



Australian Energy Market Commission

CONSULTATION PAPER

**REVIEW OF THE GAS SUPPLY
GUARANTEE**

11 MARCH 2021

REVIEW

INQUIRIES

Australian Energy Market Commission
GPO Box 2603
Sydney NSW 2000

E aemc@aemc.gov.au
T (02) 8296 7800

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ABOUT THE AEMC

The AEMC reports to the Council of Australian Governments (COAG) through the COAG Energy Council. We have two functions. We make and amend the national electricity, gas and energy retail rules and conduct independent reviews for the COAG Energy Council.

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1 INTRODUCTION

On 9 September 2020, the Energy Ministers provided the Australian Energy Market Commission (AEMC or Commission) with terms of reference to conduct a review of the Gas Supply Guarantee.

The terms of reference provided by Energy Ministers require the AEMC to consider the following¹:

- the scope of the Gas Supply Guarantee guidelines (the guidelines) as developed and amended by the Australian Energy Market Operator (AEMO)²
- the manner in which the guidelines have been utilised by AEMO, including in relation to industry engagement
- any overlap between the guidelines and other existing reliability or security mechanisms in the national energy framework
- the potential for the guidelines, or another similar mechanism as identified by the AEMC, to support reliability in the national electricity market (NEM), or to otherwise provide value to consumers
- the form any such mechanism should take (for example, through changes to the national electricity and gas laws, or associated rules)
- the impact of any such mechanism on AEMO, the market and market participants (including the costs and benefits of any recommended approach) — such consideration should also take into account any current and enduring issues arising from the COVID-19 pandemic.

A copy of the terms of reference can also be found on the AEMC website, www.aemc.gov.au.

This consultation paper has been prepared to facilitate public consultation on the review.

Details on how to lodge a submission are contained in section 1.2 below. A template setting out the questions included in this paper is available from the project page to assist stakeholders in providing their views on the issues raised in the paper.

This paper:

- sets out a summary of, and background to, the terms of reference
- identifies a number of questions and issues to facilitate the consultation on this review
- outlines the process for making submissions.

¹ Energy Ministers, *Review of the Gas Supply Guarantee*, terms of reference, pp. 2-3.

² In March 2017, AEMO, at the request of the COAG Energy Council, developed the guidelines to facilitate the delivery of these commitments, with the guidelines being effective since 1 December 2017.

1.1 Approach to this review

The AEMC will adopt a two-stage approach to carry out this review. The findings of stage one will determine if stage two is required:

- Stage one will identify if there is a problem and how material the problem is. If the Commission concludes that there is no longer a problem, or the problem is solved by other mechanisms in place in either the electricity or gas markets, then stage two will not be required and will not go ahead.
- Stage two will identify potential solutions and recommend an implementation and transition plan to the problem established through stage one of the review.

In undertaking the review, the AEMC must consult with AEMO, the Australian Energy Regulator (AER), the Australian Competition and Consumer Commission (ACCC), industry as well as state and territory governments.

The AEMC is requested to report back to Energy Ministers by quarter 1, 2022.³

1.2 Responding to this paper

Written submissions to this consultation paper must be lodged with AEMC by 15 April 2021 online via its website, www.aemc.gov.au, using the "lodge a submission" function and selecting the project reference code EMO0041. A template is available to help stakeholders provide their views on the issues raised in the paper.

The submission must be on letterhead (if submitted on behalf of an organisation), signed and dated.

Where practicable, submissions should be prepared in accordance with the Commission's guidelines for making written submissions.⁴ All submissions are published on the AEMC website, subject to a claim of confidentiality.

All enquiries on this project should be addressed to Daniela Moraes at (02) 8296 0607 or daniela.moraes@aemc.gov.au.

³ Energy Ministers, *Review of the Gas Supply Guarantee*, terms of reference, pp. 2-3.

⁴ This guideline is available on the Commission's website www.aemc.gov.au.

2 BACKGROUND AND CURRENT ARRANGEMENTS

This chapter outlines:

- the background on the guidelines, including a description of the load shedding event that preceded the Gas Supply Guarantee
- the current arrangements (how the Gas Supply Guarantee is put into operation)
- the existing jurisdictional emergency procedures for both electricity and gas.

2.1 Background

In March 2017, producers and pipeline operators made commitments to the Australian Government to make gas available to meet peak demand periods in the NEM (such as during heat waves):⁵

- Producers proposed to meet this commitment by making additional gas supply available to gas-powered generators through AEMO's facilitated markets⁶ or contractual arrangements during peak NEM demand periods.
- Pipeline operators proposed to meet this commitment through new interruptible agreements for shipping additional gas supply, and where possible, by coordinating additional transfer and delivery of gas between pipelines and/or by transporting and making available additional delivery of gas to gas-powered generators.

AEMO and industry worked together to develop guidelines in order to support the commitments made to the Australian Government in March 2017.

The guidelines are a non-binding instrument and set out the process for calling meetings with market participants in relation to potential gas supply shortfalls, the purposes of those conferences and how the conferences will be conducted.

It is worth noting that the mechanism has not been triggered since its inception in December 2017.⁷

While AEMO has not found a gas supply shortfall or communicated with the industry to resolve a potential shortfall, it has used the Gas Supply Guarantee to preemptively reduce the risk of a supply shortfall emerging.⁸

5 AEMO, *Gas Supply Guarantee Guidelines*, March 2020, pp. 2-3.

6 AEMO operates a number of facilitated wholesale markets. These are the Victorian declared wholesale gas market, the short term trading markets, the gas supply hubs and other markets supporting the secondary trading of gas and pipeline capacity.

7 This was noted in the submissions to the consultation on AEMO's *Gas Supply Guarantee Guidelines* by the Australian Petroleum Production and Exploration Association, Australia Pacific LNG and Shell Australia. See AEMO's website: <https://aemo.com.au/en/consultations/current-and-closed-consultations/gas-supply-guarantee-guidelines-consultation>.

8 AEMO, *Summer 2020-21 Readiness Plan*, November 2020, p. 16.

2.1.1 Gas Supply Guarantee

In March 2017, east coast gas producers and pipeline operators made a commitment to the Australian Government to make gas supply available to electricity generators during peak demand periods in the NEM.⁹

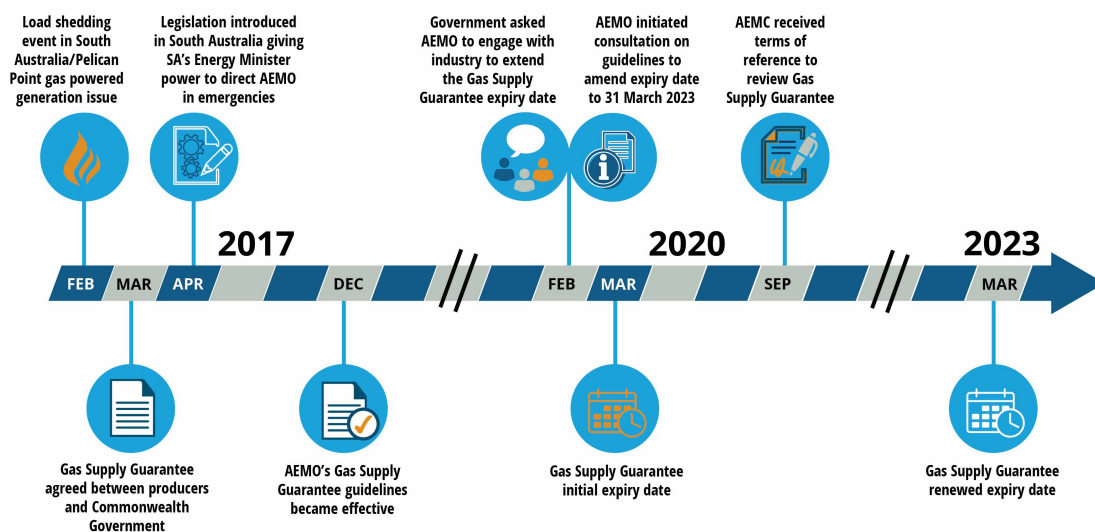
AEMO, at the request of COAG Energy Council (now Energy Ministers), developed the guidelines to facilitate the delivery of these commitments, with the guidelines being effective since coming into effect on 1 December 2017.¹⁰

The guidelines are non-binding and were due to expire in March 2020. However, in February 2020 the Minister for Energy and Emissions Reduction requested AEMO to engage with industry to extend the Gas Supply Guarantee expiry date.¹¹

AEMO initiated a consultation process and subsequently amended the expiry date of the guidelines to 31 March 2023.¹²

A timeline of events is illustrated in figure 2.1 below.

Figure 2.1: Gas Supply Guarantee timeline



Source: AEMC

9 The Hon. Malcolm Turnbull MP, Prime Minister, *Measures agreed for cheaper, more reliable gas*, 15 March 2017. See <https://www.malcolmturnbull.com.au/media/measures-agreed-for-cheaper-more-reliable-gas>. See also AEMO, *Gas Supply Guarantee Guidelines*, March 2020, pp. 2-3.

10 AEMO, *Gas Supply Guarantee Guidelines*, March 2020, p. 2.

11 AEMO, *Notice of guideline consultation*, 19 February 2020, p. 1.

12 AEMO, *Gas Supply Guarantee Guidelines Consultation*, final determination, March 2020, p. 2.

2.1.2 Australian Domestic Gas Security Mechanism

The Australian Government announced the of the Australian Domestic Gas Security Mechanism (ADGSM) in April 2017. In July 2017, the ADGSM was established to safeguard domestic gas users against a potential supply shortfall, due to the tightening supply-demand balance following the commencement of liquefied natural gas (LNG) exports in 2015.¹³

The ADGSM has been designed as a measure of last resort in the event of a forecast domestic gas shortage and provides the Australian Government with the ability to restrict LNG exports to secure domestic supply.

Appendix B provides a more detailed explanation of this mechanism.

2.2 February 2017 load-shedding event in South Australia

This section provides a description of the load shedding event that preceded the introduction of the Gas Supply Guarantee.

Firstly, an introduction about what is load shedding and how it is triggered.

What is load shedding?

Load shedding is the controlled reduction of electricity supply to parts of the power system servicing homes and businesses to protect system security and mitigate damage to infrastructure.¹⁴

AEMO does not decide which areas are shed. AEMO makes the decision about how much electricity consumption needs to be reduced, then the electricity transmission and distribution companies and government decide how this will be done on a local level.¹⁵

Each state and territory has a plan developed by the government in collaboration with the electricity industry for how load shedding is to be carried out in that jurisdiction. Wherever possible, load shedding is implemented on a rotational basis.¹⁶

Background: South Australia generation mix and Pelican Point

South Australia had an installed generation capacity of 4,556 MW of which 2,960 is gas-fired and the remaining 1,596 MW generation is mainly wind in 2017.

