

Australian Energy Market Commission

**Rule Determination**

**National Electricity Amendment (Central  
Dispatch and Integration of Wind and Other  
Intermittent Generation) Rule 2008**

Rule Proponents  
NEMMCO

01 May 2008

Signed: .....

**John Tamblyn**  
**Chairman**  
For and on behalf of  
Australian Energy Market Commission

**Commissioners**  
Tamblyn  
Carver  
Woodward

## **Inquiries**

The Australian Energy Market Commission  
PO Box H166  
Australia Square NSW 1215

**E:** [aemc@aemc.gov.au](mailto:aemc@aemc.gov.au)

**T:** (02) 8296 7800

**F:** (02) 8296 7899

## **Citation**

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## **About the AEMC**

The Council of Australian Governments, through its Ministerial Council on energy, established the Australian Energy Market Commission (AEMC) in July 2005 to be the Rule maker for national energy markets. The AEMC is currently responsible for Rules and policy advice covering the National Electricity Market. It is a statutory authority. Our key responsibilities are to consider Rule change proposals, conduct energy market reviews and provide policy advice to the Ministerial Council as requested, or on AEMC initiative.

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## Abbreviations and glossary

AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
AGC	Automatic generation control (AGC): is the system into which the loading levels from economic dispatch will be entered for generating units operating on automatic generation control in accordance with Clause 3.8.21(d).
AWEFS	Australian Wind Energy Forecasting System
Central Dispatch	The process managed by NEMMCO for the dispatch of scheduled generating units, scheduled loads, scheduled network services and market ancillary services in accordance with Clause 3.8 of the National Electricity Rules.
Commission	see AEMC
DNSP	Distribution Network Service Provider
ESC	Essential Services Commission (Victoria)
ESCOSA	Essential Services Commission of South Australia
ESIPC	Electricity Supply Industry Planning Council (South Australia)
FCAS	Frequency Control Ancillary Services
Intermittent	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.
ISO	Independent Systems Operator
kV	Kilovolt
LNSP	Local Network Service Provider
MAS	Market Ancillary Services
MCE	Ministerial Council on Energy
MNSP	Market Network Service Provider
MTPASA	Medium Term Projected Assessment of System Adequacy
NECA	National Electricity Code Administrator
NEL	National Electricity Law
NEM	National Electricity Market
NEMDE	National Electricity Market Dispatch Engine is the computer system and algorithms used by NEMMCO to optimise the Central Dispatch process.
NEMMCO	National Electricity Market Management Company
Non-scheduled generating unit	A generating unit whose output is not controlled via the Central Dispatch process, in accordance with Chapter 2 of the Rules..
NSP	Network Service Provider

PASA	Projected Assessment of System Adequacy
Rules	National Electricity Rules
Scheduled generating unit	A generating unit whose output is controlled via the Central Dispatch process, in accordance with Chapter 2 of the Rules.
SCO	Standing Committee of Officials
SOO	Statement of opportunities, which is prepared annually by NEMMCO in accordance with Clause 3.13.3(q) of the Rules.
STPASA	Short Term Projected Assessment of System Adequacy
TNSP	Transmission Network Service Provider
TPA	Trade Practices Act 1974 (Commonwealth)
TUoS	Transmission User of Service
UIGF	Unconstrained intermittent generation forecast
WEIRG	Wind Energy Industry Reference Group
WEPWG	Wind Energy Policy Working Group
WETAG	Wind Energy Technical Advisor Group

## Summary

The Australian Energy Market Commission (Commission) makes this final Rule determination and attached Rule to be made, in accordance with sections 102 and 103 of the National Electricity Law (NEL), on NEMMCO's proposal entitled "Semi-Dispatch of Significant Intermittent Generation". NEMMCO's proposal stems from work undertaken by various Ministerial Council on Energy (MCE) working and advisory groups.

Currently, non-scheduled generating units are not required under the Rules to participate in central dispatch nor are they obliged to control their output to assist in the management of network flows. Large intermittent generators such as wind farms are currently registered as Non-Scheduled Generators because they cannot practically comply with some of the Rule requirements for Scheduled Generators such as following a dispatch target. Wind farms are increasing in capacity and are beginning to have material impacts on network congestion and power system security. This is creating challenges for NEMMCO in efficiently managing the operation of a secure power system. This problem is expected to increase in severity as the growth in wind farm development continues.

NEMMCO's Rule change proposal seeks to integrate significant intermittent generating units (such as wind farms) into the central dispatch and projected assessment of system adequacy (PASA) processes in order to enhance system security and reliability. Under NEMMCO's proposal, all new intermittent generators greater than 30 MW would be required to register under a new classification of "Semi-Scheduled Generator", submit and receive dispatch information in a similar manner to scheduled generating units, and limit their output at times when that output would otherwise violate secure network limits.

This final Rule determination contains a detailed description of the Commission's analysis of the policy issues raised in NEMMCO's proposed Rule change and the two rounds of submissions. The key policy decisions adopted by the Commission, and implemented in the Rule to be made, are to:

- include the classification of Semi-Scheduled Generator into the Chapter 2 of the Rules, and allow a Semi-Scheduled Generator to register a number of physical generating units as a single generating unit at the time of registration;
- require Semi-Scheduled Generators to participate in the central dispatch process, including submitting offers and responding to dispatch instructions;
- allow the control of semi-scheduled generating units using network constraint equations;
- require NEMMCO to prepare unconstrained intermittent generation forecast (UIGF) for each semi-scheduled generating unit;
- require NEMMCO to publish guidelines that define the information that Semi-Scheduled Generators are required to provide for the UIGF;

- require Semi-Scheduled Generators to provide information to NEMMCO for the UIGF, including plant availability for each semi-scheduled generating unit;
- require Semi-Scheduled Generators to limit the output from their semi-scheduled generating units to below a dispatch level whenever the generation is limited by the central dispatch process;
- require Semi-Scheduled Generators to have the capability to respond to voltage and reactive power instructions from NEMMCO, in accordance with the requirements in the technical standards;
- allow NEMMCO to recover regulation frequency control ancillary service costs from Semi-Scheduled Generators in a similar manner to Scheduled Generators;
- require NEMMCO to monitor the compliance of Semi-Scheduled Generators; and
- include grandfathering provisions for intermittent generating units registered at the date the final Rule determination is published and projects considered committed at 1 January 2008. The committed status of projects will be assessed against a criteria derived from the criteria used by NEMMCO for assessing committed projects for the Statement of Opportunities.

The Commission considers that following the removal of some the more arduous and less important requirements contained in NEMMCO's proposal, the Semi-Dispatch arrangements contained in the Rule to be made promote the efficient use of and efficient investment in electrical services, and improves NEMMCO's ability to efficiently and securely integrate significant intermittent generators into the central dispatch process. The Commission therefore considers that these improvements are likely to promote the long term interest of consumers of electricity through lower prices for energy, market ancillary service and network charges, and higher levels of reliability and security of the national electricity system.

The Commission has divided the Rule to be made into two schedules. Schedule 1 will commence on 1 May 2008 and will enable NEMMCO to register, or re-registered, Semi-Scheduled Generators. Schedule 2 will commence on 31 March 2009 and will enable the operation of the Semi-Dispatch arrangements, including the UIGF.

The Commission notes that the provisions of this Rule will have an affect on the table of Civil Penalty Provisions contained in the National Electricity Regulations. The Commission intends to bring this matter to the attention of the MCE and the Australian Energy Regulator (AER).

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# 1 NEMMCO's Rule Change Proposal

On 23 April 2007, the Commission received a Rule change proposal regarding the dispatch of significant intermittent generation from NEMMCO entitled "Semi-Dispatch of Significant Intermittent Generation".

## 1.1 Overall effect of NEMMCO's Rule change proposal

Currently, non-scheduled generating units are not required under the Rules to participate in central dispatch nor are they obliged to control their output to assist in the management of network flows. Large intermittent generators such as wind farms are currently registered as Non-Scheduled Generators because they cannot practically comply with some of the Rule requirements for Scheduled Generators such as following a dispatch target. Wind farms are increasing in capacity and are beginning to have material impacts on network congestion and power system security. This is creating challenges for NEMMCO in efficiently managing the operation of a secure power system. This problem is expected to increase in severity as the growth in wind farm development continues.

NEMMCO's Rule change proposal states its proposal seeks to enhance power system security by requiring significant intermittent generators<sup>1</sup> (such as windfarms) to participate in the central dispatch and PASA processes, and to limit their output at times when that output would otherwise violate secure network limits. To this end NEMMCO propose that a new registration classification of "Semi-Scheduled Generator" be defined for significant intermittent generators, instead of being limited to registering intermittent generators as either Scheduled or Non-Scheduled. The proposal also includes changes to the existing requirements for Scheduled and Non-Scheduled generation as a result of the review of the central dispatch and projected assessment of system adequacy (PASA) processes to integrate intermittent generators.

Under NEMMCO's proposal, significant intermittent generators would be required to submit dispatch offers, in a similar manner to scheduled generating units. These dispatch offers would be optimised in conjunction with the bids and offers from scheduled generating units, Scheduled Network Services and Scheduled Loads. Network flows would be controlled to within secure limits through the action of constraints in the central dispatch process which, in the case of semi-scheduled generating units, may reduce the level of output from intermittent generators when system security would otherwise be violated. In doing so significant intermittent generators must then compete with scheduled generators rather than simply being a 'price-taker'<sup>2</sup>.

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<sup>1</sup> 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.

<sup>2</sup> A price-taking generator does not attempt to influence the market price by adjusting its offer price or quantity, rather it accepts the price set by the market.

## 1.2 Description of NEMMCO's proposed Rule

This section provides a summary of NEMMCO's Rule change proposal. Section 3 of NEMMCO's proposal provides further explanation of its proposed Rule.

### 1.2.1 Registration and classification of intermittent generation

Under the current Rules a generating unit is either classified as 'scheduled', where its output is controlled via the central dispatch process, or 'non-scheduled' where the unit is a price taker and its output is not controlled via the central dispatch process.<sup>3</sup> Normally generating units that are larger than 30 MW are classified as scheduled, unless granted an exemption by NEMMCO on grounds such as its output is intermittent.

The proposed Rule change introduced a new generating unit classification of semi-scheduled and an associated participant category of 'Semi-Scheduled Generator'. NEMMCO anticipates that all new significant windfarms would be expected to classify as semi-scheduled.

NEMMCO states that under the proposed arrangements a new generating unit, or an existing generating unit that wished to be reclassified, would be classified as a semi-scheduled generating unit if:

The generating unit had an output nameplate rating  $\geq 30$  MW, or the generating unit is part of a group of generating units connected at a common connection point (a generating system) that has a combined output nameplate rating  $\geq 30$  MW, and the generating unit has an output that is intermittent.

Pre-requisites for a generating unit being classified as a Semi-Scheduled Generator would be to satisfy NEMMCO that:

- there is adequate voice and electronic communications and operational data telemetry links to support the receipt of dispatch instructions from NEMMCO every 5 minutes and to enable NEMMCO to audit dispatch cap compliance (equivalent to the requirements for scheduled generating units);
- the generator will be capable of operating its semi-scheduled generating unit in accordance with the co-ordinated central dispatch process operated by NEMMCO under Chapter 3; and
- each semi-scheduled generating system will be capable of meeting or exceeding the performance standards registered with NEMMCO.

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3 The classification of a generating unit as either scheduled or non-scheduled should not be confused with classification as a market generating unit, where the units output is not purchased in its entirety by the Local Retailer or by a local Customer, or as a non-market generating unit, where its output is purchased in its entirety by the Local Retailer or by a local Customer.

### 1.2.2 Participation in Central Dispatch and PASA

Under NEMMCO's proposed Semi-Dispatch arrangements all Semi-Scheduled Generators would be required to participate in central dispatch (dispatch and pre-dispatch) and PASA (STPASA and MTPASA).

To participate in central dispatch the Semi-Scheduled Generators would be required to:

- submit daily energy market offers (dispatch offers) to NEMMCO for each semi-scheduled generating unit;
- allow the National Electricity Market Dispatch Engine (NEMDE<sup>4</sup>) to determine the dispatch instruction for each semi-scheduled generating unit, based on optimal dispatch of all scheduled and semi-scheduled generating units in the NEM (as described in clause 3.8.1(b) of the Rules); and
- receive electronic dispatch instructions from central dispatch and comply with these dispatch instructions as required.

To participate in STPASA and MTPASA the Semi-Scheduled Generators would be required to submit valid inputs including their availability.

Requiring Semi-Scheduled Generators to participate in central dispatch and PASA will:

- allow optimal central dispatch of both scheduled and intermittent generating units; and
- provide a market based and transparent arrangement for the access to the network.

### 1.2.3 Control of intermittent generation through network constraints

Transmission network flows are controlled by the use of constraint equations in NEMDE. At present Scheduled Generators, plus scheduled network services and scheduled loads, appear in constraint equations as controllable variables<sup>5</sup>. NEMDE determines the optimal dispatch<sup>6</sup> through the action of the constraint equations in combination with the offers and bids from the Scheduled Generators, network services and loads.

The constraint equations represent the limits on the network transfers necessary to maintain system security. A constraint equation is said to "bind" when the

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<sup>4</sup> NEMDE is the computer system and algorithms used by NEMMCO to optimise the central dispatch process.

<sup>5</sup> Often referred to as left hand side (LHS) or dependent variables.

<sup>6</sup> Optimal in the sense of maximising the value of maximise the value of spot market trading, in accordance with Clause 3.8.1(b) of the Rules.

corresponding secure network transfer limit is reached and it becomes necessary for NEMDE to adjust the dispatch of the scheduled generating units in order to maintain system security. A constraint equation is said to “violate” when NEMDE is unable to find a level of dispatch for the scheduled generators that is able to limit the network transfers within its secure transfer limit.

Under NEMMCO’s proposal significant intermittent generators would be required to participate in the dispatch process and hence their output may be adjusted in order to control network flows by their inclusion as controllable variables in NEMDE constraint equations.

#### **1.2.4 Unconstrained intermittent generation forecasts (UIGF)**

NEMMCO’s proposed Semi-Dispatch<sup>7</sup> arrangements rely on the provision of “unconstrained intermittent generation forecasts” (UIGF) for each semi-scheduled generating unit, and for all intervals in the dispatch, pre-dispatch and the PASA processes.

The UIGF would be the equivalent forecast of electrical power output from a generating unit, or aggregated unit, based on the forecast amount of energy available for conversion into electrical power. The generation forecast is unconstrained in the sense that it ignores external factors that may limit the generating unit’s output such as a network limit or an economic requirement to operate at a reduced output.

NEMMCO proposed that the UIGF used in the dispatch and pre-dispatch processes would represent the most probable forecast of the generation from the semi-scheduled generating units. In the case of the PASA processes NEMMCO proposed to input the more conservative forecasts in addition to most probable forecasts from the UIGF in a similar manner to the demand forecasts that are currently input into these processes.

NEMMCO also proposes that the UIGF would be used in the dispatch, pre-dispatch and the PASA processes as an upper limit on the dispatch cap to be calculated by NEMDE for a semi-scheduled generating unit, which is analogous to the availability of a scheduled generating unit, being the maximum value to which it can be dispatched by NEMDE.

NEMMCO considered that the use of the UIGF would provide a more accurate forecast of the electrical output of significant intermittent generation and hence will lead to more efficient dispatch and pricing outcomes, more accurate PASA assessments and improved power system security and reliability. NEMMCO also considered that, as part of the arrangements for integrating semi-scheduled generating units, the UIGF is also necessary when NEMDE determines whether or not the relevant semi-scheduled generating unit will be subject to a dispatch cap for that dispatch interval.

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<sup>7</sup> The term “Semi-Dispatch” describes the general arrangements that are the subject of this Rule change.

### **1.2.5 Conditions for Semi-Dispatch compliance**

Under the Semi-Dispatch arrangements proposed by NEMMCO, a semi-scheduled generating unit would only need to comply with its dispatch calculated by NEMDE when its “Semi-Dispatch compliance” requirement flag is set.

#### **Determining a Semi-Dispatch interval**

The “Semi-Dispatch compliance” flag would either be set when the generating unit’s output is:

- explicitly limited by any binding or violating network constraint equation such that if the output were to exceed the cap this would result in violating that network constraint equation; or
- below its UIGF as a result of an offer or a market related limitation including unit ramp rate, unit fixed loading level, non-dispatch of uneconomic price bands or marginal dispatch of economic price bands.

Under NEMMCO’s proposal when, for a particular semi-scheduled generating unit and dispatch interval:

- either of these conditions above are met the dispatch interval is defined as a “semi-dispatch interval” and the “Semi-Dispatch compliance” requirement flag is set; while
- neither of these conditions above are met the dispatch interval is defined as a “non-semi-dispatch interval” and the “Semi-Dispatch compliance” requirement flag is reset.

#### **Assessing Semi-Dispatch compliance**

In assessing Semi-Dispatch compliance NEMMCO proposes the assumption that:

- the UIGF, the dispatch cap and the constraint equation solutions would all come from the same dispatch interval;
- there is no restriction on the type of network constraint that could set the “Semi-Dispatch compliance” requirement flag;
- only network constraint equations that control the output of the semi-scheduled generating unit are considered, and if the constraint equation binds or violates, then the semi-scheduled generating unit would be given a dispatch cap less than or equal to its UIGF; and
- if the binding or violating constraint equation only controls interconnector flows, then one or more semi-scheduled generating units may be constrained off due to unit ramp rate, unit fixed loading level, non-dispatch of uneconomic price bands or marginal dispatch of economic price bands.

NEMMCO considered that the use of “Semi-Dispatch compliance” requirement flags would allow “semi-dispatch intervals” to be defined where semi-scheduled generating units are required to control their output below their dispatch caps.

### **1.2.6 Requirements for dispatch cap compliance**

Under NEMMCO’s proposed arrangements each semi-scheduled generating unit would be electronically and confidentially issued with both a dispatch cap and an associated ‘Semi-Dispatch compliance’ requirement flag.

NEMMCO proposed that each semi-scheduled generating unit would be required to limit its output below its dispatch cap during ‘semi-dispatch intervals’ when the ‘Semi-Dispatch compliance’ requirement flag is set. Compliance with the dispatch cap would be assessed at the end of the dispatch interval, although NEMMCO noted that the Semi-Scheduled Generator would be encouraged to linearly ramp its output during a ‘semi-dispatch interval’ under the causer pays provisions in Clause 3.15.6A(k) in order to minimise the use of market ancillary services.

NEMMCO also proposed that a semi-scheduled generating unit would not be required to comply with its dispatch cap during ‘non-semi-dispatch intervals’ when the ‘Semi-Dispatch compliance’ requirement flag is reset, making the semi-scheduled generating unit free to operate at any output level during the dispatch interval.

Under NEMMCO’s proposed arrangements the market ancillary services causer pays factors for semi-scheduled generating units would be such that:

- during a “semi-dispatch interval” the linear trajectory that would apply in the causer pays calculations would be based on a linear ramp between successive dispatch targets, in a similar manner to the causer pays factors for scheduled generating units; and
- during a “non-semi-dispatch interval” the linear trajectory that would apply in the causer pays calculations would be based on a calculated line of best fit through the actual generation during the dispatch interval.

NEMMCO considered that these arrangements would be effective because a semi-scheduled generating unit would be required to control its output below its dispatch cap in order to avoid violating (or further violating) a network constraint, but would be able to ignore its dispatch cap at other times. NEMMCO also considers that semi-scheduled generating units controlling its output to or below its dispatch cap would allow for lower operating margins than would otherwise be required in order to accommodate potentially large uncontrolled increases in the output of the semi-scheduled generating units.

### **1.2.7 Monitoring of dispatch cap conformance by NEMMCO**

NEMMCO proposed that it would continuously monitor the conformance of semi-scheduled generating units in a similar manner to the way it monitors the conformance of scheduled generating units under Clause 3.8.23(a).

NEMMCO's proposal indicated that further information on how it intended to change its dispatch conformance monitoring procedures to accommodate semi-dispatch generating units is contained in a NEMMCO information paper available on its website<sup>8</sup>.

### **1.2.8 Transition into the Semi-Dispatch arrangements**

Under NEMMCO's proposal a complete, unconditional and ongoing exemption from any requirement associated with the proposed Rules for Semi-Scheduled Generators would be granted to all generators that own or operate generating units that either:

1. are already registered in the NEM prior to the proposed Rules taking effect; or
2. submit an application to register in the NEM on or after the proposed Rules taking effect but have executed a network connection agreement with the relevant NSP before the proposed Rules take effect.

NEMMCO considered that this approach protects the owners of significant intermittent generating units from otherwise having unanticipated expenses to upgrade these units in order to be able to operate as semi-scheduled generating units. NEMMCO also considered that the use of an executed connection agreement is an appropriate milestone for progress to be used as defining that the proponent has made a significant investment in the project and committed to technical performance. NEMMCO considered that the technology required to enable remote dispatch of intermittent generators was already available and, under the new Technical Standards Rules<sup>9</sup>, all non-scheduled generating units with a combined nameplate rating above 30 MW require active power control<sup>10</sup> and remote monitoring<sup>11</sup> which can be upgraded to electronically receive dispatch instructions.

Also under NEMMCO's Rule change proposal Semi-Scheduled Generators would be treated in the same manner as Scheduled Generators for the purposes of allocating participant fees. Also, to encourage existing intermittent generators to apply to be reclassified as semi-scheduled, NEMMCO proposed that the participant fees be waived for up to two years for those generators that reclassify their generating units as semi-scheduled.

NEMMCO considered that where Jurisdictional licensing arrangements, special dispatch control arrangements within connection arrangements or other interim arrangements exist, these arrangements may potentially conflict with the proposed arrangements for semi-scheduled generating units. NEMMCO considered, therefore, that some of these interim arrangements may need to be wound up or amended to enable the transition to the Semi-Dispatch Rules.

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<sup>8</sup> "Semi-Dispatch of Significant Intermittent Generation – Proposed Market Arrangements", 4<sup>th</sup> May 2007, available at <http://www.nemmco.com.au/dispatchandpricing/140-0091.pdf>.

<sup>9</sup> National Electricity Amendment (Technical Standards for Wind Generation and other Generator Connections) Rule 2007 No. 2, made and commenced operation on 15 March 2007.

<sup>10</sup> Under schedule 5.2.5.14 of the Rules.

<sup>11</sup> Under schedule 5.2.6.1 of the Rules.

### 1.3 How NEMMCO considers that its proposal meets the NEM objective

Section 6 of NEMMCO's proposal contains an explanation of how it considered that the proposed Rule would or would be likely to contribute to the achievement of the NEM objective<sup>12</sup>. The revised proposal does not explicitly explain its benefits in terms of the national electricity objective for the purposes of the requirements in the Regulations, however further analysis of the proposal shows that conclusions can be drawn to establish that an explanation of how the proposal meets the NEM objective has been provided. Furthermore, an analysis of the substance in the proposal clearly demonstrated the potential of the proposal to meet the NEM objective.

NEMMCO identified the implications of maintaining the status quo in the presence of increased penetration of intermittent generation as:

- increased risks of not maintaining system security due to the uncertain impact of intermittent generation on network capability;
- reduced efficiency of the central dispatch process due to large safety margins in network constraint equations;
- increased incidences of Scheduled Generators or interconnector transfers being constrained off, with associated higher operating costs, to avoid network overload in the presence of intermittent generators; and
- increased use of directions and instructions by NEMMCO under Clause 4.8.9, "Power to issue directions and Clause 4.8.9 instructions", to Non-Scheduled Generators to address potential system security violations.

NEMMCO considered that the proposal addresses these issues and summarises the benefits of the proposed Rule that are associated with the NEM objective as:

- reducing the risk of operating in an insecure state;
- reducing the risk associated with investment in intermittent generation that is currently subject to NEMMCO directions and instruction under Clause 4.8.9;
- more efficient investment in and use of network services due to reducing the constraint equation operating safety margins;
- more effective inter-regional hedging due to the increased firmness of interconnector capability;
- improved generator investment signals due to better representation of congestion in the power system network; and

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<sup>12</sup> The national electricity objective replaced the NEM objective in the amended NEL that took effect on 1 January 2008.



- more efficient investment generally due to greater confidence in the market outcomes due to the reduction in the number of approaches taken to manage intermittent generation and reduced reliance on market intervention.

NEMMCO considered that the compliance costs imposed on intermittent generators and itself would be relatively small and are more than outweighed by the benefits identified above. For these reasons, NEMMCO considered that the Rule proposal has the potential to satisfy the Rule making test.

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## 2 Background to the proposal

### 2.1 Historical context for the proposed Rule

The connection of significant amounts of non-scheduled wind generation in the NEM has resulted in a concern that there may be an adverse impact on NEMMCO's ability to manage network flows within secure limits.

In 2004, the Ministerial Council on Energy's (MCE) Standing Committee of Officials (SCO) formed the Wind Energy Policy Working Group (WEPWG) to review the range of policy issues associated with the connection of large amounts of wind generation. The WEPWG review recommended a number of initiatives including the introduction of market based arrangements for the management of significant amounts of intermittent generation, such as wind generation, within network limits.

WEPWG requested NEMMCO to form the Wind Energy Technical Advisor Group (WETAG) to investigate the technical matters from the WEPWG policy review. WETAG identified a number of issues including that large amounts of intermittent non-scheduled generation are incompatible with the optimised central dispatch process in the NEM, in part because the operational security limits of the network may be infringed. In its report WETAG<sup>13</sup> considered that it is:

“...inevitable that significant non-scheduled generation plant will need to be controlled to reduced outputs in cases where network loading constraints become binding. There is merit in determining the acceptable loading level limits of non-scheduled generating plant using the central dispatch engine, particularly for any plant that is greater than 30 MW in size.”

The WETAG report proposed the “Semi-Dispatch” model whereby wind generators would be incorporated into the central dispatch process using network constraint equations to control network flows within secure limits. Under the Semi-Dispatch model NEMMCO's dispatch algorithm NEMDE would issue the wind generators dispatch instructions to limit their output when the relevant network constraints are binding. WETAG noted that the windfarm owners would need to install appropriate communications and control facilities to ensure that the dispatch instructions could be followed.

In August 2005 the SCO requested NEMMCO to develop a more detailed description of the Semi-Dispatch arrangements. To this end the Wind Energy Industry Reference Group (WEIRG) assisted NEMMCO to develop proposed Semi-Dispatch arrangements. In December 2005 NEMMCO and the WEIRG completed an initial investigation and confirmed to WEPWG the Semi-Dispatch arrangements were technically feasible. In March 2006 WEPWG gave NEMMCO its in-principle support of the proposed Semi-Dispatch arrangements and requested NEMMCO to develop a

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<sup>13</sup> Integrating windfarms into the NEM”, WETAG report to WEPWG, 12 January 2005, <http://www.mce.gov.au/assets/documents/mceinternet/WEPWGDiscussionPaperMar0520050510160534.pdf>

package of proposed Rule changes. NEMMCO, in consultation with the WEIRG, developed a package of proposed Rule changes to incorporate intermittent generation, including wind generators, in the central dispatch processes.

On 23 April 2007 the Commission received a Rule change proposal regarding the dispatch of significant intermittent generation from NEMMCO "Semi-Dispatch of Significant Intermittent Generation".

## **2.2 Risks of increased connection of wind generation**

The amount of intermittent generation, predominantly in the form of wind generation, has grown rapidly in recent years in the NEM and this trend is expected to continue. This growth has been particularly pronounced in South Australia.

To date the intermittent generators have been able to register with NEMMCO as non-scheduled<sup>14</sup> and hence their output is not controlled by central dispatch. Intermittent generators are classified as non-scheduled because their output cannot be fully controlled as it is derived from an irregular and uncontrollable fuel source. A number of network control and market efficiency issues are emerging for the NEM as the output of the non-scheduled generators is not centrally controlled, effectively giving the intermittent generators firm network access in preference to scheduled generators, unless directed by NEMMCO or its agents.

Allowing intermittent generators, including relatively large windfarms, to register as non-scheduled generating units is likely to lead to increased risks in the future. The possible risks identified include the issues outlined below.

### **Increased risk of violating a secure network limit**

The output of a non-scheduled generator may significantly increase the flows in the network which may cause flows to go beyond a secure limit, thus causing the power system to be in an insecure state. Such a violation of a secure network limit could not be alleviated by NEMDE as it does not have control over non-scheduled generators.

