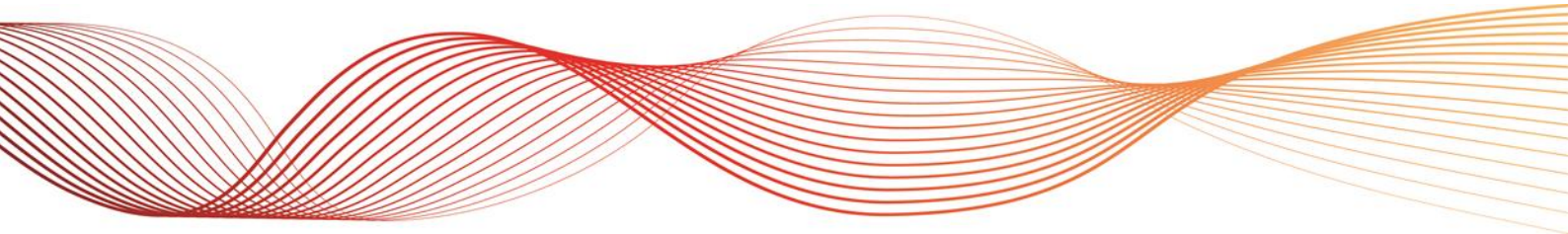


NEM EVENT – DIRECTION 12-15 JANUARY 2018

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IMPORTANT NOTICE

Purpose

Where the Australian Energy Market Operator (AEMO) intervenes in the National Electricity Market (NEM) through the use of directions, AEMO must publish a report in accordance with National Electricity Rules (NER) clause 4.8.9(f) and 3.13.6A(a). This report satisfies those NER obligations, and is based on information available to AEMO at 07 June 2018.

Unless otherwise indicated, terms in this report have the same meanings as those defined in the NER.

All references to time in this report are based on Australian Eastern Standard Time (AEST).

Disclaimer

AEMO has made every reasonable effort to ensure the quality of the information in this report but cannot guarantee its accuracy or completeness. Any views expressed in this report are those of AEMO unless otherwise stated, and may be based on information given to AEMO by other persons.

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1. SUMMARY

To ensure adequate system strength for secure operation of the South Australian power system, certain combinations of synchronous generating units must be in service at all times¹.

Clause 4.8.9 of the National Electricity Rules (NER) allows AEMO to intervene in the market by issuing directions or clause 4.8.9 instructions, if AEMO is satisfied that it is necessary to maintain or re-establish the power system to a secure, satisfactory, or reliable operating state. Section 116 of the National Electricity Law allows AEMO to issue directions to take certain action if AEMO considers that it is necessary to maintain power system security or for reasons of public safety.

Between 12 January 2018 and 15 January 2018, AEMO issued four directions to South Australian Market Participants to maintain power system security. The directions are summarised in Table 1.

Table 1 Summary of the four South Australia directions between 12 January 2018 and 15 January 2018

Direction	Directed Participant	Issue time	Cancellation time	Direction instruction
Osborne Power Station (PS)	Origin Energy Electricity Ltd	2000 hrs, 12 January 2018	0600 hrs, 15 January 2018	Remain synchronised and follow dispatch targets effective from 2030 hrs on 12 January 2018.
Pelican Point Gas Turbine (GT) 12	Pelican Point Power Pty Ltd (ENGIE)	2005 hrs, 12 January 2018	0700 hrs, 14 January 2018	Remain synchronised and follow dispatch targets effective from 0130 hrs on 13 January 2018.
Torrens Island B unit 3	AGL SA Generation Pty Ltd	2010 hrs, 12 January 2018	0530 hrs, 14 January 2018	Remain synchronised and follow dispatch targets effective from 0100 hrs on 13 January 2018.
Pelican Point GT 12	Pelican Point Power Pty Ltd (ENGIE)	1229 hrs, 14 January 2018	0500 hrs, 15 January 2018	Remain synchronised and follow dispatch targets effective from 1230 hrs on 14 January 2018.

2. INTERVENTION ASSESSMENT

2.1 The need for intervention

To ensure adequate system strength for secure operation of the South Australian power system, certain combinations of synchronous generating units must be in service at all times¹. AEMO continues to investigate system strength requirements in South Australia, and updates the set of viable combinations on a regular basis. The need for intervention, and options considered, were assessed against the set of viable combinations available on 12 January 2018.