Pelican Point is a combined gas and steam generation station located in South Australia and owned by Engie.¹⁷ Part of the station was placed on standby and was not operational in 2014 by Engie for commercial reasons. It was understood that, if required, given four hours' notice, the non-operational part of the station could return to service. Pelican Point had rarely operated at full capacity over the period 2015-2017.¹⁸

13 The ADGSM sits within Division 6 of the Customs (Prohibited Exports) Regulations 1958. Details about the operation of the ADGSM are in the Customs (Prohibited Exports) (Operation of the Australian Domestic Gas Security Mechanism) Guidelines 2020. New guidelines came into effect on 6 January 2021.

14 AEMO, *Load shedding fact sheet 2020*, 15 December 2020.

15 AEMO, *Load shedding fact sheet 2020*, 15 December 2020.

16 AEMO, *Load shedding fact sheet 2020*, 15 December 2020.

17 Engie owned another six generators in South Australia in 2017, two of them also gas-powered: Dry Creek (211 MW) and Mintaro (90 MW).

What happened on 8 February 2017?

South Australia suffered load shedding and associated blackouts during an afternoon heatwave, which left 90,000 users without power. Load shedding was necessary to return the state's power system to a secure state and reduce flows on the Murraylink interconnector to within limits.

Despite the weather conditions, forecasts prepared by AEMO did not anticipate the level of demand for electricity in South Australia that day.

Throughout the day, AEMO's forecasts predicted materially lower levels of demand and a greater contribution from wind generation than occurred, which resulted in reduced price forecasts.

The AER noted in its report for spots price above \$5,000/MWh that:¹⁹

...had the forecasts been more reflective of actual conditions it is likely that the potential shortage of supply may have been visible to the market earlier, allowing for a wider range of potential mitigation actions to have been considered.

At 5.39 pm, AEMO contacted Engie to enquire about the availability of Pelican Point gas turbine two (the one on standby). Engie stated that it did not have the extra gas and, even if it could obtain gas, it would be four hours before it could get the turbine to minimum load. In light of this, at 6.03 pm, AEMO issued a direction to ElectraNet to shed 100 MW of load. The load shedding was complete at 6.20 pm, however, 200 MW of extra load was inadvertently interrupted.²⁰

What happened on the next day, 9 February 2017?

On 9 February, the temperature in Adelaide also exceeded 40 degrees, which resulted in high levels of electricity demand, reaching a peak of 3,041 MW at 6.30 pm.²¹

AEMO published notices throughout the day to encourage local market participants to make additional generating capacity ready before 3 pm. As it received little response, at 3.05 pm, AEMO directed Engie to run an additional generator at Pelican Point.²²

The AEMO intervention event commenced at 3.10 pm and a market notice was issued. AEMO issued a further market notice declaring intervention pricing would commence from the 3.50 pm dispatch interval.

Engie made the increased capacity at Pelican Point available to the market via a rebid²³ effective at 3.30 pm and was issued an increased target at 4.15 pm. Pelican Point continued

18 AER, *Electricity spot prices above \$5,000/MWh — South Australia 8 February 2017*, April 2017, p. 14.

19 AER, *Electricity spot prices above \$5,000/MWh — South Australia 8 February 2017*, April 2017, p. 5.

20 AER, *Electricity spot prices above \$5,000/MWh — South Australia 8 February 2017*, April 2017, p. 17.

21 AEMO, *NEM Event — Direction to South Australia Generator — 9 February 2017*, July 2017, p. 4.

22 The direction was issued under clause 4.8.9 of the NER. section 2.3.2 explains this in more detail.

23 Generators bid to supply a certain amount of power at a particular price up to a day and a half before the power is needed. Generators must be genuinely prepared to honour their bid if AEMO calls on them to dispatch. If there is an unexpected need for more or less supply as the dispatch time draws nearer, generators can submit a new offer (a rebid). Rebidding allows participants to adjust bids in response to new information as it becomes available, such as changes in weather, consumer demand, generator performance, network constraints or bids of other participants.

to operate at 320 MW until 7 pm when the direction was cancelled, and the Intervention pricing event ceased.²⁴

Developments after the February 2017 events

- **Engie's media statement:** Engie issued a media statement on 10 February 2017 stating that:²⁵

...the second Pelican Point unit has no gas contracts in place, which means ENGIE is unable to make the plant available to the market through the bidding system operated by AEMO. There is no commercial rationale to operate the second Pelican Point unit in the current market environment in South Australia for a small number of days across the year. However, once ENGIE was directed on by AEMO on February 9, we were able to promptly start the second unit, ensuring our costs were covered, including gas to operate the unit.
- **AER's spot price above \$5,000/MWh reports:** In April 2017, the AER published reports on electricity spot prices above \$5,000/MWh for 8 February 2017 and for 9 February 2017. In its reporting on the high price events, the AER set out its investigation of the reasons behind the price spikes on both days.²⁶
- **AEMO's NEM event direction to SA generator report:** In July 2017, AEMO published a report on the circumstances of the direction, the processes followed and its impact on dispatch outcomes.²⁷
- **AER's Federal Court proceedings against Pelican Point:** In August 2019, the AER commenced proceedings in the Federal Court against Pelican Point for alleged breaches of the NER. The AER alleges that Pelican Point did not disclose to AEMO that one of the generators at its Pelican Point Power Station was capable of being made available on 24 hours' notice. The AER is seeking declarations, penalties and costs.²⁸

2.3 Current arrangements

This section outlines:

- the operation of the Gas Supply Guarantee
- AEMO's power to direct a NEM market participant
- South Australia power to direct AEMO in the NEM
- the NEM reliability standard
- the legal framework for emergency management in electricity and gas

²⁴ AER, *Electricity spot prices above \$5,000/MWh — South Australia 9 February 2017*, April 2017, p. 8.

²⁵ Engie, *Pelican Point second unit*, media statement, 10 February 2017.

²⁶ This is a requirement under clause 3.13.7(d) of the NER. The reports are AER, *Electricity spot prices above \$5,000/MWh — South Australia 8 February 2017* and AER, *Electricity spot prices above \$5,000/MWh — South Australia 9 February 2017*.

²⁷ AEMO, *NEM Event — Direction to South Australia Generator — 9 February 2017*. Publishing this report is a requirement under clause 3.13.6A(a) of the NER.

²⁸ See AER's website: <https://www.aer.gov.au/wholesale-markets/enforcement-matters/pelican-point-power-limited-requirement-to-submit-accurate-generator-availability-information-to-the-market-operator#:~:text=On%2026%20August%202019%2C%20the,its%20Pelican%20Point%20Power%20Station.>

2.3.1 Operation of the Gas Supply Guarantee

AEMO utilises a number of information sources to assess whether a gas supply shortfall may occur, including gas-powered generators' NEM dispatch offers for a trading day. Where gas-powered generators submit their NEM dispatch offers for a trading day seven days before that trading day, AEMO may be in a better position to assess whether a gas supply shortfall may occur.²⁹

The Gas Supply Guarantee is put into operation through the guidelines which outline AEMO's ability to:

- Determine if a gas supply shortfall exists, by using the *Extended pre-dispatch report*, in conjunction with existing Gas Bulletin Board (GGB) data, to provide visibility of gas supply and demand up to seven days ahead. This report, prepared by AEMO, contains indicative regional reference prices, interconnector flows, binding constraint information as well as a projection of aggregate daily fuel use by gas-powered generation in the NEM. The report is published to support the identification of a potential gas supply shortfall in the NEM as per the guidelines and provides information to market participants to support their short term operations. AEMO can request information from gas industry market participants to assist with its monitoring of gas demand and supply conditions.
- Call an assessment conference³⁰ to exchange information about electricity and gas supply and demand conditions to facilitate AEMO's assessment of whether a gas supply shortfall exists, or is reasonably likely to occur.
- Call an industry conference³¹ for AEMO to confirm a potential gas supply shortfall and to facilitate an industry response from producers, storage providers, pipeline operators and gas-powered generators.
- If a solution is not forthcoming, AEMO may schedule further industry conferences and may notify jurisdictional representatives.³²

2.3.2 AEMO's power to direct a NEM market participant

Under clause 4.8.9 of the NER, AEMO is permitted to intervene in the NEM and issue directions and instructions to registered participants, if satisfied it is necessary:

- to maintain or re-establish the power system to a secure, satisfactory or reliable operating state
- for reasons of public safety or otherwise for the security of the power system.

Where AEMO intervenes in the market through issuing directions, it must, in accordance with NER clauses 4.8.9(f) and 3.13.6A(a), publish a report on the circumstances of the direction, the processes followed and its impact on dispatch outcomes.

²⁹ AEMO, *Gas Supply Guarantee Guidelines*, March 2020, p. 3.

³⁰ Attendance at an assessment conference is restricted to producers, storage providers and pipeline operators that have been notified by AEMO.

³¹ An industry conference is a meeting organised by AEMO conducted by telephone which may be attended by producers, storage providers, pipeline operators, gas generators and, other relevant market participants or large users and jurisdictional representatives who have been notified by AEMO.

³² AEMO, *Gas Supply Guarantee Guidelines*, March 2020, p. 6.

Under the NER, the compensation that a directed market participant obtains is designed to put that market participant in the position that it would have been in had the intervention not occurred. This compensation occurs if the absolute value of the compensation amount is greater than \$5,000 per intervention event. The compensation is provided at the 90th percentile price for the relevant region over the preceding 12 months.

2.3.3 South Australia's power to direct AEMO in the NEM

Soon after the February 2017 load shedding event, on 28 March 2017, the South Australian Government introduced into Parliament the Emergency Management (*Electricity Supply Emergency*) Amendment Bill to give the Minister for Energy and Mining the power to direct AEMO to direct market participants in the NEM to restrict, suspend or generate electricity in an electricity supply emergency, giving ultimate control for the state's energy security to the South Australian Minister rather than relying on AEMO to act.

The legislation was passed on 26 April 2017. The Commission understands that this mechanism has not been utilised.

2.3.4 The reliability standard

The reliability standard is the baseline level of forecast customer demand that must be served in the NEM. The standard is reviewed by the independent Reliability Panel and is informed by the value that customers place on having a reliable electricity supply which is reviewed by the AER on an annual basis.³³ The standard currently requires at least 99.998 per cent of forecast customer demand to be met each year.³⁴

Market participants respond to price signals and information published by AEMO to provide the level of reliability that is expected under the reliability standard. If AEMO determines that the market's response is not adequate to avoid a breach of the reliability standard, then AEMO can intervene in the market by contracting for Reliability and Emergency Reserve Trader (RERT) emergency supplies.³⁵

2.3.5 Emergency management for electricity and gas

There is no overarching national legal framework for coordinating the supply of electricity and gas in the case of an emergency. Legislation in each jurisdiction in the NEM provides for the emergency management of the supply of electricity and gas within those jurisdictions (but not beyond).

In some jurisdictions, this includes granting the relevant Minister the power to give directions to market participants in order to respond to an energy supply emergency. These powers are only available where an emergency has been "declared or proclaimed" in writing and published. The declaration or proclamation remains in force for a limited period (for example,

³³ The NER rules 8.12(b) and 8.12(g) require the AER to develop a methodology to determine the 'values of customer reliability', which includes a mechanism for adjusting the value on an annual basis.

