place to actively

[19] Pg 13, NEM Operational Forecasting and Dispatch Handbook for wind and solar generators, AEMO.

monitor and submit offers, bids and rebids, there must also be relevant personnel available to actively monitor and act on any changes or errors identified in these systems.

Participants should familiarise themselves with the AER's Rebidding and Technical Parameters Guideline, which details our expectations for bidding and rebidding technical parameters and the level of information and specificity in the rebid reasons. Relevantly, the Guideline provides that, where the technical parameters are rebid, the reason provided should relate directly to the technical characteristics that have altered since the initial offer.

For more information regarding the process that the AER applies when monitoring and enforcing compliance relating to bid and rebid information, please see AER's Compliance Bulletin No 3 – Monitoring and enforcing compliance of electricity offer, bid and rebid information.

Automated bidding systems

The AER has observed an increased adoption of automated bidding software that can be set to submit rebids in response to a pre-determined set of parameters. The use of such software alone, and not supported by duty traders who can update bids if required, is unlikely to represent sufficient compliance processes and practices, for the purposes of ensuring that participants can meet relevant obligations under the NER.

For example, a participant adopted an automated bidding system, with limited oversight of duty traders, which set a breakeven price and configured the system to bid in a manner where the plant will not be dispatched below that price. The participant did not maintain an active 24/7/365 trading desk with rostered duty traders and relied heavily on third-party contractors to monitor the plant's compliance with dispatch offers and bids. When the contractors identified non-compliant dispatch intervals, there was often no duty trader rostered on for the contractor to contact and request to manually submit a rebid that would override the automated bidding system. As a result, the participant frequently submitted offers it could not comply with and failed to meet dispatch instructions. The AER considers this behaviour to have potentially contravened various NER obligations.

The AER recognises that there are some benefits from automated bidding systems, as they can be more timely and are less prone to human errors. However, the risk of non-compliance due to system error emphasises a continued need for manual bidding systems. We expect technical and operational staff to maintain adequate manual oversight to ensure that the generating unit or load can comply with the latest market offer at all times and that the rebidding reasons are appropriately specific. This may involve manual intervention where staff observe potential or actual misalignment between offers and capability.

In this instance, we consider that participants should have duty traders rostered in a 24/7/365 fashion to ensure active monitoring of generator output, offers and correct input of bid/rebid reasons. Participants utilising automated bidding systems must ensure that all offers and rebids comply with overarching obligations around the provision of high quality and accurate information to AEMO and the market.

Frequency control ancillary services (FCAS)

AEMO is responsible for ensuring that the power system is operated in a safe, secure and reliable manner. FCAS is one of the mechanisms used by AEMO to manage power system security. SSGs can register with AEMO to provide FCAS services and must comply with the relevant obligations once registered. It is important that FCAS can be, and is, delivered when required as it forms a key part of the safety net measures to ensure AEMO can achieve and maintain power system security.

The obligations that apply to the provision of FCAS apply equally to both Scheduled Generators and SSGs. For more information, participants should familiarise themselves with the AER's Contingency FCAS compliance bulletin which outlines our expectations regarding compliance with a number of critical obligations relating to contingency frequency control ancillary services.

3 Dispatch

AEMO is responsible for the operation and administration of the wholesale electricity market. AEMO coordinates a central dispatch process to manage the spot market, which involves matching generator offers and demand in real time. Every five minutes, AEMO issues dispatch instructions based on relevant participants' bids and offers and system capabilities so that the quantity of electricity produced will meet the demand for electricity at the lowest available cost, while maintaining the technical security of the power system.

