

# NEM Event Directions Report 12-19 November 2022

July 2023





# 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) clauses 4.8.9(f) and 3.13.6A(a). This report satisfies those NER obligations and is based on information available to AEMO as at 30 June 2023.

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).

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## Abbreviations

Abbreviation	Expanded name
AEMO	Australian Energy Market Operator
CRA	Compensation recovery amount
FCAS	Frequency control ancillary services
MN	Market Notice
MW	megawatt/megawatts
NEM	National Electricity Market
NER	National Electricity Rules
TI	Trading Interval

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# 1 Summary

On 12 November 2022, several non-credible contingency events on multiple transmission lines caused the synchronous separation of the majority of the South Australian power system from the rest of the National Electricity Market (NEM). The incident was caused by the failure of a double circuit tower supporting the South East – Tailem Bend No.1 and No.2 275 kilovolts (kV) lines, causing them to trip. In addition, the Keith – Tailem Bend 132 kV line tripped due to operation of an overload protection scheme. Substations between Keith and South East remained connected to the NEM via the Heywood interconnector<sup>1</sup>.

The separated system was operated as an island until temporary structures were erected, allowing the South East – Tailem Bend No. 1 275 kV circuit to return to service on 19 November 2022, reconnecting the SA island to the rest of the NEM. On 23 November 2022, the second South East – Tailem Bend circuit was returned to service.

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.

After it issues a direction, AEMO is required to publish a report outlining the matters specified in clause 3.13.6A of the NER.

During the islanding event between 12 and 19 November 2022, AEMO issued a series of system security and frequency control ancillary services (FCAS) directions across several events to Market Participants in South Australia to maintain the power system in a secure operating state. These directions are summarised in Table 1.

**Table 1 Summary of the South Australian directions between 12 and 19 November 2022**

Directed unit	Directed Participant	Event No.	Issue time	Direction instruction	Cancellation time
Torrens Island Power Station (PS) B4	AGL SA Generation Pty Ltd	200-1	1700 hrs, 12 November 2022	Remain synchronised and follow dispatch targets at 0200 hrs, 13 November 2022	0330 hrs, 13 November 2022
Torrens Island Power Station (PS) B2	AGL SA Generation Pty Ltd	200-2	1700 hrs, 12 November 2022	Synchronise and follow dispatch targets at 0600 hrs, 13 November 2022	1600 hrs, 13 November 2022
Torrens Island Power Station (PS) B2	AGL SA Generation Pty Ltd	201-1	1800 hrs, 14 November 2022	Synchronise to provide FCAS services and follow dispatch targets from 0700 hrs, 15 November 2022	1500 hrs, 15 November 2022
Torrens Island Power Station (PS) B2	AGL SA Generation Pty Ltd	202-1	1700 hrs, 16 November 2022	Remain synchronised and follow dispatch targets at 0745 hrs, 17 November 2022	0100 hrs, 17 November 2022
Torrens Island Power Station (PS) B4	AGL SA Generation Pty Ltd	202-2	1700 hrs, 16 November 2022	Remain synchronised and follow dispatch targets at 0745 hrs, 17 November 2022	0100 hrs, 17 November 2022

<sup>1</sup> See AEMO's final incident report on the Trip of South East-Tailem Bend 275 kV lines on 12 November 2022, available at [https://aemo.com.au/-/media/files/electricity/nem/market\\_notices\\_and\\_events/power\\_system\\_incident\\_reports/2022/trip-of-south-east-tailem-bend-275-kv-lines-november-2022.pdf?la=en](https://aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/power_system_incident_reports/2022/trip-of-south-east-tailem-bend-275-kv-lines-november-2022.pdf?la=en)