ENGIE submitted a rebid at 1310 hrs on 12 January to de-commit Pelican Point Power Station (PS) from 0130 hrs on 13 January 2018². AGL SA Generation Pty Ltd also submitted a rebid at 1402 hrs on 12 January 2018 to de-commit Torrens Island B unit 3 from 0100 hrs on 13 January 2018³.

Subsequently, the 1530 hrs Pre-Dispatch (PD) run on 12 January (available at approximately 1500 hrs) indicated that there would be insufficient online synchronous generating units available to meet system strength requirements from 0100 hrs on 13 January 2018.

Further to the 1530 hrs PD run on 12 January 2018, at 1926 hrs on 12 January 2018, Origin Energy Electricity Ltd submitted a rebid to de-commit Osborne PS from 2030 hrs on 12 January 2018⁴.

¹ <http://www.aemo.com.au/Media-Centre/South-Australia-System-Strength-Assessment>.

² Rebid reason: 1305-F-REVISED TOLLING NOMINATION-.

³ Rebid reason: 1230-F-91 PD PRICE F/CAST LOWER THAN AGL EST-SA D+1.

⁴ Rebid reason: 1924A CONSTRAINT MANAGEMENT – S_V_NIL_ROCOF SL.



AEMO assessed available options for market response or intervention, and determined the latest time to intervene should a market response not be provided.

2.2 Assessment of market response and latest time to intervene

Under NER clause 4.8.5A(a) and (c), AEMO must notify the market of any anticipated power system security or reliability issue that may require intervention, and the latest time for market response before AEMO would need to intervene. AEMO issued these market notices (MN 60681 and MN 60684) at 1513 hrs and 1540 hrs on 12 January 2018⁵.

AEMO contacted the Registered Participants who operate eligible synchronous generating units in South Australia to seek their availability for the relevant period, and to determine the latest time to intervene. Those Registered Participants indicated they did not intend to adjust their market offers, but identified units that would be available if directed. Based on 1530 hrs PD run, and the advised synchronisation lead times, AEMO assessed that the latest time to intervene was 2100 hrs on 12 January 2018.

After Origin Energy Electricity Ltd submitted a rebid at 1926 hrs on 12 January 2018 to de-commit Osborne PS from 2030 hrs on 12 January 2018, AEMO did not issue a market notice to update the latest time to intervene. However, an immediate response was required and all eligible Participants had already been contacted regarding their availability.

2.3 Decision to intervene

With insufficient market response provided, AEMO evaluated the estimated costs, and issued directions to Origin Energy Electricity Ltd, ENGIE, and AGL SA Generation Pty Ltd for Osborne PS, Pelican Point GT 12, and Torrens Island B unit 3, respectively, to remain synchronised and follow dispatch targets.

AEMO cancelled the Torrens Island B unit 3 and Pelican Point GT12 directions at 0530 hrs and 0700 hrs on 14 January 2018, respectively, when AGL SA Generation Pty Ltd and ENGIE rebid their directed units into the market.

A further direction was issued to ENGIE for Pelican Point GT12 to remain synchronised and follow dispatch targets when ENGIE informed AEMO that they intend to de-commit Pelican Point GT 12 at 1230 hrs on 14 January 2018.

3. INTERVENTION PROCESS

AEMO considers that it followed all applicable processes under NER Clause 4.8 for the management of the direction between 12 and 15 January 2018⁶ other than the publication of a revised estimate of the latest time to intervene on 12 January 2018 under NER 4.8.5A(g) as discussed in part 2.2 above. Table 2 provides a high level timeline of the intervention event.

⁵ AEMO Market Notices are at <http://www.aemo.com.au/Market-Notices>.

⁶ http://aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Procedures/SO_OP_3707---Intervention-Direction-and-Clause-4-8-9-Instructions.pdf.