³⁴ Reliability Panel, *The reliability standard: current considerations*, 12 March 2020, p. 7.

³⁵ Reliability Panel, *The reliability standard: current considerations*, 12 March 2020, pp. 11-15. The RERT is a last resort mechanism that allows AEMO to pay for additional capacity to be on standby in case of emergencies when the supply and demand balance is tight.

14 days) and may be revoked at any time. The current arrangements and powers are outlined in appendix C.

Coordination across jurisdictions

In the absence of a national legal framework, there are a number of key policies which enable the supply of electricity and gas to be coordinated across jurisdictions in emergencies:

- NEM Emergency Powers Memorandum of Understanding: this non-binding agreement includes the procedures which will be followed by a jurisdiction if AEMO advises that jurisdiction that in its opinion the exercise of emergency powers is required. These procedures include providing notice of proposals to exercise an emergency power, continuous consultation and setting up a formal protocol.
- NEM Emergency Protocol: this protocol was made pursuant to the NEM Emergency Powers Memorandum of Understanding and sets out further details on how AEMO and the relevant jurisdictions must notify each other of proposals to exercise emergency powers.³⁶
- Power System Emergency Management Plan (PSEMP): this plan is governed by the NEM Emergency Powers Memorandum of Understanding, NEM Emergency Protocol and NER. It states that AEMO will:³⁷
 - consider the safety of its employees, NEM participants, and the community as its first priority
 - promote a seamless co-operative response from jurisdictional authorities and industry participants
 - take all reasonable actions to return the power system to a secure operating state
 - restore electricity generation supply as quickly as possible
 - ensure power-sharing between jurisdictions in accordance with appropriate guidelines.

The PSEMP complements each jurisdiction's own emergency response arrangements and communications plans.

- National Gas Emergency Response Advisory Committee (NGERAC): NGERAC is a forum consisting of industry and government representatives across jurisdictions as well as AEMO. It was established in 2005 to enable efficient and effective communication across the sector to manage multi-jurisdictional natural gas supply shortages. NGERAC also develops and tests arrangements and protocols for responding to and mitigating the impact of multi-jurisdictional gas supply incidents. In particular, the NGERAC set up the Interruption to Supply Process which:
 - outlines the emergency escalation process in relation to a multi-jurisdictional gas emergency;
 - outlines the communication process during such an emergency;

36 See AEMO's website: https://aemo.com.au/-/media/files/electricity/nem/emergency_management/2016/national-electricity-market-emergency-protocol---april-2016---signed.pdf?a=en&hash=71B42527768950E01B44E24C0A0C3AD0

37 See AEMO's website: <https://aemo.com.au/energy-systems/electricity/emergency-management/national-role>

- defines NGERAC processes for advice to relevant jurisdictional Ministers during a major gas supply shortage; and
- defines the principles to be applied to determine the allocation of available gas between jurisdictions.

These processes do not duplicate or replace jurisdictional and industry gas emergency management practices. The NGERAC also provides advice to governments on such matters as necessary.³⁸

AEMO and facilitated markets

AEMO also has a number of processes and procedures to respond to emergencies where it is the market operator.

For the Victorian Declared Wholesale Gas Market (DWGM) AEMO has the following processes in place:

- Emergency Procedures (Gas)³⁹
- Wholesale System Security Procedures⁴⁰
- Gas Curtailment and Gas Rationing and Recovery Guidelines⁴¹

In addition to these, a number of bodies have been created to plan and co-ordinate emergency responses:⁴²

- Energy Industry Response Committee: vets the operational strategy and possible use of emergency powers, as well as providing strategic advice to the government on the impacts of and response to a declared emergency.
- Gas Emergency Management Group: co-ordinates and plans the gas industry's response to and recovery from an extended gas emergency.
- Gas Emergency Management Consultative Forum: a planning and coordinating forum of industry representatives convened by Energy Safe Victoria and AEMO.

In the Short Term Trading Markets (STTM), AEMO uses contingency gas arrangements to balance physical supply and demand at each hub in the event that normal market mechanisms are unlikely to achieve a balance. Contingency gas arrangements are implemented through an industry consultation process which is coordinated by AEMO.⁴³

38 See: <http://www.coagenergycouncil.gov.au/current-projects/gas-emergency-response>, viewed 25 February 2021.

39 AEMO, *Emergency procedures (gas)*, February 2015.

40 AEMO, *Wholesale market system security procedures (Victoria)*, 23 November 2015.

41 AEMO, *Gas load curtailment and gas rationing and recovery guidelines*, 13 May 2010.

42 See AEMO's website: <https://aemo.com.au/energy-systems/gas/emergency-management/victorian-role>

43 AEMO, *STTM procedures*, 1 March 2021.

3 CHANGES IN THE ELECTRICITY AND GAS MARKETS SINCE 2017

Since the introduction of the Gas Supply Guarantee in 2017, the dynamics in both the electricity and gas markets have continued to evolve. Major regulatory reforms and government initiatives have also been implemented.

For example, the supply and demand dynamics in the NEM have experienced several major changes, such as changes in the generation supply mix, the entry of new large-scale storage systems and demand trends.

In addition, many regulatory changes have been implemented to reinforce the reliability and security of the NEM. The main relevant regulatory changes that were implemented and that could have implications to the issue of gas supply adequacy to meet peak demand periods in the NEM, includes the five-minute settlement rule change, the requirement for generators to provide notice three years prior to closures, changes to wind farm settings, the Retailer reliability obligation (RRO), the wholesale demand response mechanism and major relevant Energy Security Board (ESB) reforms that are currently under consideration.

Appendix A provides further details on each of these changes.

The market dynamics on the east coast and northern gas markets have also experienced significant changes in the last few years.

For example, the increased liquidity in wholesale gas and pipeline trading markets, the entry of new gas suppliers, the easing of the moratorium on gas exploration in some jurisdictions, the proposed investment in new gas pipelines, the increased use of locational gas swaps and the introduction of additional trading points in some of the key facilitated markets on the east coast.

A number of reforms have been introduced by COAG Energy Council to encourage liquidity in gas markets, such as the introduction of secondary trading of pipeline capacity and the soon to be introduced measures to increase transparency in the gas market.

There have also been initiatives led by the Australian Government and some jurisdictions in relation to the gas sector that could impact the issue of gas supply adequacy. These government initiatives include the Australian Domestic Gas Supply Mechanism, the Gas Acceleration Program, the NSW Energy Package and, more recently, the announcement of the Gas-fired Recovery Plan.

Appendix B provides further details on each of these changes.

The Commission is seeking stakeholder views on whether these changes have had any impact on issues in relation to the supply of gas to gas generators in the NEM that the Gas Supply Guarantee addresses.

4 ASSESSMENT FRAMEWORK

The terms of reference from the Energy Ministers are made under the NGL and NEL, and require the AEMC to consider the potential of the Gas Supply Guarantee guidelines to:⁴⁴

support reliability in the national electricity market, or to otherwise provide value to consumers.

As such, the national electricity objective (NEO), particularly in relation to reliability, will be a primary component of the Commission's consideration of the guidelines and any alternative mechanism that may be assessed in the course of the review.

The NEO is:⁴⁵

To promote efficient investment in, and efficient operation and use of, electricity services for the longer-term interests of consumers of electricity with respect to -

- (a) price, quality, safety, reliability and security of supply of electricity; and
- (b) the reliability, safety and security of the national electricity system.

However, given the requirements placed on the operation of the gas market, the market operator and market participants by the guidelines, consideration will also be given to their impacts on the efficient operation of the gas market, and efficient investment in the gas market for the long term interests of consumers, with respect to the reliability and price of the supply of natural gas.

Consideration will also be given to the counterfactual without guidelines or where an alternative mechanism is used instead.

The NGO is:⁴⁶

to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, safety, reliability and security of supply of natural gas.

The Commission will also have regard to the balance of objectives between the NEO and the NGO and the impact on consumers in one market from additional guidelines or requirements in the other during this review.

44 Energy Ministers, *Review of the Gas Supply Guarantee*, terms of reference. p. 3.

45 Section 7 of the NEL.

46 Section 23 of the NGL.

4.1 Proposed assessment framework

To determine whether the recommendations made in the process of conducting the review would be likely to promote the NEO and the NGO, the Commission will carry out its assessment against the framework outlined below. This framework may be refined during the process of the review.

At this stage, the Commission is seeking stakeholder views on its proposed assessment framework, which includes the following criteria:

- **Reliability:** Whether the NER enables generators to deliver a level of reliability consistent with the value placed on that reliability by consumers. Whether additional rules or guidelines placing obligations on the gas market would support the provision of this level of reliability.
- **Efficiency:** The extent to which reliability is provided, from gas-fired generators, is reflective of the underlying costs and supply and demand conditions in the NEM and gas markets. Whether guidelines may benefit electricity consumers by lowering the costs of the provision of reliability services in the NEM.
- **Effective risk management:** What is the balance of risks and costs borne between the NEM and gas markets from providing reliability and peaking electricity and gas supply. In general, operational risk and investment decisions should rest with parties best placed to manage them.
- **Information:** Whether market participants and the market operator, have access to all necessary information in the NEM and gas markets to support reliability in the NEM.
- **Barriers to entry:** Whether transactions costs and barriers to the provision of peaking gas services are minimised, both for new and existing gas-fired power stations.
- **Competition and market signals:** Markets will generally lead to better outcomes than centralised planning and regulation, as competing businesses have an incentive to meet consumers' needs efficiently.
- **Resilient and flexible rules:** Frameworks should be resilient to changing supply and demand conditions over the long-term, but should also be flexible and provide firms with a clear and consistent set of rules that allow them to independently develop business strategies and adjust to changes in the market.
- **Regulatory and administrative burden:** Whether the cost of implementing the proposed solution(s) is/are proportional to the costs of managing the issues to be resolved. Whether there is any overlap between the guidelines and other existing reliability or security mechanisms, and the extent to which these mechanisms could be adapted to perform the same function or provide the same outcome as the guidelines.
- **Cost-benefit assessment:** Whether the benefits of any guidelines or alternative mechanism outweigh the costs, including an assessment of the impact of the guidelines on the market operator (AEMO), the market and market participants. Consideration will also be given to any current and enduring issues arising from the COVID-19 pandemic.

5 ISSUES FOR CONSULTATION

Taking into consideration the assessment framework, a number of issues have been identified for initial consultation. Stakeholders are asked to comment on these issues as well as any other aspect of the terms of reference or this paper, including the proposed assessment framework.

This chapter outlines the AEMC's approach on how to:

- define the problem
- assess the impact of the problem
- investigate potential solutions.

Details on how to lodge a submission are contained in chapter 1 of this consultation paper. A template is available from the project page on the AEMC website to assist stakeholders in providing their views on the issues raised in the paper.

5.1 Assessing the problem

As noted in this consultation paper, the gas and electricity markets and underlying supply chains are complex.