### **Reduced market efficiency due to higher operating margins**

The network constraint equations used in NEMDE to control network flows to be within secure transfer limits include a safety margin to account for measurement errors and other uncertainties due to inaccuracies of forecast demands on network flows. These safety margins need to be sufficiently large to allow for the errors and uncertainties but the presence of a safety margin does reduce the network transfers associated when the associated constraint equation is binding.

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<sup>14</sup> The South Australian Jurisdiction has recently required all new wind generators in its state to be registered with NEMMCO as scheduled. This is an interim measure that is likely to be revoked if this Rule change package is accepted.

A reduction in the transfer capability through an increase in the operating margin means that at the times when the constraint is binding a higher cost generator must operate at an otherwise increased output, with an equivalent reduction in the output of a low cost generator, thus increasing the cost of dispatching generation to meet the load.

The presence of large non-scheduled intermittent generation is likely to increase the uncertainty in the network flows, thus increasing the operating margins, reducing the transfer allowable capability and increasing costs of dispatching sufficient generation to meet demand. Where the affected network is an interconnector the reduction in network transfer capability may reduce the firmness of the hedges funded by the associated inter-regional settlements residues.

### **Reduced market efficiency due to increased market interventions**

Where the transfer in the network is above a secure operating limit, and this transfer cannot be reduced by the actions of NEMDE, such as when the generators associated with the transfer are non-scheduled, then NEMMCO would need to rely on directions or instructions to control the output from these non-scheduled generators to return the transfer in the network to below a secure operating limit.

Controlling network flows through market interventions such as NEMMCO directions and instructions is less efficient than controlling the flows using explicit constraint equations in NEMDE. This is because:

- the costs of market interventions are not as rigorously costed when compared to the central dispatch process; and
- the network flows are controlled more precisely by the central dispatch process.

Consequently, the use of NEMMCO intervention to control network flows creates additional uncertainty for participants compared to controlling network flows using NEMDE and constraint equations.

### **Interim measures**

The South Australian Jurisdiction has been concerned about large amount of wind generation connecting to networks in that state and the potential impacts on those networks. In the absence of any arrangements in the NEM to manage large intermittent generators, in September 2005 the Essential Services Commission of South Australia (ESCOSA)<sup>15</sup> implemented its own arrangements for managing the network security issues associated with windfarms including:

- local dispatch control schemes operated by the associated NSP; and

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<sup>15</sup> Wind Generation Licensing - Statement of Principles", ESCOSA website, <http://www.escosa.sa.gov.au/webdata/resources/files/050930-R-WindGenerationStatementofPrinciples.pdf>

- requiring new windfarms to be classified as scheduled generators under ESCOSA's licensing conditions.

While these actions appear to be prudent for managing network flows in the absence of the proposed "Semi-Dispatch" model they are likely to lead to less efficient outcome as:

- local dispatch control schemes tend to be coarse and do not attempt to optimise the dispatch of generation while controlling the network flows; and
- requiring new windfarms to be classified as scheduled generators will impose significant unnecessary costs.

ESCOSA has indicated that:

"until appropriate arrangements (such as formalised Semi-Dispatch rules) are made in the NEM, it is appropriate to require wind generators to operate as scheduled generators under the NER [Rules]."

### **3 Final Rule Determination**

The Commission has determined in accordance with sections 102 and 103 of the National Electricity Law (“NEL”) to make the final Rule.

This determination sets out the Commission’s reasons for making the final Rule. The Commission has taken into account:

- the Commission’s powers under the NEL to make the Rule;
- the proponent’s Rule change proposal and proposed Rule;
- submissions received;
- relevant Ministerial Council of Energy (“MCE”) statements of policy principles; and
- the Commission’s analysis as to the way(s) in which the Rule to be made will or is likely to contribute to the achievement of the national electricity market objective so that it satisfies the statutory Rule making test.

#### **3.1 The Commission’s power to make the Rule**

The subject matters about which the AEMC may make Rules are set out in section 34 of the NEL and more specifically in Schedule 1 to the NEL.

The proposed Rule falls within the subject matters that the AEMC may make Rules about, as it relates to:

- the operation of the national electricity market (as it involves the Rules for dispatching intermittent generating systems);
- the operation of the national electricity system for the purposes of the safety, security, and reliability of that system (as this matter involves the ability to maintain system security and reliability in the presence of intermittent generating systems) and;
- the activities of persons (including registered participants) participating in the national electricity market or involved in the operation of the national electricity system (as this matter involves the registration and operation of intermittent generators as a new class of Registered Participant).

The Commission is satisfied that the proposed Rule is a matter about which the Commission may make a Rule.

Specifically, the Rule is also within matters set out in Schedule 1 to the NEL as it relates to:

- the registration of persons as Registered Participants or otherwise for the purposes of this Law and the Rules, including the deregistration of such persons or suspension of such registrations (Clause 1 of Schedule 1 to the NEL); and
- the operation of generating systems, transmission systems, distribution systems or other facilities (Clause 11 of Schedule 1 to the NEL).

### **3.2 Relevant MCE statements of policy principles**

The NEL requires the Commission to have regard to any MCE statements of policy principles in applying the Rule making test. The Commission notes that currently there are no MCE statements of policy principles that currently relate to the registration and dispatch process contained in the Rules.

### **3.3 Assessment of the Rule to be made: the Rule making test and the national electricity objective**

The national electricity objective is the basis of assessment under the Rule making test and is set out in section 7 of the NEL:

“The objective of this Law is to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to –

(a) price, quality, safety, reliability and security of supply of electricity; and

(b) the reliability, safety and security of the national electricity system.”<sup>16</sup>

The Rule making test states:

“(1) the Commission may only make a Rule if it satisfied that the Rule will or is likely to contribute to the achievement of the national electricity objective;

(2) for the purposes of subsection (1), the Commission may give such weight to any aspect of the national electricity objective as it considers appropriate in all circumstances having regard to any relevant MCE statement of policy principles.”<sup>17</sup>

In Section 4 of this determination, the Commission considered the likely advantages and disadvantages of NEMMCO’s proposal in contributing to the economically efficient operation and performance of the NEM. As a result of this analysis, and the issues raised in submissions, the Commission made a number of amendments to

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<sup>16</sup> National Electricity Law, Section 7. The national electricity objective replaced the NEM objective in the amended NEL that took effect on 1 January 2008.

<sup>17</sup> National Electricity Law, Section 88.



NEMMCO's proposal that are reflected in the Rule to be made. This section presents the Commission's assessment of the extent to which the Rule to be made promotes the national electricity objective and satisfies the Rule making test.

NEMMCO's Rule proposal seeks to ensure that significant intermittent generating units are integrated into the NEM central dispatch processes so that NEMMCO can more effectively control network flows within secure operating limits. NEMMCO stated in Section 6 of its proposal that its proposed Semi-Dispatch arrangements contribute to the NEM objective, as presented in Section 1.3 of this final Rule determination.

The Commission considers that integrating significant intermittent generating units<sup>18</sup> into the NEM central dispatch processes would provide a number of improvements to the operation of the NEM. These benefits relate to the improved efficiency of the dispatch process and the improved certainty to investors in NEM. The Commission considers that the main impacts of this Rule to be made are:

- **Registration and operation of significant intermittent generation:** providing greater certainty for the arrangements for the registration and operation of significant intermittent generation projects as a result of defining the semi-scheduled generating unit classification;
- **NEMMCO's ability to manage significant intermittent generation:** improving NEMMCO's ability to manage the impacts from significant intermittent generating units, which represent a growing proportion of the generation in the NEM;
- **NEMMCO's ability to maintain system security:** improving NEMMCO's ability to maintain system security by incorporating the impact of significant intermittent generating units into network constraint equations;
- **Reduce operating margin:** allowing NEMMCO to reduce the operating margins on its network constraint equations which increases the transfer limits for the transmission network by having more accurate forecasts of the output of significant intermittent generating units;
- **Optimise output:** allowing the NEM dispatch process to jointly optimise the output from both scheduled and semi-scheduled generating units, particularly when these are subject to a joint network constraint, thus allowing all significant generating units to compete for access to the transmission network on the basis of their dispatch offers;
- **Reduce incidences of network congestion:** reducing the number of occasions where network congestion reduces the transfer capability of interconnectors due to the generation from significant intermittent generating units;

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<sup>18</sup> That is, generating units with a output nameplate rating greater than 30 MW, or the generating unit is part of a group of generating units connected at a common connection point (a generating system) that has a combined output nameplate rating greater than 30 MW.

- **Effectiveness of inter-regional hedging:** improving the effectiveness of inter-regional hedging using inter-regional settlements residues due to the increased firmness of interconnector capability;
- **Reduce NEMMCO directions:** reducing the need for NEMMCO to rely on directions under Clause 4.8.9 to manage system security as the generation from significant intermittent generating units would be controlled (at least to the extent that the generation can be reduced) directly by network constraint equations; and
- **Reduce requirements for local control:** reducing the need for network service providers to require the provision of local control and protection schemes to manage network overloads due to the presence of significant intermittent generating units, as overloads would be managed through the dispatch systems using network constraints.

The Commission also considers that using the “unconstrained intermittent generation forecasts” (UIGF) for each semi-scheduled generating unit in the dispatch process will specifically:

- enable the effective operation of the Semi-Dispatch arrangements; and
- improve the quality of the dispatch process as it would better estimate the generation from intermittent generating units and hence the level of generation to be supplied from scheduled generating units.

### **Efficient use of electricity services**

The Commission considers that the Rule to be made will improve the use of existing Scheduled Generators and future Scheduled and Semi-Scheduled Generators units by including all significant generating units in the NEM central dispatch process. This is likely to be reflected in lower dispatching costs which would be expected in the long-term to be passed onto consumers of electricity through lower energy prices.

The Commission considers that reducing the operating margins on network constraint equations will increase the transfer capability of the network which will further promote trade both within regions and between regions. This increase in trade will also operate to reduce the dispatch costs in the NEM and will tend in the long-term to lower energy prices to consumers of electricity.

The Commission considers that the increased network capability associated with reduced operating margins on network constraint equations will generally increase the network capability during times of generation supply shortfall. This will, all other things being equal, generally improve the reliability of supply to consumers of electricity and improve NEMMCO’s ability to maintain system security for given levels of demand from consumers of electricity.

The Commission considers that integrating significant intermittent generating units into the dispatch process is likely to reduce the quantity of regulation market ancillary services required to control the power system frequency. This reduction

would be possible as the variation of the generation from significant intermittent generating units from one dispatch interval to the next would be captured, to some degree, in the UIGF. The Commission considers that requiring less ancillary services is likely to lead to lower prices to consumers of electricity in the long-term.

The Commission considers that requiring significant intermittent generators to respond to voltage control and reactive power dispatch instructions from NEMMCO will further improve NEMMCO's ability to manage power system security. This would be expected to improve the transfer capability of the network, thus improving the utilisation of the network assets, and reduce the probability of a significant security incident.

### **Efficient investment in electricity services**

The Commission considers the reduced operating margins on network constraint equations will increase available power transfer capability of the network and hence provide better utilisation of existing network assets. This increased utilisation of the existing network assets could delay the need for future network augmentations which may reduce the network usage charges passed on to consumers of electricity in the long-term.

The Commission considers that defining a specific set of registration and operating requirements for significant intermittent generation projects will increase certainty, when compared to the current arrangements, for the investors in these projects. Under the current arrangements a significant intermittent generating unit is likely to be registered as a non-scheduled generating unit with the possibility that NEMMCO may modify their registration requirements in accordance with Clause 2.2.3(c). This uncertainty may have deterred some investment decisions which may lead to higher energy prices to consumers of electricity in the long-term.

The Commission also considers that the recent significant intermittent generating units in South Australia are likely to have had significant higher compliance and operating costs as a result of being required to be registered as scheduled generating units. Therefore, allowing these and future significant intermittent generating units to register as semi-scheduled generating units would likely to reduce these compliance and operating costs which in the long-term, would lead to reduced energy prices to consumers of electricity.

Under the Rule to be made scheduled generating units would be able to compete with significant intermittent generating units for access to the network during times of congestion on the basis of their dispatch offers. The Commission considers that allowing equivalent access to the network for both classifications of significant generators would remove a possible barrier to new Scheduled Generators. This could potentially reduce the dispatch costs in the NEM which is likely to reduce the energy prices to consumers of electricity.

### **Costs to significant intermittent generators**

While the Commission considers that the Rule to be made is likely to contribute to the long-term benefits of consumers of electricity through improved reliability and security and lower energy prices, it is also mindful that it places additional costs on a significant intermittent generator compared to the costs of being classified as a Non-Scheduled Generator. These costs include:

- additional systems to submit dispatch offers and receive dispatch instructions from the NEMMCO systems;
- possible additional staff to respond in the event that dispatch instructions are not being followed; and
- lost revenue during periods where its generation is capped due to network constraints.

As discussed in Chapter 4 of this final Rule determination, the Commission has reduced the obligations on Semi-Scheduled Generators with the aim of reducing the cost of setting up the necessary facilities and the ongoing compliance costs.

The Commission does also, however, note that the costs to some significant intermittent generators may also be reduced through the operation of this Rule to be made. In particular, windfarms that have been recently constructed in South Australia have been required to be classified as scheduled generating units and in the future these units may be able to be re-classified as semi-scheduled generating units, with reduced compliance costs.

The Commission considers that these increased costs to significant intermittent generators, while minimised, would impact on the cost of a semi-scheduled generator and would be likely to increase the energy prices to consumers of electricity in the long-term.

### **Advancement of the national electricity objective**

The Commission considers that, following the removal of some the more arduous and less important requirements contained in NEMMCO's proposal, the Semi-Dispatch arrangements contained in the final Rule promote the efficient use of, and efficient investment in, electrical services through the improvement in NEMMCO's ability to integrate significant intermittent generators in the central dispatch process. The Commission therefore considers that these improvements are likely to promote the long-term interests of consumers of electricity through lower prices for energy, market ancillary service and network charges, and higher levels of reliability and security of the national electricity system.

## **3.4 Consultation on the Rule proposal**

On 10 May 2007 the Commission commenced consultation under section 95 of the NEL on the proposal. The consultation closed on 6 July 2007 and the Commission received submissions to the proposal from the following parties:

- Auswind;
- Electricity Supply Industry Planning Council (ESIPC);
- Flinders Power;
- Pacific Hydro;
- Roaring 40s;
- TrustPower; and
- Vestas.

The Commission also received supplementary submissions to the proposal from the following parties:

- NEMMCO on 1 August 2007 and 3 October 2007;
- Pacific Hydro on 14 August 2007;
- Flinders Power on 25 September 2007; and
- Clean Energy Council (previously Auswind<sup>19</sup>) on 28 September 2007

The submissions and supplementary submissions all agreed that there is need for NEMMCO to be able to limit the output of significant intermittent generating units to manage network flows and hence supported the concept of Semi-Dispatch. However all submitters except for ESIPC (and NEMMCO) considered that the Rule change was unnecessarily onerous and could be significantly simplified while still achieving the aim of introducing Semi-Dispatch. The Clean Energy Council (as Auswind) and Vestas made detailed submissions addressing the proposed Rule changes.

The Commission issued two notices under section 107 of the NEL on 23 August 2007 and 4 October 2007, extending the period of time for the preparation of the draft Rule determination for the proposed National Electricity Amendment (Central Dispatch and Integration of Wind and Other Intermittent Generation) Rule 2007 by six weeks to 11 October 2007 and by a further six weeks to 22 November 2007 respectively. The Commission made these decisions in order to analyse substantive late submissions, to have opportunities to meet with key stakeholders and to consider the complex nature of the issues raised in the submissions which included:

- grandfathering of existing arrangements for existing intermittent generators,
- the treatment of aggregated intermittent generating units;

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<sup>19</sup> Since its submission in July, Auswind merged with the Business Council of Sustainable Energy to form the Clean Energy Council.

- the extent to which intermittent generators should participate in PASA and be required to re-bid;
- the need for semi-scheduled generators to operate a manned control room 24 hours a day; and
- the arrangements of intermittent generating units that are connected to a distribution network.

On 22 November 2007 the Commission gave notice under section 99 of the NEL of the making of the draft Rule determination and published the draft Rule. The consultation on the draft Determination and draft Rule closed on 25 January 2008. The Commission received submissions to the proposal from the following parties:

- ESIPC;
- International Power;
- Pacific Hydro;
- Pacific Hydro Detailed Comments;
- NP Power;
- NEMMCO;
- Flinders Power;
- Clean Energy Council ; and
- South Australian Government.

On 6 March 2008 the Commission published a notice under section 107 of the NEL to extend the publication of the final Rule determination and Rule to be made for this proposal for six weeks until 17 April 2008. The Commission considered it necessary to extend the publication of the final Rule determination in order to sufficiently analyse and address the complex issues that included:

- grandfathering of existing arrangements for existing intermittent generators;
- the treatment of aggregated intermittent generating units; and
- the ability for NEMMCO to instruct a Generator to adjust voltage and reactive power control set points.

On 17 May 2008 the Commission published a second notice under section 107 of the NEL to extend the publication of the final Rule determination and Rule to be made for this proposal for a further two weeks until 1 May 2008.

On 1 May 2008 the Commission gave notice under sections 102 and 103 of the NEL to publish its final Determination and Rule to be made.

### **3.5 Civil penalty provisions affect by this Rule to be made**

The Commission notes that the amendments proposed by the Rule to be made may require the MCE to review its classification of clauses as civil penalty provisions. The following clauses of the Rule to be made are currently classified as civil penalty provisions under the National Electricity Regulations:

- Non-Scheduled Generator - Clause 2.2.3(d)
- Semi-Scheduled Generator - Clause 2.2.7(e)
- Medium term PASA Clause 3.7.2(d) - (e)
- Short term PASA - Clause 3.7.3(e)
- Participation in central dispatch - Clause 3.8.2(a)
- Self-commitment - Clause 3.8.17(e)
- Self-decommitment - Clause 3.8.18(c)
- Rebidding - Clause 3.8.22(c)
- Systems and procedures - Clause 3.13.2(h)
- Standing data - Clause 3.13.3(b)- (c)
- Operational frequency control requirements - Clause 4.4.2(b)
- Determination of latest time for intervention by direction or dispatch of reserve contract - Clause 4.8.5A(d)
- Dispatch instructions for Scheduled Generators - Clause 4.9.2(c)
- Dispatch instructions for Scheduled Network Service Providers - Clause 4.9.2A(c)
- Instructions to Registered Participants - Clause 4.9.3(d)
- Dispatch related limitations on Scheduled Generators - Clause 4.9.4(a) and (c)
- Dispatch related limitations on Scheduled Generators - Clause 4.9.4(d)
- Remote control and monitoring devices - Clause 4.11.1(a)
- Unconstrained intermittent generation forecast – Clause 3.7B (new)

### **3.6 Split commencement date of the Rule to be made**

As discussed in Section 4.9 of this final Rule determination in relation to grandfathering, the Commission has proposed a split commencement date for the Rule to be made. The purpose of this split commencement is to ensure only those generating units that meet the requirements in the Rule to be made are

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grandfathered. As a result of the delay in time between the making of the final Rule determination (and the final Rule) and the time NEMMCO's systems will be ready to accommodate central dispatch, the Commission considers that those units who should be registered as semi-scheduled (that is, do not meet the grandfathering requirements) should be registered as such rather than using the delay in time to register as non-scheduled generating units. Schedule 1 of the Rule to be made will commence operation on the day the final Rule determination is made (or as soon as practicable after that date). The provisions in Schedule 1 all relate to registration. Schedule 2 of the Rule to be made will commence operation on 31 March 2009 or a similar date that takes into account NEMMCO's requirements in implementing semi-scheduled generation into central dispatch.



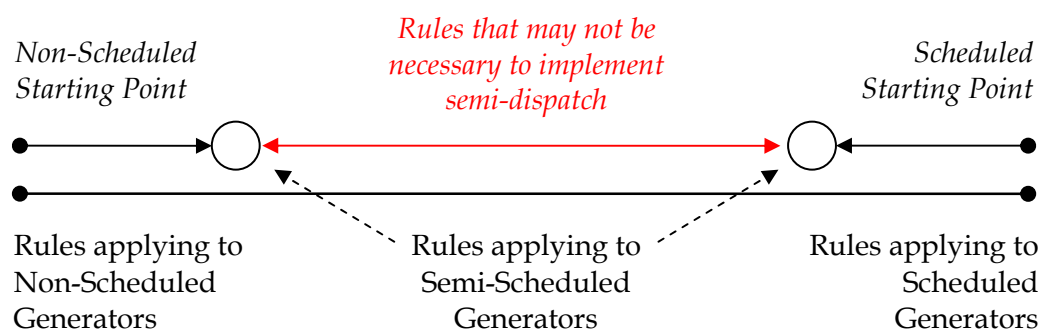
## 4 Commission’s consideration of matters raised in analysis and consultation

### 4.1 The Commission’s Approach

In developing its proposed Rule change to implement Semi-Dispatch, the Commission understands that NEMMCO used Rule provisions applying to Scheduled Generators as a starting point to develop Rule provisions for Semi-Scheduled Generators. NEMMCO then excluded the provisions that NEMMCO considered could not practically be met by intermittent generators. Based on this analysis, the Commission believes that the differences between the operation of Scheduled Generators and Semi-Scheduled Generators in the NEM were not appropriately accounted for resulting in a more onerous set of Rules applying to Semi-Scheduled Generators than is necessary.

#### Methodology

In developing the draft Rule to implement Semi-Dispatch, the Commission started with those Rule provisions applying to Non-Scheduled Generators, and added provisions (in most case provisions that currently apply to Scheduled Generators under the Rules) only where necessary for Semi-Scheduled Generators to participate in the market. As illustrated below, this approach resulted in the Commission developing a draft Rule which added requirements compared to the “Non-Scheduled Generator starting point”.



In its Rule change proposal, NEMMCO justified incorporating the concept of Semi-Dispatch into the Rules against the national electricity objective. However the Commission considers that NEMMCO did not demonstrate a need to align the obligations on Semi-Scheduled Generators as close as possible to Scheduled Generators, and hence, NEMMCO did not fully justify many of the Rule changes it proposed. The Commission considers its approach to developing Rule provisions to apply to Semi-Scheduled Generators as an efficient and effective method of implementing Semi-Dispatch.

## Reduced Complexity

The Commission acknowledges that aspects of the proposed Rule that the Commission considered to be unnecessary to implement semi-dispatch would in practice have little if any impact on intermittent generators. However, the Commission does not consider this is a reason to introduce a new provision into the Rules. To introduce a new provision, the Commission must be convinced that it would make a positive contribution to the national electricity objective. Introducing unnecessary provisions creates confusion and complication for NEM participants, and creates a risk that the Rule could be misinterpreted in the future.

Submissions to the draft Rule determination raised concerns with some of the provisions that the Commission deleted from NEMMCO's Rule change proposal. In some cases submissions provided well considered justification as to why restoring these provisions to the Rule to be made would promote the national electricity objective. The Commission has considered these on a case by case basis and added provisions to the Rule to be made where additions were found to promote the national electricity objective.

**The Commission has adopted the view that the national electricity objective is best served by making the least changes to the Rules necessary to implement semi-dispatch as this will ensure the most efficient application of the Rules for Semi-Scheduled Generators. Provisions in addition to the "least change" approach have been included where it can be demonstrated that a particular provision would promote the national electricity objective.**

The Commission believes this approach will significantly simplify the Rules applying to intermittent generators, which will lead to a better understanding of the Rules by investors new to the NEM. This approach also reduces regulatory and compliance costs for Semi-Scheduled Generators.

## Flexibility in application

The Commission understands that NEMMCO's proposal sought to apply the proposed Rule to all potential intermittent generation technologies. Whilst the Commission supports this approach, it considers that in practice this may have resulted in the introduction of additional complexity into the Rules.

Wind farms are the only intermittent generation technology currently connected (or expected to be connected) in the NEM in sufficient volume to impact NEM efficiency and security. Whilst, there are other intermittent generation technologies that potentially could be connected in significant volumes in the future, at present it is difficult to predict which technologies will have a material impact on NEM efficiency and security, and what the characteristics of those technologies would be.

The Commission is therefore of the view that the semi-dispatch Rules should be developed to operate as simply and efficiently as possible for wind farms, without creating barriers to entry for other technologies to participate in the NEM.

**The Commission has taken a narrow interpretation of NEMMCO's proposal in terms of the specific application of each relevant provision of the Rules. The**

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**Commission has comprehensively assessed the proposal in terms of its applicability to wind farms and has not attempted to foresee the requirements of all possible future intermittent generation technologies.**

However, the Rule to be made is expressed in terms of intermittent generation so it is more generally applicable to other forms of intermittent generation. If at a later date additional requirements are needed in the Rules to integrate intermittent generation technologies other than wind, then this could be addressed by a subsequent Rule change without having to significantly amend the framework for Semi-Scheduled Generators in the Rules created by the Rule to be made.

### **Overall effect**

The Semi-Dispatch arrangements contained in the Rule to be made would generally only constrain a semi-scheduled generating unit when that unit is involved in a binding constraint<sup>20</sup>. By simplifying the Rules applying to Semi-Scheduled Generators, the Commission believes that the impact of Semi-Dispatch on semi-scheduled generating units that are not involved in binding constraints would not be significant. Therefore intermittent generators located in non-congested areas of the network should be largely indifferent to whether they register as semi-scheduled or non-scheduled, other than the costs of the necessary dispatch systems required if registering as semi-scheduled.

The remainder of this chapter discusses the Commission's decisions on key policies including where policy positions from the draft Rule determination have been modified for this final Rule determination. Appendix A remains unchanged from the draft Rule determination, and provides explanation on the detail of the draft Rule. Appendix B provides explanation on changes from the draft Rule to the Rule to be made.

## **4.2 Registration and Classification of Intermittent Generation**

NEMMCO's proposed Semi-Dispatch arrangements introduce a new generating unit classification of "semi-scheduled generating unit" and an associated participant category of "Semi-Scheduled Generator".

NEMMCO would apply the following criteria in classifying a generating unit as a semi-scheduled generating unit:

1. The generating unit has an output nameplate rating  $\geq 30$  MW, or the generating unit is part of a group of generating units (that is, a generating system) connected at a common connection point that has a combined output nameplate rating  $\geq 30$  MW; and
2. The generating unit has an output that is intermittent.

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<sup>20</sup> Conditions for when a Semi-Scheduled Generator is constrained under Semi-Dispatch is discussed in Section 4.6.

## 4.2.1 Unit Aggregation

### First Round Submissions

A common concern expressed in first round submissions from the wind industry was the treatment of aggregated units throughout the Rules. Modern windfarms can consist of over 100 individual turbines connected to the grid through one connection point. The wind industry believes that the process of registering, and the ongoing obligation of maintaining compliance with the Rules as they are currently applied, for 100 or more individual units would be unnecessarily onerous and costly.

Clause 3.8.3 of the Rules currently allows Generators to aggregate their generating units to a single unit for the purposes of dispatch. The semi-dispatch proposal does not attempt to alter this principle for Semi-Scheduled Generators, and as such Semi-Scheduled Generators would be permitted to aggregate generating units connected at the one connection point so that they are treated as a single unit for the purposes of dispatch.

Despite the aggregation provisions under clause 3.8.3 of the Rules, the Commission understands that two issues remain of concern to the wind industry:

1. The Rules are silent on when a Generator may apply for aggregation. This could result in a Generator being required to individually register many wind turbines before applying to aggregate these units.
2. Inconsistent application of the terms generating unit, generating system, and aggregated unit throughout the Rules creates misunderstanding or ambiguous interpretation. The wind industry is concerned that although they may aggregate a cluster of individual wind turbines under clause 3.8.3, some parts of the Rules could require compliance on an individual unit (or wind turbine) basis.

### Analysis

The physical plant configuration of intermittent generators can be quite different to that of the traditional generation technologies in the NEM. Coal-fired power stations generally consist of a small number of large generating units that are dispatched independently of each other. Gas and hydro power stations generally consist of a small number of generating units that are either dispatched independently of each other, or are aggregated to be dispatched as a group. Windfarms can consist of over 100 individual turbines connected at a single site, and in this case it would make no sense to dispatch each turbine independently of each other. This issue is of greater significance for solar farms where thousands of solar panels, or millions of solar cells, are connected at the one site. In the case of solar, the Rules are currently unclear as to what should constitute a "unit".