The NEM dispatch engine (**NEMDE**) is the algorithm developed and used by AEMO to ensure the central dispatch process calculates an optimal solution to a security-constrained dispatch problem, which contains a large number of variables, parameters, limits, and constraints, including:[20]

- Forecast demand estimating the aggregate electricity to be consumed by all customers in the next 5-minute period.
- Forecast output from wind and solar generators, non-scheduled generation and distributed energy resources.
- The prices and quantities contained in the bids and offers submitted by generators and loads that participate in the market.
- Network flows – constraining generation where required to keep power flows within the technical limits of available network infrastructure.
- Frequency – maintaining frequency in the NEM close to 50 hertz.
- Voltage – coordinating the voltage profile across the main transmission grid within technical limits
- Equipment limits – ensuring equipment remains within its technical limits.

The optimal solution will be to dispatch the 'least-cost' combination of generation (and dispatchable load) to meet demand and ancillary services, based on bids and offers, while remaining within the security and reliability parameters such as the technical envelope.[21]

NEMDE derives dispatch instructions to produce, consume, reduce or transfer active power. It determines the dispatch of Semi-Scheduled Generating units based on bid price bands and availability. For a Semi-Scheduled Generating unit, the dispatch instruction includes the dispatch target which nominates a dispatch level to be supplied by the generating unit over the specified period and a semi-dispatch cap flag. Other dispatch instructions may also be made by AEMO regarding FCAS and changes to plant configuration.

[20] Pg 5, Power System Requirements, AEMO, July 2020.

[21] Under the NER 4.3.1, AEMO is required to maintain power system security and operate the power system to the extent practicable in a secure operating state and within the limits of the technical envelope. Specifically, the technical envelope refers to the technical boundary limits of the power system for achieving and maintaining the secure operating state of the power system for a given demand and power system scenario.

Dispatch instructions will be issued electronically via the AEMO EMMS and where possible, dispatch instructions are issued electronically via the automatic generation control system (**AGC**). A generating unit providing regulation services must be set up to receive and respond to dispatch instructions issued via the AGC. A generating unit will not be issued dispatch instructions via AGC unless the unit indicates via SCADA that its AGC is available for remote control and AEMO selects the unit to remote AGC.

SSGs must ensure they have facilities to receive dispatch instructions (NER 3.8.21(f)). This includes dispatch instructions received electronically as outlined above and dispatch instructions in other forms if in AEMO's reasonable opinion the AGC and electronics displays in the plant control room are not possible avenues of communication.

3.1 Following Dispatch Instructions

The NER chapter 4 requirements for registered participants to comply with dispatch instructions and to ensure that offers and bids represent the capabilities of their equipment at all times are essential to the secure operation of the power system.

NER 4.9.2(a) gives AEMO the power to, at any time, give an instruction to the Generator in relation to any of its generating units (a dispatch instruction), in accordance with NER 4.9.5(a).

Widespread failure from participants to follow dispatch instructions can raise system security issues, requiring AEMO to intervene. AEMO must be confident that relevant participants have accurately represented their capabilities and will follow dispatch instructions at all times, other than in the limited circumstances allowed by the Rules. This enables AEMO to assess its security management options based on accurate information, including where necessary, intervening in the market such as by issuing directions to participants. Furthermore, market participants then have confidence that the market price and dispatch instructions calculated by AEMO result from a process where all participants have provided accurate information to AEMO that appropriately reflects their capability.

NER 4.9.8(a), 4.9.8(a1) and 4.9.8(e) contain the overarching obligations requiring registered participants to comply with AEMO dispatch instructions, including the requirement for SSGs to ensure that each of their Semi-Scheduled Generating units is at all times able to comply with the latest generation dispatch offer (NER 4.9.8(e)).

The AEMC's 2021 rule change has changed the nature of an SSG's compliance with semi-dispatch instructions. The relevant rules did not previously make separate provision for semi-dispatch instructions, such that SSGs were only required to follow semi-dispatch instructions where AEMO had determined that the dispatch interval was a 'semi-dispatch' interval. During a semi-dispatch interval, AEMO's dispatch instruction included a dispatch level that specified the maximum level of a Semi-Scheduled Generating unit's MW generation (also commonly know as a semi-dispatch cap). The Semi-Scheduled Generating unit could generate at any level up to the dispatch level but could not exceed it.[22]

[22] Pg 46, National Electricity Amendment (Semi-scheduled generators dispatch obligation) rule 2021, AEMC.

