Roaring40s
THINKING ENERGY

Dr John Tamblyn,
Chairman
Australian Energy Market Commission
PO Box H166
Australia Square
NSW 1215

Dear John,

Semi-Dispatch of Significant Intermittent Generation

Roaring40s welcomes the opportunity to comment on the 'Semi-Dispatch of Significant Intermittent Generation Proposed Rule Change'.

Roaring40s is one of the leading wind farm developers in Australia/Asia, with 300MW of installed capacity and 250 MW of generation under construction and development across Australia, China, and India. To date, Roaring40s has invested over $400M in wind generation in the National Electricity Market (NEM), with another $300M in the advanced stages of development.

As a significant investor operating in a number of jurisdictions, Roaring40s is acutely focussed on the importance of market regulations in driving efficient and timely investment in the generation sector. Roaring40s recognises the importance of allocating transmission capacity to competing generation on an efficient and predictable basis and strongly commend the efforts of NEMMCO to develop sustainable arrangements for wind generation operating in the National Electricity Market (NEM).

Roaring40s supports the fundamental approach of the proposed Rule.

To this end, detailed review has identified a number opportunities to further enhance the effectiveness of the proposed Rule, predominantly involving reducing the cost and effort associated with integrating wind generation with existing market systems. These opportunities are presented on the following pages.

One matter we believe to be of substantial importance is the effectiveness of the Savings and Transition provisions. Grandfathering of non-scheduled status to generators with existing connection agreements is supported, however we believe it is necessary to include a provision to capture other advanced generation projects with similar or higher levels of sunk investment which do not yet have connection agreements.

In addition to this submission, Roaring40s has also worked with other developers and operators through Auswind to present a joint industry response.

Due to the complex nature of the issues at hand, we would welcome the opportunity to discuss the matters raised in our submission in person at the appropriate time.

If you have any questions regarding this submission, please contact Andrew Jones (Market and Regulation Manager) on 0400 537 944 or by email Andrew.Jones@Roaring40s.com.au

Yours Sincerely,

Mark Kelleher, Managing Director, Roaring40s Pty Ltd.

Roaring40s
THINKING ENERGY

Index

Introduction

The Semi-Dispatch of Significant Intermittent Generation Proposed Rule Changes (The Rule) is likely to substantially increase the operational costs of new wind farms in Australia. It is acknowledged that systems to manage the impact of high levels of wind penetration on the power system will result in unavoidable costs, however we believe the market objective makes it incumbent on the AMEC to ensure that the costs of these systems are minimised and commensurate with the benefits they bring to the market.

The Rule appears to adequately address the power system security issues associated with large scale wind integration. However, the general approach of aligning arrangements for semi-scheduled wind generation with that of scheduled generation will, in some circumstances, create substantial and unnecessary administrative and operational costs. Roaring40s has identified such situations and present them below together with practical proposals to address those issues raised.

Communications considerations

Issue: The requirement to have adequate communications to receive dispatch instructions from NEMMCO could result in a substantial increase cost for distribution connected wind farms.

The Semi-dispatch Rule change proposal creates a requirement for "semi-scheduled generators" to have adequate communications to receive dispatch instructions from NEMMCO (Clause 2.2.2A). Further, the minimum access standard for active power control (Clause S5.2.5.14), creates a new requirement for control of active power output in response to an 'instruction electronically issued by a control centre'. The combined effect of these provisions appears to be a requirement for electronic remote control of wind farms.

In the case of larger transmission connected wind farms, this requirement is not particularly onerous as the cost of connecting to existing TNSP or Telco communication networks is low relative to the overall value of the projects. For this reason there is little harm in applying remote electronic control requirements to this class of generator, and in fact developers such as Roaring40s have historically installed remote electronic control capability of their own volition.

In the case of distribution connected wind farms, substantial problems can arise due to the lack of communications infrastructure in the vicinity of the connection point. Although distribution connected wind farms will generally be below 30MW in capacity and hence exempt from semi-scheduling obligations, wind farms connecting to the 66kV network in Victorian can be larger than this. This creates a situation where relatively small wind farms (40-80MW) will be exposed to costs for communication systems which are

large relative to the overall value of the project. This will put such Victorian projects at a distinct disadvantage. It should also be noted that the materiality of any impact of these distribution connected wind farms have on transmission system congestion is questionable.

Proposed Solution: Intermittent generators connecting to networks less than 100kV are not required to register as semi-scheduled.

A practical solution would be to allow distribution connected generators to register as non-scheduled, irrespective of size. The size of these generators will be naturally limited by the capacity of distribution connection points. This would avoid placing substantial extra costs on smaller Victorian projects embedded within the 66kV network without compromising the effectiveness of semi-dispatch arrangements in managing flows on the transmission system.