It is difficult to quantify the impact of specific factors and reforms on market outcomes, including that of the Gas Supply Guarantee. This is particularly the case when a reform has not been utilised, as is the case for the Gas Supply Guarantee in the short time that it has been in operation.

Nevertheless, the purpose of this review is to establish the value of the Gas Supply Guarantee to the NEM and electricity consumers. In particular, whether it (or an alternative mechanism) is needed to "ensure continued supply of gas to support peak demand periods [in the NEM]".⁴⁷

To answer this key question, the Commission intends to consider the context and circumstances in which the Australian Government introduced the Gas Supply Guarantee. It notes the following:⁴⁸

- the introduction of the Gas Supply Guarantee was preceded by a system black event in South Australia in February 2017
- the ADGSM was also introduced in 2017, resulting in Queensland-based LNG producers undertaking to make supplies available to the east coast gas market
- since 2017, the east coast gas market has
 - experienced improved liquidity with new suppliers emerging and exploration and production restrictions being eased
 - there has been investment in pipelines to improve capacity, the potential for LNG import terminals has emerged

⁴⁷ Energy Ministers, *Review of the Gas Supply Guarantee*, terms of reference, 9 September 2020, p. 1.

⁴⁸ See chapters 2 and 3 and appendices A, B and C.

- had greater flows (or swaps) and trading of gas to enable gas supply to reach the southern part of the east coast market
- regulatory reforms in the east coast gas market since 2017 have undertaken to
 - enable secondary trading of pipeline capacity to occur more readily
 - improve the transparency of the market for all market participants
- the NEM has also experienced a number of changes since 2017, including
 - the penetration of renewable-based generation has increased while some large coal-fired generators have retired recently, changing the generation mix in the NEM
 - the introduction of large scale energy storage systems that are able to respond quickly to market conditions
 - changing demand patterns with declining consumption overall with relatively little change in peak demand
 - the introduction of reforms such as five-minute settlement⁴⁹ and the wholesale demand response mechanism⁵⁰ in the NEM, requiring generators to provide notice of planned closures, changes to wind farm settings and the introduction of the retailer reliability obligation.

QUESTION 1: PROBLEM DEFINITION

1. Is there a problem with access to gas supply for gas-powered generators in the NEM over the timeframes required to make generators available to support system reliability? Are there any other problems that the Gas Supply Guarantee could solve?
2. The market dynamics in the east coast gas market and the NEM have changed since 2017. Do these changes impact the issues the Gas Supply Guarantee was introduced to resolve?
3. A number of regulatory reforms have occurred since 2017 as well as government initiatives. Do these changes impact the issues the Gas Supply Guarantee was introduced to resolve?
4. Are there any other relevant changes that could impact the issues the Gas Supply Guarantee was introduced to resolve?
5. Do you see a scenario in which the Gas Supply Guarantee could be triggered?
 - a. What would be the drivers of such scenario?
 - b. What is the likelihood that such a scenario would occur?

⁴⁹ Implementation is scheduled for 1 October 2021.

⁵⁰ Implementation is scheduled for 24 October 2021.

5.2 Impact of the problem

The Gas Supply Guarantee is designed to assist gas market participants in supplying gas to one or more gas-powered generators in a short time frame to meet unexpected high demand for electricity in the NEM.

The result of using the Gas Supply Guarantee could be a decline in supply for some gas users to enable the demand from a gas-powered generator to be met. However, without gas being made available to a gas-powered generator it is possible that electricity demand would not be met without intervention in the NEM to reduce it.

Under such a scenario, a number of market participants in the east coast gas market and the NEM are likely to be impacted. Some parties may benefit, but others may be negatively impacted.

QUESTION 2: IMPACT OF THE PROBLEM

1. Under a scenario where issues arise in the NEM and gas market that might see the Gas Supply Guarantee triggered:
 - a. What would the impact of not having the Gas Supply Guarantee in place be?
 - b. How material would the impact of no Gas Supply Guarantee be?
 - c. Who, in the NEM and the east coast gas market, would be impacted?

5.3 Assessing potential solutions

This review will be carried out under the NEL and NGL. While the terms of reference request the Commission to consider the value of the Gas Supply Guarantee to the NEM and electricity consumers, the Commission will also have regard to the NGO as well as the NEO.

The assessment framework the Commission proposes to use to assist it in considering the NEO and NGO has been set out in chapter 4 of this consultation paper.

QUESTION 3: ASSESSMENT FRAMEWORK

1. Do you consider the proposed assessment framework relevant for the AEMC to consider the value of the Gas Supply Guarantee (or an alternative mechanism)?

Under the terms of reference for this review, the Commission is to consider that if there are issues in the NEM and/or east coast gas market that should be addressed, whether the Gas Supply Guarantee is appropriate.

However, a range of potential alternative solutions should also be considered. These range from using mechanisms outside the energy framework such as a memorandum of understanding or an undertaking, to incorporating a mechanism into the energy framework.

If a mechanism should be included in the energy frameworks, this could consist of utilising existing mechanisms and functions, amending existing provisions or creating new specific purpose provisions.

QUESTION 4: POTENTIAL SOLUTIONS

1. Is the Gas Supply Guarantee mechanism fit for purpose? Why?
2. Are there alternative solutions?
 - a. Are there rules in place, or under development (in the NER and/or NGR), that provide a better solution?
 - b. Do other approaches or mechanisms (that are not rules-based) provide a better solution?
 - c. How would each potential solution address the issues?
 - d. Who, in the NEM and the east coast gas market, would be impacted by each potential solution?

ABBREVIATIONS

ACCC	Australian Competition and Consumer Commission
ADGSM	Australian Domestic Gas Security Mechanism
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
Commission	See AEMC
CTP	Capacity trading platform
DAA	Day-ahead auction
DWGM	Declared wholesale gas market
ESB	Energy Security Board
ESOO	Electricity Statement of Opportunities
GBB	Gas Bulletin Board
GSH	Gas supply hub
GSOO	Gas Statement of Opportunities
GW	gigawatt
ISP	Integrated system plan
LNG	Liquefied natural gas
MW	megawatt
NEL	National Electricity Law
NEM	National electricity market
NEO	National electricity objective
NER	National Electricity Rules
NGERAC	National Gas Emergency Response Advisory Committee
NGIP	National Gas Infrastructure Plan
NGL	National Gas Law
NGO	National gas objective
NGR	National Gas Rules
PJ	petajoules
PSEMP	Power System Emergency Management Plan
RERT	Reliability and Emergency Reserve Trader
RRO	Retailer reliability obligation
STTM	short term trading market
TJ	terajoules
TWh	terawatt hours
UCS	unit commitment for security

A CHANGES IN THE ELECTRICITY MARKET SINCE 2017

Since the introduction of the Gas Supply Guarantee in 2017, the dynamics in the electricity markets have continued to evolve. Major regulatory reforms have also been implemented in the reliability frameworks that govern the NEM.

The major recent changes to the electricity market are discussed below in terms of market dynamics and regulatory changes. This appendix also outlines the outlook for the NEM and the various measures being considered and implemented in order to address it.

A.1 Market dynamics

This section outlines the main changes that have occurred, focusing on the generation supply mix, the entry of new large-scale storage systems and demand trends.

A.1.1 Changes to the generation mix

During the period from 2017 until 2021, major changes have occurred to the generation mix throughout the national electricity market as it has been shifting away from a centralised system of large forms of generation towards a number of dispersed smaller-scale generators.⁵¹

One of the main changes has been the retirement of a few very large coal generators during the last few years.

The main significant generator exit since 2017 has been the retirement of the Hazelwood brown coal generator in Victoria (with a capacity of 1,600 MW). The closure was especially significant given Hazelwood supplied approximately five per cent of the NEM's total output.⁵²

Two gas-powered generators are also scheduled for retirement in the near-term; Torrens Island A in South Australia (480 MW) is being progressively closed from 2020 to 2022, while Mackay in Queensland (34 MW) will close in April 2021.⁵³

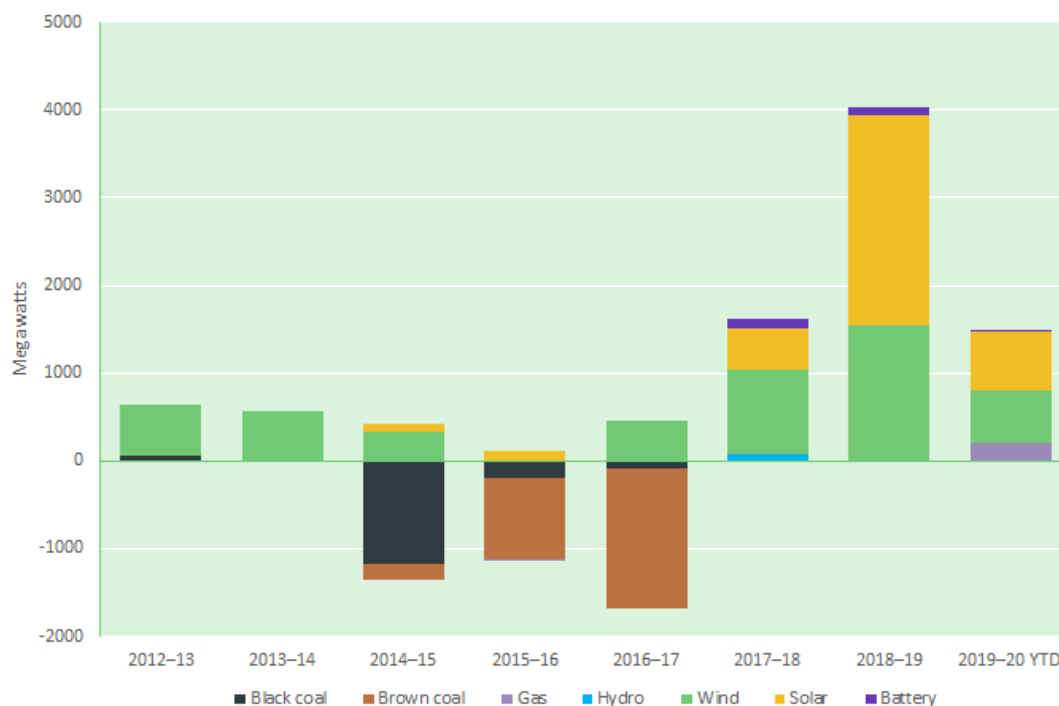
Prior to 2017, there were a number of retirements of black and brown coal-fired generators in the NEM, including the Northern power station (520 MW) in South Australia in May 2016.

51 AER, *State of the Energy Market 2020*, July 2020, p. 29.

52 AER, *State of the Energy Market 2018*, December 2018, p. 76.

53 AEMO, *Generating unit expected closure year — January 2021*, 29 January 2021.

Figure A.1: Recent entry and exit of generation capacity in the NEM



Source: AER, *State of the Energy Market 2020*, July 2020, p. 30.

Since 2016-2017, a large quantity of wind and solar generation capacity entered the NEM, particularly during 2018-2019. Figure A.1 above indicates the generation capacity that has entered and exited the NEM since 2012-2013.

