AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Declared Wholesale Gas Market – Intervention Report

March 2022

Notice of threat to system security

A report into low LNG stock levels at the Dandenong LNG storage facility

Important notice

Purpose

AEMO has prepared this report pursuant to rule 351 of the National Gas Rules, using information available as at January 2022, 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

In the 2021 Victorian Gas Planning Report (2021 VGPR)[1] AEMO identified a threat to system security for the Victorian Declared Transmission System (DTS) during winter 2021 onwards.

AEMO's modelling and information gathering for the 2021 VGPR identified that there was insufficient contracted Dandenong LNG stock in the event of certain operational and emergency scenarios during winter 2021 onwards. These low levels of LNG at Dandenong meant that there was an increased risk of curtailment of supply for winter 2021 onwards unless the LNG stock was increased to the required levels determined in the 2021 VGPR modelling.

On 29 March 2021, AEMO notified the market of a threat to system security with an expectation that the threat would commence on 1 May 2021. In this notice AEMO indicated that a market response may alleviate the threat to system security and remove the need for AEMO to act. During winter 2021 while AEMO considered options for increasing Dandenong LNG inventory, the LNG stock level remained above the level specified in the Notice of a Threat to System Security.

On the basis that the threat would be ongoing and impact into winter 2022 due to the expected contracted capacity at Dandenong remaining relatively low, AEMO contracted 60 TJ of capacity with APA on 19 January 2022. AEMO included $1,000,000 in the FY22 budget to reflect a provision for reserve gas supply in 2021-22. The cost of this LNG reserve will be recovered through AEMO's fees on the same basis as the existing Declared Wholesale Gas Market (DWGM) fees.

AEMO notified the market on 8 March 2022 that the threat had ended.

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.

[1] AEMO, 2021 Victorian Gas Planning Report, at https://www.aemo.com.au/-/media/files/gas/national_planning_and_forecasting/vgpr/2021/2021-victorian-gas-planning-report.pdf?la=en

2 Background

AEMO's declared system functions include controlling the operation and security of the DTS[2], and AEMO has a duty to minimise, as far as practicable, the hazards and risks to safety of the public and customers arising from a gas supply interruption[3]. One of the greatest risks to the safety and security of the DTS is an extended gas supply interruption during a period of high demand.

Dandenong LNG is a critical piece of infrastructure in the DTS due to its proximity to Melbourne with its ability to quickly ramp up and inject gas into the DTS to restore pipeline pressures. It is not uncommon for AEMO to schedule gas to be injected into the DTS from the Dandenong LNG facility because of a threat to system security, although this typically only occurs on high-demand days.

2.1 Historical LNG usage

Historically Market Participants have maintained Dandenong LNG storage levels at close to the maximum capacity (680 TJ) as winter approaches.

Table 1 summarises threat to system security (TTSS) events where LNG was required, the total amount of LNG injected across those events, the total market use of LNG, and the maximum storage level depletion during each winter since 2017.

Table 1 Summary of number LNG usage in recent winters

Year	TTSS Events	LNG (TJ) used in TTSS	Market LNG (TJ)	Total LNG Scheduled (TJ)	Minimum tank level (TJ)	Cumulative EDD[4]
2017	1	17.9	14.5	32.4	596	878
2018	0	0	58.3	58.3	610	879
2019	3[5]	44	76.3	120.3	600	845
2020	4[6]	135	246[7]	381	526	884
2021	0	0	7.1	7.1	299	821

2.2 Intervention

From the 2021 VGPR modelling, AEMO identified that low Dandenong LNG inventory is a threat to system security.

[2] South Australian Government. National Gas Law, 91BA(1)(b). Available at https://www.legislation.sa.gov.au/__legislation/lz/c/a/national%20gas%20(south%20australia)%20act%202008/current/2008.19.auth.pdf. Viewed: 14 October 2021.

[3] Victorian Government. Gas Safety Act 1997, Section 32(c). Available at https://content.legislation.vic.gov.au/sites/default/files/2020-12/97-99aa045%20authorised.pdf. Viewed: 14 October 2021.

[4] EDD (effective degree days) is a measure of coldness. The higher the EDD, the more gas is expected to be used for heating.

[5] There were two interventions at the end of May 2019 accounting for 32 TJ being injected in responding to threats to system security.