Directed unit	Directed Participant	Event No.	Issue time	Direction instruction	Cancellation time
Torrens Island Power Station (PS) B2	AGL SA Generation Pty Ltd	202-3	0100 hrs, 17 November 2022	Remain synchronised and to provide FCAS services and follow dispatch targets from 0745 hrs, 17 November 2022	1130 hrs, 17 November 2022
Torrens Island Power Station (PS) B4	AGL SA Generation Pty Ltd	202-4	0100 hrs, 17 November 2022	Remain synchronised and to provide FCAS services and follow dispatch targets from 0745 hrs, 17 November 2022	1700 hrs, 17 November 2022
Quarantine Power Station (PS) 5	Origin Energy Electricity Limited	202-5	0940 hrs, 17 November 2022	Synchronise to provide FCAS services and follow dispatch targets from 1000 hrs, 17 November 2022	1700 hrs, 17 November 2022
Torrens Island Power Station (PS) B4	AGL SA Generation Pty Ltd	203-1	1640 hrs, 17 November 2022	Remain synchronised and follow dispatch targets at 2130 hrs, 17 November 2022	0830 hrs, 18 November 2022
Torrens Island Power Station (PS) B2	AGL SA Generation Pty Ltd	203-2	1640 hrs, 17 November 2022	Synchronise to provide FCAS services and follow dispatch targets from 0830 hrs, 18 November 2022	1900 hrs, 19 November 2022
Torrens Island Power Station (PS) B4	AGL SA Generation Pty Ltd	203-3	0100 hrs, 18 November 2022	Remain synchronised and to provide FCAS services and follow dispatch targets from 0830 hrs, 18 November 2022	1530 hrs, 18 November 2022
Torrens Island Power Station (PS) B4	AGL SA Generation Pty Ltd	203-4	1500 hrs, 18 November 2022	Remain synchronised and to provide FCAS services and follow dispatch targets from 0030 hrs, 19 November 2022	1900 hrs, 19 November 2022
Quarantine Power Station (PS) 5	Origin Energy Electricity Limited	203-5	0530 hrs, 18 November 2022	Synchronise to provide FCAS services and follow dispatch targets from 0830 hrs, 18 November 2022	0740 hrs, 18 November 2022
Quarantine Power Station (PS) 5	Origin Energy Electricity Limited	203-6	0730 hrs, 19 November 2022	Synchronise to provide FCAS services and follow dispatch targets from 0830 hrs, 19 November 2022	1540 hrs, 19 November 2022

## 2 Intervention assessment

### 2.1 The need for direction

The requirement to intervene for directions in this report arose due to the synchronous separation of a major part of South Australia from the rest of the NEM and prevailing market and system conditions. Those conditions included:

- The synchronous generating unit expected to be synchronised would be inadequate to maintain a secure operating state.
- Lack of FCAS availability forecast and FCAS constraints violations in the South Australia island.

### 2.2 Assessment of market response and latest time to intervene

Under NER 4.8.5A(a) and (c), AEMO must notify the market of any foreseeable circumstance that may require AEMO to issue a direction, and the latest time for market response before AEMO would need to intervene.

AEMO contacted all participants who operate suitable generating units in South Australia to confirm their availability and the latest time to intervene. Those participants indicated that no market response would be provided but identified units that would be available if directed. For this direction event, AEMO assessed the latest

time to intervene taking account of the advised lead times. Note that due to the rapidly unfolding nature of the South Australian islanding event, it was not always feasible to issue latest time to intervene notice, or provide the full reasoning for the intervention in every market notice. The latest times to intervene and reasons for intervention are listed in Table 2.

**Table 2 Summary of latest time to intervene**

Event no.	Latest time to respond	Market Notice	Reason
200	1700 hrs, 12 November 2022	MN 103047	System security
201 <sup>A</sup>	1800 hrs, 14 November 2022	MN 103175	System security (FCAS)
202	1700 hrs, 16 November 2022	MN 103329	System security
	AEMO had not estimated the latest time to respond	MN 103348	System security (FCAS)
203	1630 hrs, 17 November 2022	MN 103415	System security (FCAS)

A. Latest time to respond was not indicated in the market notice. FCAS was the reason for the intervention as part of managing system security, but this was not stated in the market notice.

## 3 Intervention process

AEMO considers that it followed applicable processes under NER 4.8 for the management of the directions between 12 and 19 November 2022<sup>2</sup>.

### 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 12 and 19 November 2022.

### 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. A directed participant in Table 1 informed AEMO that the unit would need to be synchronised 1.5 hours before the required time to deliver FCAS services due to physical plant heat rate characteristics. AEMO subsequently updated its direction instructions in the participant notice to direct the unit to synchronise earlier.

AEMO is not aware of any other failure to comply and is satisfied with all participants complying with direction instructions during the South Australian islanding event.