A large number of rooftop solar systems entered the NEM during 2019 and 2020, leading to approximately 2.1 gigawatts (GW) of new installations over the 2019 calendar year, and a total capacity of rooftop solar systems in the NEM of approximately 10.7 GW as of June 2020.⁵⁴

At present, approximately 21 per cent of the NEM capacity is provided by gas-powered generation. For the various NEM jurisdictions, the percentage of existing electricity capacity provided by gas-powered generation is:⁵⁵

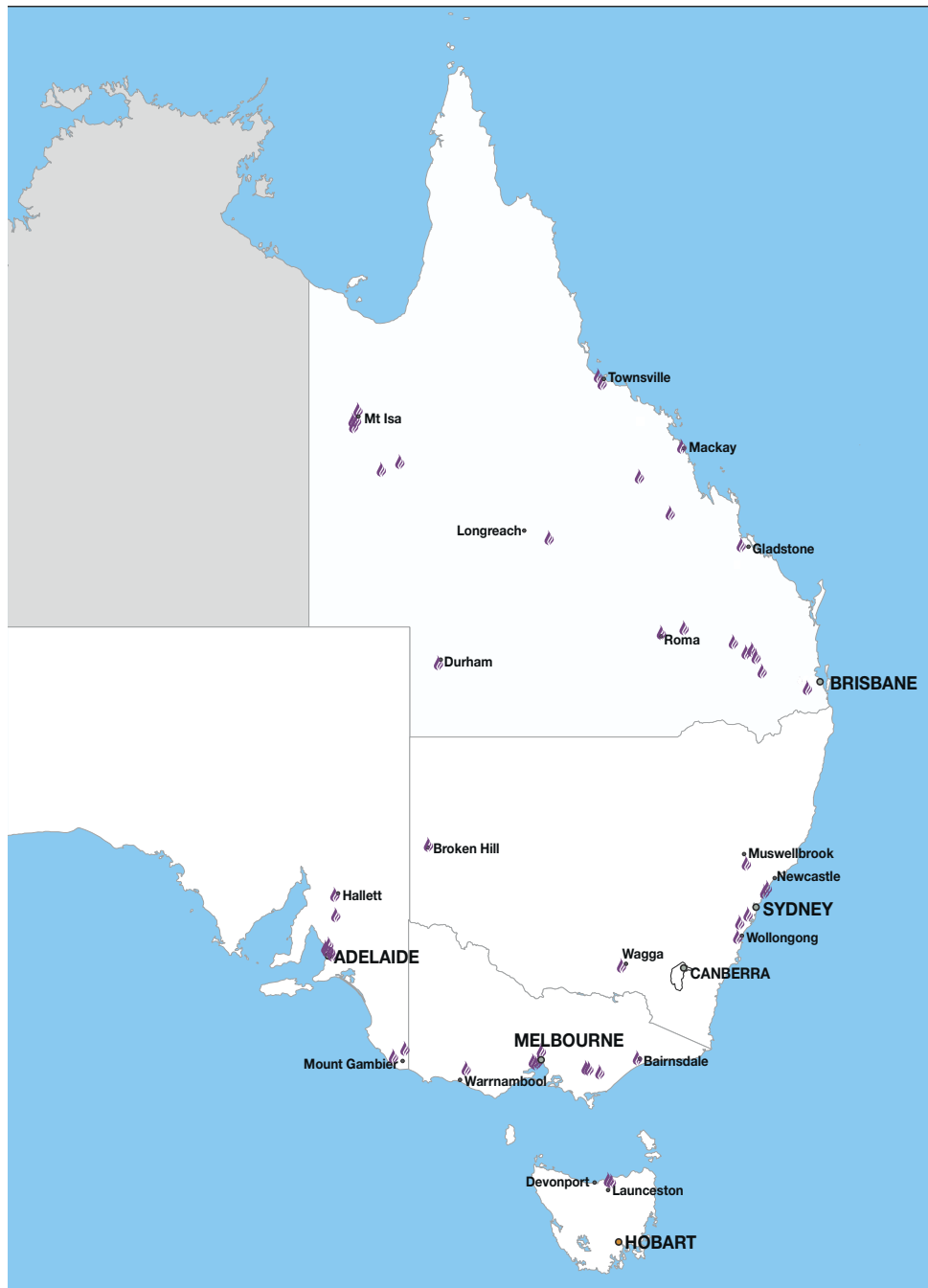
- 12 per cent for New South Wales
- 24 per cent for Queensland
- 53 per cent for South Australia
- 12 per cent for Tasmania
- 18 per cent for Victoria.

⁵⁴ AEMO, *2020 Electricity Statement of Opportunities*, August 2020, p. 28.

⁵⁵ AEMO, *NEM Generation Information January 2021*, 29 January 2021.

Figure A.2 below provides a map of all existing gas-powered generators in the NEM.

Figure A.2: Locations of existing gas-powered generators in the NEM



Source: AEMC

Note: The Mackay generator in Queensland is scheduled to close in April 2021.

A.1.2 Uptake of large-scale energy storage systems

As the NEM increasingly relies on renewable generation, opportunities have emerged for additional dispatchable and fast-response energy storage resources like large-scale batteries and pumped hydro to enter the NEM.

The first utility-scale battery storage system was commissioned in late 2017 in South Australia. As of March 2021, there are now five registered battery storage systems installed in either Victoria or South Australia that have a nameplate capacity of more than 25 MW each.⁵⁶ The largest existing utility-scale battery storage facility is the Hornsdale Power Reserve in South Australia with a nameplate capacity of 150 MW.

Pumped hydro is the most mature form of energy storage and has operated in the NEM for some time, in Queensland (570 MW at Wivenhoe) and New South Wales (240 MW at Shoalhaven, 1500 MW at Tumut 3, and 70 MW at Jindabyne).⁵⁷

There are two new major pumped hydro developments identified for the short to medium-term future: Snowy Hydro's Snowy 2.0 in New South Wales and Hydro Tasmania's Battery of the Nation in Tasmania:

- Snowy 2.0 is a committed project with a nameplate capacity of 2,040 MW that is expected to be available for full commercial use in March 2025.⁵⁸
- The Battery of the Nation project is expected to have a nameplate capacity of 3,150 MW and be available for full commercial use in December 2028.⁵⁹

AEMO also expects significant additional investment to occur in utility-scale pumped hydro and battery storage because these technologies can be used to store and dispatch electricity when it is needed. As a result, these technologies can be used to provide firm supply support for variable renewable energy generation and so that reliable supply is provided for consumers into the future, especially during peak demand periods.⁶⁰

The AEMC is currently exploring options to support the participation of storage systems in the NEM through the *Integrating energy storage systems* rule change by removing barriers that may exist under the current framework.⁶¹

A.1.3 NEM demand trends

The maximum peak demand that each jurisdiction experiences has remained relatively flat or showed small increases in most jurisdictions since 2017. Notably, in all jurisdictions other than Tasmania, maximum peak demand occurs in summer.

As noted in figure A.3 below, for the majority of NEM jurisdictions, maximum peak demand remained relatively flat during this period. New South Wales had a recent peak in its maximum peak demand level in 2017, which was mostly followed by slightly lower peak

56 AEMO, *NEM Generation Information January 2021*, 29 January 2021.

57 AER, *State of the Energy Market 2020*, July 2020, p. 38)

58 AEMO, *NEM Generation Information January 2021*, 29 January 2021.

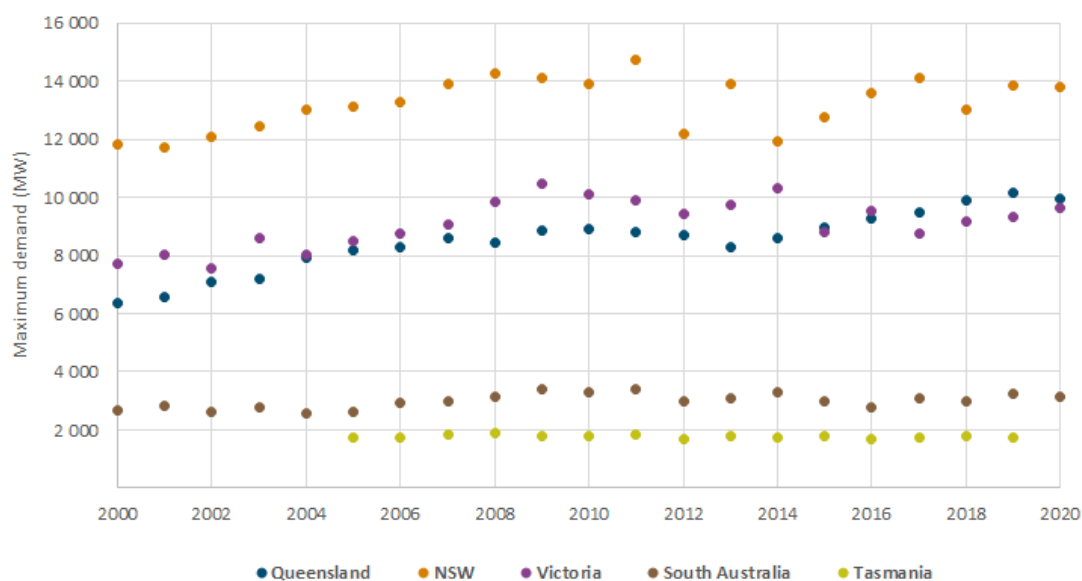
59 AEMO, *NEM Generation Information January 2021*, 29 January 2021.

60 AEMO, *2020 Integrated system plan*, July 2020, p. 50.

61 AEMC, *Integrating energy storage systems into the NEM*, options paper, 17 December 2020.

demand outcomes in later years. The maximum peak demand levels in South Australia and Tasmania did not experience any major changes during this period.⁶²

Figure A.3: NEM maximum grid demand by region (2000-2020)



Source: Chart based on AER, *State of the Energy Market 2020*, p. 73.

Increases in maximum peak demand could be seen in Queensland and Victoria during this period. Victoria's maximum peak demand experienced gradual continued increases in peak demand after it plateaued in 2017, although its 2020 level is far below the highest level that Victoria has ever recorded, which occurred in 2009. Queensland's maximum peak demand level also gradually increased since 2017 and reached its highest level in 2019. It then dropped slightly back to 2018 levels in 2020 based on available figures.

According to the AER, trends in maximum demand are driven by factors similar to those affecting total demand (population and economic growth, energy efficiency, and technology). But the impact of changes in these drivers can differ for total consumption and maximum demand.

As an example, the forecast rise in rooftop solar systems' capacity over the next decade will significantly reduce the total generation required from the grid but will have less of an impact on maximum demand, which typically occurs in the evening, when solar generation is limited.⁶³

⁶² Because Tasmania's maximum peak demand occurs in the winter, no 2020 figures were available for that jurisdiction.

⁶³ AER, *State of the Energy Market 2020*, July 2020, p. 73.

