NEMMCO
National Electricity Market Management Company Ltd
ABN 94 072 010 327

Sydney Office

3 October 2007

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

By email: submissions@aemc.gov.au

Dear John

Central Dispatch and Integration of Wind and Other Intermittent Generation (Semi-Dispatch) Rule Change

AEMC Request for Additional Information

I refer to the request, dated Wednesday 15th August 2007, from your Dr Julian Eggleston which asked NEMMCO to provide additional information in relation to our Semi-Dispatch Request for Rule Change proposal[1] ("the Rule proposal").

In particular the request sought information relating to the materiality of the need for semi-dispatch including how often the intermittent output of wind farms has placed the system in an insecure state.

Attachment 1 to this letter provides this requested information, which in our view supports the implementation of the Rule proposal.

Attachment 2 to this letter describes the operation of Pacific Hydro's Challicum Hills wind farm in relation to management of flows on the Ballarat–Horsham 66 kV distribution loop, to clarify advice previously provided to the AEMC in NEMMCO's supplementary submission (1st August 2007) and in Pacific Hydro's subsequent reply to that submission (15th August 2007). While NEMMCO has discussed the content of Attachment 2 with Pacific Hydro and the relevant NSP, the AEMC should note that Pacific Hydro does not endorse the note as written.

This example, while relevant in terms of showing how a distribution-connected wind farm can cause a system security issue, relates to the situation as it stood in February 2007.

Since that time the relevant line ratings have been increased, and since our supplementary submission to the AEMC, discussions between the TNSP, DNSP and Pacific Hydro have progressed to the point where an alternate solution has been identified and is expected to be implemented. Once implemented that solution should significantly reduce the risk of a reoccurrence of the issues experienced in February 2007.

[1] NEMMCO's "Central Dispatch and Integration of Wind and Other Intermittent Generation" Rule Request, 23 April 2007, http://www.aemc.gov.au/electricity.php?r=20070430.162452

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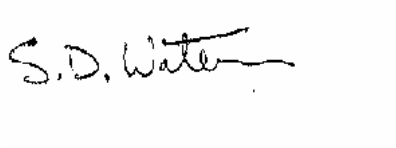
If you need further clarification on any of the matters covered in this letter, or require any of the underlying data used in the analysis please contact Ross Gillett on (02) 9239 9114.

Yours sincerely,



David Waterson

General Manager
Development and Strategy

NEMMCO

Attachment 1:
Is There a Material Need for Semi-Dispatch?

Preface

To establish the materiality of the need for the Semi-Dispatch NEMMCO has examined the evidence to date to gain some insight into whether the long-term implications of maintaining the status quo, when compared with the proposed arrangements, would on balance advance or detract from the NEM objective.

The growing presence of significant sources of intermittent non-scheduled generation in the NEM poses challenges to NEMMCO and their agents in discharging their collective responsibility under NER Clause 4.3.1 to maintain the power system in a secure operating state, and in particular to efficiently control network flows within secure operating limits.

NEMMCO believes that if these challenges are not met and the status quo is maintained then the following issues will emerge, as documented in the "Statement of the Issues" section of our original Rule proposal:

1. Increased risk of violating secure network limits that involve significant intermittent generation[2];

2. Increased use of interventions to address such violations, resulting in reduced market transparency[3] and less efficient market outcomes;

3. Increased reliance on different regulatory regimes and local control schemes that operate outside of the market to address such violations, resulting in greater investment uncertainty and reduced market transparency[3]; and

4. Increased risk of less efficient market outcomes (that is, higher market costs and price distortion) when affected network constraints are binding, owing to:

    - the over-constraining of scheduled generation and inter-regional flows ahead of the uncontrolled output from significant intermittent generation[3], in situations where the intermittent generation may be more expensive, and

    - the use of higher operating margins below the secure limit of network constraints than would otherwise be necessary, to cover the risk of uncontrolled increases in output from significant intermittent generation , also resulting in the under-utilisation of available network capacity

While the extent and severity of the above issues are relatively moderate at present (given the modest levels of significant intermittent generation) NEMMCO contends that their materiality will worsen over the long term if not ultimately addressed on a NEM-wide basis through the proposed Semi-Dispatch arrangements, or in the interim through (less desirable) jurisdiction-specific arrangements which in themselves increase regulatory uncertainty and compliance costs[4].