Accordingly, for intermittent generators that consist of a large number of small power generation sources (relative to the aggregated total), the Commission considers that there appears to be merit in referring to the total power source as a single entity. The Commission considers that the approach of registering a cluster of

individual power generation sources (i.e. wind turbines) as a single entity (a single semi-scheduled generating unit) significantly simplifies the application of the Rules to Intermittent Generators in two ways:

1. The registration process is streamlined because the Intermittent Generator would only be required to register one generating unit rather than potentially hundreds, and the intermittent generator would not need to apply to aggregate following registration. In practice, this benefit is likely to be small because NEMMCO currently streamlines the process of registering multiple identical units. However, potential investors not familiar with NEMMCO's processes would see this as a major simplification.
2. The Rules would only apply to the registered semi-scheduled generating unit as a single entity, and not individually to each physical generating unit making up that semi-scheduled generating unit. This would be the case whether the Rules refer to a generating unit, generating system, or aggregated generating unit, thus eliminating a source of confusion raised in submissions.

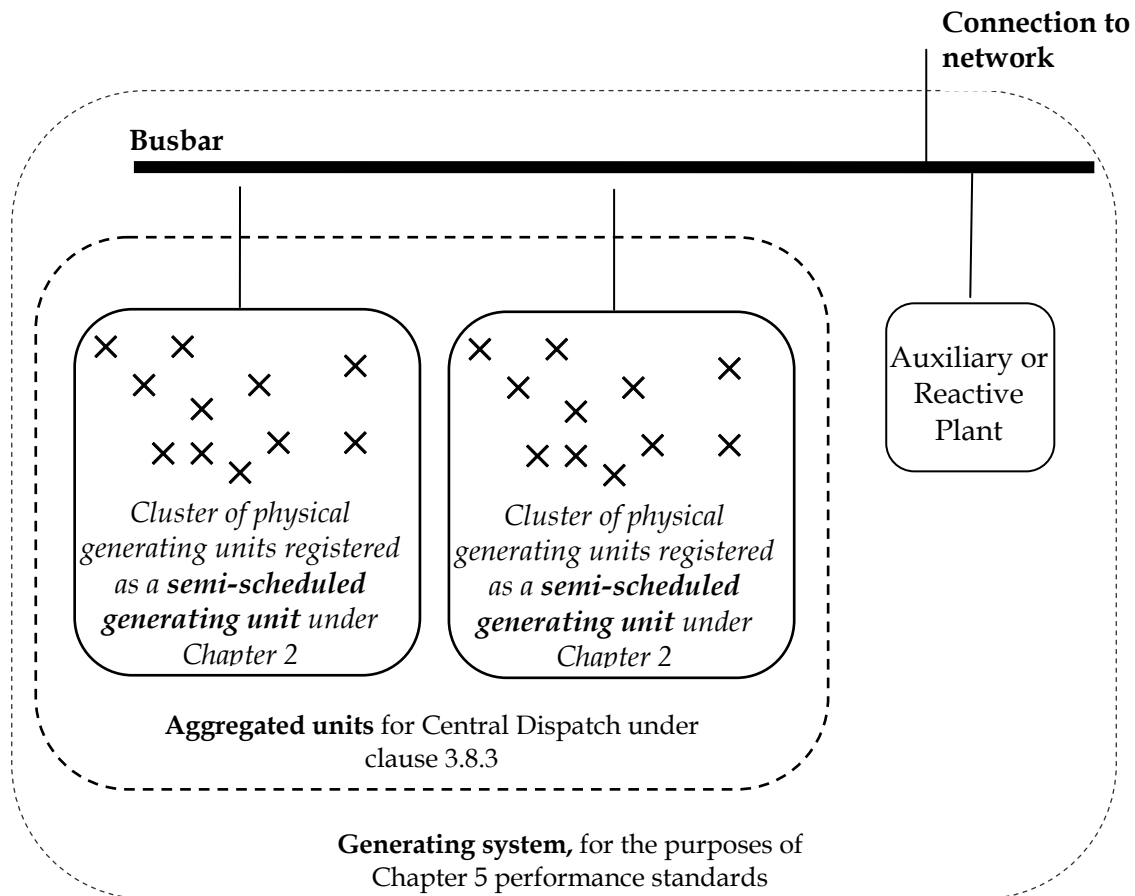
For power system planning, modelling and forecasting, NEMMCO may still require information at an individual physical generating unit level. The Commission believes NEMMCO has adequate powers to request this information under existing provisions in the Rules even if individual physical units are not individually registered. The Commission does not consider that this is any different to NEMMCO, for example, requiring detailed information on the equipment located behind the connection point of a 660 MW scheduled generating unit.

In some circumstances an intermittent generator may not wish to, or may not be permitted to, register all physical generating units at a site as a single semi-scheduled generating unit<sup>21</sup>. If a Semi-Scheduled Generator were to register two clusters of physical generating units as two separate semi-scheduled generating units, the Semi-Scheduled Generator may still meet criteria permitting those two generating units to be aggregated under clause 3.8.3 for the purposes of dispatch. For this reason, the Rules will still allow aggregation of semi-scheduled generating units under clause 3.8.3.

The diagram below illustrates the relationship between physical generating units, semi-scheduled generating units as registered under Chapter 2 of the Rules, aggregated semi-scheduled generating units aggregated under clause 3.8.3, and for completeness a semi-scheduled generating systems for the purpose of performance standards under Chapter 5 of the Rules.

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<sup>21</sup> Conditions for registering multiple generating units as a single semi-scheduled generating unit are discussed in Section 4.2.2.



## Second Round Submissions

NEMMCO did not believe automatic aggregation as proposed in the draft Rule determination is necessary. The current registration process allows aggregation at time of registration which means registering multiple identical units is no more difficult than registering a single unit.

NEMMCO believed automatic aggregation would risk system security because NEMMCO would only be able to control the total dispatch of a cluster of turbines, would provide favourable treatment to Semi-Scheduled Generators over Scheduled Generators, and would further complicates the registration process by introducing an alternative aggregation mechanism.

NEMMCO proposed clarifying aggregation (under clause 3.8.3) at time of registration under Chapter 2 as an alternative.

ESIPC believed multiple physical turbines should not be registered as a single unit. This provision adds complexity to the Rules. If changes were to be made, those changes should focus on the existing concept of generating system to ensure consistency.

The wind industry did not address this issue in second round submissions, however following a phone conversation with the Clean Energy Council, the Commission understands that the wind industry is generally happy with the approach to registration outlined in the draft Rule determination.

## Further Analysis

The Commission considers that allowing multiple intermittent generating units to be registered as a single semi-scheduled generating unit provides greater flexibility to the registration process, and reduces the perceived problems of registering a significant intermittent generator. The Commission also considers that allowing registration as a single unit clarifies the obligations on Semi-Scheduled Generators elsewhere in the Rules.

While NEMMCO did not support allowing multiple physical generating units to register as a single semi-scheduled generating unit, it proposed introducing the concept of “generating unit clusters”, which would be a set of intermittent generating units with similar forecasting characteristics. This would enable Semi-Scheduled Generators to submit plant availability to the UIGF at a cluster level rather than separately for each physical generating unit. Semi-Scheduled Generators could not be permitted to submit plant availability at an aggregated level (as aggregated under clause 3.8.3) because this would impact the accuracy of the UIGF when the individual units that are aggregated have differing forecasting characteristics<sup>22</sup>.

The Commission considers that NEMMCO’s approach of clustering for submitting data to the UIGF is equivalent to the provisions in the draft Rule that allow multiple physical generating units to register as a single semi-scheduled generating unit. That is, multiple wind turbines can be combined into one or more semi-scheduled generating units, and data can be submitted to NEMMCO for the UIGF collectively rather than separately for every individual wind turbine<sup>23</sup>. The Commission views this as a further benefit of its approach to registering Semi-Scheduled Generators.

Under the Rule to be made, the conditions for registering multiple generating units as a single semi-scheduled generating unit under Chapter 2 are more onerous than the conditions for aggregation under clause 3.8.3. This is because the purpose of each is quite different.

- Aggregation under clause 3.8.3 is provided to simplify the dispatch of co-located units. Hence units will generally only be treated as aggregated for Chapter 3 of the Rules, and in most other parts of the Rules each unit would be treated independently as a non-aggregated entity.
- The Rule that allows multiple intermittent generating units to be registered as a single semi-scheduled generating unit is provided because each individual generating unit is small and thus of little relevance to dispatch and power system security, whereas a cluster of many individual generating units acting in unison is relevant to dispatch and power system security. Thus the semi-scheduled generating unit would be the registered entity for the entire Rules, with no obligations applying to individual physical generating units.

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<sup>22</sup> This is discussed further in Section 4.2.2.

<sup>23</sup> This would require all individual generating units that are registered as a single semi-scheduled generating unit to have similar forecasting characteristics as required under the Rule to be made. This is discussed further in Section 4.2.2.

Thus it is possible that a Semi-Scheduled Generator would not be permitted to register all of its physical generating units as one single semi-scheduled generating unit under Chapter 2, but would be permitted to aggregate all of its units into a single entity under clause 3.8.3. For example, a wind farm with 50 individual turbines could register two semi-scheduled generating units of 25 turbines each. That wind farm could then apply to aggregate those two semi-scheduled generating units into a single entity for dispatch under clause 3.8.3. This would enable that Semi-Scheduled Generator to comply with all Rule obligations on the basis of just two registered generating units (rather than 50). It would also enable that wind farm to submit data to the UIGF for just two units rather than 50. Then that Semi-Scheduled Generator could aggregate its two semi-scheduled generating units under clause 3.8.3 for the purposes of dispatch thus allowing the wind farm to be dispatched as a whole.

Introducing a new registration process for Semi-Scheduled Generators obviously comes at some risk (as with any change to the Rules) compared to the current registration process which is well tested. The Commission notes the concerns raised by NEMMCO and ESIPC that a new approach to registration for Semi-Scheduled Generators would add additional complexity to the registration provisions in the Rules. However, on balance, the Commission believes that the benefits of simplicity and certainty for intermittent generators combined with improved accuracy for the UIGF outweigh the complexity of introducing a new parallel registration process for Semi-Scheduled Generators.

**The Rule to be made allows Semi-Scheduled Generators to register multiple physical generating units as one semi-scheduled generating unit.**

#### **4.2.2 Conditions for registering physical generating units as a single semi – scheduled generating unit.**

The draft Rule listed two conditions that, if satisfied, NEMMCO must approve a request to register multiple generating units as a semi-scheduled generating unit. These were:

1. the units must be identical in make, model and capacity; and
2. the units must be connected at the same connection point.

#### **Second Round Submissions**

NEMMCO identified the following issues with the conditions for NEMMCO to approve a request under this provision:

1. There should be an upper limit on the size of identical units.
2. The generating units should have the same AGC control point.
3. The generating units should have similar forecasting characteristics for the UIGF.
4. NEMMCO should have the right to reject the request on system security grounds.



## Analysis

The Commission has considered each of NEMMCO's four issues as follows.

1. **Upper limit on unit size:** This provision is intended for intermittent generators consisting of many small and similar generating units where the group of generating units as a whole is more relevant to the management of system security than each discrete generating unit. This clause is not intended for larger intermittent generating units that can impact system security in their own right. As such the Commission agrees with NEMMCO's recommendation to include an upper limit on the size of the individual physical units. The figure of 6 MW has been chosen as the upper limit because this is consistent with the minimum allowable error for deeming compliance with a dispatch target as defined in NEMMCO's Dispatch System Operating Procedure<sup>24</sup>.
2. **Same AGC control point:** The draft Rule determination listed a requirement that generating units must have a single AGC system to have a request approved under this provision. This was unintentionally omitted from the draft Rule.

However the Commission now considers it is not necessary to include a condition that units must have a single AGC system. This is because 4.11.1(g) requires Generators to "comply with NEMMCO's reasonable requirements in respect of how the remote control signals are issued by the automatic generation control system". This clause would enable NEMMCO to request a single AGC system if that was deemed reasonable.

However the Commission still considers it important for the individual units to be located at the same site, and to be consistent with conditions for aggregation the Commission has added a requirement for intra-regional loss factors to also be the same.

3. **Similar forecasting characteristics:** The Commission agrees that all physical generating units registering as a single semi-scheduled generating unit must have similar output forecasting characteristics. This is important because Semi-Scheduled Generators will only notify NEMMCO of plant availability of the semi-scheduled generating unit as whole and will not provide information on individual physical units. Hence if the forecasting characteristics of individual units within a registered semi-scheduled generating units vary then the accuracy of the UIGF forecasts could be adversely impacted.
4. **System security:** The Commission believes that an issue as fundamental and integral to the national electricity objective as system security should be explicitly included as a reason to reject a request under this clause to remove any doubt.

Subsequent to the above amendments, the Commission no longer sees a need to require all individual generating units to be identical in make, model and capacity. This has become redundant now that the clause will allow NEMMCO

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<sup>24</sup> Dispatch System Operating Procedure SO\_OP3705, NEMMCO Website

to reject a request on grounds such as system security, forecasting characteristics and capacity.

### **4.2.3 Threshold for Registration as a Semi-Scheduled Generator**

Under NEMMCO's proposal, all intermittent generating systems with a combined rating of greater than 30 MW must be registered as semi-scheduled generating units. This would include generating systems connected to distribution networks.

#### **First Round Submissions**

Pacific Hydro considered that the semi-dispatch provisions should not apply to wind farms connected below 100 kV, as small wind farms are unlikely to have a material impact. It noted that a 30 MW wind farm typically only generates 10-12 MW<sup>25</sup> and that it was unlikely that a rural distribution connected generator would be included in a transmission constraint. Pacific Hydro suggest that under NEMMCO's proposal, an intermittent generating unit would be required to be semi-scheduled without NEMMCO demonstrating that the generator would ever contribute to a network constraint.

Roaring40s noted that distribution connected wind farms may not have communications infrastructure in the vicinity of the connection point and this may result in "costs for communication systems which are large relative to the overall cost of the project." Roaring40s suggested that all distribution connected generators (connected to the network at a voltage less than 100 kV) be exempt from classification as semi-scheduled, thus reducing the compliance costs.

NEMMCO<sup>26</sup> cited two examples of distribution connected wind farms that affect transmission constraints. The Canunda distribution connected wind farm, as well as the Lake Bonney 1 transmission connected wind farm, impact on one of the constraint equations for Victorian export to South Australia. Further information on the impact of Canunda is provided in Appendix B of NEMMCO's Rule change proposal. The impact of Challicum Hills wind farm on the Victorian 66 kV network is disputed by Pacific Hydro<sup>27</sup> and discussed further in a later supplementary submission from NEMMCO<sup>28</sup>.

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<sup>25</sup> Using this logic a 300 MW open cycle gas-turbine should not be required to be scheduled if it operates less than 10 % of the year (or 876 hours). The Commission considers that the size of the generating unit is of importance, and hence should determine whether it is scheduled or semi-scheduled.

<sup>26</sup> Page 2 of the NEMMCO submission dated 1 August 2007.

<sup>27</sup> Pacific Hydro submission dated 14 August 2007.

<sup>28</sup> Page 10 of the NEMMCO submission dated 2 October 2007.

## Analysis

The Commission acknowledges that some semi-scheduled generating units will not materially impact congestion in the immediate future. This is true for both transmission and distribution connected semi-scheduled generating units.

However the location of network congestion changes over time, and any semi-scheduled generator could materially impact congestion in the future. This has the potential to happen very rapidly due to a major change in network flows resulting from the loss of a major network, generation or load asset.

Exempting large intermittent generating systems from semi-scheduled registration on the basis that the systems are not currently contributing to congestion raise the following issues:

1. there could be an impact on NEM security and/or efficiency if at some time in the future that intermittent generating system's contribution to congestion changes; and
2. it would create uncertainty and the possibility for disputes if NEMMCO was able to re-classify an intermittent generator as semi-scheduled in the future.

The Commission is of the view that the Rules for Semi-Scheduled Generators should be largely benign when a semi-scheduled generating unit is not contributing to congestion. Based on this view, an intermittent generator not contributing to congestion should be largely indifferent as to whether it is classified as non-scheduled or semi-scheduled because the obligations for each under the Rules should be similar when that generating unit is not contributing to congestion.

In addition the Commission believes the incremental costs of meeting requirements for semi-dispatch are relatively low. These costs are set out below.

- **Capital Costs** - Active power control and communications are existing technical requirements for intermittent generators under clauses S5.2.5.14 and S5.2.6.1 of the Rules, respectively. Intermittent generators are also required under the current Rules to provide real-time information to NEMMCO for forecasting purposes. Additional capital expenditure would be required for systems to enable Semi-Scheduled Generators to receive dispatch instructions from NEMMCO.
- **Operating Costs** - Windfarms would be required to submit data to NEMMCO to facilitate the UIGF, however this would be required irrespective of semi-dispatch. As non-scheduled generators, intermittent generators have been price-takers in the NEM. Intermittent generators could choose to continue being price-takers by submitting default offers to NEMMCO and not actively re-offering. The Commission agrees with submissions that Semi-Scheduled Generators should not be required to operate 24-hour on-site control rooms. Operating costs for semi-scheduled generators not contributing to congestion should be minor.

The Commission does not support creating a connection voltage threshold for semi-dispatch compliance<sup>29</sup>. The Commission acknowledges the argument that distribution connected intermittent generators are less likely to contribute to congestion, but as outlined in NEMMCO's supplementary submission, it would still be possible for distribution connected intermittent generators to impact congestion. In addition, the Commission believes distribution connected intermittent generators that have a nameplate rating of greater than 30 MW in capacity should install adequate communications to supply NEMMCO data for operational purposes such as the UIGF. This data should be provided irrespective of the arrangements for semi-dispatch. Hence the Commission considers the argument that the cost of communications for distribution connected intermittent generators would be high relative to the project cost is invalid.

## **Second Round Submissions**

NP Power believes that the 30 MW registration threshold should refer to sent out generation and not nameplate capacity because a 30 MW rated wind farm would never actually send out 30 MW due to internal losses and auxiliary loads.

## **Analysis**

The Commission does not support changing the definition of the 30 MW registration threshold from nameplate rating to sent-out generation. The threshold is currently defined as nameplate for both Scheduled and Non-Scheduled Generators and, to be consistent the registration threshold for Semi-Scheduled Generators should be defined in terms of nameplate rating also. The Commission has not seen evidence to suggest that the issue is sufficiently material to make such a change for all classifications of Generator.

The Commission has decided that all groups of intermittent generating units with a combined capacity of over 30 MW should be required to be classified as semi-scheduled generating units. This is based on the view that the compliance costs of semi-scheduled generators has been designed to be low for intermittent generators not contributing to congestion. The Commission is also of the view that the risks created by exempting some large intermittent generators has the potential to materially impact NEM efficiency and system security.

**Intermittent generating units with a combined nameplate rating of over 30 MW will be required to classify as semi-scheduled generating units<sup>30</sup>.**

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<sup>29</sup> As suggested by Auswind and Roaring 40s

<sup>30</sup> Although an Intermittent Generator with a nameplate rating greater than 30 MW that supplies a local load and rarely sends out more than 30 MW is still eligible to classify as a Non-Scheduled Generator under existing clause 2.2.3(b).

#### **4.2.4 Restriction of the application of aggregation under clause 3.8.3**

Under clause 3.8.3(a) of the Rules, a Scheduled Generator may apply to NEMMCO for its generating units to be aggregated for the purposes of dispatch and settlements. However this is inconsistent with clause 3.8.3(d) which requires aggregated generating units to be treated as a single generating unit for all provisions of the Rules.

NEMMCO considered that the application of aggregation under clause 3.8.3(d) should be limited to chapter 3 and clause 4.8.9, that is to the purposes of dispatch and settlements.

NEMMCO also contended that Semi-Scheduled Generators should not be permitted to submit data to NEMMCO for the UIGF at an aggregated level (that is aggregated under clause 3.8.3) because there is no condition for semi-scheduled generating units aggregating under clause 3.8.3 to have similar forecasting characteristics. UIGF accuracy could be compromised if data was submitted from an aggregation of semi-scheduled generating units with dissimilar forecasting characteristics.

#### **Analysis**

The heading for clause 3.8.3 is “Bid and offer aggregation guidelines”. The Commission believes from the heading of this clause it is clear that the purpose of clause 3.8.3 is to simplify the process of making bids and offers for the purposes of dispatch. The Commission also understands that in practice the application of aggregation has been limited to dispatch related obligations. As such the Commission believes that limiting the application of aggregation under clause 3.8.3 to Chapter 3 and clause 4.8.9 as suggested by NEMMCO would clarify the appropriate use of this clause.

The Commission recognises the importance of requiring clusters of generating units to have similar forecasting characteristics before being permitted to submit data to the UIGF in aggregated form. This is why such a condition has been included as a condition for permitting multiple generating units to register as a single semi-scheduled generating unit<sup>31</sup>. As such the Commission agrees that aggregation under clause 3.8.3 should not apply to data provision to the UIGF.

**Under the Rule to be made, application of aggregation under clause 3.8.3(d) applies to chapter 3 and clause 4.8.9 only. The exception is the clause that sets out data requirements for the UIGF (clause 3.7B in the Rule to be made) in which aggregation under 3.8.3 will not apply.**

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<sup>31</sup> Discussed under Section 4.2.2

## 4.3 Participation in PASA and Central Dispatch

NEMMCO's proposed semi-dispatch arrangements would require Semi-Scheduled Generators to participate in central dispatch, pre-dispatch, and PASA. Semi-Scheduled Generators would be required to:

- submit valid daily energy market offers;
- allow dispatch instructions to be centrally determined by the NEM Dispatch Engine;
- electronically receive and comply with dispatch instructions; and
- submit STPASA and MTPASA inputs.

### 4.3.1 Dispatch

#### Notification of Available Capacity

NEMMCO's proposed semi-dispatch arrangements require semi-scheduled generators to notify NEMMCO of changes to its operational availability.

#### **First Round Submissions**

Roaring40s considered that advising NEMMCO of the changes in availability of individual physical generating units, or the impact of the change on the total availability of an aggregated generating unit, would be excessively arduous for a Semi-Scheduled Generator and of minimal value to NEMMCO. Roaring40s proposed that semi-scheduled generating units only be required to report availability when it is more than 30 MW below the registered capacity.

Auswind also suggested that a semi-scheduled generating unit should not be required to notify NEMMCO of changes to availability if the variations are within 30 MW of the rated capacity of that unit.

#### **Analysis**

The Commission understands that the UIGF<sup>32</sup> would provide availability information to central dispatch, and as such it is unnecessary for Semi-Scheduled Generators to separately provide this information. Therefore, the Commission considers that removing this obligation simplifies the Rules and compliance requirements for Semi-Scheduled Generators.

**The Rule to be made requires Semi-Scheduled Generators to submit plant availability to NEMMCO for the purposes of the UIGF.**

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<sup>32</sup> See Section 4.4

The Commission accepts the view in the submissions that the provision of regular updates to NEMMCO on minor changes in availability is unnecessary. This view is captured in the new obligations to provide data to NEMMCO for the purposes of the UIGF discussed in Chapter 4.5 of this final Rule determination.

### **Self commitment, Self-decommitment, and Self-dispatch levels**

NEMMCO's proposed Semi-Dispatch arrangements capture Semi-Scheduled Generators in the following areas: Self-commitment, Self-decommitment, and Self-dispatch levels.

#### **First Round Submissions**

Auswind stated that these rules are confusing when applied to wind farms, and are not consistent with the actual operation of intermittent plant. Auswind also pointed out that at a generating unit level, the requirement to provide 2-days notice in advance of a Self-decommitment event for a wind turbine is impractical.

#### **Analysis**

The Commission agrees that these Rule provisions are confusing when applied to intermittent generators. The output from wind farms varies with the wind and NEMMCO is notified of expected generation levels from the UIGF. It is therefore unnecessarily onerous for Semi-Scheduled Generators to be required to comply with Self-commitment processes. Removing this obligation simplifies the Rules and compliance requirements for semi-scheduled generators.

**The Rule to be made does not impose obligations on Semi-Scheduled Generators under clause 3.8.17 (Self-commitment) and clause 3.8.18 (Self-decommitment).**

### **Dispatch Inflexibilities**

NEMMCO's proposed semi-dispatch arrangements allow Semi-Scheduled Generators to utilise dispatch inflexibility profiles.

#### **First Round Submissions**

Auswind stated that wind generating units can't meet either the slow start profile or the bid inflexibility profile.

#### **Analysis**

It is not clear what condition would impose an 'abnormal plant condition or other abnormal operating requirement' on a semi-scheduled generating unit, that would require an inflexibility profile. For a semi-scheduled generating unit, it would be expected that if a fault condition developed, one or more physical generating units would be shut down for repair. This would simply be reflected in the availability of

the generator, as defined by the UIGF. This argument also applies to testing and commissioning of new physical units.

Hence the Commission formed the view for the draft Rule determination that dispatch inflexibility is unnecessary for Semi-Scheduled Generators because Semi-Scheduled Generators already have the freedom to operate their generator at whatever level they wish when the generating unit is not involved in a binding constraint. As dispatch inflexibility for Semi-Scheduled Generators is unnecessary, the Commission took the view that the Rules should not be complicated by including this provision for Semi-Scheduled Generators.

### **Second Round Submissions**

Pacific Hydro stated that wind farms require about 240 hrs of uninterrupted operation during commissioning to test guaranteed performance of turbines. Hence dispatch inflexibility may be required during this time.

NP Power and Clean Energy Council believe there may be valid technical reasons for wind farms to bid inflexible.

### **Analysis**

Following consideration of second round submissions, the Commission accepts that there can be valid reasons for a Semi-Scheduled Generator to bid inflexible. As Scheduled Generators are permitted under the Rules to bid inflexible, the Commission is of the view that there is no reason to disadvantage Semi-Scheduled Generators by not permitting dispatch inflexibility.

The Rule to be made includes provision for Semi-Scheduled Generators to bid inflexible (note change in policy from the draft Rule determination).

### **Re-bidding**

NEMMCO's proposed semi-dispatch arrangements require Semi-Scheduled Generators to comply with the re-bidding requirements in clause 3.8.22.

### **First Round Submissions**

Roaring40s understood the re-bidding requirements in clause 3.8.22 were intended to prevent inappropriate exercise of market power in the NEM through withdrawal or repricing of capacity at short notice. Roaring40s considers that NEMMCO did not provide any evidence to demonstrate that intermittent generators will be likely to abuse their market power. Roaring40s believed that these re-bidding requirements were very prescriptive in nature and were likely to lead to technical breaches, and associated penalties and loss of reputation. Therefore, Roaring40s considered that the re-bidding requirements in clause 3.8.22 should not apply to semi-scheduled generating units.



Auswind stated that the rebidding provisions were highly prescriptive and created the potential for a technical breach of these requirements without either an inappropriate intent to influence market outcomes or an actual impact on market outcomes.

### **Analysis**

The Commission believes that if Semi-Scheduled Generators are to be dispatched based on submitted offers, then Semi-Scheduled Generators should have the right to alter those offers through rebids. As Semi-Scheduled Generators submit changes to availability through the UIGF, they would only need to make re-bids when moving capacity between price bands. As Semi-Scheduled Generators are generally price-takers in the NEM, the Commission does not expect Semi-Scheduled Generators would need to utilise the re-bidding provisions often. Hence if the rebidding provisions are onerous, their impact on the operations of a Semi-Scheduled Generator would still be minor due to infrequent use.

The Commission does not accept the argument that semi-scheduled generators are unlikely to inappropriately re-bid capacity. While this could be true, the Commission believes the re-bidding provisions should apply equally to all Generators as these provisions provide an important safeguard to protect the integrity of the central dispatch process.

**The Rule to be made does not contain exemptions from rebidding provisions for Semi-Scheduled Generators.**

### **Ramp Rates**

Prior to the publication of the draft Rule determination, the Commission understood that wind farms were capable of ramping their entire capacity within a dispatch interval. Based on this understanding, the Commission decided the inclusion of ramp rates in dispatch for Semi-Scheduled Generators was unnecessary and only served to complicate the Rules and the participation of Semi-Scheduled Generators in dispatch.

