



NEM Event – Direction 23-29 May 2018

September 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 28 August 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 document; 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.

Contents

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	6
3.2	Participant ability to comply with the intervention	6
4.	Changes to dispatch outcomes	7
4.1	Application of intervention pricing	7
5.	Conclusions and further actions	8
	Abbreviations	9

Tables

Table 1	Summary of the four South Australia directions between 23 and 29 May 2018	4
Table 2	Timeline of key events between 23 and 29 May 2018	5
Table 3	Estimated changes to local generation in each region (MWh)	7
Table 4	Estimated changes to interconnector flow between regions (MWh)	7

1. Summary

To ensure adequate system strength for secure operation of the South Australian (SA) 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 23 and 29 May 2018, AEMO issued four directions to South Australian Market Participants to maintain power system security. These four directions are classified under three direction events and are summarised in Table 1.

Table 1 Summary of the four South Australia directions between 23 and 29 May 2018

Direction	Directed Participant	Event No.	Issue time	Cancellation time	Direction instruction
Torrens Island A unit 1	AGL SA Generation Pty Ltd	1	1800 hrs, 23 May 2018	1400 hrs, 24 May 2018	Remain synchronised and follow dispatch targets from 0100 hrs on 24 May 2018.
Torrens Island A unit 3	AGL SA Generation Pty Ltd	2	1414 hrs, 25 May 2018	1400 hrs, 27 May 2018	Remain synchronised and follow dispatch targets from 0030 hrs on 26 May 2018.
Torrens Island A unit 4	AGL SA Generation Pty Ltd	2	1414 hrs, 25 May 2018	1300 hrs, 27 May 2018	Remain synchronised and follow dispatch targets from 0100 hrs on 26 May 2018.
Torrens Island A unit 1	AGL SA Generation Pty Ltd	3	1500 hrs, 27 May 2018	1600 hrs, 29 May 2018	Synchronise and achieve stable operation by 0030 hrs on 28 May 2018 then follow dispatch targets.

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 times. 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 from 23 May 2018 for each of the direction events.

Between 23 and 26 May, AGL SA Generation Pty Ltd submitted several bids to de-commit its units.

A bid was submitted at 1506 hrs on 21 May to de-commit Torrens Island A unit 1 from 0100 hrs on 24 May 2018, which raised the need for the first direction.

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

The next two bids raised the need for the second set of direction event. At 0843 hrs on 24 May, Torrens Island A unit 3 was bid available from 1430 hrs on 25 May and to de-commit from 0030 hrs on 26 May. At 1507 hrs on 21 May, a bid was submitted to de-commit Torrens Island A unit 4 from 0100 hrs on 26 May.

At 1607 hrs on 22 May, a bid was submitted to de-commit Torrens Island B unit 3 from 0030 hrs on 28 May 2018. This raised the need for the last direction.

As a result, AEMO determined that there would be insufficient online synchronous units available to meet system strength requirements following these de-commitments and assessed all available options before directing.

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. For the first direction, AEMO issued this market notice (MN 62914)² at 0418 hrs on 23 May 2018. The timing of issuing this market notice was delayed until 23 May 2018 in order to distinguish from then ongoing direction on 22 May 2018. An updated notice (MN 62920) was issued at 1412 hrs on 23 May 2018. For the next two directions, AEMO issued the notice (MN 62940) at 1340 hrs on 25 May 2018. The notice for the last direction (MN 62954) was issued at 1152 hrs on 27 May 2018.

AEMO contacted all eligible Participants who operate eligible synchronous generating units in South Australia to confirm their availability and 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 advised lead times, AEMO assessed the latest time to intervene was 0100 hrs on 24 May 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 for Torrens Island A units 1, 3 and 4 to follow dispatch targets. AEMO cancelled the directions when relevant synchronous generating 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 23 and 29 May 2018³. Table 2 provides a high-level timeline of the intervention event.

Table 2 Timeline of key events between 23 and 29 May 2018

Time	Events / comments
23 May 2018	
0418 hrs	AEMO published a market notice seeking a market response and noting the latest time to intervene was at 0030 hrs on 24 May 2018 (MN 62914).
1412 hrs	AEMO published an updated market notice seeking a market response and noting the latest time to intervene changed to 0100 hrs on 24 May 2018 (MN 62920).
1800 hrs	<ul style="list-style-type: none"> Direction issued to AGL SA Generation Pty Ltd for Torrens Island A unit 1 to remain synchronised and follow dispatch targets from 0100 hrs on 24 May 2018.