Under the new rules, the obligation not to exceed a semi-dispatch cap is unchanged. However the Rules now clarify that the unit's output may deviate from its dispatch target due to energy source availability or, in the case of a semi-dispatch interval, regardless of energy source availability provided that the dispatch level is not exceeded.[23] It continues to be the case that a Registered Participant is not required to comply with a dispatch instruction where to do so would, in the Registered Participant's reasonable opinion, create a material risk to plant or public safety.[24]

The semi-dispatch cap flag is set for a Semi-Scheduled Generating unit when either one of the following conditions is satisfied for a trading interval (called a semi-dispatch interval):

- The dispatch target is limited by binding or violated network or FCAS constraint; or
- The dispatch target is otherwise below the UIGF as a result of either a purely inter-regional limitation, or an offer or market-related limitation.

It is important that SSGs continually monitor current output and plant capabilities and compare these to the relevant dispatch targets from AEMO. Where the current capabilities are likely to deviate from the dispatch target or, for a semi-dispatch interval, exceed the semi-dispatch cap, the participant should inform AEMO of this through rebids and, if appropriate, also by contacting AEMO's control room directly.

We also expect SSGs to monitor actual ambient temperatures and energy source availability to compare them with the forecasts upon which the relevant offers were based, to determine whether offers should be updated. We consider the use of real-time systems to monitor compliance with this obligation to be best practice. For example, an automatic system to compare a unit's actual output to its current dispatch target, and activate an alarm if output is not in accordance with dispatch target. The alarm would alert the plant operator or trader to investigate further and, if necessary, to submit a rebid to AEMO. Further, we expect that relevant SSG operational personnel are available at all times to receive and immediately act upon dispatch instructions. These obligations are discussed further in section 4.2.

As part of a dispatch instruction for energy, NER 4.9.5(a)(3) requires AEMO to specify a ramp rate or a specific target time to reach the outcome specified in the dispatch instruction.[25] Further, SSGs are required to linearly ramp their active power across the trading interval in a uniform way. This is further discussed in section 3.2 of this document.

Where the SSG's semi-dispatch cap is set and the unit output is away from the dispatch level by a certain magnitude or for a period of time, it will be declared by AEMO as non-conforming and notified as such by email (NER 3.8.23(b)).

Non-conformance vs non-compliance

Non-conformance is an AEMO dispatch process. Conformance monitoring is a process that AEMO uses to identify and implement corrective measures if a Market Participant fails to follow a dispatch instruction. It automatically flags non-responsive Semi-Scheduled

[23] NER 4.9.8(a2).

[24] NER 4.9.8(a).

[25] In practice, AEMO typically does not specify a ramp rate.

Generating units based on the SCADA quantities used by the central dispatch process. The intention of the non-conformance process is to ensure non-complying plant don't impact price signals.

Non-compliance refers to the AER's assessment of participant compliance with dispatch instructions under NER 4.9.8(e). It is important that participants understand that not being flagged by AEMO as non-conforming does not necessarily indicate compliance with dispatch instructions.

The AER's Compliance Bulletin No.1 contains additional information on the AER's compliance and enforcement approach to registered participants' obligations to follow dispatch instructions, including a distinction between non-compliance with dispatch instructions and being declared as non-conforming by AEMO.

Monitoring of Dispatch instructions

The AER has observed an increased adoption of automated software that aligns power plant output controls with all aspects of AEMO dispatch instructions, including dispatch targets and SCADA semi-dispatch cap flags. This kind of software may also include alarms set to alert staff when output does not match the dispatch instruction. In some cases, the use of such software alone and reliance on AEMO non-conformance notifications will not enable participants to meet relevant obligations under the NER.