### **Second Round Submissions**

The Clean Energy Council advised the Commission that most modern wind farms are ramp limited, particularly for de-loading.

### **Analysis**

The Commission accepts the advice provided by the Clean Energy Council that wind farms can be ramp limited within a dispatch interval. To maintain the integrity and accuracy of dispatch, the Commission has decided to include ramp rate limits for Semi-Scheduled Generators in dispatch. This is consistent with NEMMCO's original Rule change proposal.

**The Rule to be made includes ramp rate limits for Semi-Scheduled Generators in dispatch.**

### **4.3.2 PASA**

NEMMCO's Rule change proposal required Semi-Scheduled Generators to provide plant availability to the PASA processes.

#### **First Round Submissions**

Roaring40s considered that forecasting the output of intermittent generators over the PASA timeframes, particularly the ST-PASA timeframe, would be difficult and a decision to direct a plant or reserve trade was unlikely to be affected by the availability of wind generators.

Roaring40s was also concerned that the proposal appears to create a requirement for the availability of individual generating units to be reflected in PASA, even though the individual units were likely to be 2-3 MW in size. Roaring40s provided the following options for improvements to obligations on Semi-Scheduled Generators with regards to PASA:

- Remove the requirement for semi-scheduled generating units to participate in PASA on the basis that their impact would be small and NEMMCO has not demonstrated it to be material.
- That semi-scheduled generating units only be required to report availability when it is more than 30 MW below the registered capacity.
- That the accuracy of the PASA availability data be limited to the nearest 100 MW on the basis that the generation assumed in PASA is likely to be only of the order of 25% of the available generation<sup>33</sup>.

Vestas expressed concern with the proposed obligations on Semi-Scheduled Generators with regard to PASA including:

- Additional administrative costs for windfarms to forecast plant availability 2 years out for MTPASA;
- Unnecessary to update PASA data weekly as this information may not vary on a weekly basis; and
- Taking one or two turbines out of service for maintenance will have only a small impact on the total windfarm output, and an immaterial impact on the NEM.

Auswind suggested that a threshold be introduced within which no adjustment to the MTPASA would be required to be submitted to NEMMCO. Auswind stated that

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<sup>33</sup> 23% and 19% applied for summer and winter maximum demand respectively in Victoria in the 2007 APR. In South Australia ESIPC assumed a value of 5% in its 2007 APR.

this would substantially reduce administrative overheads for operators without compromising the effectiveness of the MTPASA processes.

## **Analysis**

The Commission does not believe it is necessary for Semi-Scheduled Generators to submit any data to NEMMCO for the purposes of PASA. The “availability” of an intermittent generating unit can be misleading. For example, if a 2 MW wind turbine is declared available to generate, it may only be capable of generating 0 or 1 MW depending on wind conditions. It is for this reason that the UIGF is being developed to provide information on what a wind turbine is expected to be capable of generating based on forecast wind velocity (and similar forecasting tools would need to be developed for other intermittent generation technologies should their development reach a material level).

The Commission accepts there is a need for Semi-Scheduled Generators to submit data to NEMMCO as inputs to the UIGF, and as such has discussed this amendment in Section 4.5. The Commission agrees with many of the issues raised in submissions with regards to PASA, and has taken them into account in developing obligations for data provision to NEMMCO for the UIGF.

**The Rule to be made does not require Semi-Scheduled Generators to provide data to NEMMCO for the purposes of PASA as this is provided for by the UIGF.**

### **4.3.3 Participation in Pre-dispatch**

Under NEMMCO’s proposal, semi-scheduled generating units would be required to offer their capacity into the pre-dispatch process.

#### **First Round Submissions**

Roaring40s stated that the planned maintenance schedule could change daily or even hourly as maintenance was targeted to periods of low wind to minimise lost production and to allow the use of cranes. Roaring40s considered that this would mean additional operational resources, or less flexible maintenance practices, would be required, especially if bidding to the nearest MW was required. Roaring40s are also concerned that the wind forecasts may not be accurate enough to add value to the Pre-dispatch process.

Therefore, Roaring40s propose that semi-scheduled generating units should only be required to re-bid their availability into pre-dispatch when it is more than 30 MW below the registered capacity, which would be consistent with Roaring40s’ proposal for PASA.

## Analysis

As with PASA, the Commission understands that the UIGF would provide availability data for pre-dispatch and hence it is unnecessary for Semi-Scheduled Generators to separately submit availability data for pre-dispatch.

**The Rule to be made does not require Semi-Scheduled Generators to separately provide data to NEMMCO for the purposes of pre-dispatch as this is provided for by the UIGF.**

The Commission has taken Roaring40s proposal regarding a 30 MW threshold into account when developing the obligations for data provision to NEMMCO for the UIGF as discussed in Section 4.5.2.

## 4.4 Control of Intermittent Generation through Network Constraints

NEMMCO's proposed semi-dispatch arrangements would allow NEMMCO to formulate network constraints with semi-scheduled generating unit terms on the left-hand-side of the constraint equation. This allows the semi-scheduled generating unit terms to be optimally dispatched by NEMDE in the same way as scheduled generation.

### Analysis

The Commission is of the view that the control of intermittent generators through constraint equations in NEMDE is a fundamental aspect of the Semi-Dispatch proposal. The Commission does not consider there is a feasible alternative to this approach to implementing Semi-Dispatch given the current design of NEMDE (which minimises the cost of dispatch based on a set of constraints). No other alternatives for integrating the control of intermittent generation into the central dispatch process were proposed in submissions.

**The Rule to be made allows NEMMCO to formulate constraints with semi-scheduled generating unit terms on the left-hand-side of the constraint equation.**

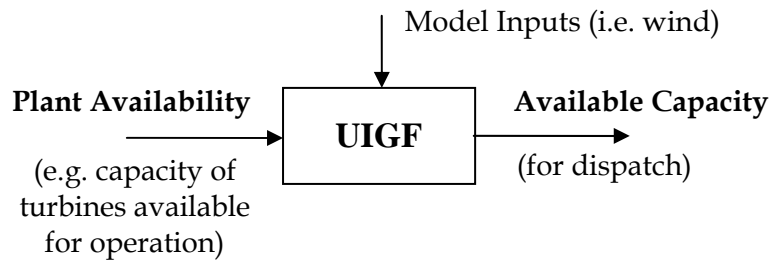
## 4.5 Use of Unconstrained Intermittent Generation Forecasts

### 4.5.1 Unconstrained Intermittent Generation Forecast

NEMMCO's proposed semi-dispatch arrangements rely on regular forecasts of generation for each semi-scheduled generating unit from the Unconstrained Intermittent Generation Forecast (UIGF) for dispatch, pre-dispatch, and PASA.

The UIGF is being developed to forecast the expected level of generation from windfarms. In simple terms, the forecast is a function of the capacity of wind turbines available for generation and the forecast wind velocity at site.

Unlike scheduled generating units, a semi-scheduled generating unit's plant availability for operation does not necessarily equal its available capacity for dispatch. This will depend on its energy source (i.e. wind) at the time of dispatch. As illustrated below, it is the role of the UIGF to take the plant availability data from the Semi-Scheduled Generator, and compute the available capacity for dispatch.



The Commission understands that the model inputs to the UIGF are yet to be confirmed but are likely to be in the following broad areas:

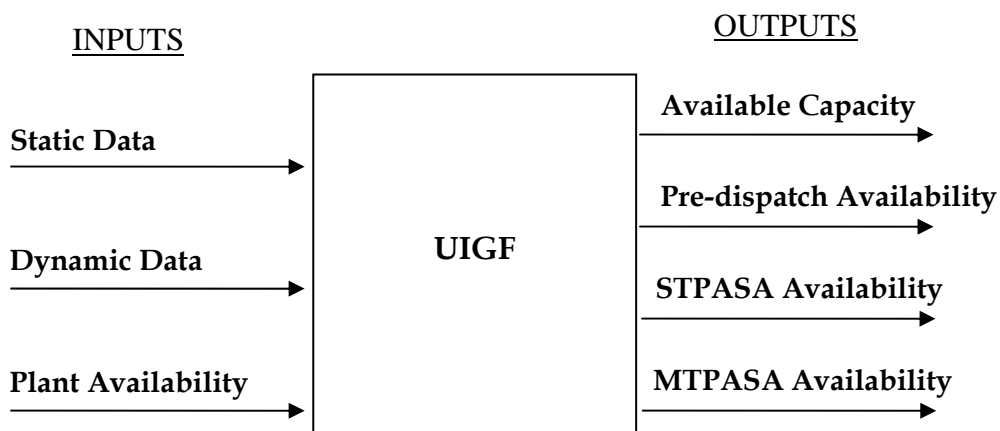
Static Data - for example wind turbine characteristics, site topology.

Dynamic Data - for example metered meteorological data from site, meteorological forecasts, unit SCADA data.

Availability - available generating capacity.

The UIGF would provide as its output the forecast generation for each semi-scheduled generating unit for the dispatch, pre-dispatch, STPASA and MTPASA timeframes.

The diagram below illustrates the UIGF process.



## Analysis

The Commission views the UIGF as an integral element of Semi-Dispatch. Without the UIGF, NEMMCO would have no basis on which to determine the MW capacity available for dispatch, pre-dispatch, STPASA or MTPASA for semi-scheduled generating units.

To provide Semi-Scheduled Generators certainty with regards to the operation of semi-dispatch, and in particular the obligation on NEMMCO to produce the generation forecasts and not each individual Semi-Scheduled Generator, the Commission believes the Rules should explicitly require NEMMCO to produce the UIGF.

### **The Rule to be made places an obligation on NEMMCO to produce the UIGF.**

To ensure NEMMCO has the power to acquire the data necessary to accurately run the UIGF, the Commission has added new obligations under the Rules requiring Semi-Scheduled Generators to provide the data required for the UIGF. The obligation is similar to the obligation on Scheduled Generators to provide forecast availability data to NEMMCO for use directly in pre-dispatch, STPASA, and MTPASA.

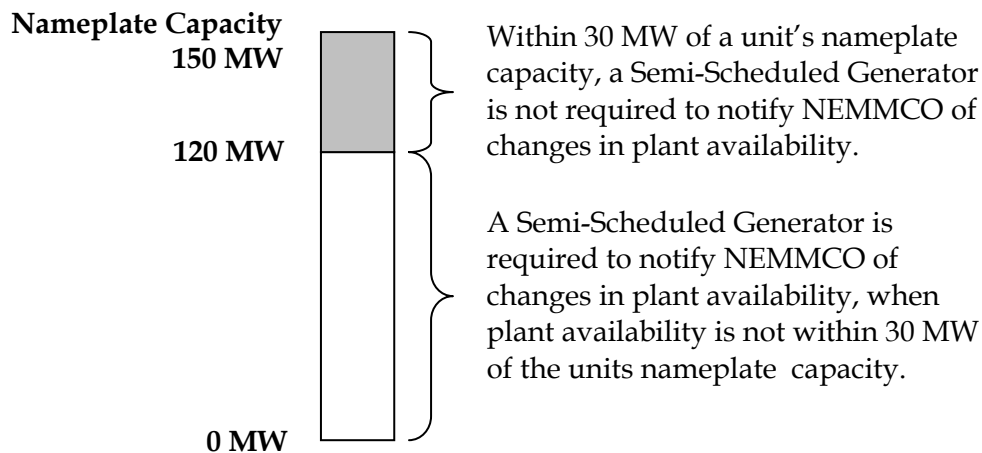
## 4.5.2 Notification Threshold

Many submissions<sup>34</sup> raised concerns with the frequency that Semi-Scheduled Generators would be required to update availability information to NEMMCO for the purposes of pre-dispatch and PASA. Submissions argued that some changes in wind turbine activity would not significantly impact central dispatch. For example if a 2-3 MW wind turbine was removed from service for maintenance, the impact on NEMMCO's operations and the power system more generally would be negligible. Changes in industrial loads can have a greater influence on the power system than individual wind turbines. For this reason, submissions argued that a threshold should be set, below which Semi-Scheduled generators would not be required to notify NEMMCO of changes to capacity.

The proposal put forward in submissions, as illustrated in the diagram below, is that if a semi-scheduled generating unit (or aggregation of) is operating or expecting to be operating within 30 MW of its registered capacity, then there is no requirement to advise NEMMCO of changes to availability. However if the semi-scheduled generating unit is operating or expecting to be operating outside of this range, then any changes to availability would be required to be advised to NEMMCO.

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<sup>34</sup> Auswind, Vestas, and Roaring 40s



The basis on which the 30 MW threshold was established is as follows. An intermittent generator with a nameplate rating of 30 MW or greater would be required to register as a Semi-Scheduled Generator. Intermittent generators with a nameplate rating less than 30 MW would register as a Non-Scheduled Generator, and thus would not be required to advise NEMMCO of any variation in capacity. The output of Non-Scheduled Generators could come and go with minimal impact on central dispatch or system security. Thus if a 30 MW intermittent generator is not required to advise NEMMCO when its availability changes, therefore a larger intermittent generator should not be required to advise NEMMCO when its availability changes by 30 MW or less.

The Commission agrees that the requirement on a Semi-Scheduled Generator to advise NEMMCO of every minor change to availability is unnecessarily onerous. Especially given the fact that on any given day several wind turbines can be removed and returned to service on a rotational basis for maintenance. And the timing of outages is highly weather dependant so can be difficult to accurately time. Hence the Commission supports the establishment of a 30 MW notification threshold

## Second Round Submissions

ESIPC believed that the effectiveness of the UIGF would be eroded by the introduction of a notification threshold and that Semi-Scheduled Generators should be under the same obligation to advise NEMMCO of changes to availability as Scheduled Generators.

NEMMCO believed that the 30 MW notification threshold should be removed as it would significantly impact UIGF accuracy. At a minimum it should be reduced to 6 MW to align with existing minimum accuracy tolerance used in the dispatch process.

## Further Analysis

In its draft Rule determination, the Commission supported the concept of a notification threshold so that the burden on Semi-Scheduled Generators of advising

NEMMCO of small changes in plant availability could be avoided. Semi-scheduled generating units are different to scheduled generating units in that they can consist of many small generating sources. Intermittent Generators such as wind farms generally undertake a rolling maintenance program where on any given day one or two wind turbines could be out of service for maintenance. The Commission sees little benefit in a wind farm advising NEMMCO when a single turbine is removed from service. In this final Rule determination, the Commission continues to support the concept of a notification threshold.

The draft Rule determination set the notification threshold at 30 MW. In its draft Rule determination, the Commission commented that it believed that 30 MW was a high threshold, but as submissions had provided a justification for setting the threshold at this level the Commission accepted this level.

In response to the draft Rule determination, NEMMCO expressed concern with the concept of a notification threshold, but stated that if the notification threshold was to be retained in the Rule to be made then the level should be reduced to 6 MW. The level of 6 MW is based on the existing minimum accuracy tolerance referred to in Clause 3.8.23(a) for deeming compliance with a dispatch target.

The Commission supports reducing the notification threshold to 6 MW. In the case of a wind farm this would allow the operator to remove 2 or 3 wind turbines from service without needing to advise NEMMCO. The Commission believes that a notification threshold set at 6 MW would still satisfy the wind industry's operational requirements.

The Commission also believes that setting the notification threshold at 6 MW would have little impact on the accuracy of the UIGF and dispatch. This is because under current NEMMCO procedures,<sup>35</sup> Scheduled Generators are only required to comply with dispatch targets to within a tolerance of 6 MW. In addition, Semi-Scheduled Generators are incentivised to provide accurate information to the UIGF because they can be penalised for not generating to the dispatch level determined by NEMDE under regulation FCAS cost recovery provisions<sup>36</sup>.

It could be argued that a notification threshold is unnecessary because the existing minimum accuracy tolerance of 6 MW effectively allows a Semi-Scheduled Generator to remove up to 6 MW of turbine capacity from service before being declared non-complaint. The Commission does not support this argument as Generators should be using their best endeavours to meet a dispatch target and the minimum accuracy tolerance should only be required for forecasting errors or technical problems.

**Under the Rule to be made, a Semi-Scheduled Generator will not be required to advise NEMMCO of changes to availability for the purpose of pre-dispatch, STPASA and MTPASA if availability is within 6 MW of registered unit capacity.**

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<sup>35</sup> Dispatch System Operating Procedure SO\_OP3705, NEMMCO Website

<sup>36</sup> Discussed in Section 4.7.2



### 4.5.3 Available Capacity

The Commission considered the need to clarify the meaning of “availability” in relation to Semi-Scheduled Generators. In particular, the Commission considered it necessary to make clear the differences between “available capacity” which is effectively what the UIGF produces taking account of input energy source availability, and “availability” which is the maximum plant availability (i.e. not limited by energy source availability) and is what a Semi-Scheduled Generator provides to NEMMCO to be taken into account in producing the UIGF. To avoid confusion between the defined term of “available capacity”, the Commission has created a new definition of “plant availability” which is the capacity of a semi-scheduled generating unit available to the electrical power conversion process to convert the input energy into electricity.

**The Rule to be made includes a new defined term “plant availability” which means the capacity of a semi-scheduled generating unit available to the electrical power conversion process to convert the input energy into electricity.**

### 4.5.4 UIGF Guidelines

In its second round submission, ESIPC suggested that NEMMCO should be required to develop and maintain a set of Forecasting System Procedures, using the Rules consultation procedures. ESIPC believed that these procedures should outline the information requirements and a timetable of when that information needs to be supplied to support the operation of the Forecasting System as it evolves.

#### Analysis

The Commission believes that a published set of guidelines would clarify what information is required from wind farms to support the operation of the UIGF. This would assist wind farms provide the correct information to NEMMCO, and would minimise the risk of disputes arising regarding such information. The Commission also believes that NEMMCO should be required to consult with Semi-Scheduled Generators when developing and changing the procedures to ensure that the information exchange occurs as efficiently as possible.

To ensure the guidelines remain focused, the Commission has decided that the Rule to be made will require the guidelines to be developed for wind farm energy conversion models. It is a wind farms energy conversion model that defines how a wind farms input energy (i.e. wind) is converted into electrical output, and is hence fundamental to the operation of the UIGF.

**The Rule to be made includes a requirement that NEMMCO develops and maintains guidelines setting out the information to be contained in a semi-scheduled generating unit’s energy conversion model.**

## 4.6 Conditions for Semi-Dispatch Compliance

### 4.6.1 Dispatch Cap / Dispatch Level

Under the proposed semi-dispatch arrangements, NEMDE would determine and issue a “*dispatch level*” for every semi-scheduled generating unit, in much the same way that NEMDE currently issues dispatch targets for Scheduled Generators. However the *dispatch levels* for semi-scheduled generating units would vary in their application from dispatch targets for Scheduled Generators in the following two ways:

1. A *dispatch level* would impose a cap on a semi-scheduled generating unit’s generation. The semi-scheduled generating unit would be free to generate at any level up to the *dispatch level*.
2. A semi scheduled generating unit would only be required to comply with the *dispatch level* during a dispatch interval that has been classified as a semi-dispatch interval for that particular semi-scheduled generating unit. Therefore a semi-scheduled generating unit would be permitted to disregard the *dispatch level* and generate at any level they wish during non-semi-dispatch intervals.

A dispatch interval would be declared as a semi-dispatch interval when either of the following conditions are satisfied:

1. The *dispatch level* is limited by a binding or violated constraint equation; or
2. The *dispatch level* is otherwise below the UIGF as a result of either a purely inter-regional limitation, or an offer or market-related limitation.

Semi-dispatch intervals would be determined on an individual unit basis. It would be quite normal for one semi-scheduled generating unit to be declared to be in a semi-dispatch interval, whilst others are not.

### Analysis

The Commission believes that the *dispatch level* and *dispatch level* compliance conditions have been appropriately defined in the proposal to accommodate semi-Scheduled Generators in central dispatch whilst minimising the impact of Semi-Dispatch on intermittent generators.

Defining a *dispatch level* rather than a dispatch target for semi-scheduled generating units is important because intermittent generators would not always be physically capable of meeting a target due to the uncertain nature of their input energy source.

Taking windfarms for example, modern control systems allow the output of a windfarm to be limited, but depending on wind strength a windfarm may not be capable of generating up to a target established by NEMDE.

The main reason for introducing Semi-Dispatch is to allow NEMMCO to efficiently reduce the output of intermittent generators to manage network limits. The

Commission believes a *dispatch level* gives NEMMCO appropriate control of intermittent generators to manage network limits.

NEMMCO's proposal used the term "dispatch cap" rather than "*dispatch level*". Whilst the Commission supports the concept of a dispatch cap, the Commission does not believe that the term dispatch cap is the appropriate term to describe the information in the dispatch instruction provided to Semi-Scheduled Generators.

The fundamental principle of Semi-Dispatch is that the output of intermittent generators can be capped by NEMDE under an economic dispatch solution. Hence the dispatch instruction received by a Semi-Scheduled Generator has been labelled a dispatch cap (rather than a dispatch target as received by Scheduled Generators) in NEMMCO's proposal.

However under the Semi-Dispatch Rules a Semi-Scheduled Generator would only be required to comply with a dispatch cap during a semi-dispatch interval. In all other dispatch interval, a Semi-Scheduled Generator would be permitted to generate at any level. Therefore the dispatch cap merely represents the forecast generation for a Semi-Scheduled Generator as provided by the UIGF.

The Commission understands that the majority of dispatch intervals will be non-semi-dispatch intervals and as such Semi-Scheduled Generators will generally not be required to comply with a dispatch cap. Hence the Commission has concluded that the term dispatch cap does not appropriately describe the information provided in the dispatch instruction. The Commission believes that the term *dispatch level* better describes that piece of information as it is the level at which NEMDE expect the Semi-Scheduled Generator to be generating at by the end of the dispatch interval.

**The Rule to be made incorporates the concept of capping the dispatch of Semi-Scheduled Generators, but the term "dispatch cap" as used in the draft Rule determination has been replaced by the term "*dispatch level*".**

#### **4.6.2 Conditions for Declaring a "Semi-Dispatch Interval"**

The proposal to only require a semi-scheduled generating unit to comply with its *dispatch level* during semi-dispatch intervals reduces the impact of Semi-Dispatch on intermittent generators. During non-semi-dispatch intervals, a semi-scheduled generating unit would not be required to limit its generation output and would essentially operate under similar obligations as a non-scheduled generating unit.

A dispatch interval would be declared a semi-dispatch interval for a semi-scheduled generating unit when the dispatch level for that unit is limited by a binding network constraint, or the dispatch level is determined to be less than or equal to the UIGF. This would generally occur when the semi-scheduled generating unit is involved in a binding network constraint, or is constrained off for market reasons (i.e. its offer price is higher than the offer price of other generators).

As price-takers currently in the NEM, intermittent generators accept the spot price derived by NEMDE with little influence over the derivation of that price. If the

intermittent generator does not wish to generate at a given spot price, the only real option is to back-off or disconnect their generator.

Under the Semi-Dispatch arrangements, it is feasible for an intermittent generator to employ similar strategies. Based on financial contract positions, the Semi-Scheduled Generator could submit a default offer and let NEMMCO automatically back-off generation from that unit when the spot price drops to a certain level. A Semi-Scheduled Generator that has contracted 100% of its variable output could choose to offer all of its capacity at the market floor price. There would be no reason for a Semi-Scheduled Generator to monitor the NEM more than it may currently do as a Non-Scheduled Generator.

Based on marginal costs, the offers from semi-scheduled generating units could be structured below those of scheduled generating units who would generally factor fuel costs into offer prices. Based on this view, Semi-Scheduled Generators would rarely be constrained-off for market related reasons because under efficient economic dispatch the higher cost scheduled generating units would be expected to be backed off first. This would also be true when multiple generators are included on the left-hand-side of constraint equations, in which case the higher cost generators would be backed off first.

However Scheduled Generators sometimes bid below costs for reasons such as avoiding the costs of shutting down a large thermal generating unit, for contract portfolio reasons, or when competing for limited access to the Regional Reference Node<sup>37</sup>. In one of these situations a semi-scheduled generating unit may be constrained off before a scheduled generating unit.

It is therefore the Commission's view that constraints due to network limitations would be the predominant reason for a semi-scheduled generating unit being constrained off by Semi-Dispatch. This would be an appropriate outcome because when a semi-scheduled generating unit is not contributing to congestion the generating unit would be largely unaffected by Semi-Dispatch.

#### **4.7 Requirements for Dispatch Level Compliance**

Under NEMMCO's proposed Semi-Dispatch arrangements, for all semi-dispatch intervals, a semi-scheduled generating unit would be required to limit its output at the end of that dispatch interval to less than or equal to the value of its *dispatch level*.

A semi-scheduled generating unit is not required to comply with its *dispatch level* during non-semi-dispatch intervals.

A Semi-scheduled generating unit would not be required to follow a particular profile during a dispatch interval. Although the FCAS Regulation Causer Pays provisions under clause 5.15.6 incentivise a Semi-Scheduled Generator to ramp its

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<sup>37</sup> When a constraint is binding between a generator and the Regional Reference Node, that generator can bid below cost without influencing the Regional Reference Price. This can result in generators bidding to -\$1000 to compete for limited access to the Regional Reference Node.

actual generation at a uniform rate over a semi-dispatch interval to the *dispatch level*, and at a uniform rate over a non-semi-dispatch interval. Any deviations from a uniform rate of change that contributes to frequency deviation will add to the FCAS Regulation Causer Pays factors for that generating unit, and will thus lift the proportion of FCAS Regulation costs attributable to that generating unit.

Under clause 4.9.2(b) of NEMMCO's proposed Rule change NEMMCO has the ability to instruct a generator to adjust transformer tap changers, voltage control set points and reactive power control set points.

#### **4.7.1 Dispatch Level Compliance**

**The Commission believes that NEMMCO's proposal places appropriate compliance obligations on Semi-Scheduled Generators.**

#### **4.7.2 Ancillary Service Transactions**

Under clause 3.15.6A(k)(5) of NEMMCO's proposed Rule, a semi-scheduled generating unit is considered to be contributing to a frequency deviation unless it ramps linearly in response to a *dispatch level* during a semi-dispatch interval.

#### **First Round Submissions**

Roaring40s considered that this created an incentive for semi-scheduled generating units to delay their response to minimise market FCAS costs, thus giving precedence to minimising FCAS costs over system security by not adjusting the generator's output as quickly as possible. Roaring40s proposed that clause 3.15.6A(k)(5) be modified so that a semi-scheduled generating unit is not considered to be contributing to a frequency deviation if it is ramping in response to a dispatch cap [level]. This view can be argued equally for scheduled generating units. As the Commission is not aware of this issue for Scheduled Generators, the Commission is not convinced that the issue would be material for semi-scheduled generating units.

Auswind was concerned with the definition of 'uniform rate' for a non-dispatched interval. Auswind stated that it may not be possible to change the output of a wind farm in a uniform fashion.

#### **Analysis**

NEMMCO's proposal would change the methodology for determining FCAS Regulation Causer Pays factors for semi-scheduled generating units. Currently intermittent generators registered as non-scheduled generators are required to change their output at a uniform rate over a dispatch interval to avoid being deemed to have contributed to frequency deviation. Whereas the proposal adds a requirement that semi-scheduled generators ramp their output at a uniform rate to the *dispatch level*.

The Commission did not agree with the additional requirement of ramping to the *dispatch level*. If a semi-scheduled generator is unable to reach its *dispatch level* (i.e. due to a drop in wind strength), then the semi-scheduled generator could potentially be penalised (under the FCAS Regulation Causer Pays provisions) for not ramping its output to the *dispatch level*. Semi-Dispatch is based on capping the output of semi-scheduled generators and allowing the Semi-Scheduled Generator freedom to generate below that *dispatch level*, not imposing a fixed generation target. As such, in order to be consistent with this principle, FCAS Regulation Causer Pays provisions should not impose penalties on Semi-Scheduled Generators for not reaching the *dispatch level*.

However the Commission is of the view that semi-scheduled generators should be incentivised to change their output at a constant rate of change. The Commission acknowledges Auswind's position that some windfarms are not able to change their output at a constant rate. The Commission accepts that this is true for some windfarms, but the Commission holds the view that if Semi-Scheduled Generators contribute to the need for ancillary services, then they should also proportionately contribute to the cost of those services. This would:

1. ensure this cost is not inefficiently attributed to other NEM participants;
2. ensure that the true cost to the NEM of introducing intermittent technologies is well captured in project evaluations; and
3. incentivise intermittent generators to develop technology to better control their output.