[6] Winter 2020 was impacted by the changing demand profile due to people working from home due to COVID-19. This has been documented in the 2020 Intervention Reports available here https://aemo.com.au/energy-systems/gas/declared-wholesale-gas-market-dwgm/dwgm-events-and-reports

[7] It is likely that the higher volume of market LNG relates to a contract terminating and Market Participant(s) selling the gas into the market. 165 TJ was scheduled to be injected in September 2020.

The VGPR set out the two scenarios where AEMO would be required to intervene in the market or direct gas to be injected from Dandenong LNG:

- Threat scenario – for use when LNG is required to be injected as out-of-merit-order gas as an operational response to a threat to system security to prevent system pressures dropping below their minimum allowable operating levels. This type of event typically occurs on a high-demand day, and it can occur several times a year.
- Emergency scenario – for use in an emergency curtailment situation to support the stabilisation of critical system pressures as curtailment of residential, small commercial and large industrial load occurs. This is a very low probability event with potentially very high public safety consequences. It is likely that a Threat scenario would precede an Emergency scenario.

The modelling undertaken by AEMO for the 2021 VGPR indicated that approximately 140 TJ of LNG would be required as reserve in the Dandenong LNG facility for the **Emergency scenario**. This means that AEMO requires 140 TJ in the facility to manage an emergency curtailment event safely and therefore AEMO would only allow the usable storage levels at Dandenong to drop below 140 TJ during an emergency. AEMO also determined that an additional 110 TJ was required for the **Threat scenario**, or 250 TJ in total.

Historically there has been sufficient LNG stock in the facility for both the **Threat scenario** and **Emergency scenario**, including market-scheduled LNG. However, at the lower contracted levels, there are times when there would have been insufficient volumes to meet these scenarios.

2.3 LNG contracted volumes

Information obtained when preparing the 2021 VGPR, and as shown on the Gas Bulletin Board, indicated that Dandenong LNG would only have 80 TJ of market[8] contracted capacity leading into winter 2021, from a capacity of 680 TJ. A summary of the estimated contracted volumes is available in Table 2.

[8] APA does hold additional volumes for its own commercial and operational purposes.

Table 2 Dandenong LNG estimated contracted volumes

Date updated	Applicable period	Estimated contracted volume (TJ) [9]
October 2019	From October 2020	261 (down from 561)
November 2019	From October 2020	271
January 2020	October 2020 – December 2020	291
January 2020	From January 2021	171
February 2020	From February 2021[10]	81
June 2020	January 2021	181 (all other periods after January 2021 remain at 80)
December 2020	January 2021	241 (all other periods after January 2021 remain at 80)
January 2021	From February 2021	101
February 2021	From February 2021	161
March 2021	From March 2021	194
May 2021	From May 2021	269
July 2021	From February 2022	254

2.4 Market response

The low level of contracted capacity, combined with the requirements to meet the Emergency and Threat scenarios resulted in AEMO issuing a Notice of a Threat to System Security on 29 March 2021 calling for a market response with an expectation that the threat would commence from 1 May 2021. In this notice AEMO indicated that a market response may alleviate the threat to system security if Market Participants were to contract LNG capacity at Dandenong.

2.5 LNG reserve

Prior to 2010, AEMO (and previously VENCorp) held 3,000 tonnes (~165 TJ), approximately a quarter of the capacity of the Dandenong LNG facility, as an LNG reserve. This reserve was to ensure that there would be sufficient LNG stock maintained in the facility to maintain minimum system pressures in the event of a gas emergency (**Emergency scenario**). In 2010, following an amendment to the National Gas Rules, the National Gas Amendment Dandenong Liquefied Natural Gas Storage Facility[11] (the 2010 Rule Determination), AEMO ceased to hold its own LNG reserve.

The intent of the 2010 Rule Determination was to improve and promote efficient capital investment of the Dandenong LNG facility, as well as giving APA greater flexibility over its operation in being able to offer more services. There were some elements of the original mechanisms that were retained, including:

- the potential for AEMO to re-establish an LNG reserve; and

[9] These values have been estimated based on Gas Bulletin Board submissions for nameplate capacity and uncontracted capacity outlook.

[10] The 2021 VGPR was published in March 2020

[11] AEMC, 2010. "Dandenong Liquefied Natural Gas Storage Facility". Available at https://www.aemc.gov.au/rule-changes/dandenong-liquefied-natural-gas-storage-facility. Viewed: 4 October 2021

- the intervention powers of AEMO under NGR 343 allowing AEMO to inject from an LNG reserve.