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[2] This issue was explained by way of an example in Appendix A of our Rule proposal, supported by historical evidence of the issue in Appendix B of the Rule proposal

[3] Rules Clause 3.1.4(a) describes principles for market design, including minimising NEMMCO decision-making to allow the market to operate, maximising market transparency to achieve a very high degree of market efficiency & avoiding special treatment in respect of different technologies used by market participants - refer Appendix B

[4] As example of this is in SA, where all new wind farms > 30 MW must register in the NEM as a Scheduled Generator as a condition of their generation license so that their output can be controlled within network constraint equations. This also means that that wind farm must follow dispatch instructions at all times, thus placing a greater burden on

Indeed the level of issues could substantially increase if the expected rate of entry of significant intermittent generation into the NEM continues or accelerates over the next decade, driven by the expansion of the various state and national-based renewable energy incentives and the proposed national carbon emissions cap and trade scheme.

NEMMCO believes that it is appropriate to not only consider this proposed Rule change in the context of the current situation, but also in the context of growing wind penetration in the NEM.

Table 1 below lists the regional totals of current wind farms in the NEM as well as publicly announced future wind farm proposals that are at various stages of development at the current time[5].

These totals are compared with the 2007/2008 summer total installed generation capacities[6].

Table 1: Wind Farms in the NEM

Region	NOW	Committed	Planning Approved	Seeking Approval	Feasibility	Future Total	TOTAL	07/08 Summer Installed Capacity	NOW as % of Installed Capacity	TOTAL as % of Installed Capacity
SA	550	180	1,200	0	740	2,120	2,670	3,260	17%	65%
VIC	83	360	860	30	505	1,755	1,838	8,509	1%	21%
TAS	140	0	130	0	190	320	460	2,509	6%	13%
NSW	0	0	290	290	515	1,095	1,095	12,424	0%	9%
QLD	0	0	125	0	40	165	165	11,195	0%	1%
NEM	**773**	**540**	**2605**	**320**	**1,990**	**5,455**	**6,228**	**37,897**	**2%**	**14%**

As indicated in the Table, while the current levels of wind power are modest (773 MW, or 2% of installed generating capacity) this could rapidly rise in the next few years (over 6,200 MW, or 14% of installed generating capacity).

Wind farm entry would be further stimulated by the setting of more ambitious renewable energy targets, the development of a national emission trading scheme, which in themselves may also encourage the entry of other emerging renewable technologies of an intermittent nature, such as solar and tidal power.

With increases in both the scale and extent of these emerging renewable technologies it would be expected that their per unit capital costs would decrease over time (as has occurred for wind power), further stimulating growth in renewable generation.

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rebidding to maintain dispatch compliance than would otherwise be necessary under the Semi-Dispatch arrangements. It is understood that ESCOSA would remove this licence condition once the Semi-Dispatch arrangements are in place. See "Wind Generation Licensing - Statement of Principles", ESCOSA website, http://www.escosa.sa.gov.au/webdata/resources/files/050930-R-WindGenerationStatementofPrinciples.pdf

[5] Wind Energy Projects in Australia, Auswind, http://www.auswind.org/projects/

[6] Chapter 4, 2006 Statement of Opportunities, NEMMCO, http://www.nemmco.com.au/nemgeneral/040-0042.htm

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Q: How often has intermittent output of wind farms placed the system in an insecure state?

In terms of how often intermittent generation places the power system in an insecure operating state, we need to examine not only how often network constraints violate, but also how close the network constraints are to violating - that is, when the network constraints are binding.

The following sections look at both the historical evidence to date and possible future scenarios if the status quo is maintained.

Constraint Materiality

In assessing whether a network constraint issue has a material market impact it is useful to consider both the duration of the constraint, the MW amount (or depth) of constraint and how those translate into total market cost.

It may be instructive to refer to the criteria under the Rules for defining a NEM region, which under Clause 3.5.1(b)(2)(ii) includes a materiality test of a minimum 50 hours per year for a binding network constraint between the prospective regions.

Historical Evidence

In answering this question NEMMCO extended the analysis that was presented in Appendix B of our Rule proposal to also cover the subsequent one-year period from 1st August 2006 to 31st July 2007.