Therefore, the Commission is of the view that any deviations from a uniform rate of change that contributes to frequency deviation will add to the FCAS Regulation Causer Pays factor for a semi-scheduled generating unit.

## **Second Round Submissions**

International Power believed that the reference trajectory should be based on the dispatch cap [level]. This would allow a participant who is able to provide better forecasts to share some of the benefits of the improved forecast.

ESIPC believed that efficient allocation of FCAS costs would best be achieved by measuring each wind farms output against the forecast or dispatch cap [level]. This would incentive Semi-Scheduled Generators to actively support the accuracy of the UIGF. Additionally if efficient costs are not fully reflected to all generators, a sub-optimal mix of investment could arise.

Pacific Hydro believed the reference trajectory should be based on actual generation and not the UIGF which will have a degree of error.

NEMMCO believed that the causer pays reference trajectory for Semi-Scheduled Generators should be based on linear ramps between dispatch caps [levels] of successive dispatch intervals. This would minimise use of regulation FCAS and is consistent with the decision from NEMMCO's recent FCAS review.

## Further Analysis

The Commission recognises that Semi-Scheduled Generators have little if any control over the input energy to their electricity generation process. It is therefore difficult to forecast the level of generation expected from Semi-Scheduled Generators at the end of a dispatch interval. NEMMCO would take the forecast from the UIGF in assessing the supply/demand balance at the end of a dispatch interval, and would dispatch generation accordingly. When the UIGF proves to be incorrect, NEMMCO would rely on regulation FCAS enabled generators to adjust their output to maintain the supply/demand balance. These regulation FCAS enabled units come at a cost to the market.

In its draft Rule determination, the Commission adopted the position that incorrect forecasts from the UIGF would not be the fault of Semi-Scheduled Generators, and as such Semi-Scheduled Generators should not bear the cost of the regulation FCAS required to manage frequency deviations resulting from the incorrect forecasts.

The Commission's view on this issue has changed since the draft Rule determination. Although Semi-Scheduled Generators would have little influence on the accuracy of the UIGF, the fact that the UIGF is needed is due to investors making an economic decision to pursue an intermittent generation technology rather than a more predictable generation technology. If intermittent generators impose an additional cost on the operation of the NEM by creating a greater need for regulation FCAS, then that cost should be borne by the intermittent generator so that this cost is fully considered during the economic evaluation of a project. Appropriately reflecting all costs of a generation technology in a project evaluation will ensure an appropriate mix of generation technology investment in the NEM.

Making Semi-Scheduled Generators responsible for the full cost of the regulation FCAS that they create the need for would also incentivise Semi-Scheduled Generators to minimise their contribution to frequency deviation through measures such as investing in more advanced active power control technology, and providing the most accurate information available for use by the UIGF.

This approach to regulation FCAS cost recovery will likely result in Semi-Scheduled Generators being penalised through higher causer pays factors when they are unable to reach their *dispatch level* because the UIGF proved to be incorrect. However as discussed above, this is a real cost to the NEM as NEMMCO is required to acquire more regulation FCAS to make up the difference in the actual output of the Semi-Scheduled Generator, and that forecast by the UIGF and used by NEMDE for determining dispatch levels for the end of a dispatch interval. Although failing to reach a *dispatch level* would not be the fault of the Semi-Scheduled Generator when their input energy such as wind fails to materialise, the need for additional regulation services as a result of this situation would be due to the nature of this generator technology. As such there is no sound economic argument for imposing this cost on any other NEM participant.

**The draft Rule has been modified so that the Rule to be made allows NEMMCO to determine regulation FCAS causer pays factors for Semi-Scheduled Generators based on a straight line reference trajectory that terminates at the that Semi-Scheduled Generator's dispatch level at the end of a dispatch interval.**

### **4.7.3 Voltage Control**

NEMMCO's proposed Rule change gives NEMMCO the ability to instruct a generator to adjust transformer tap changers, voltage control set points and reactive power control set points

#### **First Round Submissions**

Roaring40s considered that for wind generators at the peripheral of the network the reactive power management and the voltage profile across a wind farm would be critical to achieving compliance with generator performance standards, particularly for riding through disturbances. Therefore, Roaring40s considered that wind farms that have been directed by NEMMCO to adjust their transformer tap changer, voltage control set point and reactive power control set point should be exempted from meeting its relevant performance standards.

Auswind stated that the clause 4.9 wording is inconsistent with the definition of a semi-scheduled generating unit. Auswind believed that the Semi-Dispatch rule changes were meant to be concerned with control of active power during times of network congestion. This was intended to provide an automated method via the semi-dispatch interval flag by which an automated wind farm could control its power output. Control of the connection point voltage was outside the context of this set of Rule changes and there was no efficiency gain or reason given for these rules going beyond what was agreed in the reference group.

Auswind also said that for wind generating systems at the peripheries of the network, reactive power coordination and management of voltage profile across a wind farm could be critical to achieving compliance with generator performance standards, particularly with respect to 'disturbance ride through'. For this reason a generator could be caused to breach its generator performance standards as a result of complying with a NEMMCO dispatch instruction under Clause 4.9.2(b).

#### **Analysis**

At the time of publishing the draft Rule determination, the Commission understood that the Rules do not currently require Non-Scheduled Generators to provide facilities for NEMMCO to vary the transformer tap changers and the excitation control system voltage set-points. In its Rule change proposal, NEMMCO did not provide specific justification for giving it the power to issue voltage control instructions to Semi-Scheduled Generators. The draft Rule determination did not include provision for NEMMCO to issue voltage instructions to Semi-Scheduled Generators.

#### **Second Round Submissions**

Pacific Hydro supported the Commission's draft position on voltage control, especially for low voltage connections where voltage is controlled by the DNSP and to a much tighter range than within the transmission system.



ESIPC stated that the voltage control provisions applying to Scheduled Generators should apply to Semi-Scheduled Generators to enable NEMMCO to manage system security.

NEMMCO believed that they should have the right to issue voltage control instructions to Semi-Scheduled Generators as permitted under their connection agreement, if required to maintain system security.

### **Further Analysis**

The Commission now understands that NEMMCO currently requires large wind farms registering as Non-Scheduled Generators to be capable of receiving and acting upon voltage control instructions. NEMMCO imposes this as a special condition of registration under clause 2.2.3(c). Therefore the starting point for this Rule change is a regime where large wind farms are required to receive voltage control instructions, rather than a regime where wind farms are not required to receive voltage instructions as assumed for the draft Rule determination.

The Commission understands that on occasions NEMMCO could require support from Semi-Scheduled Generators to maintain voltage levels within acceptable tolerances. Without support from Semi-Scheduled Generators, NEMMCO could be forced to operate the power system in a less secure state which could result in voltage collapse.

Schedule 5.2.5.13 already specifies the voltage response required from all generators including the new classification of Semi-Scheduled Generators<sup>38</sup>. In addition clause 4.9.2(c) ensures that NEMMCO must not issue voltage instructions that are outside of the plants relevant performance standard.

The Commission now believes that not permitting voltage control instructions would be a retrograde step compared to the current arrangements where voltage control is imposed on large wind farms as a condition of registration. The Commission is of the view that enabling NEMMCO to issue voltage control instructions to Semi-Scheduled Generators will promote the national electricity objective by providing a more secure power system.

**The draft Rule has been changed so that the Rule to be made permits NEMMCO to issue voltage control instructions to Semi-Scheduled Generators.**

## **4.8 Monitoring of *Dispatch Level* Conformance by NEMMCO**

Under Clause 3.8.23(a) of the Rules NEMMCO is required to continuously monitor the conformance of scheduled units with their dispatch target, and to declare that unit non-conforming if it fails to respond to a dispatch instruction within a tolerable time and accuracy, as determined in NEMMCO's reasonable opinion.

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<sup>38</sup> Introduced by the Commission in March 2007 as part of the National Electricity Amendment (Technical Standards for Wind Generation and other Generator Connections).

Under the proposed semi-dispatch arrangements, all semi-scheduled generating units would be subject to essentially the same conformance monitoring process that applies to scheduled generating units.

### **Analysis**

To maintain the integrity of the Rules, Semi-Scheduled Generators must be subject to conformance monitoring. The Commission sees no reason not to consistently apply the conformance monitoring processes that currently applies to scheduled generators.

**Under the Rule to be made, Semi-Scheduled Generators will be subject to the same conformance monitoring as currently applies to Scheduled Generators.**

## **4.9 Transition into the Semi-Dispatch Arrangements**

### **4.9.1 Grandfathering**

Under NEMMCO's proposed semi-dispatch arrangements, intermittent generating units that exist at the date the proposed Rule takes effect would not be required to re-register as a "Semi Scheduled Generator" or to meet any additional requirements. An "existing generating unit" would be defined as "a classified generating unit" or a generating unit for which there is a connection agreement that was executed by all parties to the connection agreement before the commencement date and that is in force at the time NEMMCO is to approve its classification."<sup>39</sup>

### **First Round Submissions**

A number of stakeholders disagreed with using the connection agreement as a measure of whether an intermittent generator project is committed or not. Other options proposed by stakeholders included: demonstrated sunk cost of over \$5M; automatically reclassify all existing generators as semi-scheduled; use the commitment criterion from the NEMMCO SOO; and use of the connection agreements. Each of these options are discussed further in Appendix C.

### **Analysis**

The Commission recognises the importance of formulating an appropriate transition to the Semi-Dispatch arrangements. Semi-Dispatch must apply as broadly as possible to maximise NEMMCO's ability to efficiently manage network limits, but cannot be applied retrospectively. The objective with grandfathering should be to not detrimentally alter the economics of committed projects and to not create regulatory risk and uncertainty for future investment.

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<sup>39</sup> Clause 11.11.1 of the Proposed Rule Changes.

The Commission believes that certain intermittent generator proponents that have committed to the construction of an intermittent generator based on the current Rules, but have not registered their generating units by the issue of the Final Rule determination, should have the option to be grandfathered as non-scheduled generating units (or scheduled generating units, if the circumstances require). Two questions arise in implementing this policy: firstly, at what date must a project be considered committed to be grandfathered; and secondly, on what criteria is a project to be determined to be committed.

The simplest solution to the questions identified in the above discussion is to grandfather all generating units registered as non-scheduled generating units at the time the Rule commences operation. As the basis of assessing the grandfathering options, the Commission has assumed a Rule commencement date of 31 March 2009. However, the Commission considers that such an option will not provide a robust framework to meet the needs of efficient investment in intermittent generation as well as the objectives of reliability of supply. The Commission has noted the following considerations in relation to this option:

- it would provide intermittent generation proponents a high degree of certainty and opportunity to develop and register new generators before the Rule commences;
- it could result in a large number of registration applications just prior to Rule Commencement to avoid semi-scheduled classification; and
- due to the likely long lead time between the making of the final Rule and the commencement of that Rule, this approach could result in a number of large intermittent generators in the NEM that NEMMCO is unable to efficiently control to manage network limitations.

The Commission therefore considered that grandfathering all intermittent generating units registered as non-scheduled generating units at the commencement date would not promote the NEM objective particularly in relation to ensuring the reliability and security of supply of electricity and the national electricity system.

The Commission also believes that using “sunk cost” as the basis for grandfathering as proposed in some submissions would be too difficult to measure and verify and as such has not considered this option further.

Having considered the views put forward in submissions, the Commission has assessed the following three options for addressing the two questions raised above, that is at what date must a project be considered committed to be grandfathered and on what criteria is a project to be determined to be committed.

#### *Option 1 - Grandfather all generators with a Connection Agreement Executed*

Considerations noted by the Commission:

- Does not necessarily provide a good indication of project commitment, however can be identified and determined as a matter of fact thereby serving as an objective test.

*Option 2 - Grandfather all generators classified as “Committed Wind Farms” under the 2007 Statement of Opportunities (SOO)*

Considerations noted by the Commission:

- Unbiased and based on objective and defensible criteria.
- Although the SOO was published in October, the SOO lists only projects that were committed in May 2007. Hence projects that reached committed status since May 2007 would not be grandfathered.

*Option 3 - Grandfather all generators classified as “Committed Wind Farms” under the 2007 Statement of Opportunities (SOO) criteria as at a specified date such as the release of the Draft Rule determination or release of the Final Rule determination.*

Considerations noted by the Commission:

- As above, this is unbiased and based on objective and defensible criteria.
- Ensures all committed projects at the time of the Draft/Final Rule determination are grandfathered as non-scheduled classification.
- Applying the SOO criteria at the release of the draft Rule determination would ensure more intermittent generators are captured by semi-dispatch and avoid a flood of registrations before the release of the final Rule determination.
- However this would legally be difficult to implement because for the period between the Draft and Final Rule determinations, the classification of semi-scheduled would not be available to NEMMCO for registration. The earliest the semi-scheduled classification could be introduced into the Rules would be at the release of the Final Rule determination.

The Commission also considered combining the three different sets of criteria. The effect of this combination would be that a generating unit that met the criteria identified in points 1, 2 or 3 above at a specified date such as the release of the Draft Rule determination or release of the Final Rule determination, would have the option to be grandfathered as a non-scheduled generating unit or scheduled generating unit.

In its Draft Rule determination, the Commission considered that the criteria used in the 2007 SOO for classifying generators as “Committed Wind Farms” are the most appropriate criteria for defining committed projects for the purposes of grandfathering prospective semi-scheduled generating units. The SOO criteria are objective, well tested, have been refined over many years, and capture the core elements of whether a project is committed.

The Commission in its Draft Rule determination considered that all projects that meet the SOO criteria at 1 January 2008 should be grandfathered. This would include all projects listed as “Committed Wind Farms” in the 2007 SOO, plus all projects that reach committed status, as determined by NEMMCO, by 1 January 2008. The Commission considered that 1 January 2008 gives developers with well advanced projects a one month grace period following publication of this Draft Rule determination to finalise arrangements to meet the SOO criteria. This period is also sufficiently short so that uncommitted projects that are in the early stages of development would be unable to make the necessary arrangements to meet the SOO criteria having become aware of the Commission’s intended grandfathering

approach in the Draft Rule determination. These projects would, therefore, be required to be classified as Semi-Scheduled Generators.

The Commission considered that this was the approach that best balances the objective of maintaining the reliability and security of electricity supply with the need to promote efficient investment in, and efficient use of electricity services, including by avoiding retrospectively altering the economics of committed projects.

## **Second Round Submissions**

Pacific Hydro cited the example of Clements Gap as a planned wind farm that Pacific Hydro considers to be fully committed but does not satisfy the proposed definition of “committed project” because the land is not owned, there are no project financing contracts as such, and the turbine supply contract was not executed by 1 January even though a firm commitment was in place with the supplier including cancellation penalties. Pacific Hydro believes that NEMMCO should have some discretion to evaluate the committed nature of projects on a case-by-case basis, taking relevant considerations into account. For example most wind farms lease rather than purchase land, and projects financed by equity will not have financing contracts.

ESIPC reinforced their belief that Semi-Dispatch should apply as widely as possible, including all intermittent generators greater than 30 MW. At a minimum, ESIPC believes that Semi-Dispatch should apply to all existing intermittent generators that currently have a requirement to control their output as part of their connection agreement or licence agreements.

Flinders proposed that the grandfathering criteria be tightened so that those existing Intermittent Generators capable of complying with Semi-Dispatch are not grandfathered. They believe that the potential benefits of semi-dispatch identified in the Draft Rule determination would not be achieved because of grandfathering.

International Power, Pacific Hydro, and Clean Energy Council supported the concept of grandfathering generators registered before the issue of the Final Rule determination.

Clean Energy Council supported the concept of “committed project”, however believes that the definition of “committed project” did not represent the actual development process for wind farms. For example, wind farms generally don’t “acquire” land, may not need supply contracts because are constructed by companies associated with the turbine manufacturer, and are often initially financed on the balance of the developer without the need for debt plans.

NEMMCO suggested that the definition of “potential semi-scheduled generating units” should include a table listing all committed projects as at 1 January 2008 with the capacity of each project, so that any future increases in capacity will have to be registered as Semi-Scheduled Generators

## Further Analysis

The Commission's view on grandfathering has not changed since the draft Rule determination. The Commission believes that intermittent generators that have committed to a project based on the current Rules should not be required to participate in Semi-Dispatch as this could detrimentally impact the economic viability of a project. However the Commission does believe that some improvements could be made to the criteria used to determine the committed status of a project.

The Commission does not support NEMMCO's proposal of including a table of "committed projects" in the Rule to be made. This would involve the Commission assessing which wind farms should be included on the list. The Commission believes NEMMCO is better qualified to make such an assessment because of its experience in assessing committed projects for the SOO. The Commission views its role as "Rule Maker" is to develop the criteria for a suitably skilled organisation, in this case NEMMCO, to apply.

The Commission accepts the position put forward in some submissions that the criteria outlined in the Draft Rule determination does not appropriately represent the development process for wind farms. The Commission's policy is clear that any intermittent generator that has committed to a project by the nominated "cut-off date" should be grandfathered. Any wind farm that is clearly committed, but fails to be grandfathered due to a technicality would represent a failure in the implementation of this policy. The implications of such a failure are significant in terms of the commercial impact on effected intermittent generators, and increased regulatory risk which could impact the efficiency of future investment in the NEM.

The Commission has not been made aware of any generating technologies other than wind generation that are likely to satisfy the criteria for grandfathering. As such, the Commission is comfortable developing the criteria to apply as precisely as possible to wind farms.

The Commission considers that it would be difficult to develop criteria that represent all forms of wind farm developments. As such the Commission believes that NEMMCO should be allowed some discretion in assessing committed projects. Creating a more subjective test for assessing committed projects would provide NEMMCO with factors to take into account when assessing committed projects, whilst providing NEMMCO discretion to also take into account other factors specific to certain projects.

The Commission has decided that the SOO criteria for assessing committed projects does not precisely represent the development process for wind farms. However the Commission still believes that the SOO criteria is a sound basis for developing a specific criteria for assessing committed wind farms.

The Commission agrees with submissions that wind farms are generally constructed on leased rather than purchased land. As such, the Draft Rule has been modified so that the project proponent is required to demonstrate its rights to land for construction, rather than the requirement to demonstrate it has acquired land for construction.

The Commission accepts that not all approvals and licences for the project are required prior to the commencement of construction. As such, the Draft Rule has been modified so that the project proponent is only required to demonstrate that it has all approvals and licences that are required for construction to commence.

The Commission accepts that not all projects require debt financing, and that some projects could be equity financed. As such, the Draft Rule has been modified so that project proponents are only required to demonstrate a level of commitment to financing arrangements for the project.

The changes made to the criteria for assessing committed projects are designed to capture additional projects that do not meet the SOO criteria for committed projects, rather than reducing the list of projects that would satisfy the SOO criteria. As such, to simplify the task for NEMMCO, the Commission has decided to take the 2007 SOO list of committed wind farms as the starting point for the list of committed projects under this Rule. The criteria provided under the Rule to be made would be applied to add those projects assessed to be committed at 1 January 2008, but not included in the SOO list of committed wind farms.

**Accordingly, the Rule to be made grandfathers all intermittent generating units that are either:**

- **Registered prior to the publication of the final Rule determination;**
- **Are listed as a committed project in the 2007 SOO; or**
- **Meet the criteria for committed project as defined in the Rule to be made at 1 January 2008.**

**All other intermittent generating units applying for registration after the publication of the Final Rule determination would be considered for classification as a semi-scheduled generating unit under clause 2.2.7.**

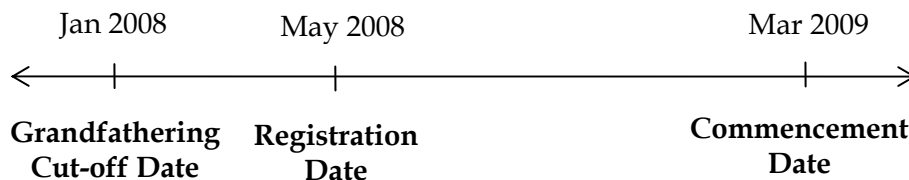
The Commission recognises that some wind farms in South Australia are required to register as Scheduled Generators under their licence agreements. The Commission understands that this is done because wind farms in that state have already reached a capacity where they are impacting on network security. The Commission believes that the semi-dispatch arrangements provided for in this Rule would enable those wind farms to be efficiently controlled within the technical envelope of the network. Whilst the Commission believe that these wind farms should be reclassified as Semi-Scheduled Generators, this is ultimately a decision for the South Australian Government to implement through amendments to the licence agreements for these wind farms. Under the Rule to be made, these wind farms would be grandfathered in the category of Scheduled Generator, however there is nothing in the Rule to be made that would prevent them from applying to NEMMCO to reclassify as Semi-Scheduled if permitted under their licence agreement.

#### 4.9.2 Requirements for generating units registered after the Rule being made and prior to Rule commencing

Following the Rule being made, a group of generating units could exist that are capable of being registered as a semi-scheduled generating unit but cannot be so registered until the Rule commences operation. These units are referred to in the draft Rule as “potential semi-scheduled generating units”.

The Commission considers that these generating units need to be sufficiently captured by the savings and transitional arrangements for two reasons. Firstly, not adequately addressing these generating units has the effect of undermining the Commission’s specific policy decisions in relation to grandfathering. Secondly, clearly identifying the requirements for classification of potential semi-scheduled generating units provides transparency for the registration process as well as providing regulatory certainty for those Generators as well as other market participants interacting in the market with such Generators.

The Commission has therefore included a split commencement in the draft Rule. The two dates are referred to in the draft Rule as the “registration date” and the “commencement date”. The registration date would be the date that the Rule is made and at this time, the registration clauses of the draft Rule (and those clauses relevant to registration) would commence operation. The commencement date would be the date the rest of the Rule primarily relating to central dispatch would commence operation. This date is assumed to be 31 March 2009. This concept is illustrated below using indicative dates.



The implications of the two dates are that a generating unit that could be classified as a semi-scheduled generating unit at the registration date can be registered in the semi-scheduled generating unit category. However, as the central dispatch provisions would not have commenced operation, these units will operate as non-scheduled generating units until the central dispatch provisions commence operation (on the commencement date). As the generating units would already be registered in the category of semi-scheduled generating unit and therefore meet the additional requirements that exist for semi-scheduled generating units over non-scheduled generating units, the transition to operating as a semi-scheduled generating unit should not create any administrative or regulatory hurdles for the Semi-Scheduled Generator.

The Commission considers this approach to best address the “registration gap” created between the Rule being made and the Rule commencing operation. It also ensures those generating units that do not meet the grandfathering criteria and therefore should not be grandfathered (based on the Commission’s reasoning) are integrated into the market as semi-scheduled generating units with minimal



administrative and regulatory burdens for both NEMMCO as the registering body and the Semi-Scheduled Generators.

Lastly, the effect of the split commencement date, allows those non-scheduled generating units and scheduled generating units that have the option of being reclassified to reclassify earlier than the Rule commencement date. Those generating units that are currently operating in the market can either continue to operate as a non-scheduled or scheduled generating unit or alternatively choose to reclassify. Those units that choose to reclassify will be exempt from participant fees for two years after the Rule commencement. However, if those Generators choose to reclassify their units as semi-scheduled generating units after the registration date but prior to the Rule commencing, the units will continue to operate as non-scheduled generating units or scheduled generating units (as the case may be) until the central dispatch provisions commence operation.

Similarly to the effect of a split commencement on potential semi-scheduled generating units, allowing current Generators to reclassify their units prior to the central dispatch provisions commencing operation promotes the efficiency of the registration process. As the relevant generating units will meet the criteria for semi-scheduled generating units at the time of registration, the requirement to operate as a semi-scheduled generating unit (which is assumed will be immediate) should not create any additional obstacles,

Accordingly, the Commission has included a split commencement in the Rule to be made. The "registration date" will be the date that the Rule is made and at which time the registration clauses and those clauses relevant to registration would commence operation. The "commencement date" would be the date the rest of the Rule primarily relating to central dispatch would commence operation. This date is assumed to be 31 March 2009.

#### **4.9.3 Commencement Date**

The Draft Rule provided for the commencement of Schedule 2 of the Rule ("commencement date") on 1 January 2009.

#### **Second Round Submissions**

NEMMCO recommended that the commencement date for Schedule 2 be delayed by 2 months to allow sufficient time to develop the UIGF. NEMMCO also suggested the commencement date be a week day in order to ensure that sufficient staff are available during normal office hours to manage the significant number of changes to the market systems required to implement the new Rule

#### **Analysis**

The Commission accepts NEMMCO's reasoning for delaying the commencement of Schedule 2 of the Rule to be made. The UIGF is integral to semi-dispatch and the

Commission supports allowing sufficient time to tune and test the UIGF to ensure it adequately supports semi-dispatch.

The Commission also accepts NEMMCO's reasoning for commencing the Rule on a weekday to ensure NEMMCO has adequate IT staff available for implementation. The Commission generally aims to commence Rules at the end or beginning of a month for administrative efficiency. Hence the Commission has delayed the commencement of Schedule 2 of the Rule to be made until 31 March 2009 which satisfies NEMMCO's desire for a weekday commencement and the AEMC desire for an end of month commencement.

**The commencement date for Schedule 2 of the Rule is 31 March 2009 (note change from the draft Rule determination) .**

#### **4.9.4 Additional Savings And Transitional Arrangements**

In addition to the grandfathering and related provisions noted above, the Commission has also included some additional savings and transitional arrangements to address matters that create transition issues as a result of the amendments created by the draft Rule. These provisions are:

- A requirement that Semi-Scheduled Generators will be treated as Scheduled Generators for the purposes of paying participant fees until NEMMCO determines a structure for the payment of participant fees by Semi-Scheduled Generators.
- Any action taken by NEMMCO prior to the Rule commencing for the purposes of amending the timetable to incorporate the Amending Rule will be taken to be valid as long as NEMMCO adheres to the requirement for amending the timetable under the Rules.
- Any action taken by NEMMCO to amend the contribution factors procedure to incorporate contribution factors for semi-scheduled generators will be taken to be valid as long as NEMMCO adheres to the requirement for amending the timetable under the Rules.

## A Detailed discussion on submissions - draft determination

This table outlines the Commission’s decisions for the draft Rule determination in relation to those aspects of NEMMCO’s proposed Rule changes where the Commission is recommending something substantially different to that proposed by NEMMCO, or the Rule change was considered a significant issue in a submission. This table is unchanged from the draft Rule determination. As such this table may not reflect the Rule to be made. Appendix B outlines changes from the draft Rule to the Rule to be made, and hence should be read following this appendix to understand the Commission’s decisions in the Rule to be made. Major policy decisions are discussed in the final Rule determination report only,

The Rule reference numbering refers to reference numbering submitted in NEMMCO’s Rule change proposal.