<sup>2</sup> AEMO. Power system operating procedure SO\_OP 3707, "Procedures For Issue Of Directions And Clause 4.8.9 Instructions", 6 September 2019, [https://aemo.com.au/-/media/files/electricity/nem/security\\_and\\_reliability/power\\_system\\_ops/procedures/so\\_op\\_3707-procedures-for-issue-of-directions-and-clause-4-8-9-instructions.pdf?la=en](https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/procedures/so_op_3707-procedures-for-issue-of-directions-and-clause-4-8-9-instructions.pdf?la=en).

# 4 Dispatch and pricing outcomes

## 4.1 Changes to dispatch outcomes due to the directions

The directions during this reporting period resulted in 6,729 megawatt hours (MWh) of synchronous generation being directed into the market for system security. For FCAS, average MW enabled from directions by market and direction event is summarised in Table 3 below.

**Table 3 Summary of average FCAS enabled (MW) from directions by market and direction event**

Market	201	202	203
LOWER5MIN	6	1	7
LOWER60SEC	22	7	12
LOWER6SEC	11	7	7
LOWERREG	4	12	8
RAISE5MIN	7	2	6
RAISE60SEC	22	8	10
RAISE6SEC	11	5	5
RAISEREG	13	12	16

## 4.2 Application of intervention pricing

Intervention pricing does not apply in circumstances where the reason for the intervention is to obtain a service which is not market-traded, such as system security, voltage control or inertia. However, when an intervention is for the purpose of obtaining energy or market ancillary services, intervention pricing (with some exceptions) is used to set prices across the NEM to preserve market scarcity signals that would have existed had the intervention not occurred<sup>3</sup>.

AEMO declares intervention pricing for periods subject to an applicable 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 Methodology.

During the South Australia extended island event, AEMO issued three directions for market traded services (market ancillary service). Table 4 contains the periods when intervention pricing was active in dispatch, as a result of the South Australia extended island event, between 12 and 19 November 2022.

<sup>3</sup> AEMC, Rule determination, <https://www.aemc.gov.au/sites/default/files/2021-11/Final%20Determination%20-%20ERC0284.pdf>.



**Table 4 Intervention pricing application**

Intervention pricing event	Intervention pricing start (DI ending)	Intervention pricing end
201	0705 hrs, 15 November 2022	1500 hrs, 15 November 2022
202	0750 hrs, 17 November 2022	1700 hrs, 17 November 2022
203	0835 hrs, 18 November 2022	1900 hrs, 19 November 2022

### 4.3 Direction costs

The compensation recovery amount and ancillary service compensation recovery amount (Total CRA) for the provision of energy and FCAS directions between 12 and 19 November 2022 totalled \$930,079 (Table 5). The Total CRA includes compensation to both directed participants (for energy and FCAS) and those participants (affected participants, market customers and ancillary service providers) that were dispatched differently due to the intervention event<sup>4</sup>. Total CRA also includes six claims for additional compensation by Directed and Affected Participants assessed by an independent expert (IE) and fees payable to the IE pursuant to clause 3.12.3.

**Table 5 Total directions CRA between 12 and 19 November 2022**

	Compensation recovery amount (Total CRA)
Directed participants (energy and FCAS) – see Table 6	\$1,337,885
Compensation to Affected Participants, Market Customers and Ancillary Service Providers – see Table 7	-\$407,806
<b>Total</b>	<b>\$930,079</b>

#### Directed participants – energy and FCAS

Total CRA for system security directions (energy and FCAS) during this reporting period was \$1,337,885. The component breakdown calculated in accordance with NER 3.15.8(a) and (e) is detailed in Table 6.

For energy directions, the direction compensation (12-month 90<sup>th</sup> percentile spot price) was greater than the trading amounts calculated and paid as normal using spot prices (retained trading amount), therefore the settlement compensation amount is positive and is reflected in the settlement system as a payment to the directed participant. The CRA payable to directed participants in relation to the provision of energy, including additional claims assessed by the IE and IE fee was \$2,209,546.

Contrasting this was FCAS directions, where AEMO recovered \$871,661 (negative ancillary service compensation recovery amount) from directed participants through the settlement process as the 12-month 90<sup>th</sup> percentile ancillary service prices used to compensate directed participants was less than the retained trading amount calculated using spot ancillary service prices.