Clause 2.2.2A(a) should be altered as follows:

> …with a combined *nameplate rating* of 30MW or more and is connected to a network that operates a voltage>100kV…

Going forward, it is noted that there is potential for development of mobile phone/data networks to substantially reduce the cost of remote control in remote areas in the not too distant future. If this technology proves effective, distribution connected generators >30MW should be included in semi-dispatch.

MT PASA

Issue: The large numbers of small units within a wind farm will create a requirement for frequent but insignificant changes to MT PASA bids

Clause S3.7.2 is modified to create the requirement for Semi-scheduled generating units to participate in MT PASA. It is acknowledged that inclusion of substantial wind generation in MT PASA may be of some assistance in assessing the medium term supply/demand balance in the NEM, however, forecasting of wind conditions in the MT PASA timeframe is almost impossible. For this reason, it is considered highly unlikely that NEMMCO decisions in the MT PASA timeframe (such as direction of plant or activation of reserve trader) would be at all effected by the availability or otherwise of wind generation plant. Hence there is little value in seeking a high level of precision in forecasting wind generation unit availability.

The MT PASA arrangements, as proposed, appear to create a requirement to reflect changes in the availability of individual units in a wind generating system on a turbine by turbine basis. Consider for example the impact this would have on a modern large scale wind farm with more than 100 individual generating units. At least one unit is likely to be out of service at

any point in time. Operation staff would be rebidding MT PASA weekly to reflect day to day changes in turbine availability, even though the overall capacity of the wind farm may only vary by a few MW.

Proposed solution: Limit MT PASA bidding obligations on semi-scheduled units to a reasonable threshold

Given the relative insensitivity of decisions in the MT PASA timeframe to wind farm availability, it is suggested that changes to wind farm capacity only be reflected in MT PASA if they exceed a certain threshold. It is further suggested that 30MW would be a practical threshold which is consistent with similar thresholds for material generation though out the NER.

The following new clause is proposed:

> 3.7.2 (d)(1A) For the purposes of clause 3.7.2(d)(1), *semi-scheduled generating units* are not required to report on changes to their PASA *availability* if the PASA *availability* of the semi-scheduled generating unit is no less that 30MW below the registered capacity of the semi-scheduled generating unit.

ST PASA

Issue: The large numbers of small units within a wind farm will create a requirement for frequent but insignificant changes to ST PASA bids.

Clause S3.7.3 is modified to create the requirement for Semi-scheduled generating units to participate in ST PASA. It is acknowledged that inclusion of substantial wind generation in ST PASA may be of some assistance to assessing the short term supply/demand balance in the NEM, however, forecasting of wind conditions in the ST PASA timeframe has a high degree of uncertainty. For this reason, it is considered unlikely that NEMMCO decisions in the ST PASA timeframe (such as direction of plant, dispatch of reserve trader plant or dispatch of mandatory restrictions) would be particularly sensitive to the availability or otherwise of wind generation plant. Therefore a somewhat lower level of precision in forecasting wind generation unit availability should be acceptable.

The ST PASA arrangements, as proposed, appear to create a requirement to reflect changes in the availability of individual units in a wind generating system on a turbine by turbine basis. Consider for example the impact this would have on a modern large scale wind farm with more than 100 individual generating units. Operation staff would be rebidding ST PASA on a daily basis to reflect day to day changes in turbine availability, even though the overall capacity of the wind farm may only vary by a few MW.

Proposed Solution: Limit ST PASA bidding obligations on semi-scheduled units to a reasonable threshold

Given the reduced sensitivity of decisions in the ST PASA timeframe to wind farm availability, it is suggest that changes to wind farm capacity only be reflected in ST PASA if they exceed a certain threshold. It is suggested that 30MW would be a practical threshold which is consistent with to similar thresholds for material generation throughout the NER.

The following new clause is proposed:

> 3.7.3 (e)(1B) For the purposes of clauses 3.7.3(e)(1) and 3.7.3(e)(1A) *semi-scheduled generating units* are not required to report on changes to their *availability* or PASA *availability* if the *availability* or PASA *availability* of the semi-scheduled generating unit is no less that 30MW below the registered capacity of the semi-scheduled generating unit.

Pre-dispatch

Issue: Wind farm maintenance practices need to be highly flexible to take advantage of wind conditions and maximise resource utilisation

In the case of Roaring 40s, a very high emphasis is placed on performing planned maintenance in low wind periods to minimise loss of production. Further, any activity using cranes to access wind turbines can only be carried out during relatively low wind periods. For these reasons, timing of planned maintenance more often than not changes on a daily, if not hourly basis. If it becomes necessary for a wind farm to bid plant availability down to MW resolution, additional operational resources are likely to be required, or alternatively, maintenance practices will become less flexible, so sacrificing resource utilisation for a reduction in the need for re-bidding. Both outcomes result in material economic detriment.

