
Declared Wholesale Gas Market – Intervention Report

August 2020

Notice of threat to system security

A report into the notice of threat to system security issued on 7 August 2020

IMPORTANT NOTICE

Purpose

AEMO has prepared this report pursuant to rule 351 of the National Gas Rules, using information available as at 12 August 2020, unless otherwise specified.

Disclaimer

AEMO has made every 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.

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1. Introduction

AEMO issued a notice of a threat to system security in the Victorian Declared Wholesale Gas Market (DWGM) for gas day 7 August 2020. This event was due to actual gas demand during the day tracking higher than forecast which indicated a potential breach of the minimum operating pressure at Dandenong City Gate (DCG).

When pressures within the Declared Transmission System (DTS) are forecast to fall below minimum operating limits, AEMO will indicate to the market that there is a threat to system security and out-of-merit-order injections may be scheduled to maintain system security.

AEMO scheduled 71 TJ, including out-of-merit-order of 57 TJ, of Dandenong LNG injections at the 2.00 pm schedule, resulting in approximately \$148,000 of additional ancillary payments and corresponding uplift payments.

Rule 351 of the National Gas Rules (NGR) requires that AEMO investigate and prepare a report following an event which is or may be a threat to system security. Rule 351 also requires that AEMO assess and advise on:

- the adequacy of the provisions of the NGR relevant to the event or events;
- the appropriateness of actions taken by AEMO in relation to the event or events; and
- the costs incurred by AEMO and Registered participants as a consequence of responding to the event or events.

This report is published in accordance with rule 351(2) of the NGR. All times used in this report are AEST.

2. Event Summary

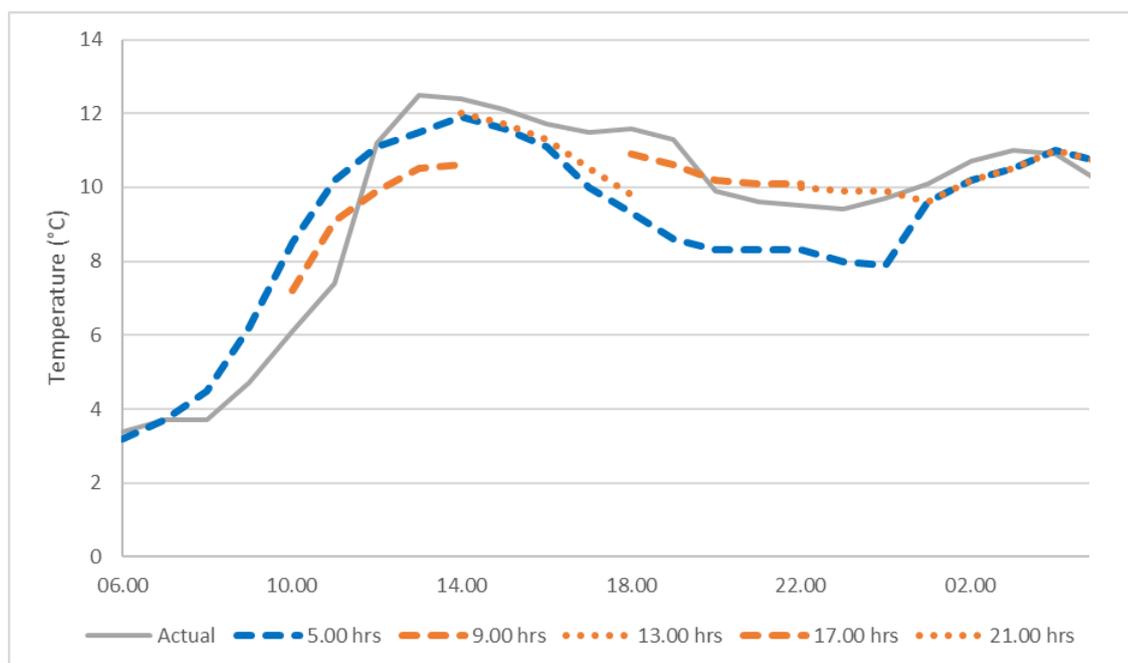
The event for the 7 August 2020 involved changes to weather conditions, profiling of demand, demand forecast and actual demand.

