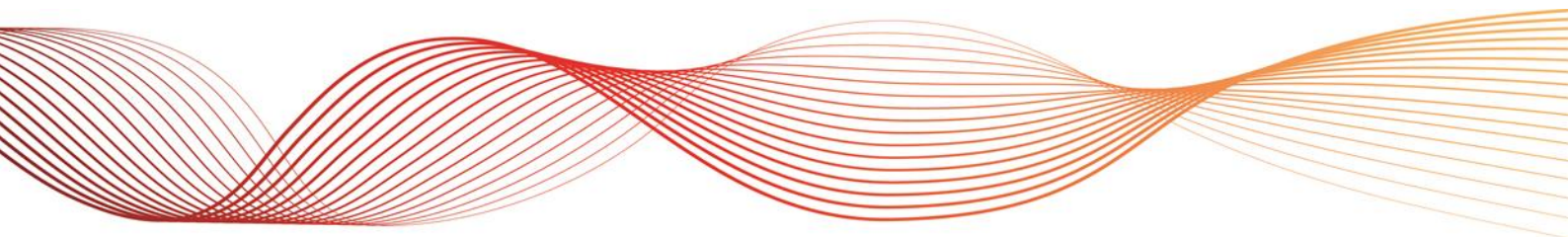




NEM EVENT – DIRECTION 07 - 16 APRIL 2018

Published: **July 2018**





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 6 July 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.

Accordingly, to the maximum extent permitted by law, AEMO and its officers, employees and consultants involved in the preparation of this report:

- make no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of the information in this report; and
- are not liable (whether by reason of negligence or otherwise) for any statements or representations in this document, or any omissions from it, or for any use or reliance on the information in it.

© 2018 Australian Energy Market Operator Limited. The material in this publication may be used in accordance with the [copyright permissions on AEMO's website](#).



CONTENTS

Purpose	2
Disclaimer	2
1. SUMMARY	4
2. INTERVENTION ASSESSMENT	4
2.1 The need for intervention	4
2.2 Assessment of market response and latest time to intervene	5
2.3 Decision to intervene	5
3. INTERVENTION PROCESS	5
3.1 Adequacy of responses to AEMO inquiries	7
3.2 Participant ability to comply with the intervention	8
4. CHANGES TO DISPATCH OUTCOMES	8
4.1 Application of intervention pricing	9
5. CONCLUSIONS AND FURTHER ACTIONS	9
ABBREVIATIONS	10

TABLES

Table 1	Summary of the 12 South Australia directions between 7 April and 16 April 2018	4
Table 2	Timeline of key events between 7 April and 16 April 2018	5
Table 3	Estimated changes to local generation in each region (MWh)	8
Table 4	Estimated changes to interconnector flow between regions (MWh)	8

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 7 April and 16 April 2018, AEMO issued 12 directions to South Australian Market Participants to maintain power system security. The directions are summarised in Table 1.

Table 1 Summary of the 12 South Australia directions between 7 April and 16 April 2018

Direction	Directed Participant	Issue time	Cancellation time	Direction instruction
Torrens Island A unit 3	AGL SA Generation Pty Ltd	1400 hrs, 07 April 2018	1600 hrs, 12 April 2018	Synchronise at 2000 hrs on 08 April 2018 and follow dispatch targets.
		1400 hrs, 12 April 2018	1400 hrs, 16 April 2018	Remain synchronised and follow dispatch targets from 0100 hrs on 13 April 2018.
Torrens Island A unit 4	AGL SA Generation Pty Ltd	1400 hrs, 07 April 2018	1600 hrs, 10 April 2018	Synchronise at 2000 hrs on 08 April 2018 and follow dispatch targets.
		2100 hrs, 10 April 2018	1600 hrs, 12 April 2018	Remain synchronised and follow dispatch targets from 2200 hrs on 10 April 2018.
		1400 hrs, 12 April 2018	1400 hrs, 16 April 2018	Remain synchronised and follow dispatch targets from 0130 hrs on 13 April 2018.
Pelican Point Gas Turbine (GT) 12	Pelican Point Power Pty Ltd (ENGIE)	1415 hrs, 07 April 2018	1430 hrs, 08 April 2018	Remain synchronised and follow dispatch targets from 0100 hrs on 08 April 2018.
		1630 hrs, 12 April 2018	1100 hrs, 16 April 2018	Remain synchronised and follow dispatch targets from 1000 hrs on 13 April 2018.
Torrens Island B unit 1	AGL SA Generation Pty Ltd	2100 hrs, 10 April 2018	1600 hrs, 12 April 2018	Remain synchronised and follow dispatch targets from 0100 hrs on 11 April 2018.
		1400 hrs, 13 April 2018	1500 hrs, 15 April 2018	Remain synchronised and follow dispatch targets from 2230 hrs on 13 April 2018.
Torrens Island B unit 2	AGL SA Generation Pty Ltd	1400 hrs, 13 April 2018	1700 hrs, 14 April 2018	Remain synchronised and follow dispatch targets from 1500 hrs on 13 April 2018.
		1930 hrs, 14 April 2018	1400 hrs, 16 April 2018	Remain synchronised and follow dispatch targets from 2230 hrs on 14 April 2018.
Torrens Island B unit 3	AGL SA Generation Pty Ltd	1400 hrs, 13 April 2018	1400 hrs, 16 April 2018	Remain synchronised and follow dispatch targets from 0030 hrs on 14 April 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