As noted previously with MT PASA and ST PASA processes, precise notification of generation plant availability in the pre-dispatch time frame adds little to the accuracy of the pre-dispatch process due the uncertainty associated with actual wind conditions in this time frame. This is particularly pertinent in the case of wind turbine maintenance where operation personnel 'duck and weave' wind conditions on an hourly basis to maximise resource utilisation as described above.

It is proposed that changes are required to ensure that rebidding requirements do not result in reduced resource utilisation or un-necessary costs as illustrated above. This could be practically achieved by placing an increased tolerance on the resolution of availability changes to be reflected in bids of semi-scheduled generators. It is suggested that a threshold of 30MW be applied, consistent with that proposed for MT PASA and ST PASA, and other thresholds for material generation throughout the NER.

Proposed Solution: Limit bidding obligations on semi-scheduled units to a reasonable threshold

The following new clause is proposed:

> 3.8.4 a(1). For the purpose of clause 3.8.4(a1), a semi-scheduled generator is not required to notify NEMMCO of changes to anticipated available capacity if the anticipated available capacity is within 30MW of the registered capacity of the generator.

Re-bidding

Issue: The rebidding provisions will place a substantial cost burden on semi-scheduled generators and drive in-efficient behaviour.

The Rule change as proposed by NEMMCO applies Clause 3.8.22 Rebidding to semi-scheduled generators. It is understood that these clauses are intended to prevent inappropriate exercise of market power in the NEM through withdrawal or repricing of capacity at short notification. It is acknowledged that in theory a semi-scheduled generator could conceivably be part of a larger portfolio with short term pricing power in the NEM, however NEMMCO has not presented any evidence or argument to indicate that such a situation has or is likely to result in un-satisfactory market outcomes. It is also noted that Clause 3.8.22 is highly prescriptive in nature, creating the potential for a technical breach of these requirements in the absence of either an inappropriate intent to influence market outcomes, or an actual impact on market outcomes.

The risk of enforcement action arising from a 'technical breach' of the rebidding provisions can result in economically detrimental behaviour by wind farms operated as semi-scheduled generators. This behaviour includes:

- Un-necessarily high commitment of resources to compliance management, both in the planning and operational timeframes.
- Reduced efficiency of plant operation arising from reluctance of operational staff to re-bid (noting that penalties under the NEL for breach of these conditions apply to individuals as well as the company).

The risk of enforcement action is also highly inequitable. For example any operator with a strong brand is likely to suffer reputation damage well in excess of any fine levied for a 'technical breach' of these requirements.

Proposed Solution: Do not apply re-bidding provisions to semi-scheduled generators.

For the reasons outlined above, it is proposed that the re-bidding provisions of clauses 3.8.22 and 3.8.22A not be applied to semi-scheduled generation,

and that the references to semi-scheduled generation in clause 3.8.22 be deleted from the proposed Rule. Should it be conclusively demonstrated (at a later date) that application of re-bidding provisions to semi-scheduled generation is necessary to prevent inefficient operation of the NEM, Roaring40s would support such a proposal.

Ancillary Services transactions

Issue: Placing FCAS liabilities on semi-scheduled generators which are ramping to conform with a dispatch cap can create an incentive to delay ramping to the dispatch cap

Clause 3.15.6A(k)(5)(i) of the proposed rule assesses a semi-scheduled generator as not contributing to a frequency deviation if it ramps linearly in response to a dispatch cap during a semi-dispatch interval. This creates an incentive for the non-scheduled unit to delay responding to the dispatch cap to minimise FCAS liabilities. It is envisaged that a dispatch cap will only be applied when a network limitation is being exceeded. Under these circumstances, system security should take precedence to optimising FCAS costs and the semi-scheduled generator be allowed to reduce output to within the limits of the system as soon as possible.

Proposed solution: Exempt semi-scheduled generators from FCAS liabilities when ramping toward a dispatch cap

Clause 3.15.6A(k)(5)(i) should be altered as follows:

> 3.15.6A(k)(5)(i) is ramping its actual *generation* over a *semi-dispatch interval* in response to a *dispatch cap*.