In one such case, the participant engaged third-party contractors to manage its control room functions and did not have processes to actively review deviances from AEMO dispatch instructions. The participant was frequently non-conforming with dispatch instructions and only began investigating the issue following AEMO non-conformance email alerts. Subsequently, the participant identified an error in the system's logic which caused the plant to inaccurately initiate linear ramping in set circumstances and fail to meet the dispatch target in the next interval. The AER considers this behaviour to have potentially contravened various NER obligations.

The AER considers that participants should have processes in place to ensure the 24/7/365 active monitoring of SSG's performance in meeting the specified dispatch level at the end of each dispatch interval. SSGs should investigate any deviation from dispatch instructions and ensure they keep records to document reasons for any such deviations. This includes energy source availability data for the relevant Semi-Scheduled Generating units.

3.2 Linear Ramping

AEMO's Dispatch procedure (SO_OP_3705)[26] specifies that during semi-dispatch intervals or when constrained by a Local Limit, Semi-Scheduled Generating units must ramp their active power across the trading interval in a linear fashion, from their initial active power at

[26] Power system operating procedure are made in accordance with NER clause 4.10.1. These procedures apply to AEMO and all registered participants.

the time of receiving the dispatch instruction to the dispatch target at the end of the 5-minute dispatch interval. This is subject to:

- energy source availability;
- physical limitations of the facility;
- technical capabilities of the facility, which must, as a minimum, be consistent with its applicable GPS; and
- provision of frequency response in accordance with the NER or the market ancillary service specification.

Otherwise, Semi-Scheduled Generating units must either ramp linearly to their dispatch target or generate in accordance with their energy source availability.

This requirement applies to Semi-Scheduled Generating units that have an active power control system capable of linear ramping as agreed in the relevant GPS. The AER expects all future plant to be built with linear ramping capability in mind.

3.3 Bidding inflexible

There are occasions when the SSG is unable to operate in accordance with AEMO's dispatch instructions and must declare itself "inflexible".

NER 3.8.19(a1) sets out the conditions under which an SSG must advise AEMO that a Semi-Scheduled Generating unit is inflexible and states that this must be "due to abnormal plant conditions or other abnormal operating requirements in respect of that Semi-Scheduled Generating unit".

Further, NER 3.8.19(a2) states that the SSG must not advise AEMO that a Semi-Scheduled Generating unit is inflexible unless it is unable to operate in accordance dispatch instructions in any trading interval due to abnormal plant conditions or other abnormal operating requirements. As soon as practicable, the SSG must also advise AEMO of the removal of the inflexibility once it reasonably expects to be able to operate in accordance with dispatch instructions.

When bidding inflexible, an SSG must provide AEMO with a brief, verifiable and specific reason for the inflexibility and must provide to the AER upon request information to substantiate and verify the reason for the inflexibility.[27]

As a general principle, the AER considers abnormal plant conditions or other abnormal operating requirements to be conditions related directly to the internal operation of the relevant plant. An exception to this principle is where another law or licensing requirement requires the plant to be operated in a certain manner, for example in accordance with an environmental requirement, depending on the circumstances. The AER considers that this could amount to abnormal operating requirements. We would encourage relevant

[27] NER 3.8.19(b).

participants to contact the AER and AEMO to discuss the management of these requirements.

Further details on what is considered abnormal plant or operating requirements and the relevant information required can be found in AER's Rebidding and Technical Parameters Guideline.

Generator Testing and Commissioning

AEMO has recently advised[28] that participants may choose to bid inflexible if necessary to support hold point testing, noting:

- The fixed load bid must be consistent with actual testing requirements and a valid reason must be submitted in accordance with AER's Rebidding and Technical Parameters Guideline.
- Dispatch targets will be limited to the minimum of Fixed Load bid and dispatch forecast (UIGF).

Prior to conducting generator testing and commissioning, participants must liaise with the AEMO National Connections team and the relevant NSP(s) to ensure appropriate coordination is undertaken, and also seek approval from AEMO Operations.