2.1 Temperature profile

Cold temperatures had been forecast for Victoria for 7 August 2020, with a minimum forecast of 3.2°C and a maximum forecast of 12°C in Melbourne. As observed in **Figure 1** the actual temperatures tracked lower than the forecast between 07.00 hrs and 12.00 hrs and higher between 12.00 hrs and 18.00 hrs. Both outcomes impacted the demand forecasts. The timing of the cold front also created uncertainty leading in to the 6.00 pm schedule.

The timing of weather changes, on days where there is a higher degree of variability, can lead to difficulties in accurately forecasting the upcoming schedule. For example, at 5.00 hrs the 6.00 am schedule is being prepared based on the latest weather forecast at that time, and to the extent that the actual weather is materially different to the forecast this can have an impact across the scheduling interval.

Figure 1 Forecast Temperature compared with Actual Temperature



2.2 Changes in demand trends

As a result of increased numbers of people working from home in Victoria, AEMO has observed a change in the typical demand trends which during cold weather can result in a sustained higher demand throughout the day. Prior to COVID-19 restrictions, the demand profile on a typical cold day would consist of a high morning and evening demand with a dip in the middle of the day. This change in demand trends has been a challenge to forecast for both AEMO and Market Participants. As a result of the limited data set available since restrictions began, the change to demand profile was even more uncertain due to the stage 4 restrictions¹.

AEMO has analysed available data from winter 2020 to adjust hourly demand forecast profiles taking account of recent changes to residential demand. As was the case for the event on 4 August 2020², the choice of demand profile needs to take account of changing weather conditions. On 7 August 2020, the forecast for 3 hours of sunshine, minimal rain and low wind speeds resulted in an average COVID-19 demand profile being selected. Although rain was expected later in the day it wasn't forecast to impact demand until the evening peak.

These combined difficulties in forecasting an accurate demand profile and changes in temperature resulted in AEMO issuing a notice of a threat to system security for gas day 7 August 2020.

2.3 Actual system demand

The demand forecast for AEMO and Market Participants can be seen in **Figure 2**. This comparison of hourly forecasts, updated at each scheduling interval, with actual demand show that both AEMO and Market Participants under-forecasted the 10.00 am scheduling interval.

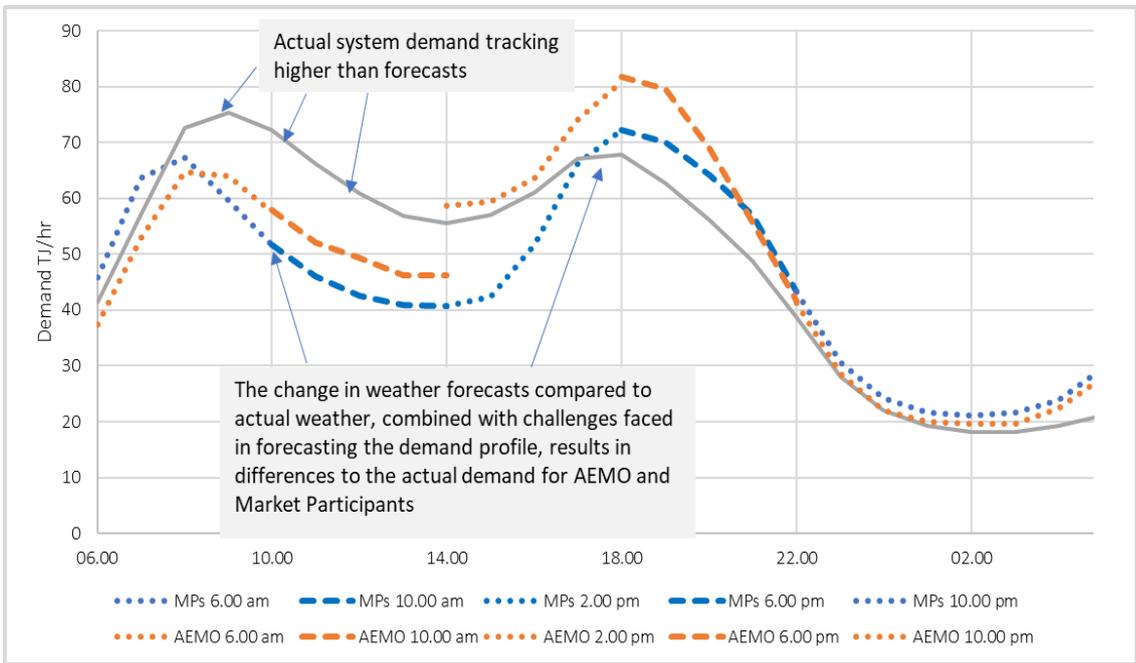
A demand forecast override of 36 TJ was applied at the 10.00 am schedule in addition to 6 TJ at the 6.00 am schedule. This was due to the extrapolated actuals pushing the AEMO total demand forecast into a higher forecast range band per the Demand Forecast Methodology rather than a change in forecast by AEMO. Despite the morning peak tracking much higher than forecast, the weather forecast had improved from the

