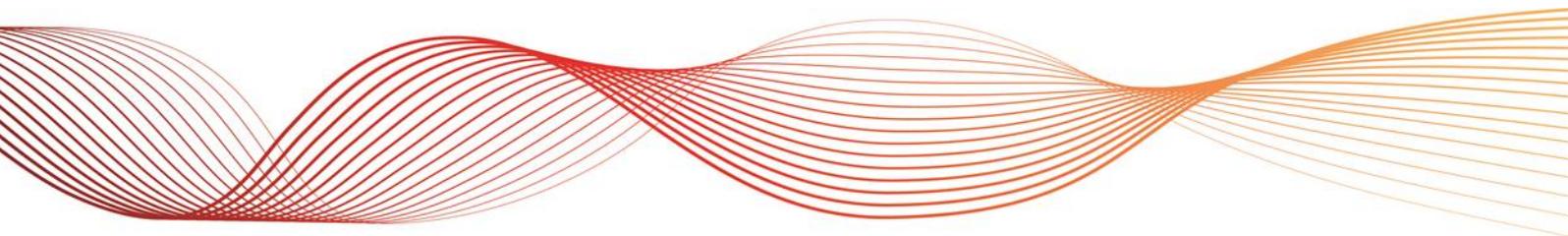




NEM EVENT – DIRECTION 25-26 APRIL 2017

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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 09 April 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

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1. SUMMARY

To ensure adequate system strength for secure operation of the South Australia 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 is necessary to maintain power system security or for reasons of public safety.

Between 25 April 2017 and 26 April 2017, AEMO issued two directions to South Australian Market Participants to maintain power system security. The two directions are summarised in Table 1.

Table 1 Summary table for the two South Australia directions between 25 April 2017 and 26 April 2017

Direction	Directed participant	Issue time	Cancellation time	Direction instruction
8 Hallett gas turbine (GT) units	EnergyAustralia Yallourn Pty Ltd	0234 hrs, 25 April 2017	1415 hrs, 25 April 2017	Synchronise all eight Hallett GT units at 0300 hours on 25 April 2017 and follow dispatch targets.
Torrens Island B unit 3	AGL SA Generation Pty Ltd	0745 hrs, 25 April 2017	1207 hrs, 26 April 2017	Synchronise Torrens Island B unit 3 as soon as possible and 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 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 as at 25 April 2017.

The 0130 hrs Pre-Dispatch (PD) run on 25 April 2017 (produced at approximately 0100 hrs) indicated that there would be insufficient online synchronous generating units available to meet system strength requirements from 0300 hrs on 25 April 2017.

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

¹ For more information about this requirement, see <http://www.aemo.com.au/Media-Centre/South-Australia-System-Strength-Assessment>.



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 58429) at 0127 hrs on 25 April 2017².

AEMO contacted the Registered Participants in respect of all synchronous generating units in South Australia to seek their availability for the relevant period, and to determine the latest time to intervene based on advised lead times for each unit.

The Registered Participants in respect of eligible synchronous generating units informed AEMO that they would not provide a market response, but that units were available under direction. Based on advised lead times, AEMO assessed that the latest time to intervene was 0200 hours on 25 April 2017.

At 0200 hours, insufficient market response had been provided, and the circumstances giving rise to the need for intervention were still in effect.

2.3 Decision to intervene

As insufficient market response had been provided, AEMO evaluated the estimated costs, and issued an initial direction to EnergyAustralia Yallourn Pty Ltd for eight Hallett gas turbine (GT) units to synchronise and dispatch to the technical minimum load of 16 megawatts (MW). This was considered the least cost viable option for satisfying system strength requirements in South Australia.

One Hallett GT unit tripped after all eight units had synchronised, and AEMO subsequently directed EnergyAustralia Yallourn Pty Ltd to maintain seven Hallett GT units online and dispatch to the technical minimum load of 14 MW.

On further advice in respect of Hallett GT, AEMO replaced the Hallett GT direction with a direction to AGL SA Generation Pty Ltd to synchronise Torrens Island B unit 3, and dispatch to the technical minimum load of 60 MW. The Hallett GT direction was cancelled after Torrens Island B unit 3 was online and stable.

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



3. INTERVENTION PROCESS

AEMO considers that it followed all applicable processes under NER Clause 4.8 for the management of the directions on 25 and 26 April 2017³. Timeline of key events on 25 and 26 April 2017 Table 2 provides a high level timeline of the intervention event.