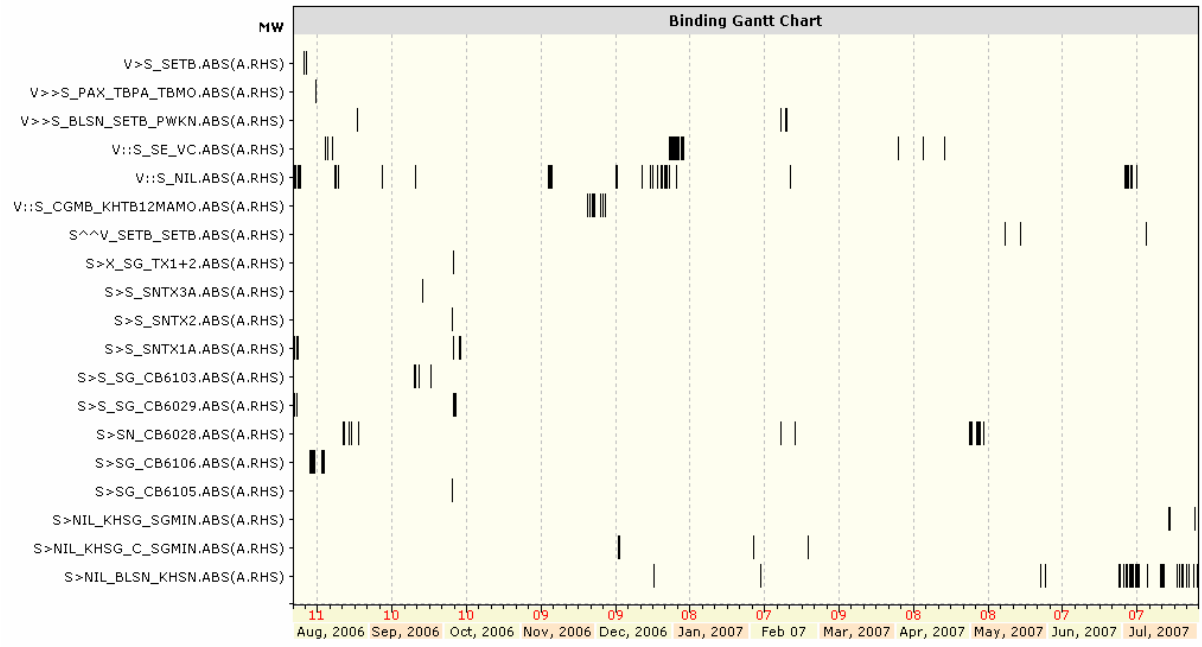
The studies look at the incidence that NEM wind farms are involved (that is, defined either explicitly or implicitly on the constraint RHS) in a binding or violated network constraint equation developed by NEMMCO, as well as the incidence that NEM wind farms were actually constrained-off through the operation of a local NSP's generation dispatch limiter (GDL) scheme.

Table 2 in Appendix A summarise the results of these studies. Diagram 1 on the next page shows the distribution of these binding network constraints over the study period.

Additional studies were carried out to examine the possible MW impact that wind farm generation in the south-east corner of SA had on the Vic-SA interconnector export and import limits. Tables 3A & 3B in Appendix A summarise the results of these studies.

Note that to date NEMMCO has not been required to intervene in the market through the issue of a direction or Clause 4.8.9 instruction to a non-scheduled intermittent generator, primarily due to the implementation of GDL schemes administered by the local NSP and the ability to constrain scheduled generation to resolve network issues.

Diagram 1: Binding Constraints with Canunda & Lake Bonney as RHS Terms



Binding and Violated Constraints

Between August 2006 and July 2007 two wind farms in the south-east corner of South Australia continue to have a material impact on Vic-SA (Heywood) interconnector flows and hence scheduled generation in the NEM.

As shown in Table 2 there were a total of 26 different network constraints[7] binding for 5,596 dispatch intervals (5.34% of the time, or 466 hours) of which there were violations in 708 dispatch intervals (0.67% of the time, or 59 hours).

These figures include the recent Lake Bonney 2 wind farm that was commissioned in June 2006, which appears to have increased the network issues in the area (although it should be noted that Lake Bonney 2 wind farm is scheduled and hence subject to central dispatch, so that it competes with other scheduled generation for network access).

It is also noted that the incidence of binding constraints has reduced when compared with NEMMCO's previous study in the original Rule proposal (8.96% binding between March 2006 and September 2006). It is understood that this improvement is a result of subsequent network augmentation in the area to address reliability issues.

[7] Note that all constraints with Lake Bonney 1 on RHS also include Canunda on RHS

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Impact on VIC-SA Interconnector Limits

As noted above, wind farms in the south-east corner of SA continue to have an impact on Vic-SA interconnector flows.