**Table 2 Timeline of key events between 12 and 15 January 2018**

Time	Events / Comments
12 January 2018	
1310 hrs	ENGIE submitted a rebid to de-commit Pelican Point PS from 0130 hrs on 13 January 2018.
1402 hrs	AGL SA Generation Pty Ltd submitted a rebid to de-commit Torrens Island B unit 3 from 0100 hrs on 13 January 2018.
1513 hrs	AEMO published market notice seeking a market response and noting the latest time to intervene was at 0000 hrs on 13 January 2018 (MN 60681).
1540 hrs	AEMO published an updated market notice seeking a market response and noting the latest time to intervene was at 2100 hrs on 12 January 2018 (MN 60684).
1926 hrs	Origin Energy Electricity Ltd submitted a rebid to de-commit Osborne PS from 2030 hrs on 12 January 2018.
2000 hrs	Direction issued to Origin Energy Electricity Ltd for Osborne PS to remain synchronised and follow dispatch targets from 2030 hrs on 12 January 2018.
2005 hrs	Direction issued to ENGIE for Pelican Point GT12 to remain synchronised and follow dispatch targets from 0130 hrs on 13 January 2018.
2010 hrs	Direction issued to AGL SA Generation Pty Ltd for Torrens Island B unit 3 to remain synchronised and follow dispatch targets from 0100 hrs on 13 January 2018.
2030 hrs	Intervention constraints applied to Osborne PS in central dispatch from dispatch interval (DI) ending 2035 hrs on 12 January 2018.
2037 hrs	AEMO published MN 60693 declaring that an AEMO intervention event had commenced and that all DIs during the AEMO intervention event would be intervention price DIs.
2037 hrs	AEMO published MN 60694 declaring multiple directions were issued to South Australian participants from 2000 hrs on 12 January 2018.
13 January 2018	
0100 hrs	Intervention constraints applied to Torrens Island B unit 3 in central dispatch from DI ending 0105 hrs on 13 January 2018.
0130 hrs	Intervention constraints applied to Pelican Point GT12 in central dispatch from DI ending 0135 hrs on 13 January 2018.
14 January 2018	
0530 hrs	AGL SA Generation Pty Ltd rebid Torrens Island B unit 3 to commercial operation. This mitigated the need for Torrens Island B unit 3 direction to remain in place. The direction to Torrens Island B unit 3 was cancelled.
0700 hrs	ENGIE rebid Pelican Point PS to commercial operation. This mitigated the need for Pelican Point GT12 direction to remain in place. The direction to Pelican Point GT12 was cancelled.
1228 hrs	ENGIE informed AEMO that they intend to de-commit the Pelican Point GT 12 at 1230 hrs on 14 January 2018.
1229 hrs	Direction issued to ENGIE for Pelican Point GT12 to remain synchronised and follow dispatch targets from 1230 hrs on 14 January 2018.
1235 hrs	Intervention constraints applied to Pelican Point GT12 in central dispatch from DI ending 1240 hrs on 14 January 2018.
15 January 2018	
0500 hrs	The direction to Pelican Point GT12 was cancelled.
0600 hrs	The direction to Osborne PS was cancelled.
0601 hrs	AEMO publishes MN 60731 declaring the cancellation of the Direction event at 0600 hrs on 15 January 2018.
0602 hrs	AEMO publishes MN 60732 declaring the cancellation of intervention pricing at 0600 hrs on 15 January 2018.



3.1 Adequacy of responses to AEMO inquires

NER 4.8.5A(d) permits AEMO to request information from Scheduled Network Service Providers, Scheduled Generators, Semi-Scheduled Generators, and Market Customers.

AEMO is satisfied with the timeliness, adequacy, and effectiveness of all responses to its requests for information prior to issuing directions between 12 and 15 January 2018.

3.2 Participant ability to comply with the intervention

NER 4.8.9(d) requires that a Registered Participant must immediately notify AEMO of its inability to comply, or intention not to comply, with a direction or clause 4.8.9 instruction.

AEMO did not receive any indication that a Registered Participant would be unable to comply with the directions.

4. CHANGES TO DISPATCH OUTCOMES

The directions to remain synchronised and dispatch to technical minimum loads resulted in approximately 15,928 megawatt hours (MWh) of generation being added to the market.

Under NER 3.8.1(b)(11), AEMO must ensure that, as far as reasonably practicable, the number of participants affected by the intervention and the resulting changes to interconnector flows are minimised⁷. AEMO considered the application of counter-action constraints to achieve this objective, but concluded this was not practical during this intervention, because all eligible units were either offline or operating at technical minimum load.

Table 3 and 4 summarise the estimated change to dispatch outcomes resulting from the directions. These are estimated by comparing against a simulated dispatch with the directions removed.

Directions in one region can cause dispatch changes to other regions. In particular, these changes are driven by economic co-optimisation within the market, and by the interplay between network constraint equations across multiple regions.