Table 2 Timeline of key events on 25 and 26 April 2017

Time	Events / comments
25 April 2017	
0127 hrs	AEMO published market notice seeking a market response and noting the latest time to intervene was at 0200 hrs on 25 April 2017 (MN 58429).
0234 hrs	Direction issued to EnergyAustralia Yallourn Pty Ltd for eight Hallet GT units to synchronise and follow dispatch targets from 0300 hrs on 25 April 2017.
0300 hrs	Intervention constraints applied to Hallet GT units in central dispatch from dispatch interval (DI) ending 0305 hrs.
0306 hrs	AEMO published MN 58432 declaring a direction was issued to a SA participant at 0234 hrs.
0307 hrs	AEMO published MN 58433 declaring an AEMO intervention event commenced from DI ending 0305 hrs and that all DIs during the AEMO intervention event to be intervention price dispatch intervals.
0401 hrs	One Hallet GT unit tripped.
0745 hrs	Direction issued to AGL SA Generation Pty Ltd for Torrens Island B unit 3 to synchronise as soon as possible and follow dispatch targets.
0812 hrs	AEMO published MN 58439 declaring a direction was issued to an SA participant at 0745 hrs.
0950 hrs	AEMO published notice for counteractions to Ladbroke Grove GT unit 1, and Osborne GT (MN 58442).
1310 hrs	Intervention constraints applied to Torrens Island B unit 3 in central dispatch from DI ending 1315 hrs.
1415 hrs	EnergyAustralia Yallourn Pty Ltd (Hallett GT units) direction was cancelled at 1415 hrs on 25 April 2017 after Torrens Island B unit 3 was online and stable. Intervention constraints revoked for Hallett GT units.
26 April 2017	
1207 hrs	AGL SA Generation Pty Ltd (Torrens Island B unit 3) direction was cancelled at 1207 hrs on 26 April 2017. Intervention constraints were revoked for Torrens Island B unit 3.
1222 hrs	AEMO published MN 58451 declaring the cancellation of the two directions, the counteractions and the intervention event.

3.1 Adequacy of responses to AEMO inquires

In order to estimate the latest time for intervention, NER 4.8.5A (d) permits AEMO to request information from Scheduled Network Service Providers, Scheduled Generators, Semi-Scheduled Generators, and Market Customers.

AEMO made several such requests for information prior to issuing directions on 25 and 26 April 2017, and is satisfied with the timeliness, adequacy, and effectiveness off all responses.

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.

At 0401 hrs on 25 April 2017, Hallett GT units 3_1 tripped offline. Based on an assessment of system conditions and system strength requirements, AEMO did not direct EnergyAustralia Yallourn Pty Ltd to commit a replacement unit.

³ AEMO power system operating procedure SO_OP 3707 “Intervention, Direction and Clause 4.8.9 Instructions”, 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.

No other notice was received that a Registered Participant would be unable to comply with the directions.

4. CHANGES TO DISPATCH OUTCOMES

The directions to synchronise and dispatch to technical minimum loads resulted in approximately 1,423 megawatt hours (MWh) of direction-based 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. To achieve this objective, AEMO applied counteraction constraints to reduce the output of Ladbroke Grove GT unit 1 and Osborne GT, in accordance with 4.8.9 (h)(3) of the NER.

Table 3 and Table 4 summarise the estimated change to dispatch outcomes resulting from this direction.

Directions in one region can cause dispatch changes to other regions, despite the use of counter-action constraints to minimise this effect. 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 local generation in South Australia, they also increased exports from the region. The increased exports, coupled with an impact on network constraints, resulted in more energy flow northward, and displacement of some generation in New South Wales and Queensland.

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

	QLD	NSW	VIC	SA	TAS
Without direction	210,823	199,451	163,960	38,405	22,100
Actual	210,518	198,082	164,872	37,833 + 1,423 ^A	22,145
Change	-305	-1,368	+912	+851	+45

A. 1,423 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	-3,158	-22,307	12,862	-3,251	-1,113	-12,591
Actual^B	-3,121	-22,050	14,637	-3,991	-1,308	-12,546
Change^C	37 MWh less to NSW	257 MWh less to NSW	1,775 MWh more to NSW	740 MWh more to VIC	195 MWh more to VIC	45 MWh less to TAS

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

B. Change = |Actual - Without direction|.

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

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 0235 hrs on 25 April 2017 until DI ending 1210 hrs on 26 April 2017.

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 units.

⁵ Intervention Pricing Methodology at <https://www.aemo.com.au/-/media/Files/PDF/Intervention-Pricing-Methodology-October-2014.pdf>.



5. CONCLUSIONS AND FURTHER ACTIONS

On 25 April 2017 and 26 April 2017, AEMO issued two energy directions to South Australian Market Participants to maintain power system security in response to a forecast lack of system strength.

AEMO has continued to investigate and update the viable generating unit combinations that can be used to meet system strength requirements in South Australia. These investigations have increased the options available to AEMO for managing system strength, and ultimately aim to reduce the frequency and magnitude of interventions required.

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 ensuring the market remained informed at all stages.

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



ABBREVIATIONS

Abbreviation	Expanded name
DI	Dispatch Interval
MN	Market Notice
NEM	National Electricity Market
NER	National Electricity Rules
AEMO	Australian Energy Market Operator Limited
AEST	Australian Eastern Standard Time
PD	Pre-Dispatch