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

³ AEMO. Power system operating procedure SO_OP 3707, "Intervention, direction and clause 4.8.9 instructions", 11 September 2014, available at 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
	<ul style="list-style-type: none"> • AEMO published MN62922 declaring a direction was issued to a SA participant. • Intervention constraints applied to Torrens Island A unit 1 in central dispatch from DI 0105 hrs on 24 May 2018.
1800 hrs	AEMO published MN62923 declaring that an AEMO intervention event had commenced and that all dispatch intervals (DIs) during the AEMO intervention event would be intervention price DIs.
24 May 2018	
1400 hrs	<ul style="list-style-type: none"> • The direction to Torrens Island A unit 1 was cancelled and intervention constraints were revoked. • AEMO published MN62933 declaring the cancellation of the direction.
25 May 2018	
1340 hrs	AEMO published a market notice seeking a market response and noting the latest time to intervene was at 0100 hrs on 26 May 2018 (MN 62940).
1414 hrs	<ul style="list-style-type: none"> • Direction issued to AGL SA Generation Pty Ltd for Torrens Island A unit 3 to remain synchronised and follow dispatch targets from 0030 hrs on 26 May 2018. • Direction issued to AGL SA Generation Pty Ltd for Torrens Island A unit 4 to remain synchronised and follow dispatch targets from 0100 hrs on 26 May 2018. • AEMO published MN62943 declaring a direction was issued to a SA participant. • Intervention constraints applied to Torrens Island A unit 3 in central dispatch from DI 0035 hrs on 26 May 2018. • Intervention constraints applied to Torrens Island A unit 4 in central dispatch from DI 0105 hrs on 26 May 2018.
1456 hrs	AEMO published MN62945 declaring that an AEMO intervention event had commenced from DI 1415 hrs and that all DIs during the AEMO intervention event would be intervention price DIs.
27 May 2018	
1152 hrs	AEMO published a market notice seeking a market response and noting the latest time to intervene was at 0030 hrs on 28 May 2018 (MN 62954).
1300 hrs	The direction to Torrens Island A unit 4 was cancelled and intervention constraints were revoked.
1400 hrs	<ul style="list-style-type: none"> • The direction to Torrens Island A unit 3 was cancelled and intervention constraints were revoked. • AEMO published MN62957 declaring the cancellation of the directions.
1500 hrs	<ul style="list-style-type: none"> • Direction issued to AGL SA Generation Pty Ltd for Torrens Island A unit 1 to synchronise and achieve stable operation by 0030 hrs on 28 May 2018 then follow dispatch targets. • AEMO published MN62959 declaring a direction was issued to a SA participant. • Intervention constraints applied to Torrens Island A unit 1 in central dispatch from DI 0035 hrs on 28 May 2018. • AEMO published MN62960 declaring that an AEMO intervention event had commenced from DI 1505 hrs and that all DIs during the AEMO intervention event would be intervention price DIs.
29 May 2018	
1600 hrs	<ul style="list-style-type: none"> • The direction to Torrens Island A unit 1 was cancelled and intervention constraints were revoked. • AEMO published MN63010 declaring the cancellation of the directions.

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 23 and 29 May 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 unit 1, unit 3, and unit 4 resulted in approximately 4,760 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.

Tables 3 and 4 summarise the estimated change to dispatch outcomes resulting from all four directions. 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 increased exports from South Australia. The increased exports, coupled with an impact on network constraints, resulted in displacement of generation in most regions other than Tasmania. The Basslink interconnector was unavailable during the direction period.

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

	QLD	NSW	VIC	SA	TAS
Without direction	608,086	628,030	461,873	122,411	111,574
Actual	608,271	624,937	460,403	122,508 + 4,760 ^A	111,574
Change	+185	-3,093	-1,471	+4,857	0

A. 4,760 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	-7,388	-54,464	36,426	-10,451	-3,328	0
Actual ^A	-7,376	-54,647	39,507	-14,173	-4,355	0
Change ^B	12 MWh less into NSW	183 MWh more into NSW	3,081 MWh more into NSW	3,722 MWh more into VIC	1,027 MWh more into VIC	0

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 that AEMO set the dispatch price and ancillary service prices at the value which

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.

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 0105 hrs on 24 May 2018 until DI ending 1400 hrs on 24 May 2018.
- DI ending 0035 hrs on 26 May 2018 until DI ending 1400 hrs on 27 May 2018.
- DI ending 0035 hrs on 28 May 2018 until DI ending 1600 hrs on 29 May 2018.

In post-event analysis, AEMO identified that the timing of invoking intervention constraints for Torrens Island A unit 1 in the last direction should have started from DI ending 2235 hrs on 27 May 2018 when the unit was synchronising. Manual reruns were performed by invoking constraints that align with the synchronisation time.

5. Conclusions and further actions

Between 23 and 29 May 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.

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. The market was informed after each direction was issued.

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

⁵ Intervention Pricing Methodology, available at <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