¹ DHHS. Stage 4 restrictions, 2 August 2020. Available at <https://www.dhhs.vic.gov.au/stage-4-restrictions-covid-19>. Viewed: 17 August 2020.

² AEMO. DWGM Intervention Report, 18 August 2020. Available at <https://aemo.com.au/-/media/files/gas/dwgm/2020/dwgm-er-20-005-4-aug-2020.pdf>

6.00 am schedule resulting in a slightly lower EDD³ for the day (this was mostly due to higher forecast overnight temperatures rather than a change in daytime weather compared to forecast conditions).

Figure 2 Comparison of forecast system demand and actual system demand by schedule



Market Participants had forecast, in aggregate, a daily system demand of 1,097 TJ at the 6.00 am schedule. Only minor updates to these aggregate forecasts were made at subsequent scheduling intervals. AEMO’s 6.00 am daily forecast was 1,120 TJ. AEMO’s forecasts were updated based on current-day observed changes and COVID-19 profile.

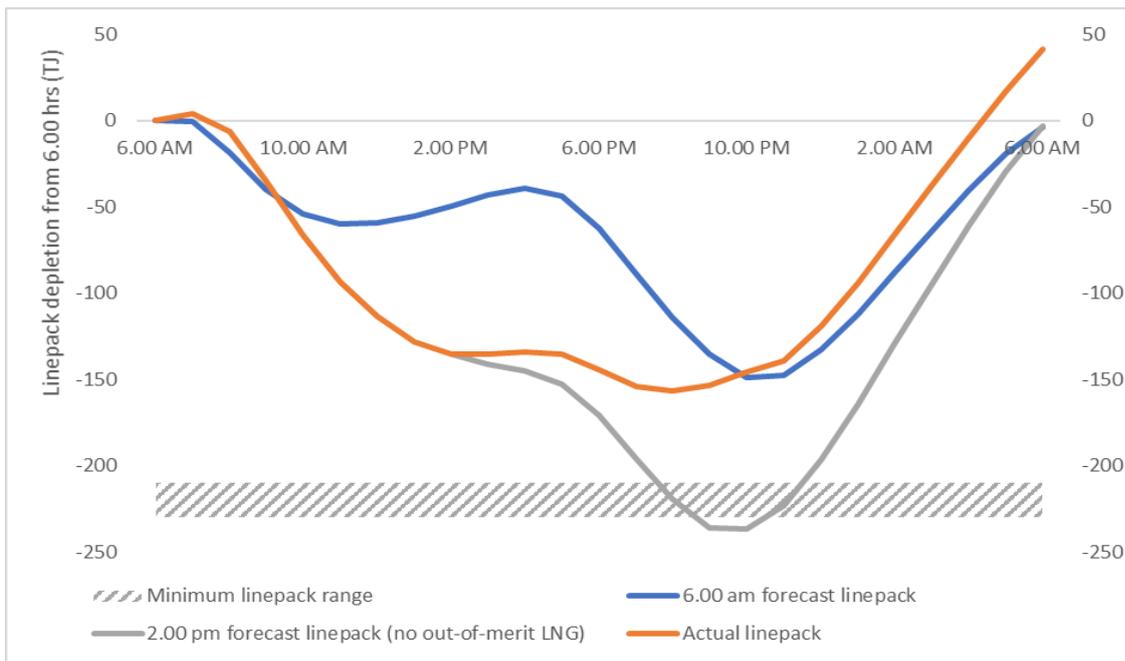
Actual demand on 7 August 2020 was approximately 1,164 TJ. The actual demand tracks higher than AEMO’s forecast between 8.00 hrs and 14.00 hrs, and tracks lower from 14.00 hrs. Forecasts for Gas-fired Power Generation (GPG) did not change materially across the day, and actual GPG usage was half of what had been forecast accounting for only 14 TJ of the daily demand. There was some uncertainty in the GPG forecast demand leading into the 6.00 pm schedule with regards to Somerton Power Station, as detailed in the chronology in appendix A1.