Of note is that while these directions displaced market-based generation in South Australia, they also increased exports from the region. The increased exports, coupled with an impact on network constraints, resulted in displacement of generation in all regions.

Table 3 Estimated changes to local generation in each region (MWh)

	QLD	NSW	VIC	SA	TAS
Without direction	398,917	442,841	243,996	54,942	40,246
Actual	394,727	436,365	243,049	52,781 +15,928 ^A	38,363
Change	-4,190	-6,476	-947	+13,767	-1,884

A. 15,928 MWh is the directed energy

⁷ AEMO's power system operating procedure SO_OP 3707 "Intervention, Direction and Clause 4.8.9 Instructions" describes this objective. In practice, AEMO meets the objective by selecting generating units located in the same region as the directed generation (and, if possible, belonging to the same participant) and then constraining the dispatch of the selected generating units by an equal and opposite amount to that of the directed generating units.



Table 4 Estimated changes to interconnector flow between regions (MWh)

	Terranora	QNI	VIC-NSW	Heywood	Murraylink	Basslink
Without direction^A	1,016	154	-8,792	2,177	120	-19,957
Actual^A	473	4,935	2,037	-9,144	-2,470	-21,841
Change^B	543 MWh less into QLD	4,781 MWh more into QLD	10,828 MWh less into NSW	11,321 MWh more into VIC	2,591 MWh more into VIC	1,884 MWh more into TAS

A. Positive numbers are for flows flowing north or west, negative for flows flowing south or east.
 B. Change = |Actual - Without direction|.

4.1 Application of intervention pricing

AEMO declares intervention pricing for periods subject to an AEMO intervention event. Under intervention pricing, NER 3.9.3(b) requires AEMO to set the dispatch price and ancillary service prices at the value which AEMO, in its reasonable opinion, considers would have applied had the intervention event not occurred. AEMO determines and publishes these prices in accordance with the Intervention Pricing Methodology⁸.

Intervention pricing was declared for this event in accordance with NER 3.9.3(b) for the full intervention period from Dispatch Interval (DI) ending 2005 hrs on 12 January 2018 until DI ending 0600 hrs on 15 January 2018.

For the duration of the direction event, significant QNI interconnector flow differences were observed between the dispatch and intervention pricing run. These differences are largely attributed to network constraint equations that use Supervisory Control and Data Acquisition (SCADA) measurements of transmission line loadings as inputs. Such inputs are based on the physical system, and therefore may not align with other assumptions in the intervention pricing run (which allows the system to evolve absent the intervention). The impact of this divergence is typically small, however in this case resulted in the QNI interconnector being more heavily constrained in the intervention pricing run.

While such divergences are consistent with the Intervention Pricing Methodology, they represent suboptimal outcomes – particularly in cases where direction events cover extended periods of time. AEMO is progressing potential options to resolve this issue with the Intervention Pricing Working Group.

5. CONCLUSIONS AND FURTHER ACTIONS

Between 12 and 15 January 2018, AEMO issued four directions to South Australian Market Participants to maintain power system security, in response to a forecast lack of system strength in the region.

With the exception of updating the latest time to intervene prior to the first intervention, AEMO is satisfied that all applicable procedures and processes were followed in assessing the need for intervention, determining the latest time to intervene, enacting and managing the intervention, applying appropriate intervention pricing and seeking market response.

AEMO is required to publish market notices under NER 4.8.5A(g) updating the latest time to intervene, this market notice was not published because significant control room resources are dedicated to seeking and processing the information necessary to quantify the requirement and timing for the intervention. AEMO is investigating changes in its processes to comply with these requirements while minimising the number of market notices issued.

AEMO is also satisfied with the timeliness and adequacy of participant responses and communication throughout.

⁸ Intervention Pricing Methodology <https://www.aemo.com.au/-/media/Files/PDF/Intervention-Pricing-Methodology-October-2014.pdf>.



ABBREVIATIONS

Abbreviation	Expanded name
AEMO	Australian Energy Market Operator
AEST	Australian Eastern Standard Time
DI	Dispatch Interval
FCAS	Frequency Control Ancillary Services
MN	Market Notice
NEM	National Electricity Market
NER	National Electricity Rules
PD	Pre-Dispatch
SCADA	Supervisory Control And Data Acquisition