Tables 3A and 3B in Appendix A summarises these impacts of each constraint equation involving Vic-SA interconnector flow and wind farms over the study period.

The first three columns in each Table show how often each constraint equation determined the Vic-SA interconnector limit.

The last column in each Table indicates the average and maximum MW amounts that the Vic-SA interconnector flow has been potentially constrained below its nominal interconnector limit based on the actual wind farm generation at that time.

The nominal Heywood interconnector limits are:

- Vic to SA flow limit = 460 MW
- SA to Vic flow limit = 300 MW

Wind farm-affected constraints set the Vic to SA flow limit for 27.2% of the time, and bound for 1.4% of that time. Two constraints ("V::S_NIL" and "V::S_SE_VC") accounted for the majority of these occurrences.

Total wind farm contribution to flow reductions below the nominal Vic to SA limit of 460 MW was on average 22 MW, up to a maximum of 84 MW. Note that the wind farm contribution for the most significant constraint "V::S_NIL" was on average 18 MW, up to a maximum of 47 MW.

Wind farm-affected constraints set the SA to Vic flow limit for 3.4% of the time, and bound for 0.9% of that time, with constraint "S>>V_PATB_PATB_MOTB" accounting for the majority of these occurrences.

Total wind farm contribution to flow reductions below the nominal SA to Vic limit of 300 MW was on average 13 MW, up to a maximum of 77 MW.

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Constraints due to GDL Operation

Table 2 also indicates the incidence that the generation dispatch limiter (GDL) schemes have operated to constrain-off wind farm generation at three other wind farms, two of which share a common GDL scheme.

These GDL schemes, operated by the local NSP, automatically calculate network limits and determine wind farm generation set-points, which are then electronically sent to the wind farm. If a wind farm does not respond to its set-point within a certain time then the local NSP may elect to disconnect the wind farm to remove the limit violation.

Note that NEMMCO only has GDL operational data for Wind Farm 'A'[8] since April 2007 and for Wind Farm 'B' since July 2007, both covering the period up to the end of August 2007.

Of significance is Wind Farm 'B', with its generation constrained-off for around 498 dispatch intervals (3.8% of the time, or 41 hours).

Future Trends

While the historical evidence to date suggests that the only material network congestion issues involve wind farms in the south-east corner of SA, this is not surprising as the current levels of wind farm penetration in the NEM are relatively modest compared to what could be expected to emerge over the next decade.

To date it appears that the main emphasis on network development in the NEM is on maintaining the reliability of customer supply and minimising the risk of load interruption, with such network augmentations justified under the reliability limb of the AER's Regulatory Test.

There appears to have been less emphasis on prospective network augmentations that would accommodate future generation projects (such as wind farms), which would require justification under the market benefits limb of the Regulatory Test.

As a result of this the levels of network congestion may grow over time in areas where multiple wind generation projects tend to concentrate to take advantage of good local wind resources.

This has already been observed with wind farms located in south-east corner of SA, and the trend is likely to continue in the near future where there a number of wind farms proposed for the mid-north area of SA– Brown Hill (95 MW, under construction), Snowtown Stage 1 (88 MW, under construction), Clements Gap (58 MW, licence approved) and Barn Hill (123 MW).

ESIPC have also received license applications for up to a further 500 MW of wind farms in that area.