A.2 Regulatory changes

Many regulatory changes have been implemented to reinforce the reliability and security of the NEM since 2017. This section sets out the main relevant regulatory changes that have been implemented, including five-minute settlement, the requirement for generators to provide notice three years prior to closures, changes to wind farm settings, the retailer reliability obligation, the wholesale demand response mechanism and major relevant ESB reforms that are currently under consideration.

A.2.1 Five-minute settlement

Since the start of the NEM in 1998, while the dispatch process for generation has operated on a five-minute basis, the settlement process for market participants has occurred on a 30-minute basis, by using the time-weighted average of the six dispatch prices that occurred during any given half-hour trading interval. This discrepancy was initially chosen due to limitations in the ability of the available technology to facilitate more frequent settlement rates.⁶⁴

On 4 December 2015, Sun Metals lodged a rule change request with the AEMC seeking to change the settlement period from 30 minutes to five minutes. This amendment was sought on the basis that the use of time-weighted averaging for settling dispatch disincentivised investment in and operation of technologies (such as batteries or fast response generators) that can respond quickly when major electricity price spikes occur in the NEM.⁶⁵

In November 2017, the AEMC made a final rule aligning settlement periods with dispatch periods by requiring the settlement process to occur on a five-minute basis for market participants. In making this rule, the AEMC anticipated that it would promote increased investment in flexible generation, storage and demand response.⁶⁶ The commencement date for this change is in October 2021.⁶⁷

A.2.2 Generator notice prior to plant closure

Prior to 2019, there was no requirement in the NER for a generator to provide a period of notice of its intention to close a generating station or a generating unit. The NER only stated that a generator could choose to notify AEMO in writing that it wished to cease to be registered as a generator or that it wished to terminate any of its generating units. The NER did not include any requirement that a participant should provide the market a period of notice of its intention to close a generating station or unit.⁶⁸

Three large power stations recently retired without providing significant notice to the market. The Northern and Playford B power stations in South Australia provided 11 months' notice of

64 AEMC, *Five-minute settlement*, final determination, 28 November 2017, p. 4.

65 AEMC, *Five-minute settlement*, final determination, 28 November 2017, pp. 15-16.

66 AEMC, *Five-minute settlement*, final determination, 28 November 2017, pp. i, 39.

67 In July 2020, the AEMC delayed the commencement date for five-minute settlement from July 2021 to October 2021 to provide sufficient time for the electricity market to account for the disruption caused by COVID-19. For more details, see AEMC, *Delayed implementation of five-minute and global settlement*, final determination, 9 July 2020.

68 AEMC, *Generator three year notice of closure*, final determination, 8 November 2018, p. 3.

their closures in 2016, while the owner of Hazelwood in Victoria provided five months' notice of its closure in 2017.⁶⁹

The *Independent review into the future security of the NEM* (also known as Finkel review) expressed concerns about these developments, as it became evident that existing large-scale generators could retire faster than the time needed for new replacement capacity to be constructed. To address this, the Finkel review recommended that all large generators to be required to provide three years' notice prior to closure.⁷⁰

In response to the recommendation, Dr Kerry Schott AO (Chair of the ESB) lodged a rule change request seeking to require three years' notice to be provided before the closure of scheduled and semi-scheduled generators or generating units.⁷¹ In November 2018, the AEMC made a final rule requiring all scheduled and semi-scheduled generators to provide AEMO with at least three years' notice of their intention to close a generating unit unless they are granted an exemption by the AER.⁷²

However, in May 2019, the ESB released its proposed rule revisions to give effect to the RRO. As part of these proposed rules, the minimum notice of closure period would change from three years to 42 months to better align with the RRO forecasting horizons.

In June 2019 the COAG Energy Council agreed to the ESB's proposed rules, which were made by the South Australian Minister and took effect on 1 July 2019.⁷³

A.2.3 Changes in wind farm settings since the September 2016 black system event

Wind farms in South Australia played a major part in the black system event in South Australia in September 2016, substantially and rapidly reducing their electricity outputs in response to voltage disturbances in the state's electricity transmission network.⁷⁴

The wind farms reduced their outputs due to the automatic activation of a protection system, which is designed to enable the wind farms to withstand a preset number of voltage dips within a two-minute period.⁷⁵ AEMO has stated that it was not informed about this protection feature prior to the black system event.⁷⁶

AEMO also stated in its report that the then existing generator performance standards under the NER did not include specific minimum requirements that would have prevented or mitigated the responses of those wind farms and therefore recommended making changes to generator performance standards, including on generator ride-through capability for successive voltage disturbances.⁷⁷

69 Commonwealth of Australia, *Independent review into the future security of the national electricity market*, final report, June 2017, p. 87.

70 Commonwealth of Australia, *Independent review into the future security of the national electricity market*, final report, June 2017, p. 88.

71 AEMC, *Generator three year notice of closure*, rule change request, March 2018.

72 AEMC, *Generator three year notice of closure*, final determination, 8 November 2018.

73 AER, *Generator notice of closure exemption guideline*, final decision, August 2019, pp. 7-8.

74 AEMO, *Black system South Australia 28 September 2016*, final report, March 2017, p. 6.

75 AEMO, *Black system South Australia 28 September 2016*, final report, March 2017, p. 6.

76 AEMO, *Black system South Australia 28 September 2016*, final report, March 2017, p. 42.

77 AEMO, *Black system South Australia 28 September 2016*, final report, March 2017, pp. 46; 94; 244-245.

However, the AER has since taken legal action in the Federal Court, alleging that some wind farm operators failed to meet the existing generator performance standards on the day of the black system event.⁷⁸

In its black system event report, AEMO noted that many of the wind farms that had reduced their output during the 2016 black system event had since taken actions to increase their capability to enable them to maintain output if similar future events occurred.⁷⁹

Following its recommendations in its black system event report, AEMO lodged a rule change request with the AEMC in August 2017 seeking its recommended changes to generator performance standards.⁸⁰ In September 2018, the AEMC made a final rule on the revised generator technical performance standards.⁸¹ The final rule included changing access standards relating to the ability for generators to continue to operate in the face of certain disturbances and low system strength conditions.⁸²

A.2.4

Retailer reliability obligation

The RRO was designed and implemented by the COAG Energy Council to provide stronger incentives for market participants to invest in technologies and regions that would support the reliability of electricity supply in the NEM.⁸³

The RRO commenced on 1 July 2019 and requires AEMO to identify any potential reliability gaps in each NEM region using its *Electricity Statement of Opportunities (ESOO)* process. If AEMO identifies a material electricity reliability gap for three years and three months into the future, it would then apply to the AER to trigger the RRO.⁸⁴

The AER has some discretion in determining whether to trigger the RRO, though this is limited to whether there are material reliability forecast errors, inaccurate assumptions, or issues with the forecasting process that impact on the application.⁸⁵

If the RRO is triggered by the AER, then retailers and relevant large energy users would need to enter into sufficient contracts with generators to cover their share of a one-in-two year peak demand occurrence, and the larger generators in a region would need to provide bids and offers that would cover the reliability gap period.⁸⁶

These contracts would have the effect of reducing the exposure of the retailer or large customer to spot market prices. They also increase the risks to generators of not dispatching

78 AER, *South Australian wind farms in court over compliance issues during 2016 blackout*, media release, 7 August 2019; AER, *Snowtown 2 to pay penalty of \$1 million for rule breach*, media release, 22 December 2020.

79 AEMO, *Black system South Australia 28 September 2016*, final report, March 2017, pp. i; 48. See also AER, *The black system event compliance report*, December 2018, p. 166.

80 AEMC, *Generator technical performance standards*, rule change request, August 2017, p. 6.

81 AEMC, *Generator technical performance standards*, final determination, 27 September 2018, pp. 188-190; 198; 208.

82 AEMC, *Generator technical performance standards*, final determination, 27 September 2018, pp. xxii-xxiii; 187.

83 See AER's website: <https://www.aer.gov.au/retail-markets/retailer-reliability-obligation>

84 The South Australian Minister also has the ability to trigger the RRO within South Australia. For more details on how this version of the mechanism operates, see: COAG Energy Council, *Bulletin — Retailer reliability obligation*, July 2019, p. 1.

85 ESB, *Retailer reliability obligation*, final rules package, May 2019, p. 18.

86 ESB, *Retailer reliability obligation*, final rules package, May 2019, pp. iii; 26-27. Under certain circumstances, generators with a market share of 15 per cent or more in the relevant region can be obliged to offer contracts available to retailers and relevant large energy users to cover a forecast reliability gap under the market liquidity obligation.

sufficient electricity during high price events. As a result, the RRO is designed to provide a very strong incentive for a generator to dispatch during peak demand periods.⁸⁷

AEMO can also procure emergency reserves through the Reliability and Emergency Reserve Trader (RERT) mechanism to address any remaining capacity gaps.⁸⁸ RERT is a last resort mechanism that allows AEMO to contract for emergency reserves, such as generation or demand response to be on standby for activation in case of emergencies when the supply and demand balance is tight and when all market options have been exhausted.⁸⁹

In January 2020, the South Australian Energy Minister triggered the RRO for the first quarters of 2022 and 2023. In December 2020, the AER approved AEMO's request to trigger the RRO in New South Wales.⁹⁰

A.2.5 Wholesale demand response mechanism

Demand-side participation is an umbrella term for the actions that a consumer can take involving their own energy consumption, responding to a wide range of incentives. It also indicates that the demand side of the market participates and is influential in clearing the market, as opposed to having a passive role.⁹¹ Wholesale demand response is one form of demand participation that involves responding to changes in wholesale electricity market prices.

On 31 August 2018, Total Environment Centre, the Public Interest Advocacy Centre and the Australia Institute lodged a rule change request with the AEMC seeking to introduce a wholesale demand response mechanism. The aim of this proposal was to allow single load or aggregated and scheduled demand response to offer its flexibility into the wholesale market, which was not available as an option at that time.⁹²

The rule change proponents expected this mechanism would reduce the need for market interventions such as issuing directions or load shedding to restore the supply-demand balance.⁹³

On 11 June 2020, the AEMC made a final determination that implemented a wholesale demand response mechanism. The mechanism will allow large customers to provide wholesale demand response that can compete with peaking generation during times when the supply and demand balance is tight. The mechanism will be operational from 24 October 2021.

87 ESB, *Retailer reliability obligation*, final rules package, May 2019, p. iii.

88 ESB, *Retailer reliability obligation*, final rules package, May 2019, p. iv. Reserves are capacity in supply or demand resources that is currently unused, available and capable of changing the supply-demand balance within the specified time.

89 AEMO, *Reliability and Emergency Reserve Trader (RERT) Quarterly Report Q4 2020*, February 2021, p. 3.

90 AER, *State of the Energy Market 2020*, p. 46.

See also: AER, *AER approves AEMO's request to trigger Retailer reliability obligation in New South Wales*, media release, 23 December 2020.