The intent of the 2010 Rule Determination assumed that alternative sources of supply would mean stronger system security. Since then AEMO has become aware that these original intentions do not hold in the current climate. Changes to the market, such as alternative supply sources, provide Market Participants with more options in managing their gas portfolios, potentially reducing the need to contract at Dandenong LNG.

However, LNG storage is still critical for system security and plays an essential role should an **Emergency scenario** or **Threat scenario** occur. If the Dandenong LNG facility was not available, without increased levels of supply and investment in the DTS, there would be a higher likelihood of curtailment during an unplanned outage or during periods of unforecast high demand (usually due to colder than forecast weather).

3 Assessment of event

This event was a direct result of the low levels of contracting at Dandenong LNG. AEMO issued a threat to system security due to this low LNG stock and called for a market response in accordance with NGR 342.

3.1 Adequacy of Part 19 of the NGR

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

- LNG reserve
- Obligations of an LNG storage provider
- Threats to system security
- Intervention reports
- Ownership rules.

3.1.1 LNG reserve

NGR 200 defines the LNG reserve as the LNG storage capacity to which AEMO is entitled under its LNG storage agreement and NGL 91BA(2) provides for AEMO to trade in natural gas. One of the options available to AEMO, as per NGR 343(1), when intervening in the market is to inject gas from AEMO's LNG reserve. This was maintained during the 2010 Rule Determination to allow AEMO, if required, to enter into contracts to re-establish an LNG reserve.

On the basis that the threat would be ongoing and the impact into winter 2022, due to the expected contracted capacity at Dandenong remaining relatively low, AEMO has re-established an LNG reserve by agreeing a contract with APA. From this experience there are improvements that can be made to the NGR:

- **Transparency around minimum volumes maintained in the tank.**
  - AEMO's current forecast for the **Emergency scenario** is for 140 TJ to be held in the storage facility as a minimum volume. This volume would be used to manage a curtailment situation safely. AEMO may restrict Market Participants from withdrawing gas from Dandenong LNG once the usable inventory reduces to 140 TJ.
  - Historically, Dandenong LNG has been fully contracted, and therefore the likelihood of the stock reducing to the minimum volume, for the **Emergency scenario**, was low. As Dandenong LNG has been contracted at lower levels more recently, there is an increased likelihood that AEMO would intervene to ensure that the tank level is maintained above the minimum volume.
  - It is important that there is transparency around minimum volumes available to Market Participants, including any inventory that may not be available due to minimum tank levels also required by APA for its operations and tank integrity. Gas cannot be contracted if it is not accessible. For this reason, there may be benefit in the NGR having an explicit requirement that AEMO will contract LNG reserve and a minimum volume is to be determined that is required for the **Emergency scenario**, which would be in addition to any volume in the tank that is not accessible.

- **Contracting an LNG reserve.**
  - Currently, the injection of AEMO's LNG reserve is within the context of an intervention measure under NGR 343. However, the contracting of an LNG reserve needs to be completed well in advance of a **Threat** or an **Emergency scenario**. Contract negotiation can be time consuming and LNG stock needs to be established. Therefore, a flexible contract for LNG capacity would not typically be conducted on a short-term. If Market Participant contracted capacity remains low, AEMO may contract capacity to cover forecast requirements.
  - The rules allow AEMO to contract the LNG reserve, however the rules could include provision for a determination of the level required in the Wholesale Market Procedures. This would ensure that a transparent approach is taken, and that adjustments to the volume contracted can be accommodated.
- **Transparency of cost recovery.**
  - AEMO recovers its operating costs through participant fees paid by Registered participants in accordance with the fee structure developed under Part 15A, Division 3 of the NGR. The development of a specific fee for recovery of LNG reserve costs would be part of AEMO's next participant fee consultation process.
  - AEMO recommends that the costs of the LNG reserve to be separately reported on participant invoices using the existing "System security charge" line item, noting that the existing fee structure[12] would apply until reviewed at the next AEMO gas fee consultation.
- **Payments associated with AEMO injections and withdrawals.**
  - The rules are currently silent on how AEMO is charged for the commodity when entering a contract for LNG reserve. There is a cost for withdrawing the gas from the DTS to establish the LNG reserve, and then any subsequent cost if the LNG reserve needs to be replenished (after being injected into the DTS). If AEMO is required to supply gas from its LNG reserve into the market, which may be under an AEMO direction, there is also the issue of the payment for gas that is supplied into the market under direction.
  - AEMO's approach is that the gas that is withdrawn or injected, as required, will be subject to deviation payments. To ensure there is no ambiguity, this process should be clearly documented in the NGR and Wholesale Market Procedures.
- **Directing injections in the LNG reserve.**
  - The NGR specifies that injecting gas from AEMO's LNG reserve is an intervention per NGR 343(1), and NGR 280(1) highlights the difference between LNG injection bids and the LNG reserve. To the extent that the NGL 91BA(2) provides AEMO with the ability to trade in natural gas, it is appropriate that when AEMO injects gas into the market it is through an intervention and not as an injection bid. It should not be interpreted that AEMO could actively bid volumes of gas into the market, and the NGR provides sufficient guidance that this is not the case with regards to the LNG reserve.