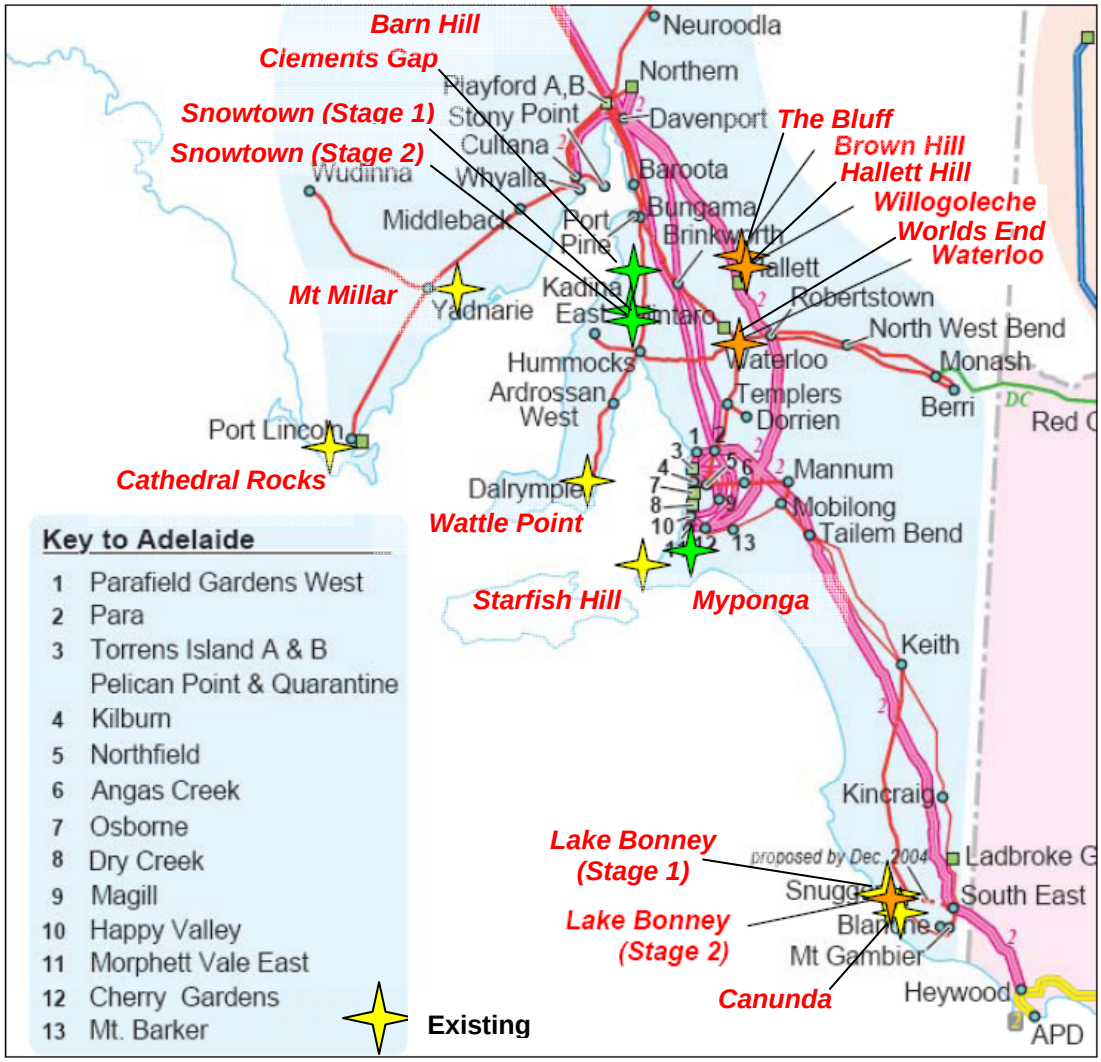
Diagram 2 below shows the location of current and proposed wind farms in SA.

While these areas would require the use of network constraints and associated control schemes to avoid network limit violations, they do not necessarily place the reliability of customer supply at risk and hence some time may transpire before a level of network congestion is reached that could impact customer supply to the extent of justifying a reliability network augmentation.

[8] Wind Farms are not explicitly identified for confidentiality reasons

In the interim NEMMCO must still manage the heightened risk of insecurity in these congested areas, and the Semi-Dispatch Rule proposal is intended to improve control over such generation to alleviate these issues.

Diagram 2: Wind Farms in SA - Current and Proposed



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Attachment 2:

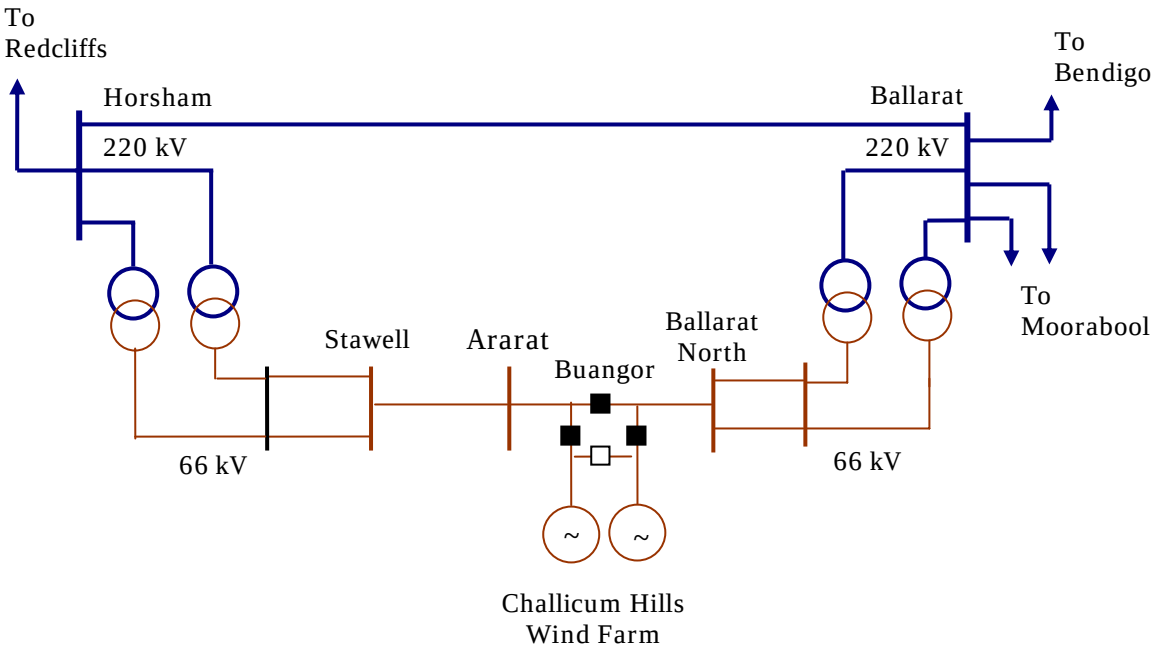
Management of Ballarat–Horsham 66kV distribution loop in relation to Challicum Hills wind farm

The information provided in this Attachment is intended to further clarify some of the potentially conflicting advice that NEMMCO provided to the AEMC in our supplementary submission on Semi-Dispatch (1st August 2007) and that Pacific Hydro subsequently provided to the AEMC in reply to our submission (15th August 2007).

The matter for clarification relates to our example of Challicum Hills wind farm as a distribution-connected generator that could have been controlled to address network security issues on the Ballarat–Horsham 66 kV distribution loop (refer Diagram 3 below).

While NEMMCO has discussed the information in this Attachment with Pacific Hydro and the relevant NSPs, AEMC should be aware that Pacific Hydro does not endorse the note as written.

Diagram 3: Simplified Ballarat–Horsham 66kV distribution network



Prior to the introduction of the NEM and the consequential use of constraint equations for the management of the power system, processes such as the use of circuit breakers operated by NSPs and generators were used to a greater extent to manage power system related issues.

In the operation of the NEM, NEMMCO relies heavily on constraint equations to constrain-on or constrain-off generation to manage pre- and post-contingent flows. It is not NEMMCO's intention to constrain-off generators (including wind farms) that are contributing to lower line flows, only those that are increasing line flows to the point where pre- or post-contingent overloading could occur.

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Situation before Challicum Hills

Overload issues in the Ballarat – Horsham 66kV network existed prior to the establishment of the Challicum Hills wind farm, and were managed by the opening of a circuit breaker to split the 66kV loop.

However leaving the 66kV loop permanently open to avoid overload following the loss of the Ballarat – Horsham 220kV line was considered to be a less reliable configuration that operating as a solid interconnection, as it would leave supply to the Ararat load radial off Stawell.

Situation after Challicum Hills

When the wind farm was being established, significant capital investment was undertaken by the Pacific Hydro to minimise any power systems security issues.

This included establishing mechanisms, in consultation with the NSP, to physically separate the output of the wind farm through the use of a manually operated scheme under the control of the NSP that split the 66kV tie at Buangor in the event of line overload. This maintained the traditional approach of system reconfiguration by using circuit breakers to manage power system security issues on this line.

In January 2006 the Murraylink very fast runback scheme was implemented, which reduced the risk of 66kV network overloads (and the need to split the 66kV tie) following the loss of the Ballarat–Horsham 220kV line at times when Murraylink was exporting to SA.

However under the current arrangements the risk of overloading either the Ballarat North – Buangor or Buangor–Ararat 66kV lines still exists under high demand conditions where the Murraylink very fast runback scheme is unavailable or the Murraylink export to SA is less than 25 MW.

Managing the current situation

NEMMCO, on the advice of VENCorp, developed network constraint equation "V>SML_NIL_7" to manage the above risk through the central dispatch process.

In addition to this, as mentioned above there is the Ballarat North–Buangor–Ararat 66kV tie splitting scheme which is manually initiated by Powercor only in response to overload conditions.