The cold and varied temperatures across the day, combined with the COVID-19 adjusted demand profile, resulted in demand tracking higher than forecasts from around 8.00 hrs through to 14.00 hrs. **Figure 2** also highlights the difficulties for accurate forecasts with residential demand more sensitive to variations in weather than previous years due to many people currently at home during the day.

AEMO’s modelling, conducted at 10.45 hrs and updated at 13.20 hrs, forecast that there could be system security issues with system pressure potentially breaching limits at DCG inlet if the demand continued to track above forecast. Forecasted impacts on the total system linepack levels can be seen in **Figure 3**, showing the impact of the forecast for the 2.00 pm schedule which included an additional 62 TJ demand override.

³ AEMO uses Effective Degree Days (EDD) to forecast gas demand in the DTS. This is a factor derived from temperature, wind speed and sunshine hours, and each gas day is assigned an EDD value based on the weather conditions.

Figure 3 Total forecast and actual system linepack



Consequently, AEMO notified the market of a threat to system security at 13.53 hrs. To avoid the potential breach of system pressures at DCG inlet, AEMO intervened and took the following actions at the 2.00 pm schedule:

- applied a demand forecast override of an additional 62 TJ in accordance with the Demand Override Methodology⁴; and
- scheduled 70.7 TJ (including out-of-merit-order of 56.7 TJ) of Dandenong LNG injections.

There was no further change to the scheduled LNG at the 6.00 pm schedule and AEMO notified the market that the threat to system security had ended at 21.30 hrs. Market prices across the day ranged from \$5.83/GJ at the 6.00 am schedule, up to as high as \$6.92/GJ at the 2.00 pm schedule and as low as \$4.50/GJ at the 10.00 pm schedule.

A chronology of events is included in appendix A1.

3. Assessment of event

This event was triggered due to the actual demand being higher than forecast throughout the day. The decision to issue a notice of a threat to system security was made for the following reasons:

- A significant unforeseen increase in gas demand
- There was the potential for a pressure breach at DCG

3.1 Adequacy of Part 19 of the NGR

In respect of this event, AEMO has assessed the application and adequacy of the NGR, with a primary focus on the following provisions:

- NGR 341 Notice of threat to system security

⁴ AEMO. Demand Override Methodology. Available at <https://www.aemo.com.au/-/media/files/pdf/demand-override-methodology.pdf>

- NGR 351 Intervention reports
- NGR 208 and 215 Demand forecasts

3.1.1 Notice of threat to system security

NGR 341 requires that if AEMO believes there is a potential threat to system security, it must notify Registered participants, without delay, the details of that threat to system security.

At 13.53 hrs on 7 August 2020 AEMO notified the market of the threat to system security.

