



Tasmania region not in a secure operating state on 23 October 2019

April 2020

Reviewable Operating Incident Report under the
National Electricity Rules

INCIDENT CLASSIFICATIONS

| Classification | Detail |
|---------------------------|---|
| Time and date of incident | 1050 hrs on 23 October 2019 |
| Region of incident | Tasmania |
| Affected regions | Tasmania |
| Event type | Power system not in a secure operating state |
| Generation impact | No generation was disconnected as a result of this incident |
| Customer load impact | No load was disconnected as a result of this incident |
| Associated reports | Nil |

ABBREVIATIONS

| Abbreviation | Term |
|--------------|---------------------------------------|
| AEMO | Australian Energy Market Operator |
| AEST | Australian Eastern Standard Time |
| MWs | Megawatt-second |
| NEM | National Electricity Market |
| NER | National Electricity Rules |
| TNSP | Transmission Network Service Provider |

Important notice

PURPOSE

AEMO has prepared this report in accordance with clause 4.8.15(c) of the National Electricity Rules, using information available as at the date of publication, unless otherwise specified.

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1. Overview

This report relates to a reviewable operating incident¹ that occurred on 23 October 2019 in Tasmania. The Tasmania region was not in a secure operating state for 37 minutes.

As this is a reviewable operating incident, AEMO is required to assess the adequacy of the provision and response of facilities and services and the appropriateness of actions taken to restore or maintain power system security².

AEMO has concluded that:

1. The power system in Tasmania was not in a secure operating state for 37 minutes due to low inertia levels.
2. The reduction in inertia was the result of a generating commitment variation modifying the available generation mix as part of normal operation.
3. AEMO was not initially aware of the reduced inertia. AEMO has subsequently installed alarming on inertia levels and updated its internal procedures.
4. Capabilities for managing system inertia are expected to be improved by new processes for managing inertia in Tasmania, due to be implemented from 1 April 2020.

This report is prepared in accordance with clause 4.8.15(c) of the National Electricity Rules (NER).

National Electricity Market (NEM) time (Australian Eastern Standard Time [AEST]) is used in this report.

¹ See NER clause 4.8.15(a)(1)(i), as the event relates to a non-credible contingency event; and the AEMC Reliability Panel Guidelines for Identifying Reviewable Operating Incidents.

² See NER clause 4.8.15(b).

2. The incident

2.1 The incident

At 1050 hrs on 23 October 2019, the inertia level in Tasmania was 3,725 megawatt-seconds (MWs), which is below the 3,800 MWs required to maintain the power system in a secure operating state³. At 1128 hrs on 23 October 2019, the inertia increased to secure levels, as shown in Figure 1.

Figure 1 Tasmania region inertia, 23 October 2019



2.2 Investigation

Inertia levels within power systems must be maintained above certain levels to ensure correct frequency response following generation or load contingencies. Power systems with high inertia can resist the large changes in frequency arising from contingency events that lead to an imbalance in supply and demand.

In July 2018, AEMO published a report⁴ outlining the minimum inertia requirements for each region in the National Electricity Market (NEM). This report determined that the minimum inertia required to maintain a secure operating state in Tasmania is 3,800 MWs.

In the period prior to 1050 hrs on 23 October 2019, the inertia in Tasmania was above the required minimum level.

At 1050 hrs on 23 October 2019, Hydro Tasmania⁵ took one of the generating units at the Liapootah Power Station out of service as part of normal operation. This resulted in a reduction of the total inertia in Tasmania to 3,725 MWs.

AEMO was not made aware of the unit de-commitment at Liapootah Power Station prior to the event. TasNetworks advised AEMO of the inertia shortfall at 1100 hrs. As the generating units at Liapootah are part of an aggregated generating unit⁶ for dispatch purposes, and the aggregated generating unit met its dispatch targets, AEMO had previously agreed with Hydro Tasmania there was no requirement for Hydro

³ See NER clause 4.2.6(f) and 4.3.1(pb).

⁴ Inertia Requirements Methodology, Inertia Requirements & Shortfalls at https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/System-Security-Market-Frameworks-Review/2018/Inertia_Requirements_Methodology_PUBLISHED.pdf.

⁵ Hydro Tasmania is a Generator in Tasmania.