Because of the time required to operate this scheme and the manual process involved, NEMMCO believes that constraint equations are the most effective mechanism to maintain power system security in this area.

Impact of the "V>SML_NIL_7" constraint

The "V>SML_NIL_7" constraint equation is designed to constrain the pre-contingent Murraylink flow to avoid overload of the Ballarat North–Buangor 66kV line following the loss of the Ballarat–Horsham 220kV line, assuming the worst case of zero wind farm generation.

In this situation increased generation from the wind farm generally contributes to improving local network security by supplying the Horsham 66kV load and hence relieving flow on the Ballarat North–Buangor 66kV line, and there would be no intention to constrain-off wind farm generation in such situations.

At the same time, however, this increased wind farm generation also increases the risk of post-contingent overloading of the Buangor–Ararat 66kV line, which is somewhat offset by the pre-contingent "over-constraining" of Murraylink flow through the constraint equation.

In this sense the "V>SML_NIL_7" constraint attempts to avoid post-contingent overloads on both 66kV lines by "over-constraining" Murraylink flow to a greater extent than otherwise required if the wind farm were generating at nearer to its maximum rating of 52 MW.

If the "V>SML_NIL_7" constraint were relaxed to permit higher Murraylink flows into SA, or in cases where Murraylink is unavailable, there may then be a need to constrain-off the wind farm output at times to manage the flow on the Buangor–Ararat 66kV line.

Example where reducing generation from distribution-connected wind farm would alleviate issues

The "V>SML_NIL_7" constraint equation was violated in early February 2007, based on the 66kV line ratings in place at the time, and during a period when Murraylink was out of service.

Subsequent analysis of the two periods when the constraint violations occurred indicated that both the Ballarat North–Buangor and Buangor–Ararat 66kV line flows would have exceeded their respective applied ratings had the Ballarat–Horsham 220 kV line tripped. There was moderate output from the wind farm at the time and this was contributing to higher post-contingent flow on the Buangor–Ararat 66kV line and lower post-contingent flow on the Ballarat North-Buangor 66kV line.

Following discussions with VENCorp, higher ratings were provided for both 66kV lines. With the higher ratings applied, post-contingent flow on the Buangor–Ararat 66kV line would not have exceeded rating based on the moderate output from the wind farm during the two periods investigated in February 2007. However, NEMMCO investigations indicate that the post-contingent flow on the Buangor–Ararat 66kV line would exceed rating at times of medium to high output from the wind farm under similar system loading conditions.

NEMMCO believes that if the Semi-Dispatch arrangements were in place the most efficient way for NEMMCO to manage this outcome would be to reduce generation from the wind farm through the central dispatch process. This situation highlights the importance of having control over as many variables as possible that impact a network constraint so the most efficient process can be initiated.

While Powercor has provided continuous ratings for the Ballarat North–Buangor and Buangor–Ararat 66kV lines, NEMMCO has not been provided with the short-term ratings. As such, post-contingent flows cannot be higher than the continuous rating and action to reduce flows must be taken pre-contingency should this be the case.

Discussions are continuing between the various parties involved to minimise the impact of any issues, recognising the significant costs that the wind farm developer has previously expended to allow the wind farm output to be split.

In Summary

NEMMCO relies on network constraint equations to constrain-on or constrain-off scheduled generation to manage pre- and post-contingent network flows.

It is not NEMMCO's intention to constrain-on wind farms (and this is not possible, given the fuel source) nor to constrain-off wind farms that are contributing to lower line flows, only on the occasions that their output is increasing line flows to the point where overloading would otherwise occur.

In the example provided above, such action would be required when conditions are such that the post-contingent flow on the Buangor–Ararat 66kV line would exceed its continuous rating.

The establishment of additional wind farms in this particular area, without the new wind farms being subject to the proposed Semi-Dispatch arrangements, would further complicate the management of power system security.