If AEMO reasonably considers that a threat to system security is unlikely to subside without intervention (NGR 343), AEMO must intervene in the market by taking any measures it believes are reasonable and necessary to overcome the threat to system security. The Dandenong LNG facility had been notified earlier in the day that there was a possibility of LNG being scheduled and received the final notification at 13.53 hrs to inject gas in response to the threat to system security.

AEMO notes that NGR 343 specifies some of the options available to AEMO when intervening in the market are:

- Curtailment in accordance with the emergency curtailment list
- Increasing withdrawals
- Requiring gas to be injected which is available but not bid into the market
- Injecting off-specification gas
- Requiring Registered participants to do any reasonable act or thing that AEMO believes necessary in the circumstances.

In this event, the issue of a potential pressure breach at DCG Inlet could be resolved by scheduling out-of-merit-order (injection bids above the market price) gas from Dandenong LNG⁵.

3.1.2 Intervention Report Timing

NGR 351 places an obligation on AEMO to publish an Intervention Report within 10 business days after the event. AEMO has previously raised this as a concern given the limited time this placed on AEMO to conduct a thorough investigation, given the requirement to assess:

- the adequacy of the Rules;
- the appropriateness of actions taken by AEMO; and
- the costs incurred by AEMO and Registered participants as a consequence of responding to the event or events.

AEMO has reviewed this and AEMO intends to adopt the following approach to reporting on these events, wherever possible:

- Investigate and publish a report based on immediately available data within 10 business days of the relevant event.
- Where not all information necessary to complete the required assessment is available, that report will be flagged as preliminary, with a final report to be published once the additional information is received and analysed.

For the purposes of this report, AEMO believes it has all necessary information and does not intend to publish a subsequent report.

⁵ The bids at Dandenong LNG are scheduled in merit order, however, they are not in merit order when considering the market-wide bids, i.e. they are constrained on.

3.1.3 Demand Forecasts from Market Participants

On 7 August 2020 AEMO made consecutive demand overrides of 6 TJ, 36 TJ, 62 TJ and 19 TJ for the first four schedules. These actions assisted in alleviating the threat to system security.

NGR 208 requires Market Participants to submit demand forecasts for the amount of gas that they expect to withdraw in each hour of the gas day, updated for each schedule. For the purposes of producing operating schedules, as per NGR 215, AEMO must use these demand forecasts. The exception is when AEMO makes a demand forecast override. A demand forecast override is an adjustment made by AEMO, in accordance with the gas scheduling procedures, for the purpose of ensuring system security in the preparation of operating schedules.

AEMO notes that there were high levels of differences between actual and forecast demand for both AEMO and Market Participants on 7 August 2020 gas day. AEMO has been updating demand forecasts and profiling on an ongoing basis in response to the changing circumstances both for COVID-19 impacts and weather. Based on the differences between demand forecasts submitted by Market Participants for each scheduling interval, it is not clear that Market Participants have been adjusting their demand forecasts to account for these changes in forecast profiles.

3.2 Appropriateness of actions taken by AEMO

AEMO's objectives during this event were to:

- Operate in accordance with the NGR and the Wholesale Market Procedures;
- Limit the risk of involuntary curtailment to customers including Gas-fired Power Generation;
- Alleviate the threat to system security and return the DTS to normal operating conditions.

NGR 206 requires that AEMO schedule injections into and withdrawals from the DTS in accordance with bids and must:

- Comply with the gas scheduling procedures; and
- Use its reasonable endeavours to operate within the system security procedures.

AEMO's modelling indicated a potential breach of pressures at DCG could occur after the 6.00 pm scheduling interval due to higher demands that had occurred throughout the day. In this event, AEMO took all reasonable steps to assess the forecasts and notified the market accordingly. AEMO continues to monitor the changing demand profile and make corresponding adjustments to its forecasts.