3.1.2 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, of the details of that threat to system security. The information to be provided in this notice includes:

[12] AEMO. Gas Market Participants Fee Structure Review published 19 March 2021. AEMO | Gas Markets Participant Fee Structure Review

- The nature and magnitude of the threat to system security, which includes estimates of the duration of the threat to system security and the shortfall in gas supplies
- Whether AEMO will intervene in the market to avert the threat and, if so, the time intervention will be required if there was an insufficient market response.

AEMO notified the market of the threat to system security on 29 March 2021, indicating the threat would commence from 1 May 2021 and an end date to the threat was not possible to estimate. AEMO also reserved the right to determine an appropriate operational response if there was an insufficient market response.

Threat scenario

Within the notification, AEMO advised that 110 TJ of LNG stock would be required to satisfy the requirements of the **Threat scenario**. It is reasonable for AEMO to expect that there was a likelihood for the system to need this volume (110 TJ), plus an additional amount that could be used for regular market scheduling.

For the 2021 VGPR, the **Threat scenario** is possible, however it highlights that there can be limited options available to AEMO as the system operator. A **Threat scenario** typically occurs on a high-demand day when supply sources can already be operating at their maximum capacity (including pipeline capacity is constraining further supply). If there is then unforecast levels of demand or a supply disruption there are limited options to supply this demand aside from scheduling LNG into the market.

Producing LNG is energy and capital intensive, resulting in a Dandenong LNG refill rate of approximately 8 TJ/d. Therefore, it is possible that a major event or a series of events could result in the LNG inventory depleting faster than it can be refilled. AEMO undertook a probabilistic assessment of possible gas supply disruption scenarios to determine the amount of LNG that needs to be held to prevent curtailment being required due to insufficient LNG inventory.

AEMO has concluded that longer-term solutions might be appropriate but at the very least a greater level of transparency is required, either in the NGR or Wholesale Market Procedures, to provide clarity on AEMO's contracting of an LNG reserve.

Emergency scenario

AEMO advised that 140 TJ of LNG stock would be required to satisfy the requirements of the **Emergency scenario**. AEMO considers that this is necessitated by the *Gas Safety Act*. Section 32(c)(i) states that a Gas Company (which includes AEMO) is required "to minimise, as far as practicable, the hazards and risks to safety of the public and customers arising from a gas supply interruption".

AEMO has the ability to contract an LNG reserve in relation to AEMO's declared system functions pursuant to NGL 91AB and to contract gas for the safety, security or reliability of the DTS under NGL 91BA(2). As stated earlier in this document, the **Emergency scenario** includes having sufficient LNG capacity to safely manage a curtailment event.

The framework or obligations within the NGR regarding AEMO contracting for LNG storage capacity should be more detailed. For example, there is no methodology specified in the NGR or the Wholesale Market Procedures for determining the amount of LNG stock that is needed to meet the **Emergency scenario**.

AEMO, as the system operator, undertook modelling of several emergency system curtailment scenarios to determine this quantity of LNG that is necessary to minimise risks to safety that may arise due to the gas supply interruption.

For the purposes of NGR 341, the 2021 VGPR identified that there was insufficient contracted storage capacity at Dandenong LNG to limit the likelihood of curtailment (because there was insufficient LNG to satisfy the **Threat scenario**), not that there was an increased probability of a major unplanned interruption to supply.

Therefore, AEMO has contracted LNG capacity as this needs to be in place well in advance of any **Threat scenario** or **Emergency scenario**.