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



on a regular basis. The need for intervention, and options considered, were assessed against the set of viable combinations available on 5 April 2018.

ENGIE submitted an initial bid at 0858 hrs on 5 April 2018 to de-commit Pelican Point Power Station (PS) from 0030 hrs on 8 April 2018 until 1630 hrs on 8 April 2018.

AEMO determined that there would be insufficient online synchronous units available to meet system strength requirements due to the de-commitments.

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, and the latest time for market response before AEMO would need to intervene. AEMO issued this market notice (MN 62123) at 1446 hrs on 5 April 2018², and updated the notice (MN 62154) at 1457 hrs on 6 April 2018.

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 the de-commitments, AEMO assessed that the latest time to intervene was 0030 hrs on 7 April 2018.

Following discussions with relevant generators, the latest time to intervene was updated to 1400 hrs on 7 April 2018.

2.3 Decision to intervene

With insufficient market response provided, AEMO evaluated the estimated costs, and issued directions to AGL SA Generation Pty Ltd and ENGIE for Torrens Island A units 3 and 4, Torrens Island B units 1, 2 and 3 and Pelican Point PS GT12, respectively. AEMO cancelled the directions when the relevant directed units rebid into the market.

3. INTERVENTION PROCESS

AEMO considers that it followed all applicable processes under NER Clause 4.8 for the management of the directions between 7 April and 16 April 2018³. Table 2 provides a high-level timeline of the intervention event.

Table 2 Timeline of key events between 7 April and 16 April 2018

Time	Events / comments
5 April 2018	
0858 hrs	ENGIE submitted an initial bid to de-commit Pelican Point PS from 0030 hrs on 8 April 2018.
1446 hrs	AEMO published MN 62123 seeking a market response and noting the latest time to intervene was 0030 hrs on 7 April 2018.
6 April 2018	
1457 hrs	AEMO published MN 62154 seeking a market response and updating the latest time to intervene to 1400 hrs on 7 April 2018.
7 April 2018	

² AEMO Market Notices are at <http://www.aemo.com.au/Market-Notices>.

³ 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.