Appendix A: Historical Studies

Table 2: Impact of Significant Wind Farms in Constraints – 01/08/2006 to 31/07/2007

Wind Farm[9]	Trans or Dist Connected	Number of Constraints with Wind Farm as RHS Term	Number of Different Binding Constraints	Binding DIs	Total Hours	% of Total DIs out of 104,832	Violated DIs	Total Hours	% of Total DIs out of 104,832
Wind Farm 'A' + GDL[10]	T	-	-	33	3	0.10%	0	0	0.00%
Wind Farm 'B' + GDL[10]	T	24	1	498	41	3.80%	1	0	0.00%
Wind Farm 'C'	D	29	10	3,996	333	3.81%	366	31	0.35%
Wind Farm 'D' [11]	T	58	18	4,412	368	4.21%	703	59	0.67%
Wind Farm 'E' (scheduled)	T	137	8	1,184	99	1.13%	5	0	0.00%
Wind Farm 'F'	D	1	1	178	15	0.17%	49	4	0.05%
TOTAL		**223**	**27**	**6,306**	**526**	**6.02%**	**759**	**63**	**0.72%**
TOTAL w/o Wind Farm 'E'		**88**	**21**	**5,122**	**427**	**4.89%**	**754**	**63**	**0.72%**

[9] Wind Farms are not explicitly identified for confidentiality reasons
[10] GDL = Generation Dispatch Limiter scheme
[11] All constraints with Wind Farm 'D' on RHS also include Wind Farm 'C' on RHS

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Table 3A: Impact of Significant Wind Farms on VIC to SA Flow Limit – 01/08/2006 to 31/07/2007

ConstraintID with Wind Farm as RHS Term	Type		Sets Vic to SA Flow Limit		Binding			Violated			Amount Constrained Below Vic to SA Limit of 460MW due to Wind Farm Gen (in MW)			
											When Binding		All Times	
			DIs	%	DIs	%	HRS	DIs	%	HRS	AVG	MAX	AVG	MAX
V::S_NIL	Normal	Tran Stab	11,885	11.3%	502	0.5%	41.8	1	0.0%	0.1	18	47	18	85
V::S_SE_VC	Outage	Tran Stab	11,279	10.8%	615	0.6%	51.3	0	0.0%	0.0	15	51	16	61
V>>S_PATB_TBPA_TBMO	Outage	Thermal	3,179	3.0%	15	0.0%	1.3	0	0.0%	0.0	0	0	1	6
V::S_CGMB_KHTB12MAMO	Outage	Tran Stab	1,681	1.6%	268	0.3%	22.3	0	0.0%	0.0	55	84	33	85
V>>S_SETB_N-2_SGKH	Normal	Thermal	448	0.4%	41	0.0%	3.4	0	0.0%	0.0	36	48	36	54
V>S_SETB	Outage	Thermal	26	0.0%	26	0.0%	2.2	0	0.0%	0.0	8	18	8	18
TOTALS-->			**28,498**	**27.2%**	1,467	**1.4%**	**122.3**	**1**	**0.0%**	**0.1**	**22**	**84**	**19**	**85**

Table 3B: Impact of Significant Wind Farms on SA to Vic Flow Limit – 01/08/2006 to 31/07/2007

ConstraintID with Wind Farm as RHS Term	Type		Sets SA to Vic Flow Limit		Binding			Violated			Amount Constrained Below SA to Vic Limit of 300MW due to Wind Farm Gen (in MW)			
											When Binding		All Times	
			DIs	%	DIs	%	HRS	DIs	%	HRS	AVG	MAX	AVG	MAX
S>>V_PATB_PATB_MOTB	Outage	Thermal	2,777	2.6%	856	0.8%	71.3	0	0.0%	0.0	1	6	1	6
S^^V_SETB_SETB	Outage	Volt Stab	731	0.7%	26	0.0%	2.2	0	0.0%	0.0	44	77	35	79
S>>V_SETB_SETB_TBKH1	Outage	Thermal	64	0.1%	45	0.0%	3.8	0	0.0%	0.0	4	12	4	12
S>>V_SETB_SETB_TBTX4	Outage	Thermal	38	0.0%	3	0.0%	0.3	0	0.0%	0.0	1	2	1	2
TOTALS-->			**3,610**	**3.4%**	**930**	**0.9 %**	**77.5**	**0**	**0.0 %**	**0.0**	**13**	**77**	**10**	**79**

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Appendix B:

Market Design Principles

Clause 3.1.4(a) of the Rules states that:

"This Chapter is intended to give effect to the following market design principles:

(1) minimisation of *NEMMCO* decision-making to allow *Market Participants* the greatest amount of commercial freedom to decide how they will operate in the *market*;

(2) maximum level of *market* transparency in the interests of achieving a very high degree of *market* efficiency;

(3) avoidance of any special treatment in respect of different technologies used by *Market Participants*;

(4) consistency between *central dispatch* and pricing;

(5) equal access to the market for existing and prospective *Market Participants*;"