<sup>4</sup> NER 3.15.7 to 3.15.7B and 3.12.2



**Table 6 Directions CRA between 12 and 19 November – energy and FCAS**

	Direction compensation payment	Retained trading amount <sup>A</sup>	Settlement compensation	Additional claims <sup>B</sup>	IE fee	Compensation recovery amount
System security (Energy)	\$2,348,165	\$575,890	\$1,772,275	\$424,771	\$12,500	\$2,209,546
System security (FCAS)	\$117,428	\$989,088	-\$871,661	\$0	\$0	-\$871,661
<b>Total</b>	<b>\$2,465,593</b>	<b>\$1,564,978</b>	<b>\$900,614</b>	<b>\$424,771</b>	<b>\$12,500</b>	<b>\$1,337,885</b>

A. Current design of the settlements system involves calculation and payment of trading amounts to directed generators during the period of direction, that is, trading amounts are calculated and paid as normal using spot or ancillary service prices, as though there was no direction.

B. Directed Participant is entitled to claim for additional compensation in accordance with NER 3.15.7B.

### Compensation to Affected Participants, Market Customers and Ancillary Service Providers

In addition to the direction compensation in respect to the provision of energy and FCAS, Affected Participants, Market Customers and Ancillary Service Providers are also entitled to compensation in respect of an AEMO intervention event (NER 3.12.2). As discussed in Section 4.2, CRA across the three separate AEMO intervention events was -\$407,806<sup>5</sup>, of which \$1,396,615 (sum of affected participant, eligible persons and market service network provider) was recovered from affected participants while \$988,809 (positive amount) was payable to ancillary service providers by AEMO (Table 7). Negative affected participant (eligible person) compensation was payable to AEMO because if the intervention event had not occurred, there would have been lower MW flows on regulated directional interconnectors, with reduced settlement residue distributions.

**Table 7 Compensation to Affected Participants, Market Customers and Ancillary Service Providers in relation to AEMO intervention**

	Compensation recovery amount (CRA)
Affected participant	\$253,024
Affected participant (Eligible person)	-\$1,664,723
Affected participant (Market network service provider)	\$15,084
Market customer	\$0
Ancillary service providers	\$988,809
<b>Total</b>	<b>-\$407,806</b>

### Regional benefit factor determination

Compensation cost recovery arising from compensation payable to Directed Participants and to Affected Participants, Market Customers and Ancillary Service are allocated to NEM regions using a regional benefit calculation determined by AEMO in accordance with NER 3.15.8(b1).

As all directions were issued to participants in South Australia and that region was the sole beneficiary, AEMO determined to allocate the full amount of \$930,079 to South Australia under NER 3.15.8(b1). \$1,411,117 was recovered by Market Customers, while \$480,170 and \$859 was paid to Market Generators and Market Small

<sup>5</sup> Negative CRA refers to amount payable to AEMO by participants while positive CRA refers to amount payable to participants by AEMO

Generation Aggregators, respectively (Table 8)<sup>6</sup>. While compensation for energy directions is primarily recovered from Market Customers, the compensation for FCAS directions was recovered from Market Customers, Market Generators and Small Generation Aggregators in accordance with NER 3.15.8(f).

**Table 8 Compensation recovery amount by Registered Participant category – 12 to 19 November 2022**

Registered Participant category	South Australia
Market Customer	\$1,411,117
Market Generator	-\$480,179
Market Small Generation Aggregator	-\$859
<b>Total</b>	<b>\$930,079</b>

Direction compensation recovery data can be found on the AEMO website<sup>7</sup>.

## 5 Conclusions and further actions

Between 12 and 19 November 2022, AEMO issued a series of system security and FCAS directions across several events to Market Participants in South Australia to maintain power system security.

AEMO is satisfied that, other than the issue outlined in Section 2.2, all applicable procedures and processes were followed in assessing the need for intervention, determining the latest time to intervene, enacting and managing the intervention 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.

<sup>6</sup> Where the reason for the intervention event is to address a shortage of energy, compensation costs will be recovered from market customers in the region which benefited from the intervention. Where the reason for the intervention is to address a shortage of FCAS, compensation costs will be recovered in line with normal process of recovering the costs of the FCAS, i.e. from generators, small generation aggregators and/or market customers.

<sup>7</sup> AEMO, Direction Compensation Recovery, <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/data-nem/settlements-data/direction-compensation-recovery>.