Time	Events / comments
1329 hrs	ENGIE submitted a rebid to de-commit Pelican Point PS from 0100 hrs on 8 April 2018.
1400 hrs	Direction issued to AGL SA Generation Pty Ltd for Torrens Island A unit 3 to synchronise at 2000 hrs on 8 April 2018 and follow dispatch targets (1 st Torrens Island A3 direction). Direction issued to AGL SA Generation Pty Ltd for Torrens Island A unit 4 to synchronise at 2000 hrs on 8 April 2018 and follow dispatch targets (1 st Torrens Island A4 direction). AEMO published MN 62157 and MN 62159 declaring a direction was issued to a South Australian participant from 1400 hrs on 7 April 2018.
1415 hrs	Direction issued to ENGIE for Pelican Point PS GT12 to remain synchronised and follow dispatch targets from 0100 hrs on 8 April 2018 (1 st Pelican Point GT12 direction). AEMO published MN 62161 declaring a direction was issued to a South Australian participant from 1145 hrs on 7 April 2018.
1431 hrs	AEMO published MN 62162 declaring that an AEMO intervention event had commenced and that all dispatch intervals (DIs) during the AEMO intervention event would be intervention price DIs.
8 April 2018	
0100 hrs	Intervention constraints applied to Pelican Point PS in central dispatch from DI ending 0105 hrs on 8 April 2018.
1430 hrs	The 1 st direction to Pelican Point GT12 was cancelled and intervention constraints were revoked. AEMO published MN 62165 declaring the cancellation of the direction.
1630 hrs	Intervention constraints applied to Torrens Island A unit 3 in central dispatch from DI ending 1635 hrs on 8 April 2018.
1910 hrs	Intervention constraints applied to Torrens Island A unit 4 in central dispatch from DI ending 1915 hrs on 8 April 2018.
10 April 2018	
1600 hrs	The 1 st direction to Torrens Island A4 was cancelled and intervention constraints were revoked. AEMO published NN 62198 declaring the cancellation of the direction.
2100 hrs	Direction issued to AGL SA Generation Pty Ltd for Torrens Island A unit 4 to remain synchronised and follow dispatch targets from 2200 hrs on 10 April 2018 (2 nd Torrens Island A4 direction). Direction issued to AGL SA Generation Pty Ltd for Torrens Island B unit 1 to remain synchronised and follow dispatch targets from 0100 hrs on 10 April 2018 (1 st Torrens Island B1 direction) AEMO published MN 62202 and MN 62204 declaring a direction was issued to a South Australian participant from 2100 hrs on 10 April 2018.
2200 hrs	Intervention constraints applied to Torrens Island A unit 4 in central dispatch from DI ending 2205 hrs on 10 April 2018.
11 April 2018	
0100 hrs	Intervention constraints applied to Torrens Island B unit 1 in central dispatch from DI ending 0105 hrs on 11 April 2018.
12 April 2018	
1400 hrs	Direction issued to AGL SA Generation Pty Ltd for Torrens Island A3 to remain synchronised and follow dispatch targets from 0100 hrs on 13 April 2018 (2 nd Torrens Island A3 direction). Direction issued to AGL SA Generation Pty Ltd for Torrens Island A4 to remain synchronised and follow dispatch targets from 0130 hrs on 13 April 2018 (3 rd Torrens Island A4 direction). AEMO published MN 62258 and MN 62259 declaring a direction was issued to a South Australian participant from 1400 hrs on 12 April 2018.
1428 hrs	AEMO published MN 62260 declaring that an AEMO intervention event had commenced and that all DIs during the AEMO intervention event would be intervention price DIs.
1600 hrs	The 1 st direction to Torrens Island A3 was cancelled and intervention constraints were revoked. The 2 nd direction to Torrens Island A4 was cancelled and intervention constraints were revoked. The 1 st direction to Torrens Island B1 was cancelled and intervention constraints were revoked. AEMO published MN 62264 declaring the cancellation of the directions. AEMO published MN 62265 declaring the cancellation of intervention pricing (which commenced on 7 April 2018).
1630 hrs	Direction issued to ENGIE for Pelican Point PS GT12 to remain synchronised and follow dispatch targets from 1000 hrs on 13 April 2018 (2 nd Pelican Point GT12 direction). AEMO published MN 62267 declaring a direction was issued to a South Australian participant from 1630 hrs on 12 April 2018.



Time	Events / comments
13 April 2018	
0100 hrs	Intervention constraints applied to Torrens Island A unit 3 in central dispatch from DI ending 0105 hrs on 13 April 2018.
0130 hrs	Intervention constraints applied to Torrens Island A unit 4 in central dispatch from DI ending 0135 hrs on 13 April 2018.
1000 hrs	Intervention constraints applied to Pelican Point PS in central dispatch from DI ending 1005 hrs on 13 April 2018.
1400 hrs	Direction issued to AGL SA Generation Pty Ltd for Torrens Island B unit 1 to remain synchronised and follow dispatch targets from 2230 hrs on 13 April 2018 (2 nd Torrens Island B1 direction). Direction issued to AGL SA Generation Pty Ltd for Torrens Island B unit 2 to remain synchronised and follow dispatch targets from 1500 hrs on 13 April 2018 (1 st Torrens Island B2 direction). Direction issued to AGL SA Generation Pty Ltd for Torrens Island B unit 3 to remain synchronised and follow dispatch targets from 0030 hrs on 14 April 2018 (1 st Torrens Island B3 direction). AEMO published MN 62274, MN 62275 and MN 62275 declaring a direction was issued to a South Australian participant from 1400 hrs on 13 April 2018.
1500 hrs	Intervention constraints applied to Torrens Island B unit 2 in central dispatch from DI ending 1505 hrs on 13 April 2018.
2230 hrs	Intervention constraints applied to Torrens Island B unit 1 in central dispatch from DI ending 2235 hrs on 13 April 2018.
14 April 2018	
0030 hrs	Intervention constraints applied to Torrens Island B unit 3 in central dispatch from DI ending 0035 hrs on 14 April 2018.
1700 hrs	The 1 st direction to Torrens Island B2 was cancelled and intervention constraints were revoked. AEMO published MN 62317 declaring the cancellation of the direction.
1930 hrs	Direction issued to AGL SA Generation Pty Ltd for Torrens Island B unit 2 to remain synchronised and follow dispatch targets from 2230 hrs on 14 April 2018 (2 nd Torrens Island B2 direction). AEMO published MN 62321 declaring a direction was issued to a South Australian participant from 1930 hrs on 14 April 2018.
2230 hrs	Intervention constraints applied to Torrens Island B unit 2 in central dispatch from DI ending 2235 hrs on 14 April 2018.
15 April 2018	
1500 hrs	The 2 nd direction to Torrens Island B1 was cancelled and intervention constraints were revoked. AEMO published MN 62336 declaring the cancellation of the direction.
16 April 2018	
1100 hrs	The 2 nd direction to Pelican Point GT12 was cancelled and intervention constraints were revoked. AEMO published MN 62350 declaring the cancellation of the direction.
1400 hrs	The 2 nd direction to Torrens Island A3 was cancelled and intervention constraints were revoked. The 3 rd direction to Torrens Island A4 was cancelled and intervention constraints were revoked. The 2 nd direction to Torrens Island B2 was cancelled and intervention constraints were revoked. The 1 st direction to Torrens Island B3 was cancelled and intervention constraints were revoked. AEMO published MN 62358, MN 62360 and MN 62362 declaring the cancellation of the directions. AEMO published MN 62363 declaring the cancellation of intervention pricing (which commenced on 12 April 2018).