4. Costs of intervention

In response to the notice of a threat to system security issued for gas day 7 August 2020, AEMO scheduled 70.7 TJ (including out-of-merit-order of 56.7 TJ) of Dandenong LNG injections at the 2.00 pm schedule. This was consistent with the approach outlined in the market notice issued to Market Participants.

The market impact resulting from the out-of-merit-order gas was in the form of additional ancillary payments, and corresponding uplift payments, of \$148,355.

5. Conclusion

AEMO issued a notice of threat to system security in the Victorian Declared Wholesale Gas Market for gas day 7 August 2020. AEMO scheduled 70.7 TJ (including out-of-merit-order of 56.7 TJ) of LNG injections at the 2.00 pm schedule as a result of higher than forecast demand. The constrained-on LNG resulted in \$148,355 of additional ancillary and uplift payments.

AEMO has assessed the application and adequacy of associated NGR provisions and finds that these provisions were applied correctly.

AEMO continues to monitor the changing demand profile and adjusting its forecasts however, as discussed above and in the previous Intervention Report for 4 August 2020, it is not clear that Market Participants are also adjusting their demand forecasts to account for these challenging times. AEMO plans to raise this at the upcoming Gas Wholesale Consultative Forum.

Please direct any feedback or questions regarding this report to GasMarket.Monitoring@aemo.com.au.

A1. Chronology

Date/Time (AEST)	Event/ Action	Details
7 August 2020 09.00 hrs	AEMO forecast	AEMO demand forecast revised up following higher than anticipated demand from 06.00 hrs.
7 August 2020 10.45 hrs	AEMO forecast	AEMO forecasting indicates that Bendigo, Ballarat and DCG Inlet pressure may be breached if the demand continues to track high, and LNG may be required from 14.00 hrs.
7 August 2020 13.20 hrs	AEMO forecast	Multiple forecasting models have been run. AEMO demand forecast revised up following higher than anticipated demand from 10.00 hrs. Modelling using the revised forecast indicated a potential pressure breach at DCG Inlet.
7 August 2020 13.30 hrs	APA confirmation	AEMO confirms with APA the available rate of injection for Dandenong LNG.
7 August 2020 13.40 hrs	AEMO forecast	AEMO determined 70.7 TJ of LNG would be required from 14.00 hrs to 21.00 hrs to avert the threat.
7 August 2020 13.53 hrs	AEMO market notice	AEMO issued market notice of the threat to system security.
7 August 2020 13.54 hrs	2.00 pm schedule approved	2.00 pm operating and pricing schedules were approved.
7 August 2020 15.05 hrs	AEMO market notice	AEMO sends market notice advising of Dandenong LNG constraints
7 August 2020 16.50 hrs	AEMO NEM control room	NEM control room notifies Gas control room that Somerton Power Station will be scheduled for full rate during the evening peak.
7 August 2020 17.00 hrs	Contact AGL	Gas control room attempt to contact AGL to confirm forecast gas usage for Somerton Power Station
7 August 2020 17.10 hrs	AEMO NEM control room	NEM control room notifies Gas control room that Somerton Power Station likely to be at 50% load, and subsequently notifies that Somerton is likely to be off-line at 19.30 hrs
7 August 2020 17.25 hrs	AEMO forecast	AEMO demand forecast revised up following higher than anticipated demand from 14.00 hrs. Modelling using the revised forecast indicated the current level of scheduled LNG is adequate to avert potential pressure breach at DCG Inlet, taking into account GPG demand uncertainties.
7 August 2020 17.30 hrs	6.00 pm schedule approved	6.00 pm operating and pricing schedule were approved
7 August 2020 17.50 hrs	Dandenong LNG Trip	Dandenong LNG facility trips off-line, injection rate dropped to zero.
7 August 2020 18.00 hrs	Dandenong LNG	Dandenong LNG facility back on-line, injection rate increasing back up to scheduled rate.
7 August 2020 18.30 hrs	AEMO forecast	System demand flattening and lower than forecast. Low pressures in northern parts of the DTS.
7 August 2020 21.30 hrs	AEMO market notice	AEMO issued market notice advising end of threat to system security.