	<b>Comments from submissions</b>	<b>Commission’s Position</b>
2.2.2(b)	Vestas suggests that the clause should explain in detail the type of communication standards required, or at least make reference to another standard.	The communication standards are specified in Schedule 5.2 of the Rules.
2.2.2A	NEMMCO proposed a new registration clause for semi-scheduled generators under 2.2.2A	The Commission has accepted this proposal as clause 2.2.7 with some amendments to address the circumstances of registering more than one semi-scheduled generating unit. Further discussion on this matter can be found in Section 4.1.
	Vestas states that wind farms typically operate at a capacity factor of 30%.	The Commission notes that whilst the capacity factor is around 30%, the actual output of the generating unit can be 100% of the nameplate rating for a period whilst

	<p>Vestas suggests that the nameplate rating threshold be lifted to a higher value, such as 100 MW to 150 MW.</p>	<p>sufficient wind is available. The rating of the unit should be the maximum capacity able to be presented at the connection point, even if that unit is not operating at that level for some or all of the time.</p> <p>An example would be a power station with a number of gas turbines aggregated to 3000 MW and with a utilisation of about 1%. This unit has an average output of 30 MW and could be exempt from registering as a Scheduled Generator based on Vestas argument. It would be very difficult for NEMMCO to manage power system security with a 3000 MW non-scheduled generating unit connected.</p> <p>Therefore, the rating specified in the clause should be 30 MW for consistency with the requirements for scheduled generating units.</p>
	<p>Auswind states that the implications of this rule change on small projects with low to medium voltage connections has not been investigated or understood.</p> <ul style="list-style-type: none"> <li>• These smaller projects are in areas of the network for which NEMMCO has no oversight and for which it does not construct constraints.</li> <li>• The LNSP works through any issues in the connection process.</li> <li>• These projects are off-setting local load.</li> </ul> <p>In this regard, AUSWIND would like the threshold for semi-scheduled compliance to be set at a voltage level, rather than at a</p>	<p>The Commission acknowledges that it is less likely for low to medium voltage connected generating units to impact network limits on the main grid. However the Commission considers that generating units should still participate in Semi-Dispatch because although less likely they can still impact on NEMMCO's management of system security. Additionally the Commission considers compliance costs would be low for intermittent generators not contributing towards congestion. Further discussion on this matter can be found in Section 4.1.</p>

	MW capacity level. Auswind considers that 100 kV would be a suitable level at which responsibility for significant intermittent generation could be determined.	
	Auswind and Vestas state that the Rules are confusing with regard to when an obligation applies to an individual generating unit, an aggregated group of units, or a generating system.	<p>The Commission has amended NEMMCO's Rule proposal to allow multiple physical units to be registered as a single semi-scheduled generating unit (for reasons discussed under Section 4.1).</p> <p>Clause 2.2.7(k) includes a reference to the aggregation clause 3.8.3 to aid understanding for a project proponent not familiar with the Rules.</p>
	Vestas suggests that allowance should be made for dispute resolution and a particular clause for dispute resolution should be adopted. Vestas has suggested that reference to clause 8.2 of the Rules be included in this provision.	<p>The provision gives NEMMCO the absolute right to impose terms and conditions. In exercising this right, it is expected that NEMMCO will act reasonably. The dispute resolution clauses apply to the extent permitted by rule 8.2. However, clause 8.2.1 specifically excludes the dispute resolution provisions from applying in relation to a decision by NEMMCO not to approve an application for classification as non-scheduled generating unit and a scheduled generating unit. The Commission in accordance with NEMMCO's proposal has extended this exclusion to applications in relation to semi-scheduled generating units. The Commission considers consistency in application of the dispute resolution clauses to all classification applications is appropriate.</p> <p>Accordingly, the suggestion is not supported.</p>
2.2.3(b)(2)	Vestas comments that the words "physical and technical attributes" can exclude a wind farm from central dispatch.	The Commission notes that this provision applies to a 'non-scheduled generating unit' rather than a 'semi-scheduled generating unit'. Additionally the clause has not been amended in the proposed Rule change. As such, the Commission considers the comment to be out of scope of this proposal.

2.2.3(c)	<p>Vestas comments that the words “in NEMMCO’s opinion” could require the less than 30 MW wind farm to be either a scheduled or semi-scheduled generator.</p>	<p>This provision provides NEMMCO with discretion to apply some of the terms and conditions that are applicable to other categories of generating unit to a ‘non-scheduled generating unit’.</p> <p>It appears that this provision is reasonable, as it caters for any situation where the location of the generator introduces technical envelope restrictions that need to be adequately addressed.</p> <p>In this respect, the provision is required to ensure that NEMMCO can address its liability on power system security at any and all times.</p> <p>Accordingly, the Commission does not support this concern.</p>
2.2.3(g)	<p>Vestas suggests that this clause should be deleted.</p> <p>Vestas comments that clause 3.8.2(e) obliges a wind farm operator below 30 MW [to participate] in the dispatch process.</p>	<p>The Commission considers Vestas’ comment is only correct if “NEMMCO considers it reasonably necessary for adequate system operation and the maintenance of power system security”.</p> <p>If the particular wind farm under consideration by NEMMCO was considered to provide a benefit from its participation in Central Dispatch (possibly because of binding network constraint events), then it would be appropriate for the wind farm to be caught by this provision.</p> <p>The provisions only apply to wind farms less than 30 MW if NEMMCO considers it ‘reasonably necessary for adequate system operation’.</p> <p>The condition to participate in Central Dispatch is not applied until NEMMCO exercises its right.</p> <p>As such, the Commission does not believe there is merit in adopting the Vestas suggestion.</p>
2.2.7		<p>This clause is an amended replication of NEMMCO’s clause 2.2.2A.</p>

		<p>2.2.2A (g) and (h) of NEMMCO’s proposal are considered redundant clauses as these requirements are made elsewhere in Chapter 3. As such they have been deleted from the proposed Rule change. To be clear, this amendment in no way removes the obligation on semi-scheduled generators to submit availability (for the UIGF) and dispatch offers.</p> <p>Paragraph (c) requires NEMMCO to be satisfied that the output of a generator is intermittent before approving its classification as an intermittent generator.</p> <p>As discussed in Section 4.1, paragraph (h) allows multiple physical generating units to be registered as a single semi-scheduled generating unit. NEMMCO does not have the discretion to reject an application to register multiple physical generating units as a single semi-scheduled generating unit if the conditions specified are met. However NEMMCO does have discretion to approve multiple physical generating units to be registered as a single semi-scheduled generating unit when those conditions are not met but NEMMCO is otherwise satisfied that Central Dispatch and system security would not be detrimentally impacted.</p> <p>Irrespective of paragraph (h), Semi-Scheduled Generators are still permitted to aggregate units under clause 3.8.3.</p>
2.11.3(b)(8)	Vestas seeks clarification on why the clause says “must only be recovered from”. Vestas suggests that this clause should be deleted.	<p>NEMMCO has modified the current provision by the inclusion of the Semi-Scheduled Generator.</p> <p>The Commission considers that it is appropriate that all categories of Generator that are required to participate in Central Dispatch be included in making contributions to the Participant compensation fund. As semi-scheduled generating units will be included in Central Dispatch, they will be affected by errors in the NEMMCO dispatch process from time to time. Accordingly, it is right that this classification of generating unit contribute to this fund.</p> <p>The extent of contribution to the Participant Fund is subject to NEMMCO’s</p>

		methodology. It is a function of this methodology that impacts the contribution of intermittent generating units, not the Rules. As semi-scheduled generators are only subject to dispatch errors during semi-dispatch intervals, the probability of a semi-scheduled generator being incorrectly dispatched is much less than for a scheduled generator. The Commission considers that it would be appropriate for NEMMCO to take this into account when determining contributions to the participant compensation fund.
2.12	<p>Vestas seeks the following clarifications:</p> <p>(a) What is the purpose of the clause, given that the Rules have a Glossary of these terms.</p> <p>(b) How is a 'person' defined.</p> <p>Vestas suggests that this clause should be deleted.</p>	The Commission considers that the inclusion in rule 2.12 to be consistent with the purpose of that clause to other Generators. The rule is relevant to other matters not addressed by this proposal and the Commission considers it to be out of scope of this proposal to consider deleting the rule.
3.7.1		<p>It is the UIGF that contributes to PASA for an intermittent generating unit rather than a direct contribution from each Semi-Scheduled Generator.</p> <p>On this basis, there should be no requirement placed on Semi-Scheduled Generators to provide information to PASA (as discussed in Section 4.2).</p> <p>Obligations on semi-scheduled generators to provide input data to PASA have been removed from NEMMCO's proposed Rule changes. Although these obligations have been essentially replicated in rule 3.7B (the rule dealing with the UIGF) to require Semi-Scheduled Generators to provide availability data to NEMMCO for the UIGF in the dispatch, pre-dispatch and PASA timeframes.</p>
3.7.1(b)	Vestas states that the words "up to two years in advance" could impose on wind	The Commission notes that this part of the current provision was not amended in the



	<p>farm operators [the obligation] to give information to NEMMCO for two years in advance.</p> <p>Vestas advises that this is an additional administrative cost to wind farm operators.</p>	<p>NEMMCO proposal.</p> <p>There appears to be no obvious reason why PASA related information should not be made available to the market in accordance with the PASA principles.</p> <p>On the other hand, the on-going availability of a wind farm is managed by the 'Unconstrained Intermittent Generation Forecast' (UIGF) that is prepared by NEMMCO.</p> <p>It is the UIGF that contributes to PASA for an intermittent generating unit rather than a direct contribution from each Semi-Scheduled Generator.</p> <p>The Commission does not consider the task of providing NEMMCO availability data two years in advance for the UIGF to be onerous. With the introduction of the notification threshold in rule 3.7B, a Semi-Scheduled Generator would only be required to notify NEMMCO of a change in availability if a major outage is planned.</p> <p>Accordingly the Commission does not support Vestas' concern.</p>
3.7.1(c) (1)	<p>Vestas states that "on a weekly basis" forces the wind farm operator to present the required data to NEMMCO on a weekly basis, but the data may only change every six months.</p>	<p>The Commission considers that Vestas' concern is addressed under Rule 3.7B by introducing a threshold before being required to notify NEMMCO of a change in availability.</p>
3.7.1(d)	<p>Vestas states that the word "to undertake maintenance and outage planning" should embrace input from wind farm operators.</p> <p>Vestas comments that one or two units down for maintenance still leaves say another 30 or 40 units connected to the</p>	<p>The Commission understands that the provision places an obligation on NEMMCO to provide Generators, including Semi-Scheduled Generators, with "sufficient information" that allows the Generator to take maintenance and outage planning actions.</p> <p>In this regard, the provision does not provide an obligation on the Intermittent Generator.</p>

	<p>electricity grid.</p> <p>NEMMCO should not schedule maintenance of individual units.</p>	<p>On this basis, it would appear that Vestas' comments are out of context with the meaning of the provision.</p>
3.7.2(a)	<p>Vestas asks the question “can wind farm operators forecast 24 months in advance?”, and notes that the information is to be provided weekly.</p> <p>Vestas suggests that special exemption should be given to wind farm operators, or alternatively, at least there ought to be a flexible tolerance on the data provided, and the tolerance must be stated in the clause.</p>	<p>The Commission understands that the current provision places an obligation on NEMMCO to do certain things.</p> <p>In this regard, the provision does not provide an obligation on the Generator.</p> <p>On this basis, it would appear that the Vestas comments are out of context with the meaning of the provision.</p>
3.7.2(c)(4)		<p>The Commission has removed this clause from NEMMCO’s proposed Rule because it has moved the requirement for NEMMCO to prepare the UIGF to Rule 3.7B.</p>
3.7.2(f)(3)(iv)		<p>The Commission has removed this clause from the proposed Rule because the weekly energy constraints in MT-PASA do not apply to current intermittent generation technologies.</p>
3.7.2(g)	<p>Vestas requests clarification of ‘on a cost recovery basis’. Vestas suggests that this documentation should be free to generators.</p>	<p>The Commission notes that NEMMCO published the procedure 432-0004 “Medium Term PASA Process Description” on its website, at no cost. In this regard, the current provision is a hang-over from the commencement of the NEM when it was unclear how NEMMCO would make available such documents.</p> <p>However, the Commission considers that changing this clause is beyond the scope of this Rule change.</p>
3.7.3		<p>The Commission has amended this clause to be consistent with clause 3.7.2.</p>

3.7.3(f)	Vestas states that on one hand NEMMCO gives an exemption, and then due to 'power system security' removes the exemption. Vestas suggests that this clause should be deleted.	<p>The current provision has not been amended in the NEMMCO proposal. The Commission considers that this is a reasonable provision in that it provides a general exemption subject only to NEMMCO exercising its responsibility for power system security.</p> <p>Accordingly, the Commission does not support Vestas' concern.</p>
3.7B (new rule)		<p>The Commission added this Rule to place an obligation on NEMMCO to produce the UIGF, and an obligation on Semi-Scheduled Generators to provide to NEMMCO the information required for the UIGF. This matter is discussed further in Chapter 4.4.</p> <p>This rule also introduces a notification threshold so that Semi-Scheduled Generators are only required to notify NEMMCO of changes in availability when availability drops by more than 30 MW below their registered capacity. This matter is discussed further in Section 4.4.</p> <p>The definition "available capacity" can be confusing for intermittent generators. The definition states the capacity must be available for dispatch. In the context of semi-scheduled generating units, "available capacity" is provided by the UIGF as this takes into account the expected input energy at the time of dispatch. The undefined term "availability" has been used to describe the maximum plant capacity available (i.e. not limited by energy source availability).</p>
3.8.1(b)(12)	Auswind suggests that the proposed provision requires clarification.	<p>The Commission notes that the context of the proposed provision is part of a list of criteria that govern the Central Dispatch value maximisation objective function.</p> <p>Within this context, the proposed provision allows the Central Dispatch objective function to be limited by the "constraints" imposed by semi-scheduled generating units whose forecasts of generation represent unconstrained outputs.</p> <p>This type of limitation for semi-scheduled generating units represents the uncertainty associated with the fuel source, a problem that is otherwise captured by 'availability' constraints in subparagraph (2) for more predictable fuelled generating units.</p>

		<p>In this sense, subparagraph (12) is a drawing out of one of the specific conditions that would affect ‘availability’ of generating units. For wind turbines, the Commission considers that the detailed reference to this point is reasonable.</p> <p>Accordingly, the Commission supports the proposed provision. However the Commission has moved this provision to under subparagraph (2) to align the provision with the existing subparagraph (2) that deals with constraints due to availability. The UIGF provides a constraint on available capacity for semi-scheduled generating units.</p>
3.8.2(b)		NEMMCO’s proposal has not been accepted because self-dispatch levels are not relevant to current intermittent generation technologies. The self-dispatch level would simply be zero.
3.8.4		Semi-scheduled generators advise NEMMCO of their available capacity through the UIGF. Therefore, the Commission deleted obligations on semi-scheduled generating units from this clause.
3.8.6		<p>The Commission considers that self-dispatch level, ramp rate capability, loading and offloading prices are not relevant to current intermittent generation technologies and are not necessary to implement Semi-Dispatch. The self-dispatch level for an intermittent generator would simply be zero, and intermittent generators are generally capable of ramping their entire capacity within a dispatch interval, hence ramps rates are not limiting. The Commission has amended NEMMCO’s proposal to remove requirements in these areas.</p> <p>The parts of this clause that have been retained cover the structure of dispatch offers for Semi-Scheduled Generators, applies the market floor price and VoLL to Semi-Scheduled Generator offers, and defines the relationship between a semi-scheduled generating units price at the connection point and the regional reference node.</p>
3.8.17 and		The Commission considers that self-commitment and self-decommitment Rules are

3.8.18		<p>unnecessary for current intermittent technologies (as discussed in Section 4.2). The Commission has amended NEMMCO's proposal to remove requirements in these areas. The exception is 3.8.17(d) which provides a Semi-Scheduled Generator the right to synchronise.</p> <p>NEMMCO proposed new paragraph 3.8.18(b1). The Commission has accepted this addition to improve consistency with clause 3.8.17.</p>
3.8.19	Auswind states that it is hard to imagine a wind farm fitting a fast profile.	<p>The output of intermittent generating units varies depending on their intermittent input energy. The Commission agrees that it is unlikely that an intermittent generator could follow a fast profile (as discussed further in Section 4.2).</p> <p>Therefore, the Commission has deleted semi-scheduled generating units from clause 3.8.19 (Dispatch inflexibilities).</p>
3.8.20 (g)		<p>This clause required Semi-Scheduled Generators to be capable of dispatching its plant as required under the pre-dispatch schedule. This is not possible for semi-scheduled generating units that rely on an intermittent input energy source. As such, Semi-Scheduled Generator has been removed from this clause.</p>
3.8.21(d)	Auswind suggests rewording of this clause to incorporate situations where a semi-scheduled Generator does not have an AGC system or a 'plant control' room	<p>The Commission considers the definition of AGC to be quite broad ("The system into which the loading levels from economic dispatch will be entered for generating units operating on automatic generation control in accordance with clause 3.8.21(d)."). The Commission considers that it is not unreasonable to expect semi-scheduled generating units to have some form of AGC to receive dispatch instructions, as required under S5.2.5.14 .</p> <p>Additionally, the Commission does not consider establishing a "plant control" room to be onerous either. The words "on or off-site" have been added to clarify the Commission's view that semi-scheduled generators are not required to establish control rooms on-site. The Commission considers that a control room could consist of a laptop computer in an office or home, or could be out-sourced.</p>

3.8.22		<p>The Commission's decision in relation to re-bidding is discussed in Section 4.2.</p> <p>Re-bidding for Semi-Scheduled Generators is limited to available capacity and ancillary services provisions. This is a sub-set of the situations applying to Scheduled Generators and is therefore not consistent with the structure of scheduled generators dispatch offers. This inconsistency has been accepted to keep arrangements for semi-scheduled generators as simple as possible.</p>
3.8.23(a) and (a1)	<p>Auswind suggests that the paragraph requires correction to restrict compliance to the semi-dispatch interval.</p>	<p>The Commission has added paragraph (b) to the proposed Rule to outline under what conditions a semi-scheduled generating unit would be judged to have failed to conform to dispatch instructions. The Commission believe that in this new paragraph it is clear that a semi-scheduled generator is only required to conform to a dispatch instruction during a semi-dispatch interval.</p>
3.12A		<p>Non-scheduled generators are currently not captured by rule 3.12A (Mandatory restrictions), and NEMMCO has not provided justification for adding Semi-Scheduled Generators to rule 3.12A. As such, in line with the Commission's principle that new Rules are only added when it is demonstrated that they are needed to implement Semi-Dispatch, the proposed Rule has been amended to remove semi-scheduled generators from Rule 3.12A.</p>
3.13.4(p)	<p>Auswind disagrees with the proposed provision on the basis that ramp rates for individual wind turbines are meaningless.</p>	<p>The Commission has amended the proposed Rule so that the ramp rates of semi-scheduled generators are no longer required.</p>
3.13.4(q)	<p>Auswind disagrees that the 'unconstrained intermittent generation forecast' should be published for all trading intervals.</p> <p>Auswind suggests that the 'dispatch cap' should be published, when a binding network constraint against a semi-</p>	<p>The Commission notes that NEMMCO has addressed this matter in their supplementary submission (p3). NEMMCO advise:</p> <ul style="list-style-type: none"> <li>• That the UIGF is a fundamental component of the semi-dispatch proposal, as it aims to improve the accuracy of the central dispatch calculation at all times, not only during semi-dispatch intervals.</li> </ul>

	<p>scheduled generating unit has been forecast, in place of the UIGF.</p>	<ul style="list-style-type: none"> <li>• That all of the data, including the UIGF, should be published for all intervals for reasons of simplicity, market transparency, and consistency with the current next day reporting of unit data that has been presented to central dispatch.</li> </ul> <p>The Commission considers a fundamental principle of the NEM is the full publication of participant data as soon as possible after the instance of trading. It is noted that NEMMCO's reasoning is consistent with this principle.</p> <p>The Commission considers the principle to make publicly available as much information as possible is good regulatory policy as it allows interested parties to perform independent assessments on the integrity of market operation.</p> <p>NEMMCO indicate that they would support an extension to the clause to include the additional reporting on whether a dispatch interval was a semi-dispatch interval or a non semi-dispatch interval.</p> <p>Accordingly, the Commission has added clause 3.13.4(q)(2) to require NEMMCO to publish whether a dispatch interval is a semi-dispatch interval or not.</p>
3.14.6		<p>Non-scheduled generators are currently not captured by rule 3.14.6 (Compensation due to the application of an administered price, VoLL, market floor price), and NEMMCO has not provided justification for adding Semi-Scheduled Generators to rule 3.14.6. As such, in line with the Commission's principle that new Rules are only added when it is demonstrated that they are needed to implement Semi-Dispatch, the proposed Rule has been amended to remove semi-scheduled generators from Rule 3.14.6.</p>
3.15.6A(k)(5)		<p>The proposal requires causer pays factors to be based on deviations on a straight line trajectory to a semi-scheduled generating unit's dispatch cap (for semi-dispatch intervals), and as such penalises Semi-Scheduled Generator's for not reaching a dispatch cap. The Commission does not support this proposal because under Semi-Dispatch, semi-scheduled generating units are permitted to generate at any level</p>

		below the cap and thus should not be penalised under causer pays for not reaching that cap. This matter is discussed further in Section 4.6.
4.1.1(a)(3)(iv) and 4.3.1(i)	Auswind agrees with the proposed provision on the basis that the definition of 'dispatch' remains consistent with the intention to control only active power during times of a network constraint in a semi-dispatch interval	It is the view of the Commission that, in accordance with clause 3.8.23(a) and (a1), the term 'dispatch' refers to the control of active power during a semi-dispatch interval for semi-scheduled generating units.
4.3.1(q)	<p>Vestas comments that 'to interrupt' in the clause is costly to wind farm operators.</p> <p>Vestas suggests that NEMMCO should compensate for lost revenue due to 'interrupt'.</p>	<p>It is noted that the current provision is not altered by the NEMMCO provision.</p> <p>The current provision is a responsibility placed on NEMMCO to act in a certain way to restore the power system to a satisfactory operating state. It is most unlikely that the interruption would be to a semi-scheduled generating unit.</p> <p>However, an interruption to a wind farm could be envisaged if the wind farm was operating into an islanded system and there was a problem in synchronising the wind farm with the islanded system.</p> <p>The Commission considers that Vestas' comment is out of context with the intent of the provision.</p> <p>Therefore, Vestas' comment is not supported by the Commission.</p>
4.4.2(a)	Auswind disagrees with the proposed provision on the basis that clause 4.9 contains wording that is inconsistent with the definition of a semi-scheduled generating unit.	<p>The Commission notes that NEMMCO must be able to send dispatch instructions to <u>all</u> generating units that are included in central dispatch.</p> <p>In particular, all semi-scheduled generating units must respond to dispatch instructions when the dispatch interval is classified as a semi-dispatch interval and the generating system output is above the dispatch cap.</p>



		Accordingly, the Commission does not support Auswind's position.
4.4.2(b)	<p>Auswind disagrees with the proposed provision on the basis that the term 'governor system' no longer exists in Schedule 5.2.</p> <p>Auswind suggests that the intent of the provision is to refer to the unit's performance standard rather than the governor system.</p> <p>Vestas comments that the clause is not applicable to a wind farm comprising asynchronous machines because an asynchronous machine has no governor.</p>	<p>The Commission supports the comments made in submissions.</p> <p>The Commission has amended this clause to require generating units to have a frequency response in accordance with Schedule 5.2.5.11. This schedule places appropriate frequency response obligations on each classification of generating unit. This has allowed reference to 'governor system' to be removed from clause 4.4.2(b).</p>
4.8.5A(c)	<p>Vestas comments that a wind farm operator typically does not operate a manned 24 hour control room.</p>	<p>The Commission notes that the current clause, as it reads, does not specify that an on-site control room must be provided by the Generator.</p> <p>However, the Commission considers a person not familiar with the Rules could easily arrive at the position that an on-site presence was necessary in order to satisfy a requirement by NEMMCO for an 'immediate' response to its enquiry.</p> <p>In the case of a wind farm, the Commission notes that this provision would only be activated if a problem occurred that was outside the information normally received by NEMMCO when determining its UIGF and monitoring roles.</p> <p>The Commission considers it sufficient for the Generator to provide an 'on-call' person who can be contacted by electronic means and who has access to plant related information from remote acquisition facilities.</p>

		The Commission does not consider the clause requires a Semi-Scheduled Generator to operate a manned 24-hour control room.
4.9.2(d)	<p>Auswind disagrees with the proposed provision on the basis that it infers that each wind farm has a 24x7 control room, which is not always the case.</p> <p>Vestas states that the words ‘at all times’ do not consider that wind farm operators typically do not operate 24 hour manned control centres.</p> <p>Vestas comments that may be consideration should be given to an automated process.</p>	<p>The Commission notes that no change has been made to the current provision to “infer that each wind farm has a 24x7 control room”.</p> <p>On the contrary, the current provision, which is satisfactory for the operation of all intermittent generators, requires only that a person be ‘available at all times to receive’ (that is, on call and accessible by phone) and ‘immediately act upon that dispatch instruction’ (that is, to have either local and/or remote electronic access to the units control panels).</p> <p>Both Auswind and Vestas do not explain why this current arrangement can not be applied to wind turbines.</p> <p>While it considers that the current provision is adequate for all types of intermittent generators, the Commission has decided to remove any doubt through the addition of the words ‘or systems’ after the phrase ‘ensure that appropriate personnel’.</p>
4.9.2(e) – new provision	<p>Auswind states that the proposed provision [the requirement for 24 hour personnel to be available implied by paragraph (d)] places an onerous and costly obligation on semi-scheduled Generators.</p> <p>Auswind suggests that to avoid the potential costs, it should be made clear that there is no requirement for 24 hour personnel availability if a semi-scheduled generator is able to automatically respond to an electronic dispatch instruction issued by NEMMCO.</p>	<p>NEMMCO explicitly addresses the requirement for a Semi-Scheduled Generator to install additional capital works and to incur both upfront and on-going operating and maintenance expenditure in making facilities available on a 24 x 7 basis. [Section 8 “Impact on Wind farm Development and Operating Costs”, page 73]</p> <p>However, there is no explicit reference to the need to have a control room that is manned 24x7.</p> <p>The Commission considers that Auswind’s interpretation of the proposed provision is incorrect. The provision requires the Generator to “...ensure that appropriate personnel are available at all times to receive and immediately act on dispatch instructions...”, where dispatch instructions may be issued either electronically or verbally by NEMMCO.</p>

		<p>However, the provision is silent on the location of the personnel. For example, it could be that a person is “on-call” at a location remote to the generating unit. In such a situation, the person might receive the instruction from the NEMMCO System Operator and remotely access the generating unit’s control system to effect the direction specified by NEMMCO.</p> <p>Such an arrangement would not be considered onerous or costly as it is normal practice for such a Generator to have someone on-call to deal with any operational issues that unexpectedly arise.</p> <p>In particular, there is no requirement for the generator to have personnel at the site of the generating units on a 24 x 7 hour basis.</p> <p>Accordingly, the Commission does not support Auswind’s suggestion to introduce the new provision.</p>
4.9.2A and 4.9.3	Auswind states that the changes to these clauses are outside the scope of this set of Rule changes.	<p>The NEMMCO “Request for Rule Change” makes the following statements as to the scope of the proposed changes:</p> <p>Page 5: The purpose ...is to seek changes to the NER to ensure that NEMMCO can continue to effectively control network flows within secure operating limits where significant amounts of generation of an intermittent nature ...are likely to emerge in the NEM.</p> <p>This statement indicates that the Rule changes would extend beyond the actual intermittent generator to other entities, where there was an impact on those entities.</p> <p>It is also noted that the changes presented in clause 4.9.2A are of an editorial nature, and their correction is part of the on-going improvement in the presentation of the Rules.</p> <p>Therefore, the Commission does not support Auswind's view.</p>

4.9.4(a)		<p>The Commission has amended the proposed Rule so that references to self-commitment and frequency response mode apply to Scheduled Generators only. The Commission considers that self-commitment and frequency response mode is not relevant to Semi-Scheduled Generators.</p>
4.9.4(b)	<p>Auswind disagrees with the proposed provision on the basis that adjusting the transformer tap position or excitation control system voltage set-point must be left to the domain of a scheduled Generator.</p> <ul style="list-style-type: none"> <li>• Auswind states this provision was not discussed in the reference group meetings.</li> <li>• Auswind states that there are no excitation control systems on wind turbines.</li> <li>• Auswind implies in its comments that the tap changers do not have remote operation and consequently a 24 x 7 hour control room would be necessary to fulfil this requirement.</li> <li>• Auswind suggests that the proposed reference to semi-scheduled generating unit be removed, such that the current provision is retained, which refers to Scheduled Generators only.</li> </ul> <p>Vestas states that before the connection</p>	<p>The Commission has considered two points:</p> <ul style="list-style-type: none"> <li>• First, the Commission considers that NEMMCO has not explained the requirement to control the tap changer or excitation control system voltage set-point of a semi-scheduled generating unit. On its own this would raise a policy issue as to whether it is appropriate for NEMMCO to impose this requirement on a Semi-Scheduled Generator within these proposed changes.</li> <li>• Second, the question as to whether there is a benefit of such a facility. If the tap changer is installed to control the low voltage bus voltage, so as to keep the generating system at a constant voltage, the Commission considers that it cannot then be used to provide voltage support to the distribution or transmission network.</li> </ul> <p>Therefore, the Commission agrees with Vestas and Auswind's argument, and has deleted semi-scheduled generating unit from this clause of the proposed Rule.</p>