⁶ The aggregated generating unit includes the generating units at Liapootah, Wayatinah and Catagunya Power Stations, at total of eight generating units.

Tasmania to advise AEMO of the commitment/de-commitment of individual generating units. Hydro Tasmania was not aware of the potential impact on inertia, because it does not actively monitor inertia levels. Hydro Tasmania, when contacted by AEMO, voluntarily committed the generating unit at the Cethana Power Station in synchronous condenser mode, resulting in the inertia in Tasmania increasing to 4,081 MWs at 1127 hrs on 23 October 2019.

TasNetworks⁷ provided AEMO with initial advice of the inertia shortfall at 1100 hrs on 23 October 2019. This was in accordance with normal operating procedures. Prior to this advice, AEMO was unaware of the inertia shortfall. Although AEMO has indication of inertia levels, at the time of this incident AEMO did not have alarming in place to alert its operators to any shortfall.

If AEMO had had alarming in place for inertia and procedures in place to manage any shortfall prior to this incident, the time the power system was not in a secure operating state would likely have been reduced.

On 29 October 2019, AEMO updated its internal procedures dealing with managing inertia shortfalls. On 31 October 2019, AEMO implemented alarming on the inertia value for the Tasmanian region. Alarms are configured at 4200 MW to provide time to respond before critical levels are reached.

In November 2019, AEMO published a Notice of inertia and fault level shortfalls in Tasmania⁸. In response to this Notice, TasNetworks and Hydro Tasmania are currently conducting negotiations for the provision of inertia and system strength in Tasmania. Assuming the negotiations are successful, AEMO has agreed with TasNetworks that the required services will be made available from 1 April 2020. Once this contract is in place, this incident should not occur again, because AEMO and TasNetworks will actively monitor inertia and AEMO will dispatch the inertia services contracted by TasNetworks to ensure the 3,800 MWs limit is maintained.

As an interim measure until the inertia contracts are in place, Hydro Tasmania has agreed to advise AEMO prior to the de-commitment of any generating unit that will reduce the available inertia to below 3,800 MWs. Additionally, TasNetworks have implemented new procedures relating to monitoring inertia and providing advice to AEMO when inertia falls below the required levels.

⁷ TasNetworks is a Transmission Network Service Provider (TNSP) in Tasmania.

⁸ At https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/System-Security-Market-Frameworks-Review/2019/Notice-of-Inertia-Fault-Level-Shortfalls-Tasmania-Nov-2019.pdf.

3. Power system security

AEMO has certain power system security responsibilities in the NEM. These include using reasonable endeavours as permitted under the NER to operate the power system in a secure operating state to the extent practicable, and taking all reasonable actions to return the power system to a secure state following a contingency event in accordance with the NER⁹.

The power system was in a secure operating state prior to this incident. Studies have shown that during the period of low inertia, a credible contingency event involving the loss of a generating unit in Tasmania and Basslink¹⁰ could have caused the frequency in Tasmania to fall below 48 hertz (Hz) resulting in under frequency load shedding.

The commitment of the generating unit at Cethana Power Station at 1127 hrs on 23 October 2019 restored the power system to a secure operating state and no further action was required. The power system was not in a secure operating state for 37 minutes.

4. Conclusions

AEMO has assessed this incident in accordance with clause 4.8.15(b) of the NER. AEMO has assessed the adequacy of the provision and response of facilities or services, and the appropriateness of actions taken to restore or maintain power system security.

AEMO has concluded that:

1. The power system in Tasmania was not in a secure operating state for 37 minutes due to low inertia levels.
2. The reduction in inertia was the result of a generating unit de-commitment as part of normal operation.
3. AEMO was not initially aware of the reduced inertia. AEMO has subsequently implemented alarming on inertia levels and updated its internal procedures.
4. Capabilities for managing system inertia are expected to be improved by new processes for managing inertia in Tasmania, due to be implemented from 1 April 2020.

⁹ This is a summary only. Refer to AEMO's functions in section 49 of the National Electricity Law and the power system security principles in clause 4.2.6 of the NER.

¹⁰ The simultaneous loss of a transmission line, including transmission lines radially connected to generating units, and Basslink has been reclassified by AEMO as a single credible contingency event when Basslink is importing into Tasmania.