Power System Security Related Market Operations

Issue: Requirements for 24hr personnel availability could be interpreted as placing an onerous and costly obligation on semi-scheduled generators to run 24hr shifts

Clause 4.9.2(d) places an obligation on semi-scheduled generation to have '….appropriate personnel available at all times to receive and immediately act upon dispatch instructions from NEMMCO…'. This could be interpreted as requiring operational personnel to be on shift 24hrs a day. This would be a substantial additional expense to wind farm operators. It is generally accepted that 6 people are required to maintain a 24hr operational capacity resulting in costs of over $500k per annum above and beyond existing arrangements. Most modern wind farms are capable of full remote control, and it is envisaged that most semi-dispatched units would receive instructions as electronic remote control signals from NEMMCO. Under such arrangements there would be no requirement for personnel to be available.

Proposed Change: There is no requirement for 24hr personnel availability if a semi-scheduled generator is able to automatically respond to an electronic dispatch instruction issued by NEMMCO.

The following new clause is proposed:

> 4.9.2(e) For the avoidance of doubt, a Semi-scheduled generator has complied with Clause 4.9.2(d) if it is able to respond automatically to a dispatch instruction issued electronically by NEMMCO.

Issue: Conformance with a NEMMCO dispatch instruction involving tap changer settings, reactive power set point or voltage control systems set points could limit the ability of semi-scheduled generators to meet generator performance standards

Clause 4.9.2(a1) creates the requirement for semi-scheduled generators to comply with Clause 4.9.2(b). This gives NEMMCO the ability to instruct a generator to adjust transformer tap changers, voltage control system set points and reactive power set points.

For wind generating systems at the peripheries of the network, reactive power coordination and management of voltage profile across a wind farm can 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).

Proposed Solution: A semi-scheduled generator that cannot meet a generator performance standard as a result of responding to a dispatch instruction issued by NEMMCO is deemed to have met the relevant generator performance standard

The following new clause is proposed:

> 4.9.2(c1). A semi-scheduled generator that cannot meet a generator performance standard as a result of responding to a dispatch instruction issued by NEMMCO is deemed to have met the relevant generator performance standard.

Issue: The requirement to notify NEMMCO of changes in the operating state of small individual units will create administrative and communication overheads which will increase costs and distract from management of power system security

Clause 4.9.9C places an obligation on semi-scheduled generators to notify NEMMCO in the event that the operational availability of any of its generating units has changed. This is likely to create excessive and counter-productive communication between generators and NEMMCO given that individual wind turbine units are typically between 800kW and 3MW in size.

Proposed Solution: Notification of changes in operation state is limited changes which impact over 30MW of generation.

The following new clause is proposed:

> 4.9.9C (b) A semi-scheduled generator is not required to notify NEMMCO under Clause 4.9.9C if the combined capacity of generating units with changed operational ability is less than 30MW.

Access Standards

Issue: The proposed minium access standard could be interpreted as creating a requirement for active power control in excess of the ability of modern wind turbine technology

Clause S5.2.5.14(b)(3)(iii) requires a semi-scheduled generating unit to be capable of 'not-changing its active power output within five minutes by more than the raise and lower amounts specified in an instruction electronically issued by a control centre'.
Wind turbines rely on pitching of blades to regulated power transfer from the prime mover (the propeller) to the generator. When a gust of wind comes through, the pitching mechanism takes some time to respond, and as a result the output of the turbine will increase above its' MW set point until the blades are pitched to reduced energy inputs. As such, the band within which wind generation can be controlled is likely to be somewhat wider than that of a thermal generator. It is not clear whether this restriction needs to be reflected in this clause.

Proposed solution: NEMMCO needs to clarify how this clause would be applied in practice and changes made if necessary

Savings and Transition Rules

Roaring40s strongly supports the principle of grandfathering of market access and technical provisions of the Rules when changes are made. Such provisions are essential for mitigating sovereign risk and hence minimising the financing costs of new generation in the NEM.

Issue: Grandfathering on the basis of connection agreements will not capture some advance projects with higher levels of sunk investment

Clause 11.11.1 defines an existing generating unit as a '*…classified generating unit* or a *generating unit* for which there is a *connection*

agreement…' It would seem that the existence of a connection agreement is being used as being indicative of substantive sunk investment in a project, and Roaring40s supports this as being a reasonable approach. It is noted however, that there are some projects for which substantive investments have been sunk which do not have an existing connection agreement. Further it is quite possible that some of these projects represent greater sunk investment than other projects that have existing connection agreements.

Proposed solution: Grandfathering should also be applied to advanced projects which can demonstrate a sunk investment over $5M

Clause 11.11.1 should be amended as follows:

> …**existing generating unit** means a *classified generating unit* or a *generating unit* for which there is demonstrated sunk investment or binding commitments of more than $5M, or a *generating unit* for which there is an un-conditional *connection agreement* that was executed by all parties to the connection agreement …