	<p>point there may be a substation and the substation may have a transformer with a tap changer. Under this situation:</p> <ul style="list-style-type: none"> <li>• NEMMCO should not want to control the nominal voltage of this transformer.</li> <li>• Induction machines with power conditioners cannot tolerate voltages other than nominal voltage.</li> </ul> <p>A wind turbine unit may disconnect from the electricity grid when the voltage is not within specification.</p>	
4.9.4(e)	<p>Auswind disagrees with the proposed provision on the basis that it is over and above that agreed in the performance standards.</p> <p>Auswind points out that:</p> <ul style="list-style-type: none"> <li>• Wind turbines by definition do not have a 'frequency response mode', rather they simply follow the system frequency.</li> <li>• The provision infers a control function that does not exist.</li> </ul> <p>Vestas makes the following comments:</p>	<p>NEMMCO has not explained the requirement for a semi-scheduled generating unit to have a 'frequency response mode' facility.</p> <p>For the reasons outlined above in 4.9.4(b), the Commission agrees with Vestas and Auswind's argument, and has deleted semi-scheduled generating unit from this clause of the proposed Rule.</p>

	<ul style="list-style-type: none"> <li>• Induction machines do not offer frequency control.</li> <li>• Wind turbine units with induction generators may change frequency at will.</li> </ul> <p>NEMMCO approval should not be required.</p>	
4.9.5(a)	<p>Auswind disagrees with the proposed provision on the basis that paragraph (a)(2) refers to reactive power, transformer tap or other outcome.</p>	<p>The Commission agrees with Auswind's position, and has amended the Rule to include "if applicable" to (a)(2) to remove doubt.</p>
4.9.6	<p>Vestas states that a wind turbine unit may synchronise and de-synchronise many times (according to the supply of energy).</p> <p>Vestas comments that:</p> <ul style="list-style-type: none"> <li>• A wind farm operator should not need to contact NEMMCO.</li> <li>• A wind farm operator typically does not have a 24 hour manned control centre.</li> </ul> <p>Clause 4.9.6(a)(2):</p> <p>Auswind disagrees with the proposed provision and states that.</p>	<p>As discussed in Section 4.2, the Commission agrees with Vestas and Auswind's arguments in relation to commitment procedures, and as such has removed "Semi-Scheduled Generator" from this clause (Commitment of scheduled generating units and semi-scheduled generating units) of the proposed Rule.</p>

	<ul style="list-style-type: none"> <li>• The proposed provision is pointless and undermines the whole point of this set of the rule changes.</li> <li>• The intention of this set of rule changes is to allow semi-scheduled generating units to produce power freely unless the semi-dispatch interval flag is set.</li> <li>• The clause is unnecessary as all semi-scheduled generation will be operated at whatever level is possible given the wind conditions. That level will be equal to or less than the capacity of the semi-scheduled generating unit, unless the interval is a semi-dispatch interval.</li> </ul> <p>Auswind suggests that the reference to semi-scheduled generating unit be deleted.</p>	
4.9.7		As discussed in Section 4.2, the Commission has removed “Semi-Scheduled Generator” from this clause (De-commitment of Scheduled Generators and Semi-Scheduled Generators) of the proposed Rule.
S.5.2.5.14(a) (2) and (3)	<p>Auswind disagrees with the proposed provision on the basis that the Automatic access standard for non-scheduled generating systems is being changed from that agreed in the previous change to the Rules.</p> <p>Auswind suggests that the requirement on</p>	<p>The Commission notes that the NEMMCO proposal explains the formation of the automatic access standard, which is the minimum access standard plus a requirement for linear ramping similar to that for scheduled generating units.</p> <p>NEMMCO have not explained how a wind farm would be able to meet a ‘linear ramping’ requirement.</p> <p>Auswind states that there is no justification for lifting this standard and requiring the</p>

	semi-scheduled generating units be made identical to non-scheduled generating units.	<p>'linear ramping', which is dealt with through the causer pays process.</p> <p>The proposed requirement to meet 'linear ramping' is in excess of requirements on Non-Scheduled Generators, and in the absence of justification for this additional requirement, the Commission has amended the proposed Rule to remove this requirement.</p>
S5.2.5.14(b) (3)	<p>Auswind states that the 'constant rate' should not be mandated, as there is no system security justification as the change required by a dispatch instruction should not be so large as to impact on the system security itself.</p> <p>Vestas states:</p> <ul style="list-style-type: none"> <li>• A wind turbine unit cannot increase active power output.</li> </ul> <p>Wind turbine units can reduce active power output but not at a constant rate (it may be a curve).</p>	<p>The requirement in this clause to reduce active power at a 'constant rate' is more stringent than the requirement for non-scheduled generators.</p> <p>Whilst the Commission understands it is desirable for active power to be changed at a constant rate (hence its inclusion in the automatic access standard), the Commission does not believe this requirement is necessary to manage system security. As some intermittent generators are not capable of changing active power at a constant rate, inclusion of this requirement in minimum standards could be viewed as a barrier to entry.</p> <p>The Commission considers that NEMMCO has not justified this additional requirement. As such, the proposed Rule has been amended to remove the requirement to reduce active power at a 'constant rate' from the minimum access standards.</p>
S5.2.5.14(b) (3)(l)	Auswind states that the concept of 'automatically' increasing generating is contradictory to intermittent generation.	<p>Whilst it is attractive to include the ability for any generating system to automatically increase its output, in the case of a semi-scheduled generating system, the Commission considers that such a facility appears to be of no practical use.</p> <p>This is because the generating system can operate to any level below its dispatch cap at any time, and it is only in the situation that the output is above the dispatch cap and the period is declared a semi-dispatch interval that conformance with a dispatch instruction is required.</p>



		<p>In this situation, the Generator must act to reduce its output, not increase its output.</p> <p>On this basis, the point made by Auswind appears to be reasonable and the Commission has removed the phrase ‘or increasing’ from the provision.</p>
<p>Glossary - “dispatch cap”</p>	<p>Auswind disagrees with the proposed definition.</p> <p>Auswind suggests that maximum permissible generation is only capped during a semi-dispatch interval. The maximum permissible generation is otherwise the available capacity.</p>	<p>The NEMMCO proposal provides limited explanation of the dispatch cap, which can be summarised as:</p> <ul style="list-style-type: none"> <li>• The dispatch cap represents a maximum generation limit (Section 3.2.1, p31).</li> <li>• The generating unit need only comply with a dispatch instruction when the unit is subject to a ‘semi-dispatch compliance requirement (Section 3.2.1, p31).</li> <li>• A semi-scheduled generating unit would only need to comply with its dispatch cap when the semi-dispatch compliance requirement is also set (Section 3.5.1, p43).</li> <li>• For all semi-dispatch intervals, a unit would be required to limit its output at the end of that dispatch interval to less than or equal to the value of its dispatch cap (Section 3.6.1, p46).</li> <li>• For all other non-semi-dispatch intervals a unit would not be required to comply with its dispatch cap for that dispatch interval, can ignore the dispatch cap and operate at any generating output level over that dispatch interval (Section 3.6.1, p46).</li> </ul> <p>The amendment suggested by Auswind (to restrict the definition to a semi-dispatch period) does not appear to be consistent with the NEMMCO proposal in that a dispatch cap is published for all dispatch intervals. It is only when a ‘semi-dispatch compliance’ flag is also set that a unit is required to comply with the dispatch cap.</p> <p>On this basis, the dispatch cap is not limited to the semi-dispatch interval as indicated</p>

		by Auswind. Accordingly, the suggestion is not supported.
Glossary - "generating system"	<p>Auswind comments that this clause requires a lead clarification statement to clarify the difference applications of a 'generating system' in Chapter 3 and Chapter 5.</p> <p>Auswind states that a generating system in the technical standards refers to a collection of generating units, however the market use in Chapter 3 creates a situation where the semi-scheduled generating unit in Chapter 3 is in fact the equivalent of the generating system in the technical standards.</p>	<p>The National Electricity Amendment (Technical Standards for Wind and other Generator Connections) Rule 2007 of 8 March 2007 amended the definition of generating system to include auxiliary or reactive plant necessary for the generating system to meet its performance standards. The definition as it stands applies to all chapters of the Rules, however the inclusion of auxiliary or reactive plant is only required for Chapter 5 and clause 2.2.1(e)(3).</p> <p>To clarify this distinction, the Commission has amended the definition so that the expanded definition (which includes auxiliary and reactive plant) only applies to Chapter 5 and clause 2.2.1(e)(3).</p>
S11.11.4	<p>Vestas comments that there should be a special fee structure for wind farm operators.</p> <ul style="list-style-type: none"> <li>• Vestas states that the costs of a conventional synchronous machine are not the same as those of a wind farm.</li> <li>• These fees should be greatly reduced in comparison to synchronous machines.</li> </ul>	<p>The NEMMCO proposal explains the allocation of participant fees to a semi-scheduled generator in Section 3.8.1 (page 56).</p> <p>NEMMCO states that the activities NEMMCO would engage in for the proposed category of Semi-Scheduled Generator is largely similar to those in respect of Scheduled Generators.</p> <p>On this basis, NEMMCO has proposed that Semi-Scheduled Generators are treated as Scheduled Generators for the purposes of allocating fees to Semi-Scheduled Generators.</p> <p>NEMMCO also states that the waive of fees for reclassification of up to 2 years should be approved on the basis that it will encourage persons to apply for re-classification.</p> <p>This Commission supports this arrangement as it may encourage Non-Scheduled Generators to re-classify their units as Semi-scheduled Generating Units, which the Commission considers would improve NEMMCO's ability to manage system security.</p>

Various rule and clauses		The Commission has made a number of editorial and minor drafting amendments in the draft Rule that have been identified in the analysis on this proposal.
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## B Detailed discussion on submissions - final determination

This table addresses the comments from second round submissions that were not addressed in the body of the final Rule determination. These are generally comments regarding specific text in the draft Rule.

	Clause	Draft Rule	Issue	Action	Raised by
1.	General		<p>The term “dispatch cap” does not accurately describe the item of information provided to Semi-Scheduled Generators in a dispatch instruction.</p> <p>The “dispatch cap” provided in dispatch instructions to Semi-Scheduled Generators represents NEMMCO’s best estimate of what output it expects from a semi-scheduled generating unit at the end of a dispatch interval. During a semi-dispatch interval, the output of a semi-scheduled generating unit must not exceed the dispatch cap. But in all other dispatch intervals the dispatch cap is set by the UIGF and Semi-Scheduled Generators are not required to maintain output below the level of the dispatch cap.</p>	<p>In the Rule to be made the term “dispatch cap” has been replaced with the term “dispatch level”.</p> <p>The term “dispatch level” was chosen because it represents the best estimate of what NEMDE would expect the output of the semi-scheduled generating unit to be for both semi-scheduled dispatch intervals and non-semi-scheduled dispatch intervals.</p>	

2.	Commencement	<p>Schedule 1 of this Rule commences operation on [the date the final determination is made].</p> <p>Schedule 2 of this Rule commences operation on 1 January 2009.</p>	<p>CEC encourages an early start of the amended Rules.</p> <p>Schedule 2 of this Rule commences operation on the latter of the date on which the changes required to the NEMMCO systems are completed and 1 January 2009.</p>	Addressed under Issue 3.	CEC
3.			<p>NEMMCO requested a deferral of the Rule commencement date from 1 January 2009 to 5 March 2009, to allow sufficient time for the required tuning of the intermittent generation forecasting Models. NEMMCO also suggested a mid-week day to ensure adequate IT staff are available to implement the changes.</p>	<p>The Commencement date has been changed to 31 March 2009 in the Rule to be made.</p> <p>31 March 2009 was chosen in preference to NEMMCO's suggestion of 5 March 2009 for the following reasons:</p> <ol style="list-style-type: none"> <li>1. Provides NEMMCO sufficient time to develop necessary IT systems, as advised by NEMMCO.</li> <li>2. Falls mid-week which ensures plenty of NEMMCO IT staff are on hand to invoke the changes.</li> <li>3. Is the end of the month which is administratively the most efficient time for the AEMC to commence a new Rule.</li> </ol>	NEMMCO

4.	2.2.3 (b)	<p>A person must not classify a <i>generating unit</i> as a <i>non-scheduled generating unit</i> unless it has obtained the approval of <i>NEMMCO</i> to do so. <i>NEMMCO</i> must approve the classification if it is satisfied that:</p> <p>(1) the primary purpose for which the relevant <i>generating unit</i> operates is local use and the aggregate <i>sent out generation</i> at its <i>connection point</i> rarely, if ever, exceeds 30 MW; or</p> <p>(2) the physical and technical attributes of the relevant <i>generating unit</i> are such that it is not practicable for it to participate in <i>central dispatch</i>.</p>	<p>NPP state that this clause is designed to allow co-generation and other generation embedded behind a load to be non-scheduled, however the prime test of &lt; 30 MW sent out is inconsistent with the 30 MW nameplate for other generators. (a 30 MW nameplate generator will never send out 30 MW due to internal losses and auxiliary loads).</p> <p>Limit to be in terms of sent out in all cases</p>	<p>The Commission acknowledges the issue raised by NPP, but is of the view that the suggestion is out of the scope of this Rule change process. The issue concerns an existing Rule for Scheduled and Non-Scheduled Generators. The issue is more than a minor correction and could materially impact existing generators. Therefore, the Commission has decided not to amend the Rules in relation to this issue.</p>	NP Power (NPP)
5.	3.7B(b)	<p>A Semi-Scheduled Generator must submit to NEMMCO, in accordance with the timetable, the capacity of its semi-scheduled generating unit available to the electrical power conversion process to convert the input energy into electricity ('availability') for each semi-scheduled generating unit for the purpose of paragraph (a), where the availability of the unit is at least 30 MW below the registered capacity of the unit provided as part of its registered bid and offer data.</p>	<p>Clause 3.7B(b) refers to the "availability" of a semi-scheduled generating unit as "the capacity available to the electrical power conversion process to convert the input energy into electricity".</p> <p>NEMMCO proposes to replace this internal definition of "availability" with the new Chapter 10 term "plant availability", which would clarify that the availability of the electrical power</p>	<p>The Commission agrees that replacing the internal definition of "availability" for Semi-Scheduled Generators with a new chapter 10 term "<i>plant availability</i>" would improve clarity.</p> <p>The Rule to be made includes the following new chapter 10 term</p>	NEMMCO

			conversion process is not subject to any fuel supply limitations or restrictions on the energy input to that process.	<b>plant availability</b> the <i>active power capability</i> of a <i>generating unit</i> (in MW), based on the availability of its electrical power conversion process and assuming no fuel supply limitations on the <i>energy</i> available for input to that electrical power conversion process.	
6.			Clause 3.7B(b) appears to only require notification of plant availability reductions. If the Semi-Scheduled Generator had previously notified an availability reduction to less than the level of (registered capacity - 30 MW), and the availability subsequently increases to within 30 MW of the unit's registered capacity (or even to the full registered capacity) then the draft Rule does not appear to oblige the Semi-Scheduled Generator to notify NEMMCO of that increased availability level. NEMMCO does not believe this outcome is intended.	The Commission did not intend for the Draft Rule to relieve Semi-Scheduled Generators from a requirement to notify NEMMCO of increases in plant availability to within the threshold for plant availability notification.  When plant availability is not within the threshold, the Semi-Scheduled Generator would advise NEMMCO of its precise availability. When plant availability returns to within the threshold, the Scheduled Generator would only need to advise NEMMCO the plant availability is within the threshold, but not necessarily	NEMMCO



				<p>the precise plant availability.</p> <p>Note that as a Semi-Scheduled Generator is only required to notify NEMMCO when plant availability is not within the threshold, it is thus theoretically possible that if a semi-scheduled generating unit's plant availability always remains with the threshold then they would never have to notify NEMMCO of a change from the nameplate rating of the unit.</p> <p>This clause has been amended in the Rule to be made to clarify that Semi-Scheduled Generators also must notify NEMMCO when availability rises from outside of the threshold to within the threshold.</p>	
7.	3.7B(c)	<p>When preparing an unconstrained intermittent generation forecast for the purposes referred to in paragraph (a), NEMMCO must take into account, where relevant:</p> <p>(1) the total station registered capacity provided by the Semi-Scheduled Generator provided as part of its registered bid and offer data;</p>	<p>Clause 3.7B(c) lists all of the factors that NEMMCO must consider when determining the UIGF.</p> <p>At the end of the first paragraph in Clause 3.7B(c) the phrase "where relevant" appears, however it is unclear which of the listed factors</p>	<p>The words "where relevant" have been removed from this clause in the Rule to be made to add clarity and provide participants certainty that all the listed factors would in fact be taken into account.</p>	NEMMCO

		<p>(2) the availability of the semi-scheduled generating unit submitted by the Semi-Scheduled Generator under paragraph (b);</p> <p>(3) the information obtained for the semi-scheduled generating unit from the remote monitoring equipment specified in clause S5.2.6.1;</p> <p>(4) the forecasts of the energy available for input into the electrical power conversion process for each semi-scheduled generating unit;</p> <p>(5) the assumption that there are no network constraints otherwise affecting the generation from that semi-scheduled generating unit; and</p> <p>(6) the timeframes of:</p> <ul style="list-style-type: none"> <li>(i) pre-dispatch;</li> <li>(ii) dispatch,</li> <li>(iii) medium term PASA; and</li> <li>(iv) short term PASA.</li> </ul>	<p>may not be relevant and under what circumstances.</p> <p>NEMMCO believes that of the listed factors affecting UIGF, the third factor (the real-time SCADA information obtained from remote monitoring equipment) may only be relevant to forecasting in the Dispatch and Pre-dispatch Timeframes. NEMMCO would prefer that “where relevant” be only applied here, if at all.</p>		
8.	3.7B(d)	<p>(d) NEMMCO must prepare the first unconstrained intermittent generation forecast for each semi-scheduled generating unit by 1 January 2009 and there must be an unconstrained intermittent generation forecast for each semi-scheduled generating unit available at all times after that date.</p>	<p>NEMMCO are requesting a deferral of the implementation of Schedule 2 of the Amending Rule to 5 March 2009. The date for commencing UIGF calculations under Clause 3.7B(d) would need to reflect this.</p>	<p>As discussed under Issue 3, the Commission has changed the commencement date to 31 March 2009.</p>	NEMMCO
9.	3.7B		<p>NEMMCO is concerned that the requirements on Semi-Scheduled Generators for notifying their plant availability to NEMMCO are not</p>	<p>The Commission agrees that Semi-Scheduled Generators should be required to submit changes in plant availability as</p>	NEMMCO

			<p>aligned with, and hence not as stringent as, those that currently apply to Scheduled Generators, to the detriment of the ongoing accuracy and reliability of the various market processes that will use this data.</p> <p>NEMMCO believes that Semi-Scheduled Generators should be required to provide plant availability data to NEMMCO in good faith and without delay, and to accompany any changes to that data with a brief, verifiable and specific reason, as is currently required of Scheduled Generators;</p>	<p>soon as the Semi-Scheduled Generator becomes aware of such changes. This would promote accurate and efficient forecasting and dispatch. A similar provision for Scheduled Generators is provided in the current Rules in clause 4.9.9. This clause in the Rule to be made has been amended to reflect this position.</p> <p>The Commission has not included NEMMCO's other suggestions such as providing plant availability information in good faith, or providing reasons for changes in plant availability. Both these obligations apply to both Scheduled and Semi-Scheduled Generators under the rebidding clauses of the Final Rule. Applying these provisions to plant availability notification under 3.7B is unnecessary because any generator found to be providing inaccurate plant availability information under this clause could be found to be in breach of the Rules.</p>	
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10.	3.7.2 and 3.7.3		<p>The draft Rule does not include unconstrained intermittent generation forecasts in the list of inputs to the MTPASA and STPASA processes.</p> <p>NEMMCO believes that this could be an oversight, as the Commission states that:  “...the UIGF would provide expected generation data for Semi- Scheduled Generators for the PASA processes”.</p>	<p>The Commission agrees that explicitly listing the UIGF as an input to MTPASA and STPASA would add clarity to the Rules. The Rule to be made has been amended accordingly.</p>	NEMMCO
11.	3.8.3(a)	<p>Scheduled Generators, Semi-Scheduled Generators or Market Participants who wish to aggregate their relevant generating units, scheduled network services or scheduled loads for the purpose of central dispatch and settlements must apply to NEMMCO to do so.</p>	<p>NEMMCO argue that aggregation is not for the purpose of settlements.</p> <p>Clause 3.8.3 exists to allow the multiple scheduled generating units to be treated as a single aggregate for the purposes of simplified bidding and dispatch. This purpose is indicated in the title of Clause 3.8.3 - Bid and offer aggregation guidelines.</p> <p>However Clause 3.8.3(a) of the current Rules states that:  “Scheduled Generators, Semi-Scheduled Generators or Market Participants who wish to aggregate their relevant generating units, scheduled network services or scheduled loads for the purpose of</p>	<p>The Commission agrees that aggregation is for the purposes of central dispatch only and any impact on settlements would be consequential. Therefore the word “settlements” has been removed from this clause.</p>	NEMMCO

			<p>central dispatch and settlements must apply to NEMMCO to do so".</p> <p>If the Scheduled Generator also registers those units as market generating units then their output is settled through the wholesale market processes. However settlement is done at the Generator portfolio level.</p>		
12.	3.8.3(b)		<p>In NEMMCO's original Rule request, NEMMCO requested the removal of Clauses 3.8.3(b)(3), (b)(4) and (b)(5) as conditions for approval of an aggregation request, as NEMMCO considered they were covered under Chapter 5 of the Rules. NEMMCO notes that these conditions are removed in the draft Rule.</p> <p>However NEMMCO noted that in the draft Rule that the Commission has also deleted references to "aggregated under Clause 3.8.3" from both Schedule 5.2.5.14 (active power control systems) and Schedule 5.2.6.1 (remote monitoring), the latter of which also refers to Rule 4.11 technical requirements for communication protocols.</p>	<p>The Commission deleted references to "aggregated under Clause 3.8.3" from both Schedule 5.2.5.14 (active power control systems) and Schedule 5.2.6.1 (remote monitoring) because aggregation should only apply to Chapter 3 and Clause 4.9. The Commission accepts that this combined with the removal of Clauses 3.8.3(b)(3), (b)(4) and (b)(5) as conditions for approval of an aggregation request has led to a problem where adequacy of control systems is no longer a requirement for aggregation. An example of where this could be problematic is where generating units individually meet Rule requirements for AGC systems, but when</p>	NEMMCO

			<p>Therefore there is no longer any link between the adequacy of control systems for aggregated units under Clause 3.8.3, and the technical requirement for such control systems under Schedule 5.2.5.14.</p> <p>NEMMCO understands and agrees with the reasons for removing all Clause 3.8.3 references from Chapter 10. However as the technical compliance of an aggregated dispatch control system is prerequisite to approving an aggregation request, NEMMCO therefore requests that the compliance condition for “control systems” be reinstated under Clause 3.8.3(b) of the draft Rule.</p>	<p>aggregated an AGC system is not available for receiving and apportioning a single instruction from NEMMCO for the aggregated entity.</p> <p>This has been rectified by restoring clause 3.8.3(b)(3) of the current Rules to the Rule to be made.</p>	
13.	3.8.3(d)	<p>Subject to paragraph (f), for the purposes of Chapter 3 and rule 4.9, a reference to a generating unit, scheduled load and scheduled network service are to apply equally to aggregated generating units, aggregated scheduled network services and aggregated scheduled loads aggregated in accordance with this clause 3.8.3.</p>	<p>Clause 3.7B(b) only requires notification of the plant availability of a semi-scheduled generating unit, which may represent the aggregated entity approved under Clause 3.8.3. However this aggregated entity may comprise several individual generating units that are not identical in terms of make, model and capacity (nameplate rating), and hence their energy conversion models are likely to be different.</p>	<p>The Commission agrees that notification of plant availability at the aggregated level (as aggregated under clause 3.8.3) would degrade UIGF accuracy. This is because the conditions for aggregation under clause 3.8.3 do not include a requirement for the generating units being aggregated to have similar forecasting characteristics for the purposes</p>	NEMMCO

			<p>This will result in a degradation in the accuracy of the UIGF.</p> <p>To address this issue, NEMMCO suggests amending Clause 3.7B(b) so that a Semi-Scheduled Generator would be required to notify the total plant availability of each registered “cluster” of generating units (generating unit cluster) within their aggregated semi-scheduled generating unit.</p>	<p>of the UIGF.</p> <p>The Commission has addressed this issue by exempting the application of aggregation under clause 3.8.3 to rule 3.7B, so that rule 3.7B must be satisfied at a generating unit basis.</p> <p>Although a semi-scheduled generating unit may still consist of many individual generating units, the Rule to be made requires those individual generating units to have similar forecasting characteristics (or energy conversion models), therefore not effecting the accuracy of the UIGF.</p>	
14.	3.8.3(d)	<p>Subject to paragraph (f), for the purposes of Chapter 3 and rule 4.9, a reference to a generating unit, scheduled load and scheduled network service are to apply equally to aggregated generating units, aggregated scheduled network services and aggregated scheduled loads aggregated in accordance with this clause 3.8.3.</p>	<p>There is an issue with the ambiguous use of the statement “a reference to a generating unit ... are to apply equally to aggregated generating units...”. NEMMCO is unsure what “apply equally” means, as the central dispatch of a scheduled generating unit cannot apply to both a single generating unit within the aggregate, as well as to all the generating units in the aggregate – clearly only the latter interpretation is intended.</p>	<p>The Commission believes that replacing the words “are to apply equally” with the words “is only taken as a reference” in clause 3.8.3(d) would clarify application of this clause. The Rule to be made has been amended accordingly.</p>	NEMMCO

			<p>In NEMMCO's original Rule request we argued that: "The Rule requirements of Chapter 3 (Market Rules) and Clause 4.9 are designed to only apply at the aggregated unit level, and not also to each individual scheduled generating unit within the aggregate, as would be suggested by the phrase 'apply equally'.</p> <p>A strict interpretation of the current Rule would require the submission of dispatch offers and the management of dispatch for each individual scheduled generating unit in addition to the aggregated unit, which we believe is unintentional and which defeats the purpose of aggregation to rationalise the number of units participating in Central Dispatch."</p>		
15.	3.8.3(d)	Subject to paragraph (f), for the purposes of Chapter 3 and rule 4.9, a reference to a generating unit, scheduled load and scheduled network service are to apply equally to aggregated generating units, aggregated scheduled network services and aggregated scheduled loads aggregated in accordance with this clause 3.8.3.	Clause 4.11(a) of the draft Rule requires that all remote control, operational metering and monitoring devices and local circuits must be installed and maintained in accordance with NEMMCO's standards and protocols for each scheduled generating unit and semi-scheduled generating unit connected to the transmission or distribution	The Commission does not believe it is necessary to add reference to clause 4.11.1. Clause 4.11.1 applies to control, metering and monitoring devices described in schedule 5.2. As schedule 5.2 allows requirements to be satisfied at a system level, the Commission believes that an aggregated	NEMMCO



			<p>network.</p> <p>However Clause 3.8.3(d) does not explicitly refer to Rule 4.11, which infers that such devices must exist for each individual generating unit, rather than as an aggregated equivalent.</p> <p>NEMMCO believes this may be an oversight and we request that a reference to Rule 4.11 be included in Clause 3.8.3(d).</p>	<p>entity consisting of any number of generating units (also referred to as a system) can satisfy clause 4.11.1 as a whole rather than at the individual generating unit level.</p>	
16.	3.8.3(g)	<p>NEMMCO must provide a Scheduled Generator, Semi-Scheduled Generator or Market Participant with:</p> <p>(1) reasons, if its application for aggregation is denied by NEMMCO; or</p> <p>(2) notification, if its application for aggregation is approved.</p>	<p>Clause 3.8.3(i) of the current Rules requires NEMMCO to notify all Scheduled Generators and Market Participants of newly approved aggregations. However the new Clause 3.8.3(g)(2) (which replaces the Clause 3.8.3(i)) appears to only require confidential notification to the relevant person, and not the wider notice that is required under existing Clause 3.13.3(m).</p> <p>For the information of the Commission, Clause 3.13.3(m) of the Rules requires NEMMCO to publish details of special approvals, including aggregation.</p>	<p>As 3.13.3(m) already requires NEMMCO to publish details of special approvals, including aggregation, the Commission has decided that it is not necessary to repeat this requirement in clause 3.8.3.</p>	NEMMCO