91 AEMC, *Wholesale demand response mechanism*, final determination, 11 June 2020, p. ii.

92 AEMC, *Wholesale demand response mechanism*, rule change request, August 2018, p. 3.

93 AEMC, *Wholesale demand response mechanism*, rule change request, August 2018, p. 7.

The AEMC did not extend the mechanism to cover small customers due to the mechanism being less suitable for small customer participation.⁹⁴ However, it noted that there are increasing opportunities for small customers to provide demand response, which would increase further with the implementation of a two-sided market. The ESB's work program examining options for increased demand-side participation and a two-sided market are covered in appendix A.2.6.

A.2.6

ESB post-2025 reforms

The ESB is currently developing market design options as part of the ESB post-2025 program to ensure that the NEM remains fit-for-purpose into the future.

Several of the market design workstreams being considered as part of this program may have implications for gas supply availability for gas-powered generation during electricity peak demand periods. These workstreams are discussed below.

Resource adequacy mechanism & ageing thermal generation strategy

The ESB's resource adequacy mechanism and ageing thermal generation discussion focuses on whether the current NEM design will continue to deliver an adequate mix of resources and capabilities. This combined workstream does so by seeking to ensure that:⁹⁵

- A timely entry of resources into the market occurs in the NEM, meaning new resources are operating in the system when they are needed and overall system costs are minimised by avoiding investments that occur too early or too late.
- Orderly exits occur from the NEM. This would mean ensuring that reliability and security outcomes continue to meet community expectations after a generator exits, participants maintain efficient levels of investment on maintenance, price shocks are minimised and the exit of thermal generation is widely anticipated.

To meet these objectives, the ESB is proposing to explore:⁹⁶

- Recommendations for implementation principles or common approaches to integrating jurisdictional investment schemes.
- Potential enhancements to the RRO and, the way in which the changes could contribute to timely entry and orderly exit outcomes. Namely, the way that adjusting or altering key design features, such as triggers, the choice of a financial or physical tradeable product, changing the window for compliance and whether there is a need for supply side obligations, may combine to improve resource adequacy above what is achieved by current arrangements.
- Thermal plant exit arrangements. This workstream is to consider building upon the previously mentioned generator obligations to provide notice prior to closure by also requiring generators to provide notice ahead of significant changes in operation such as mothballing generator units. The ESB is also exploring the option for last-resort contractual

⁹⁴ AEMC, *Wholesale demand response mechanism*, final determination, 11 June 2020, p. 78.

⁹⁵ ESB, *Post-2025 market design*, directions paper, January 2021, p. 21.

⁹⁶ ESB, *Post-2025 market design*, directions paper, January 2021, pp. 23-24; 28-30; 32-33.

arrangements for orderly management of thermal exits where units are deemed critical for the power system.

Essential system services and scheduling & ahead mechanisms

The changing mix of generators on the grid means that essential system services that were traditionally delivered as a by-product of energy produced by thermal generators now need to be procured and delivered by other means.⁹⁷

These essential services include inertia (physical or synthetic), system strength, the provision of reserves and fast responding frequency control services. These are important for the NEM because they keep the electricity system in a secure and reliable operating state.

In the absence of markets to procure these services, AEMO may need to intervene in the market. One option available to AEMO is to direct a generator that can provide the required services to be online to supply them.⁹⁸ However, market intervention may result in less efficient outcomes, inefficient investment signals, more complex operational decisions and higher costs to consumers.⁹⁹

If changes to the current arrangements are not made, the ESB considers that AEMO will continue to intervene to maintain system security, as well as there being an increased risk of cascading failures that would lead to load shedding.¹⁰⁰

Because the ESB and stakeholders noted that valuing and procuring missing system services is a priority that cannot wait until 2025, the ESB intends to use the AEMC rule change process to accelerate the progression of this agenda.¹⁰¹ The ESB intends to continue working on a spot market approach for valuing and procuring inertia as a long-term priority.

The ESB also considers that there is a need to develop a scheduling solution to coordinating and dispatching resources that provide essential services across the NEM, in parallel with the procurement options being considered as part of the ESS workstream.¹⁰² This solution could include the introduction of a 'unit commitment for security' (UCS) approach to support scheduling system services under contract. The ESB is also considering a potential complementary 'system services mechanism' (SSM) which could involve markets to procure system services.

For the scheduling and ahead markets workstream, the ESB supports the progression of a UCS mechanism. A UCS mechanism would allow AEMO to commit additional resources to address a shortfall of system security requirements under an operational timeframe. Such a shortfall could be a breach of a minimum system requirements for system services such as system strength and inertia.¹⁰³

97 ESB, *Post 2025 market design*, consultation paper, September 2020, p. 59.

98 ESB, *Post 2025 market design*, consultation paper, September 2020, p. 59. See also AEMC, *Investigation into intervention mechanisms in the NEM*, final report, 15 August 2019, p. i.

99 ESB, *Post 2025 market design*, consultation paper, September 2020, p. 59.

100 ESB, *Post 2025 market design*, consultation paper, September 2020, p. 59.

101 ESB, *Post 2025 market design*, directions paper, January 2021, pp. 54-55.

102 ESB, *Post 2025 market design*, consultation paper, September 2020, p. 74.

103 ESB, *Post 2025 market design*, directions paper, January 2021, p. 48.

In addition, the ESB supports progressing a system service ahead market under two subcategories:¹⁰⁴

- a synchronous service market looks at the procurement and scheduling of services acquired under structured procurement. It uses the same scheduling algorithm as the UCS mechanism, but also allows uncontracted services to participate on a voluntary basis alongside contracted resources at the same time, and to be paid based on their cleared offers.
- ahead trading and scheduling of services that have a real-time market.

The ESB's current plan for the development of essential system services is for these mechanisms to be operational from early 2023 through to early 2024.¹⁰⁵

Demand-side participation

The ESB's demand-side participation workstream is considering how consumers can be rewarded for their flexibility and to enable new and innovative technologies or service providers to enter the market. The work focuses on establishing a two-sided market and the integration of DER, and associated scheduling, technical, regulatory and consumer protection reforms.¹⁰⁶

The combined workstream aims to articulate a clear transition path to a future two-sided market, which would:¹⁰⁷

- allow consumers to choose if and how they participate in the wholesale market
- better reward the value provided to the system by flexible demand and supply
- facilitate new types of participation in the market, removing barriers and providing incentives for traders to participate in dispatch, enabling greater innovation and choice to consumers
- work out how best to incorporate price responsive supply and demand into the operation of central dispatch and the forecasting that leads into real-time, enabling better informed quantity and price inputs from both the demand and supply sides in market processes
- establish an evolved consumer protections framework that makes sure all consumers have fit-for-purpose protections.

In a two-sided market, the role of the consumer (end-user) would change. While a consumer would not need to participate in a two-sided market any more than they would today, the ability for a trader (such as a retailer or an aggregator) to shift a consumer's load or import or export their energy would become a fundamental part of the market.¹⁰⁸

104 ESB, *Post 2025 market design*, directions paper, January 2021, pp. 49, 53.

105 ESB, *Post 2025 market design*, directions paper, January 2021, p. 56.

106 ESB, *Post-2025 market design*, directions paper, January 2021, p. 8.

107 ESB, *Post 2025 market design*, consultation paper, September 2020, p. 86.

108 ESB, *Post-2025 market design*, directions paper, January 2021, p. 83.

A.3 Outlook

This section outlines the future outlook of the NEM as seen through three AEMO reports; the integrated system plan (ISP), electricity statement of opportunities (ESOO) and the summer readiness report.

A.3.1 Integrated system plan

The ISP is a whole-of-system plan that provides an integrated road map for the efficient development of the NEM over the next 20 years and beyond. It identifies the optimal development path for the NEM, consisting of ISP projects and development opportunities, as well as necessary regulatory and market reforms. The ISP is updated by AEMO every two years.

Under its central 2020 ISP scenario,¹⁰⁹ AEMO expects that nearly 20 GW of coal generation and gas-powered generators will exit the NEM between 2021-2022 and 2041-2042, with the majority of capacity declining from coal-fired generators.¹¹⁰ AEMO also forecasts that more than 15 GW of new variable renewable solar generation and nearly 20 GW of new variable renewable wind generation will enter the NEM during the same period.¹¹¹

According to AEMO, coal retirements, the entry of variable forms of renewable generation and a continuing role for gas generation are expected to persist into the future.¹¹²

New interconnectors and interconnector expansions

The ISP also identifies key interconnected transmission projects that will be required in order to cater to a NEM dominated by diverse distributed energy resources and large-scale variable renewable generation.¹¹³

The interconnectors that are currently under consideration are:

- The Queensland-NSW Interconnector Minor Upgrade to add more than 150 MW of thermal capacity in both directions between Queensland and New South Wales.¹¹⁴
- The Victoria-NSW Interconnector Minor upgrade, which is expected to add more than 170 MW of thermal capacity from Victoria to New South Wales during times of peak demand.¹¹⁵
- The new Project EnergyConnect interconnector, which is planned to increase network capacity by approximately 800 MW during times of peak demand in both directions between South Australia and New South Wales. It should also increase network capacity between South Australia and Victoria by 100 MW in both directions.¹¹⁶

¹⁰⁹ AEMO's central scenario is determined by market forces and current federal and state government policies.

¹¹⁰ AEMO, *2020 Integrated system plan*, July 2020, pp. 1; 44.

¹¹¹ AEMO, *2020 Integrated system plan*, July 2020, p. 45.

¹¹² AEMO, *2020 Integrated system plan*, Appendix 4 — Energy outlook, July 2020, p. 9.

¹¹³ AEMO, *2020 Integrated system plan*, July 2020, p. 60.

¹¹⁴ AEMO, *2020 Integrated system plan*, July 2020, p. 14. See also: AER, *TransGrid contingent project — QNI minor upgrade*, final decision, April 2020.

¹¹⁵ AEMO, *2020 Integrated system plan*, Appendix 3 — Network investments, July 2020, p. 25.

¹¹⁶ AEMO, *2020 Integrated system plan*, Appendix 3 — Network investments, July 2020, p. 27.

- The new Victoria-NSW West Interconnector between Victoria and New South Wales, which is expected to increase northward network capacity by approximately 1,930 MW and southward capacity by 1,800 MW during times of peak demand.¹¹⁷
- The new Marinus Link interconnector between Victoria and Tasmania, which is planned to increase network capacity by around 750 MW in both directions during stage 1 and by an additional 750 MW in both directions during stage 2.¹¹⁸
- The Queensland-NSW Interconnector medium and large upgrades, which together are expected to increase northward thermal capacity by approximately 2,372 MW and increase southward thermal capacity by an estimated 2,130 MW.¹¹⁹

A.3.2

Electricity statement of opportunities

The ESOO forecasts electricity supply reliability and potential reliability gaps over a 10-year period. AEMO publishes this report on an annual basis.

Over the next two to five years, AEMO is expecting overall consumer operational consumption to decline slightly under its central scenario due to projections of post-COVID economic recovery, continued investments in energy efficiency activities and an increase in the adoption of distributed energy resources. Under this scenario, operational consumption would reduce from 180 terawatt-hours (TWh) in 2019-2020 to 178 TWh in 2024-2025.¹²⁰

In the longer-term (10-20 years), AEMO forecasts most NEM regions will return to experiencing growth in both operational energy consumption and maximum demand. This expectation is driven by expected growth in electric vehicles and a level of saturation in rooftop solar systems and energy efficiency investments being reached during the period.