If the dispatch outcomes result in a constraint violation, the AEMO Control Room can cancel the test and request that the participant remove the fixed load bid or apply a system security constraint.

The AER considers AEMO's suggested approach of bidding inflexible during hold point testing to be appropriate. We do, however, emphasise the importance of ensuring that AEMO and the relevant NSP(s) are appropriately informed of any testing or commissioning ahead of time and seeking AEMO's approval. The SSG should then keep AEMO and the relevant NSP(s) updated as the testing or commissioning progresses. When updating AEMO, participants should be mindful of any potential risks the testing or commissioning may pose to power system security and ensure these are communicated clearly and in a timely fashion.

[28] Intermittent Generator Forum December 2021, AEMO.

4 Continual data and communications requirements

4.1 Remote Control and Remote Monitoring Tools

SCADA

Semi-Scheduled and non-scheduled generators must have remote monitoring equipment to transmit to, and receive from, AEMO's control centres in real time.[29] Specifically, NER 4.11.1(a) requires remote control and monitoring devices to be installed and maintained in accordance with the standards and protocols determined and advised by AEMO.

The remote monitoring equipment here primarily refers to SCADA. A common cause of SCADA issues observed by AEMO is a failure between the measurement device and the generator's SCADA interface.[30] The AER expects participants to have processes in place to identify, review, test and rectify SCADA issues within the reliability requirements outlined in the standards and protocols developed by AEMO. These documents include AEMO's Standard for Power System Data Communications and Communication System Failure Guidelines.

4.2 Maintaining 24-hour generator control room and updating relevant contacts

AEMO may at times contact a generator to request information, issue a manual instruction or direction, or provide an update regarding SCADA, AWEFS/ASEFS forecasts, or participant self-forecasts. These calls may require urgent action to maintain or restore power system security and must be given priority.

SSGs must ensure that operational personnel for each generating system are available at all times to receive and immediately act upon dispatch instructions issued by AEMO.[31] Those personnel must be capable of immediately implementing AEMO's instructions or responding to urgent requests, such as to:

- switch off, or re-route, a generator;
- call equipment into service;
- take equipment out of service;
- commence operation or maintain, increase or reduce active or reactive power output;
- shut down or vary operation;
- change the generating unit's voltage control system set point to give a nominated voltage; or

[29] NER 4.11.1 and S5.2.6.1.

[30] NEM Operational Forecasting and Dispatch Handbook for wind and solar generators, AEMO.

[31] NER 4.9.2(d).

- do any other act or thing necessary to be done to maintain power system security or for reasons of public safety.

Given the broad range of actions the persons nominated to AEMO under this clause may be called upon to take, the AER considers it would not be sufficient for contact details to be provided for a person who would not be able to carry out the action which AEMO is requesting. That is, the assigned person should be an operational staff member with technical operating capabilities.

We note that the obligation applies 'at all times' and we expect generators to have sufficient resources available to control and direct generating units to meet dispatch instructions 24/7/365. This is particularly important during a system security event, which can occur at any time, requiring increased communication with AEMO. While generation assets may be operated by third parties under contract, this obligation falls on the Registered Participant for the asset and it is the responsibility of the Registered Participant to ensure that its agreements with such third parties support compliance with it.

Further, SSGs must ensure they maintain current contact details so the AEMO Control Room can contact the generator's operational personnel at all times (NER 4.11.3). Participants must ensure they include contact details for their trading team for bidding/dispatch purposes, as well as including contact details for voltage control and system security personnel. The AER expects participants to have systems, processes and personnel in place to regularly review the contact details provided to AEMO and update these where these are no longer the most appropriate contacts.

If the operation or connection of a generating system is creating a security risk in real time and operational personnel cannot be contacted, the AEMO Control Room may potentially instruct the NSP to take appropriate action, which can include disconnection.

More details regarding AER's expectation of good practice in these obligations can be found in the AER's National Electricity Market Summer Readiness Compliance Bulletin.