3.1 Adequacy of responses to AEMO inquiries

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 the directions between 7 April and 16 April 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 direction.

4. CHANGES TO DISPATCH OUTCOMES

The directions to Torrens Island A units 3 and 4, Torrens Island B units 1, 2 and 3 and Pelican Point PS GT12 resulted in approximately 35,220 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 minimised⁴. 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 close to their technical minimum load.

Table 3 and 4 summarise the estimated change to dispatch outcomes resulting from this direction. These are estimated by comparing against a simulated dispatch with the direction 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 decreased imports into South Australia. The decreased imports, coupled with an impact on network constraints, resulted in displacement of generation in most regions other than Tasmania. The Murraylink and Basslink interconnectors were unavailable during the direction period.

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

	QLD	NSW	VIC	SA	TAS
Without direction	1,350,405	1,281,389	1,004,061	226,813	210,727
Actual	1,342,815	1,270,148	992,009	223,836 + 35,220 ^A	210,727
Change	-7,591	-11,241	-12,051	32,243	0

A. 35,220 MWh is the directed energy.

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

	Terranora	QNI	VIC-NSW	Heywood	Murraylink	Basslink
Without direction^A	-15,819	-125,769	76,215	17,307	0	0
Actual^A	-14,046	-120,218	94,891	-13,842	0	0
Change^B	1,753 MWh less into NSW	5,554 MWh less into NSW	18,713 MWh more into NSW	31,200 MWh more into VIC	Unavailable	Unavailable

A. Positive numbers are for flows flowing north or west, negative for flows flowing south or east.

B. Change = |Actual - Without direction|.

⁴ 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.



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 that AEMO 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 Methodology⁵.

Intervention pricing was applied for this event in accordance with NER 3.9.3(b), and for the full intervention period from DI ending 1405 hrs on 7 April 2018 until DI ending 1400 hrs on 16 April 2018.

For the intervention pricing run, Torrens Island B unit 2 dispatch targets were restricted to the minimum enablement limit of its FCAS trapezium between DI ending 1505 hrs and DI ending 1640 hrs on 13 April 2018. While this is consistent with the Intervention Pricing Methodology, it can result in pricing outcomes that do not reflect how the market would have operated had the direction not occurred. AEMO manually resolved this issue to improve the quality of the intervention pricing run once it was identified.

There is a known issue that directed units can become restricted to the minimum enablement of their FCAS trapeziums in the intervention pricing run. AEMO has addressed this issue by following a process to increase Constraint Violation Penalty (CVP) on the intervention constraint. With a higher CVP, units can ramp down to below their minimum enablement limit in the intervention pricing run.

5. CONCLUSIONS AND FURTHER ACTIONS

Between 7 April and 16 April 2018, AEMO issued 12 directions to South Australian Market Participants to maintain power system security, in response to a forecast lack of system strength in the region.

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 from all generators capable of meeting the system strength requirements.

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

⁵ 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
MN	Market Notice
NEM	National Electricity Market
NER	National Electricity Rules
PD	Pre-Dispatch
PS	Power Station
SA	South Australia