			NEMMCO suggests that this inconsistency could be addressed by reinstating Clause 3.8.3(i) as a separate requirement.		
17.	3.8.6(c)	A Scheduled Generator's loading prices offered must be equal to or greater than \$0/MWh and may not exceed the product of VoLL and the intra-regional loss factor at the Scheduled Generator's transmission network connection point for the scheduled generating unit;	This clause in the current Rules includes the words "multiplied by" after the word "VoLL". The Commission took the view that the words "multiplied by" and "product" were not both needed in this clause as they each convey the same meaning. Three submissions did not support this change as they felt the correction appears to be unnecessary. They believe the original wording should be retained for clarity even though the multiplication is implied by the use of the word "product".	The Commission considered this to be a minor correction. However as three submissions expressed the view that this correction reduces clarity, the Commission has decided to restore the words "multiplied by" to the clause.	Pacific Hydro, NPP & CEC
18.	3.8.22(b)	Rebidding		The Draft Rule precluded Semi-Scheduled Generators from rebidding market ancillary services parameters under clause 3.8.22(b)(1)(ii). Whilst the Commission does not expect Semi-Scheduled Generators to be active in ancillary services markets, it did not intend to limit their participation in any way and has	NPP, CEC

				<p>amended the clause 3.22(b) accordingly.</p> <p>As most of the parameters under 3.8.22(b)(i)&amp;(ii) now apply to Semi-Scheduled Generators, the Commission has decided to include Semi-Scheduled Generators under 3.8.22(b)(1) and delete 3.8.22(b)(2). Clause 3.8.22(b)(1) only provides the option to vary those parameters and does not oblige a Semi-Scheduled Generator to vary anything not relevant to that Generator.</p>	
19.	3.12A.6	In clause 3.12A.6, omit the words “clause 3.8.6(h)” and substitute the words “clause 3.8.6(d)”.	Disagree isn't the equivalent clause 3.8.6 (c) ?	The Commission agrees and has corrected the Rule to be made.	Pacific Hydro, NPP & CEC
20.	Schedule 3.1		Should be included in Schedule 1 so that those intermittent generators registering between “Registration Date” and the “Commencement Date” can benefit from the streamlined schedule.	The Commission agrees. Semi-Scheduled Generators registering before the Commencement Date should only be required to provide that information required to participate as a Semi-Scheduled Generator. As such, Schedule 3.1 (Registered Bid and Offer Data) has been moved into Schedule 1 of the	NEMMCO

				Rule to be made.	
21.	Schedule 3.1		<p>Need to add ramp rates and aggregation data for semi-scheduled generating units.</p> <p>Suggested Rewording:</p> <p>Add the following to the Semi-Scheduled Generating Unit Data: Generating unit information:</p> <ul style="list-style-type: none"> <li>• normal and maximum ramp rates - MW/minute</li> <li>• aggregation data</li> </ul>	<p>The Commission agrees. This additional information is required to support the Commission's decision to add an allowance in the Rules for ramp rates and dispatch inflexibility for Semi-Scheduled Generator's.</p> <p>The following items have been added to Schedule 1 for Semi-Scheduled Generators:</p> <ul style="list-style-type: none"> <li>• normal and maximum ramp rates - MW/minute</li> <li>• aggregation data</li> </ul>	CEC
22.	4.4.2	(b) Each Generator must ensure that all of its generating units meet the technical requirements for frequency control in clause S5.2.5.11.	<p>Disagree: What happens to generators that are subject to frequency standards prior to this clause coming into effect?</p> <p>Suggest rewording: (b) Each Generator must ensure that all of its generating units meet the technical requirements for frequency control in clause 5.2.5.11. accordance with the generating unit's registered performance standard.</p>	<p>The Commission does not believe Pacific Hydro's concern is material. The changes made to S5.2.5.11 are administrative in nature or have been made in relation to the new classification of semi-scheduled generating unit. Generators subject to S5.2.5.11 prior to this clause coming into effect, and who have performance agreements in place will not be impacted the change. However existing</p>	Pacific Hydro

				Generators wishing to reclassify their units as semi-scheduled may be required to renegotiate their performance agreements and will hence have to comply with the technical standards applicable to Semi-Scheduled Generators.	
23.	4.9.2(a)	(3) in the case of a semi-scheduled generating unit, the maximum level of power to be supplied by the generating unit over the specified period.	This provision should make a distinction between a semi-dispatch interval and a non semi-dispatch interval. Active power control for transmission flow control need only apply during periods of constraint. NEMMCO is sending dispatch instructions all the time. The point of semi-scheduling is that the generating unit is not obligated to follow the instruction unless it is a 'semi-dispatch interval'.	<p>The Commission is of the view that clause 3.8.23(b) (Failure to comply with dispatch instructions) adequately defines when a Semi-Scheduled Generator must comply with a dispatch instruction. As such distinction between semi-dispatch intervals and non semi-dispatch interval is not necessary in this clause.</p> <p>In addition, clause 4.9.2 applies to both instructions and directions. NEMMCO must be permitted to direct a Semi-Scheduled Generator to limit its output at any time regardless of whether the interval is a semi-dispatch interval or not. Distinguishing between semi-dispatch intervals and non semi-dispatch intervals in the way proposed in some submissions</p>	NPP, CEC, Pacific Hydro

				would limit when NEMMCO could direct Semi-Scheduled Generators.	
24.	4.9.2(d)	A Scheduled Generator or Semi-Scheduled Generator must with respect to its generating units that have an availability offer of greater than 0 MW (whether synchronised or not), ensure that appropriate personnel are available at all times to receive and immediately act upon dispatch instructions issued by NEMMCO to the relevant Generator.	<p>We have a concern with the meaning of "available at all times". The wording here should reflect the same wording as that for scheduled loads or market participants: "ensure that appropriate personnel or electronic facilities are available at all times".</p> <p>Suggested Wording:  d) A Scheduled Generator must with respect to its generating units that have an availability offer of greater than 0 MW (whether synchronised or not), ensure that appropriate personnel are available at all times to receive and immediately act upon dispatch instructions issued by NEMMCO to the relevant Generator.  (e) A Semi-Scheduled Generator must with respect to its generating units that have an availability offer of greater than 0 MW (whether synchronised or not), ensure that appropriate personnel or electronic facilities are available at all times to receive and immediately act upon dispatch instructions issued by NEMMCO to the relevant Generator.</p>	Whilst the Commission would expect most instructions to be issued electronically, the Commission is of the view that every Generator must have a person available to receive verbal instructions or directions for when electronic facilities are not available or appropriate. This could be as simple as having a person with a mobile phone on call. The Commission expects that it would be a rare occurrence for that person to be contacted. Hence the Commission does not accept this proposed change.	Pacific Hydro, NPP, CEC

25.	4.9.4	A Scheduled Generator or Semi-Scheduled Generator (as the case may be) must not, unless in the Generator's reasonable opinion, public safety would otherwise be threatened or there would be a material risk of damaging equipment or the environment:	Agree only if the dispatch instruction and the application of the dispatch cap applies solely during a semi-dispatch interval and that no obligation remains to 'obey' the active power instruction in a dispatch instruction during a non semi-dispatch interval. Currently lacks certainty that the semi-scheduled generator is free to operate without dispatch cap during non-semi-dispatch intervals.	The Commission believes that the Rule to be made adequately specifies when a Semi-Scheduled Generator must comply with an active power instruction.	Pacific Hydro
26.	4.9.4(a)	A <i>Scheduled Generator</i> or <i>Semi-Scheduled Generator</i> (as the case may be) must not, unless in the <i>Generator's</i> reasonable opinion, public safety would otherwise be threatened or there would be a material risk of damaging equipment or the environment: (a) send out any energy from the generating unit, except: (1) in accordance with a dispatch instruction; (2)	The intention of the semi-dispatch rule change is to allow free-wheeling when the Semi Scheduled Generator is not under a semi-dispatch interval. This clause infers that power output is limited to the dispatch instruction all the time, which in the case of wind farms is the UIGF when not under the semi-dispatch interval. That was not the intention. Where is there freedom to export more than the UIGF?	See issue 25.	Pacific Hydro
27.	s5.2.5.11	maximum operating level means in relation to: (1) a non-scheduled generating unit, the maximum sent generation consistent with its nameplate rating;	A wind farm's 'maximum sent out' is never equal to its nameplate rating due to reticulation losses and transformation.	The Commission has not considered this proposal for the final Rule because it does not directly relate to this Rule change proposal.	Pacific Hydro
28.	s5.2.5.11	maximum operating level means in relation to:	As above and wind farms do not	The definition is not impacted by	Pacific

		(2) a scheduled generating unit or semi-scheduled generating unit, the maximum sent out generation (but not emergency generation) consistent with its registered bid and offer data;	have any 'emergency generation', which is only relevant to thermal machines.	lack of emergency generation.	Hydro
29.	S5.2.5.11(e)	Omit clause S5.2.5.11(e) and substitute: (e) The negotiated access standard must record the agreed values for maximum operating level and minimum operating level, and where relevant the method of determining the values, and the values for a generating system must take into account its in-service generating units.	Not required: The substitute clause is identical to the existing clause.	The Commission agrees and the amendment has been deleted from the Final Rule.	CEC
30.	S5.2.5.14(a)(3)	subject to energy source availability, for a semi-scheduled generating unit or a semi-scheduled generating system: (i) automatically reducing its active power output within five minutes at a constant rate, to or below the level specified in an instruction electronically issued by a control centre; (ii) automatically limiting its active power output to or below the level specified in subparagraph (i); and (iii) not changing its active power output within five minutes by more than the raise and lower amounts specified	By definition, a semi-scheduled generator need only limit its generation during a semi-dispatch interval; therefore both the automatic and the minimum standard should only place a requirement to perform during these periods.  The standard for semi-scheduled generators is also too detailed and can be simplified to be similar to the scheduled generator standard	This clause specifies a capability. Whether a dispatch interval is classified as semi-dispatch or not is irrelevant to the machines capability. As such, the Commission has not accepted this proposed change. In addition, the clause specifies the performance required for a generating unit or generating system to meet the automatic access standard. A generating unit that cannot meet this standard can still register with a negotiated access standard.	CEC, NPP
31.			NEMMCO's original Rule request included a technical requirement for	The Commission accepts NEMMCO's proposal to add a	NEMMCO



			<p>the active power control system of a semi-scheduled generating unit to be able to “ramp its active power output linearly from one dispatch level to another, subject to energy source availability”.</p> <p>The ability to linearly ramp already applies in the automatic standard for a scheduled generating unit under Clause S5.2.5.14(a)(1)(ii).</p> <p>The Commission rejected this requirement in the draft Rule, citing the following reason in the draft Rule Determination: “The proposed requirement to meet ‘linear ramping’ is in excess of requirements on Non-Scheduled Generators, and in the absence of justification for this additional requirement, the Commission has amended the proposed Rule to remove this requirement.”</p> <p>NEMMCO concedes that our original Rule request did not adequately justify the inclusion of a system capability to linearly ramp between dispatch levels, as part of the automatic access standard for active power control systems.</p>	<p>requirement for linear ramping capability in the automatic access standard on the basis that this would enhance power system security and reduce the need for regulation FCAS hence promoting NEM efficiency. As the penetration of intermittent generation in the NEM builds, it will become increasingly important for these generators to be capable of linear ramping to allow NEMMCO to efficiently manage frequency. Placing the requirement of linear ramping in the automatic standard will incentivise new intermittent generators to employ this capability.</p> <p>The requirement for linear ramping will not be added to the minimum access standard so as not to create a barrier to entry for wind turbines not capable of linear ramping.</p>	
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			<p>NEMMCO contends that such control systems capability should be part of the automatic access standard for a semi-scheduled generating system, as:</p> <ol style="list-style-type: none"> <li>1. Such additional capability (if used) would improve power system frequency control, reduce the average frequency regulation requirement, and hence enhance power system security. For example, assuming that 5-minute demand forecasts were perfectly accurate, then linear ramping of output between successive dispatch levels (calculated by NEMDE) would have a greater probability of minimising the standard deviation of demand-supply imbalances within a dispatch interval (and hence frequency deviations from nominal 50 Hz) than if output were to randomly fluctuate over that interval. In this way, the average frequency regulation requirement would be reduced;</li> <li>2. Such capability may assist Semi-Scheduled Generators in minimising their generating unit's contribution towards the ongoing need for regulation services under Clause</li> </ol>		
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			<p>3.15.6A(k)(6), subject to energy source availability and the accuracy of the UIGF;</p> <p>3. If wind intensity were sufficient to allow output to be linearly ramped between the dispatch levels (usually the UIGF) determined by NEMDE every 5 minutes, then this would minimise the wind farm's contribution to the use of regulation FCAS, the Generator's Causer Pays Factor, and ultimately reduce the Generator's regulation FCAS cost liabilities;</p> <p>4. Under existing Clause S5.2.5.14(a)(2)(ii) the control system of a non-scheduled generating unit is required to ramp output "at a constant rate" – hence the control system requirement to linearly ramp the output of a semi-scheduled generating unit is simply the equivalent to that non-scheduled requirement;</p> <p>5. NEMMCO understands that modern, commercially available wind turbines are able to provide such linear ramping capability, and consequently costs should not be increased under this requirement. Connection applicants would also be rewarded for providing such</p>		
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			capability by allowing connection access under the automatic standard.		
32.			<p>Under clause S5.2.5.14(a)(2)(i) of the current Rules, subject to energy source availability, a non-scheduled generating unit must be capable of “automatically reducing or increasing its active power output within 5 minutes”.</p> <p>However the capability of increasing” output has been omitted from the new Clause S5.2.5.14(a)(3)(i) for a semi-scheduled generating unit, making the automatic access standard for a semi-scheduled generating unit less onerous than for a non-scheduled generating unit.</p> <p>NEMMCO believe that this was most likely not intended in the draft Rule.</p>	The Commission did not intend to make the access standard for Semi-Scheduled Generators under clause S5.2.5.14(a)(3)(i) less than that for Non-Scheduled Generators, as identified by NEMMCO. This has been rectified by restoring the words “and increasing” to S5.2.5.14(a)(3)(i)	NEMMCO
33.			Clause should only require compliance during a semi-dispatch interval – otherwise the requirement to comply is implied all the time.	The Commission considers this issue has been adequately dealt with under Issue 31.	Pacific Hydro
34.	S5.2.5.14(b)(2)	for a non-scheduled generating system: (i) reducing its active power output, within 5 minutes, to or below the level required to	Should the statement on energy source availability be lifted to the top of the clause? Comment – where is	Material changes to this existing clause is out of scope because it does not relate to semi-	Pacific Hydro

		<p>manage network flows that is specified in a verbal instruction issued by the control centre;</p> <p>(ii) limiting its active power output to or below the level specified in subparagraph (i);</p> <p>(iii) subject to energy source availability, ensuring that the change of active power output in a 5 minute period does not exceed a value specified in a verbal instruction issued by the control centre; and</p> <p>(iv) being upgraded to receive electronic instructions from the control centre and fully implement them within 5 minutes; and</p>	<p>the obligation on NEMMCO control centre to remove the limit applied in (ii) given that non-scheduled generators are not in NEMDE to remind them or obligate them to optimize the dispatch?</p>	<p>dispatch.</p>	
35.	S5.2.5.14(b)(3)	<p>subject to energy source availability, for a semi-scheduled generating unit or a semi-scheduled generating system:</p> <p>(i) reducing its active power output within five minutes, to or below the level specified in an instruction electronically issued by a control centre;</p> <p>(ii) not changing its active power output, to or below the level specified in subparagraph (i); and</p> <p>(ii) automatically limiting its active power within five minutes by more than the raise or lower amounts specified in an instruction electronically issued by a control centre.</p>	<p>Disagree - should be simplified to match minimum standard for Scheduled generators</p> <p>There are two clauses numbered (ii) in the draft clause.</p>	<p>The Commission agrees that this clause is unnecessarily complex. The clause has been simplified so that it is consistent with the requirements for Scheduled Generators.</p> <p>The Commission has also removed reference to “subject to energy source availability” because a dispatch instruction can only specify the maximum level of power to be supplied by a semi-scheduled generating unit, hence if source energy is not available the Semi-Scheduled Generator is free to generator at any level below the maximum level.</p>	Pacific Hydro

36.	S5.2.5.14(c)	A negotiated access standard may provide that if the number or frequency of verbal instructions becomes difficult for a control centre to manage, NEMMCO may require the Generator to upgrade its facilities to receive electronic instructions and fully implement them within 5 minutes.	What defines 'difficult'?	The word difficult applies in the existing Rules, and as such the Commission has not considered this question for the final Rule determination.	Pacific Hydro
37.	S5.2.6.1(a)	The automatic access standard is a: (1) scheduled generating unit; (2) non-scheduled generating unit with a nameplate rating of 30 MW or more; (3) non-scheduled generating system with a combined nameplate rating of 30 MW or more;	Items (2) and (3) in this clause technically won't be possible after this rule change unless in a grandfathered situation with this rule.	Under the Rule to be made, an intermittent generator greater than 30 MW is permitted to register as a Non-Scheduled Generator when its output supplies a local load and sent out generation is less than 30 MW.	Pacific Hydro
38.	S5.2.6.1(b)	(5) in respect of a wind farm type of generating system: (i) wind speed; (ii) wind direction; (iii) ambient temperature; and	Why is the auto standard different to the minimum - doesn't NEMMCO want the number of units operating?	This drafting applies currently in the Rules.	Pacific Hydro
39.	S5.2.6.1(c)	(3) non-scheduled generating system with a combined nameplate rating of 30 MW or more;	By definition in chapter 2 isn't this now a semi-scheduled generator?	This still applies to grandfathered wind farms and other special cases.	Pacific Hydro
40.	11.X.3(a)	(a) Subject to paragraph (b) and clause 11.X.4, until the commencement date, a registered generating unit is taken to be a non-scheduled generating unit for the purposes of the Rules.	NEMMCO believes that the definition of a "registered generating unit" may be misconstrued, as it does not exclude a "classified generating unit" that is a scheduled generating unit	The Commission agrees that a Generator that is currently registered as Scheduled to reclassify as Semi-Scheduled and then be treated as a Non-	NEMMCO

			<p>and which subsequently reclassifies as a semi-scheduled generating units on or after the registration date. That is, the set of “classified generating units” could be regarded as a sub-set of all “registered generating units”. Given that interpretation, the proposed Clause 11.X.3(a) would then appear to allow a scheduled generating unit which reclassifies as a semi-scheduled generating unit on or after the registration date to be subsequently treated as a non-scheduled generating unit (rather than continuing its operation as a scheduled generating unit) until the Rule commencement date. This interpretation would inadvertently appear to allow a Scheduled Generator to become a Non-Scheduled Generator with respect to its significant intermittent generating units from registration date. This interpretation contrasts with Clause 11.X.2(c), which states what NEMMCO considers to be the correct intention that a scheduled generating unit or a non-scheduled generating unit that reclassifies as semi-scheduled on or after the registration date is still treated as a</p>	<p>Scheduled Generator until the Commencement Date. This has been rectified in the Rule to be made.</p>	
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			<p>scheduled or non-scheduled generating unit (as the case may be) until the commencement date, beyond which it is treated as a semi-scheduled generating unit.</p> <p>NEMMCO is proposing changes to Clause 11.X.3(a) of the draft Rule, to clarify that a scheduled or a non-scheduled generating unit that reclassifies as semi-scheduled on or after the registration date continues to be treated for operational purposes in its original classification until the Rule commencement date, after which it operates as a semi-scheduled generating unit.</p>		
41.	Chapter 10	<p>dispatch cap The amount of electricity specified in a dispatch instruction as the semi-scheduled generating unit's maximum permissible active power at the end of the dispatch interval specified in that dispatch instruction.</p>	<p>Need to specify that the dispatch cap only applies during a semi-dispatch interval; Delete the definition of Dispatch cap and substitute: dispatch cap (1) For a semi-dispatch interval, the amount of electricity specified in a dispatch instruction as the semi-scheduled generating units maximum permissible active power at the end of the dispatch interval specified in that dispatch instruction (2) For a non semi-dispatch interval</p>	<p>The Commission agrees that the definition for dispatch level [cap] should define when the dispatch level must be complied with. This adds further clarity to the Rules. As such the definition for dispatch level now distinguishes between "semi-dispatch intervals" and "non-semi-dispatch intervals".</p>	<p>CEC, NPP, Pacific Hydro</p>



			<p>an estimate of the active power at the end of the dispatch interval specified in that dispatch instruction. Actual active power at the end of non semi-dispatch interval is subject to energy source availability and may be greater than the dispatch cap.</p>		
42.		<p>generating system  (a) Subject to paragraph (b), for the purposes of the Rules, a system comprising one or more generating units.  (b) For the purposes of clause 2.2.1(e)(3), Chapter 5 and a jurisdictional derogation from Chapter 5, a system comprising one or more generating units and includes auxiliary or reactive plant that is located on the Generator's side of the connection point and is necessary for the generating system to meet its performance standards.</p>	<p>Paragraph (b) of the proposed definition, which defines a system that includes the reactive plant necessary for the generating system to meet its performance standard, does not include a reference to either Clause 4.8.9 or 4.9.2. Therefore the generating system referred to in Clauses 4.8.9 and 4.9.2 would be covered by paragraph (a) of the definition, which is a system that excludes reactive plant. This has the unintended effect of not allowing a Generator to use its reactive plant to comply with a voltage control direction or voltage control dispatch instruction issued by NEMMCO under Clauses 4.8.9 and 4.9.2 respectively.</p>	<p>Clause 4.8.9 does not refer to generating system. As such the Commission has decided clause 4.8.9 does not need to be referenced in the paragraph (b) definition for generating system.</p> <p>The Commission does not believe that it is necessary to include a reference to 4.9.2 in the paragraph (b) definition for generating system. Clause 4.9.2 allows NEMMCO to issue voltage instructions to Generators in relation to their generating units. It does not restrict what that Generator may utilise to respond to those instructions. Schedule 5.2.5.13 describes the response required by Generators and the definition of generating system in Chapter 5 includes reactive plant.</p>	NEMMCO

43.			<p>The proposed definition for generating system may also have the unintended effect of indirectly altering the definition of a generating unit when that term is used in Clause 2.2.1(e)(3) and Chapter 5. The current definition of generating unit only includes “related equipment”, and does not include auxiliary and reactive plant.</p>	<p>NEMMCO has advised the Commission that it wishes to retract this comment.</p>	<p>NEMMCO</p>
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## **C Grandfathering options put forward in submissions**

Following is an outline of the grandfathering options presented in submissions. The Commission's decision on grandfathering is discussed in Section 4.9.

### **Demonstrated sunk cost of over \$5M**

Roaring40s supported the grandfathering of the non-scheduled status to generators with existing connection agreements but believes this should be extended to capture advanced generation projects with significant levels of sunk investment. Roaring40s proposed that grandfathering should apply to projects where the proponent can demonstrate a sunk investment of over \$5M, as well as projects that have a signed connection agreement.

### **Automatically reclassify all existing generators as semi-scheduled**

TrustPower did not consider that the signing of a connection agreement is an appropriate indication that an intermittent generator project is committed. One option proposed by TrustPower was that all existing intermittent generators be automatically reclassified as semi-scheduled, unless the generator demonstrates (to NEMMCO) that it is not feasible<sup>40</sup>. This alternative option is similar to that discussed in section 10.2.1 of NEMMCO's proposal where all significant intermittent generators would be reclassified as semi-scheduled generating units.

TrustPower considered that the additional costs for control and communications equipment that are necessary to comply with the semi-scheduled requirements are low, except in remote areas. This means that the majority of wind farms, particularly in South Australia, could be reclassified as semi-scheduled.

Flinders Power considered that semi-scheduled status should be applied across both new and existing large non-scheduled generators as it considers this would better meet the national electricity objective. Flinders Power also considered that non-scheduled generators effectively get "firm access and dispatch priority over all other generation"<sup>41</sup> and, consequently, it believes that "rationing network capacity should be undertaken on a common basis across the NEM."<sup>42</sup> Flinders Power did, however, consider that exceptions should be allowed where it would be technically impractical or impossible for an existing intermittent generator to be modified to meet the semi-scheduled requirements.

While agreeing that requiring existing wind generators to be semi-scheduled would increase uncertainty and hence raises investment costs, ESIPC considered that "the market is based on the principle of security constrained, optimised dispatch and offers no guarantee that constraints might not be placed on individual generators as

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<sup>40</sup> Page 3 of the TrustPower submission dated 6 July 2007.

<sup>41</sup> Page 4 of the Finder Power submission dated 6 July 2007.

<sup>42</sup> Page 4 of the Finder Power submission dated 6 July 2007.

necessary.”<sup>43</sup> Further ESIPC stated that “The Rule change process exists to provide for the evolution of the market in accordance with the efficiency objective. This would mean that from time to time participants may have additional requirements placed on them particularly in relation to the provision of information.”<sup>44</sup> ESIPC also noted that in the second reading speech implementing the NEL in 2005 it was stated that “any person wishing to enter the market should not be treated more or less favourably than persons already participating in the market.”<sup>45</sup> Therefore ESIPC suggested that all intermittent generators greater than 30 MW be classified as semi-scheduled, with transitional arrangements for NEMMCO to assess applications for exemptions where an existing generator cannot physically comply with the semi-scheduled provisions. ESIPC considered that the efficiency gains from incorporating most installed wind farms would outweigh the considerations of grandfathering.

ESIPC considered that, in the absence of a requirement for all intermittent generators to be classified as semi-scheduled, the existing wind farms that already have arrangements for the control of their output by the network service provider should be required to be classified as semi-scheduled, stating that “in these cases, the generators have the capability to be controlled and are aware of the need to control their dispatch when necessary from a security point of view.”<sup>46</sup> ESIPC also considered that as many wind farms as possible should be included in the new wind forecasting regime, which is being implemented using the semi-scheduled provisions.<sup>47</sup>

### **Commitment criterion in the NEMMCO SOO**

TrustPower also proposed using the criteria used by NEMMCO in the SOO to determine if a project is committed, and hence exempt from the requirement to be classified as semi-scheduled. For the purposes of the 2007 NEMMCO SOO:<sup>48</sup>

“To be considered as committed, projects (including augmentations) must satisfy all of the following criteria:

- The project proponent has acquired, or has commenced legal proceedings to acquire, land for the construction of the project.
- Contracts for the supply and construction of the project’s major plant or equipment (generators, turbines, boilers, transmission towers and conductors), including contract provisions for project cancellation payments, have been executed.

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<sup>43</sup> Page 4 of the Electricity Supply Industry Planning Council submission dated 6 July 2007.

<sup>44</sup> Page 4 of the Electricity Supply Industry Planning Council submission dated 6 July 2007.

<sup>45</sup> Page 4 of the Electricity Supply Industry Planning Council submission dated 6 July 2007.

<sup>46</sup> Page 5 of the Electricity Supply Industry Planning Council submission dated 6 July 2007.

<sup>47</sup> Page 5 of the Electricity Supply Industry Planning Council submission dated 6 July 2007.

<sup>48</sup> Page 1-9 of the 2006 NEMMCO Statement of Opportunities.

- The project proponent has obtained all required planning and construction approvals and licences, including completed and approved environmental impact statements (which include planning and environmental approvals from duly authorised planning bodies at both State and Federal Government levels).
- Financing arrangements for the proposal, including debt plans, have been finalised and contracts executed.
- Construction has either commenced or a firm date has been set for it to commence.”

### **Use of the connection agreement**

TrustPower also considered that if a signed connection agreement is regarded as the most appropriate test of whether a generating unit is committed then there must be a rigorous test of the status of the connection, with a project being regarded as existing if:

- the connection agreement has all conditions precedent to the operation of the connection agreement satisfied or waived prior to the semi-dispatch Rule Effective Date; and
- the wind farm design and connection arrangements have not been materially changed after the semi-dispatch Effective Date, including a change in wind turbine manufacturer or significant model change or a material change in the negotiated performance standards.<sup>49</sup>

TrustPower considered these conditions would ensure that the connection agreements have not just been put in place to secure classification as a non-scheduled generating unit.

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<sup>49</sup> Page 5 of the TrustPower submission dated 6 July 2007.

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