SSG Control Room

The AER has observed an increased use of Operation and Maintenance agreements by SSGs to manage the operation of their units. In some cases, there has been a lack of clarity in the roles and functions of third-party service providers. This increases the risk of failure to meet relevant obligations under the NER.

In one such case, the participant has engaged a third-party contractor who utilises an offshore control room. As a result, personnel are unable to act on AEMO instructions. There were also communications issues as the offshore control room was instructed to hang up on AEMO phone calls and notify the participant's trading desk to contact AEMO, often leading to delays in AEMO speaking to the participant. The AER considers this type of arrangement concerning and may have potentially contravened various NER obligations.

Following the 2016 Black system event in South Australia, AEMO manually dispatched generators by telephone instead of its usual electronic system. This highlights the importance of participants being contactable and able to act on AEMO instructions.

It is important, particularly during major market events, that participants implement adequate processes and measures in compliance with relevant obligations under the NER, examples of which may include:

- a roster of personnel to maintain a 24/7/365 generator control room;
- processes to act on AEMO dispatch instructions;
- processes to investigate and keep records for instances of non-compliance with dispatch instructions and the semi-dispatch cap; and
- processes to monitor changes in plant conditions and inputs, and to amend plant availability submissions to AEMO.

Collectively, these measures will assist in ensuring SSGs are able to comply with their offers at all times, and to follow dispatch instructions from AEMO.

4.3 Registered participant advice and Protection or Control System abnormality

The 24-hour generator control room and the relevant roster of operational personnel serve a pivotal function in maintaining power system security. In addition to responding to AEMO instructions, it also facilitates other key NER obligations such as monitoring and promptly advising AEMO on:

- any circumstance which could be expected to adversely affect the secure operation of the power system or any equipment owned or under the control of the Registered Participant or a Network Service Provider (NER 4.8.1); and
- whether any relevant protection system or control system is defective or unavailable for service (NER 4.8.2(a)).

If AEMO considers the advised issues to be a threat to power system security, it may direct the relevant participant to take the relevant equipment out of operation or operate the equipment as AEMO directs.

We note that AEMO is monitoring the entire power system and may not review the information participants submit immediately. Where conditions in the market are tight, or the issue a participant is informing AEMO of is time sensitive, it would be sensible to verbally inform AEMO's control room operators. Maintaining direct contact allows AEMO to obtain any further details it needs immediately. We consider that, when in doubt about whether a circumstance falls under the ambit of clause 4.8.1, it is best practice to contact AEMO.

4.4 Compliance with generator performance standards

SSGs are required to implement and maintain effective compliance programs for their plant in accordance with NER 4.15. Non-compliance with certain GPS may materially increase the risk of major power system incidents.

AEMO is responsible for maintaining a register of the GPS and monitors compliance with the registered standards. Compliance with the GPS is critical to AEMO's ability to safely and reliably operate the power system. Participants must immediately notify AEMO of any non-compliance with the registered GPS. This is done by completing and submitting to AEMO a Notice of Non-compliance with Registered GPS.[32]

The NER sets out further procedures to be followed by a generator proposing to alter a generating system. Specifically, where the SSG's GPS has been previously accepted by AEMO and NSPs, it must submit to AEMO and relevant NSPs information regarding the proposed alterations as required under NER 5.3.9. This is with exceptions to SSGs making modifications to comply with the Primary Frequency Response Requirements.[33]

The AEMC's Reliability Panel reviews the template for generator compliance programs from time to time. We expect Registered Participants to follow the progress of these reviews and update their compliance programs in accordance with any changes to the template.

The AER published an Information Bulletin to promote the GPS compliance framework.[34] We proactively monitor Registered Participants' compliance quality assurance systems by conducting audits of their compliance practices.

More details regarding the AER's expectations for compliance with this GPS obligations can be found in AER's National Electricity Market Summer Readiness Compliance Bulletin.

[32] Available on AEMO's website.

[33] NER 5.3.9(a1).

[34] Available on the AER's website.