3.1.3 Ownership rules

NGL 91BO specifies that AEMO must establish the rules for determining the ownership of gas in the DTS and for resolving disputes about ownership. These "Ownership Rules" form part of the Wholesale Market Procedures and currently specify that title of gas is only applicable to Market Participants.

As AEMO can hold an LNG reserve (as contemplated under the NGR), and if this gas is supplied into the DTS, it is appropriate that title of ownership of the gas remains with AEMO for settlement purposes. This inconsistency can be resolved with an update of the Ownership Rules.

3.1.4 Intervention report timing

NGR 351 places an obligation on AEMO to publish a report within 10 business days after a threat to system security event. AEMO has adopted 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.

3.2 Appropriateness of AEMO's actions

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 any gas generation
- Alleviate the threat to system security.

Following the issuing of the Notice of a Threat to System Security, higher levels of Market Participant contracting of LNG capacity did also occur.

While NGR 341(1) does contemplate AEMO issuing a Notice of a Threat to System security when publishing the VGPR (or an update), the following sections of NGR 341 are mainly concerned with immediate operational threats to system security. AEMO can see the benefit in the rules and the Wholesale Market Procedures providing greater clarity for managing threats that are identified in the VGPR.

AEMO contracted 60 TJ of LNG reserve capacity on 19 January 2022 given the continued low levels of contracting at Dandenong LNG. AEMO intends to consult with Market Participants and other stakeholders on future LNG contract capacity where there is a risk of curtailment identified in AEMO's modelling.

AEMO notified the market on 8 March 2022 that the threat had ended.

3.3 Costs of intervention

On the basis that the Market Participant contracted capacity has remained low, AEMO has entered into a contract for LNG capacity. The cost of contracting this LNG reserve will be made of up of direct costs payable to APA for the capacity and refilling, and the commodity cost of purchased gas. These costs will be recovered through AEMO's fees, using the existing fee structure.

4 Conclusion

AEMO has assessed the application and adequacy of associated NGR provisions and finds that this event has highlighted areas where the rules and the Wholesale Market Procedures would benefit from being more explicit with regards to an AEMO LNG reserve. AEMO considers that there should be a positive obligation for AEMO to hold LNG stock for the safe operation of the DTS, and for this to be clear in the rules and Procedures. This clarification should consider whether AEMO continues to hold stock for the **Emergency scenario** if the tank is fully contracted but note that AEMO may intervene to ensure that the usable LNG inventory does not fall below the minimum required (currently modelled as 140 TJ). The Ownership Rules also need to be updated by AEMO to be consistent with the use of the LNG reserve.

As per section 3.1.1, the rules and Procedures should be clarified and strengthened for:

- Transparency around minimum volumes maintained in the tank,
- Coordination for contracting LNG reserve,
- Transparency of cost recovery,
- Payments associated with AEMO injections and withdrawals,
- Obligations under the Rules when market signals are weak, and
- Directing injections from the LNG reserve into the DTS.

AEMO will raise these matters at an upcoming Gas Wholesale Consultative Forum to seek feedback.

AEMO notified the market of a threat to system security and called for a market response on 29 March 2021, due to low Dandenong LNG contracting, to commence from 1 May 2021. AEMO contracted LNG reserve with APA on 19 January 2022 as there was an ongoing risk while contracted levels at Dandenong remained low.

While AEMO has contracted a sufficient capacity at Dandenong LNG, it is likely that the only requirement to issue a subsequent Notice of a Threat to System Security, related to this event, would be where a schedule indicates that a market response is required. The cost of this LNG reserve will be recovered through AEMO's existing fee structure, noting that it may be appropriate to explore alternative fee structures in the next fee structure period. AEMO determined that the threat ended on 8 March 2022.

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

A1. Chronology

Date/Time (AEST)	Event/Action	Details
29 March 2021	AEMO	Publication of 2021 VGPR showing insufficient contracted Dandenong LNG stock was forecast for operational and emergency scenarios during winter 2021 onwards.
29 March 2021	Market notice	AEMO notified the market indicating threat to system security to commence from 1 May 2021. This market notice also called for a market response to alleviate the threat to system security.
19 January 2022	AEMO contracted APA	AEMO contracted LNG reserve with APA.
8 March 2022	Market notice	AEMO notified the market that the threat to system security for winter 2021 onwards had ended.