Because maximum consumer demand is expected to continue to occur closer to sunset when rooftop solar systems is less able to support consumer demand, AEMO forecasts close to record high maximum demand periods for the near future, even as operational consumption declines.¹²¹

Under AEMO's central scenario, the maximum demand is forecast to:¹²²

- rebound to current levels in New South Wales and then increase only slightly in the next decade as energy efficiency efforts offset underlying growth drivers.
- grow in Queensland as underlying growth in large industrial loads and the business sector more generally exceed the expected improvements in energy efficiency.
- initially grow slightly in South Australia driven mainly by large industrial loads, then remain flat until 2029-2030 as growth in underlying residential and business load is offset by increasing energy efficiency.

117 AEMO, *2020 Integrated system plan*, Appendix 3 — Network investments, July 2020, pp. 34-36.

118 AEMO, *2020 Integrated system plan*, Appendix 3 — Network investments, July 2020, p. 38.

119 AEMO, *2020 Integrated system plan*, Appendix 3 — Network investments, July 2020, pp. 42-43.

120 AEMO, *2020 Electricity Statement of Opportunities*, August 2020, p. 6.

121 AEMO, *2020 Electricity Statement of Opportunities*, August 2020, p. 6.

122 AEMO, *2020 Electricity Statement of Opportunities*, August 2020, p. 7.

- continue to decline in Victoria until 2025-2026, as growth in underlying residential and business load is offset by a strong growth in energy efficiency, but start increasing beyond that point.
- increase initially in Tasmania driven by large industrial loads returning towards pre-COVID levels, then stay relatively flat.

The 2020 ESOO also discusses major expected changes to the generation mix and their forecast impacts on reliability. It notes that two South Australian gas-powered generators will retire during 2021-2023: Torrens Island A Power Station (480 MW) and Osborne Power Station (180 MW).¹²³

AEMO expects the risk of load shedding to increase in South Australia following the retirement of the Osborne gas-powered generator. However, AEMO also expects the import capability provided by the Project EnergyConnect interconnector during times of high demand to more than offset this risk.¹²⁴

A.3.3

Summer readiness report

Another development that has occurred since 2017 is the annual publication of AEMO's summer operations reports. AEMO as operator of the NEM has traditionally worked with generators, network operators and relevant government agencies to secure the electricity system for summer periods.¹²⁵

However, following the South Australian system black event in September 2016 and the supply interruptions in South Australia and New South Wales during summer 2016-2017 — and the increasingly tight supply and demand arrangement throughout the NEM, increases in the frequency and duration of summer heatwaves, the rapid changes occurring in the power system through the introduction of new sources of generation and off-grid capabilities, and Australians expectations for a reliable power system — AEMO came to the conclusion that it needed to place additional emphasis on the system being prepared for the upcoming summers.¹²⁶

As a result, AEMO has since implemented a summer readiness plan, collaborating with generation and transmission network providers, federal and state governments, and key agencies to actively manage heightened risks to power system operations.¹²⁷

As part of this annual process, AEMO often also reports whether it anticipates any gas availability shortfalls.¹²⁸

The publication of AEMO's summer readiness report and conducting seasonally-specific system security and reliability preparations are not obligations under the NER.

¹²³ AEMO, *2020 Electricity Statement of Opportunities*, August 2020, p. 124.

¹²⁴ AEMO, *2020 Electricity Statement of Opportunities*, August 2020, pp. 124-125.

¹²⁵ AEMO, *Summer operations 2017-18*, November 2017, p. 1.

¹²⁶ AEMO, *Summer operations 2017-18*, November 2017, p. 2.

¹²⁷ See AEMO's website: <https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/summer-operations>

¹²⁸ AEMO, *Summer operations 2017-18*, November 2017, p. 2; AEMO, *Summer 2018-19 Readiness Plan*, November 2018, p. 15; AEMO, *Summer 2020-21 Readiness Plan*, November 2020, p. 16. AEMO did not discuss gas supply availability issues in its report for 2019-2020.

B CHANGES IN THE GAS MARKET SINCE 2017

Since the introduction of the Gas Supply Guarantee in 2017, the east coast and northern gas markets have continued to evolve.

This appendix highlights the key developments in relation to market dynamics, regulatory changes and government initiatives. It also outlines the outlook for the eastern and northern gas markets in the coming years.

The Commission is seeking stakeholder views on whether these changes have had any impact on issues in relation to the supply of gas to gas generators in the NEM that the Gas Supply Guarantee addresses.

B.1 Market dynamics

The market dynamics on the east coast and northern gas markets have experienced significant changes in the last few years.

This section covers the main changes that have occurred, focusing on increased liquidity in wholesale gas and pipeline trading markets, the entry of new gas suppliers, the easing of the moratorium on gas exploration in some jurisdictions, the proposed investment in new gas pipelines, the increased use of locational gas swaps and the introduction of additional trading points in the key facilitated markets on the east coast.

B.1.1 Increased liquidity

In July 2020 the AEMC published the second *Biennial review into liquidity in wholesale gas and pipeline trading markets*. As part of this review, the AEMC found that liquidity is growing in a number of Australia's wholesale gas and pipeline capacity trading markets, but there are still some markets not showing signs of liquidity growth.¹²⁹

The Wallumbilla GSH has shown significant liquidity growth with positive indicators across quantitative and qualitative metrics. However, significant trading is yet to emerge on the Moomba GSH.

As compulsory markets, the DWGM and STTM continue to enjoy relatively higher levels of liquidity and stakeholder confidence. However, as these markets are more established, liquidity growth has been less significant than at the Wallumbilla GSH.¹³⁰

The AEMC's report also noted that the day-ahead auction (DAA) of contracted but unominated transportation capacity, which began in March 2019, appears to have contributed to liquidity growth in capacity and wholesale markets, though its use has not been consistent across all relevant pipelines.¹³¹

The capacity trading platform (CTP), which complements the DAA and was introduced at the same time, has not yet been significantly utilised. The Commission noted that the two

¹²⁹ AEMC, *Biennial review into liquidity in wholesale gas and pipeline trading markets*, final report, July 2020, p. 4.

¹³⁰ AEMC, *Biennial review into liquidity in wholesale gas and pipeline trading markets*, final report, July 2020, p. 9.

¹³¹ AEMC, *Biennial review into liquidity in wholesale gas and pipeline trading markets*, final report, July 2020, p. 3.

markets (the CTP and the DAA), as originally recommended by the AEMC, are designed to work in tandem. Therefore, it can be expected that greater use of the DAA may see less use of the CTP and vice versa.¹³²

One potential interpretation of the outcomes of the DAA to date is that there is a surplus of contracted capacity on some pipelines and this is leading to plenty of capacity being available in the auction at low prices. As participants re-contract, this may correct overtime and if auction capacity becomes scarcer, then there may be an increase in CTP activity.¹³³ It should be noted that the CTP has only been in place a short time, and unlike the DAA, there are alternatives to trade longer-term pipeline contracts.

The Commission noted that liquidity growth in the DAA and the CTP was closely connected to liquidity in the GSH with the uptake of capacity trading opportunities being driven by demand for short-term trading opportunities in the hubs, such as portfolio optimisation by moving gas both northwards and southwards.¹³⁴

B.1.2

New gas suppliers

The AER noted in its *State of the Energy Market 2020* report that there was an increase in the number of suppliers in the east coast gas market, as well as producers like Shell Energy Australia expanding their presence.¹³⁵

The AER also indicated that the growth of retailers and aggregators — such as the Eastern Energy Supply Group¹³⁶ — in downstream spot gas markets helped to challenge the role played by large retailers and producers and provide commercial and industrial customers with competitive alternative sources of gas.¹³⁷

Additionally, five new projects are expected to commence operations in Queensland over the next four years. The operators of these projects include Australia Pacific LNG, Arrow Energy, Comet Ridge and Senex. As a result, the AER considered that supply options to commercial and industrial gas users appear to be improving.¹³⁸

The ACCC has also reported that a greater number of junior producers starting to play a more active role in the development of new projects.¹³⁹

132 AEMC, *Biennial review into liquidity in wholesale gas and pipeline trading markets*, final report, July 2020, p. 16

133 AEMC, *Biennial review into liquidity in wholesale gas and pipeline trading markets*, final report, July 2020, p. 16.

134 AEMC, *Biennial review into liquidity in wholesale gas and pipeline trading markets*, final report, July 2020, pp. 99; 101.

135 AER, *State of the Energy Market 2020*, July 2020, p. 196.

136 The Eastern Energy Supply Group received approval from the ACCC in November 2017 to allow commercial and industrial businesses to jointly purchase gas and electricity.

137 AER, *State of the Energy Market 2020*, July 2020, p. 196. The AER publishes, on a quarterly basis, a list of participants in the eastern gas markets, by market participant category. See AER, *Wholesale markets quarterly Q4 2020*, pp. 59-60.

138 AER, *State of the Energy Market 2020*, July 2020, p. 197.

139 ACCC, *Gas inquiry 2017-2025*, interim report, January 2021, p. 37.

B.1.3 **Moratorium on gas exploration**

Restrictions on exploration and fracking have influenced the development of supply across jurisdictions in recent years. For example, the Northern Territory Government lifted a fracking ban in 2018.¹⁴⁰ An implementation plan is now in place to provide a regulatory framework for the development of onshore natural gas resources.

The Victorian Government has recently announced it will lift the ban on onshore exploration of conventional natural gas in 2021. However, it will continue to ban fracking and coal seam exploration in the state by making an amendment to the Victorian constitution. Permitting conventional onshore exploration and development is expected to enable further development of the Otway Basin.¹⁴¹

The New South Wales Government ceased the issuance of exploration licences in April 2011 and introduced exclusion zones for the approval of new coal seam gas developments across the state in 2012. Since then, the government has implemented its Gas Plan which aims to manage coal seam gas development in accordance with recommendations made by the Chief Scientist and Engineer in 2014.¹⁴²

B.1.4 **Investment in major gas pipelines**

Bi-directional flow

Traditionally, long transmission pipelines have linked remote gas production basins with a demand centre such as a manufacturer or city — necessitating only a one-way flow of gas.

According to the Australian Pipelines and Gas Association (APGA), an area of pipeline innovation in the past decade has been the investment in bi-directional pipelines. These investments have transformed most of the major gas transmission pipelines into bi-directional pipelines, allowing gas to flow in both directions in the pipeline, providing gas consumers with greater flexibility in terms of contracting and trading.¹⁴³

In addition, investment in recent years has included a proliferation of linkages between major pipelines. These linkages now provide pipeline operators with the ability to redirect gas flows in response to regional shortages or excess supply.¹⁴⁴

For example, the following pipelines have been upgraded:¹⁴⁵

- South West Queensland Pipeline and the QSN Link, connecting South Australia and Queensland (2014)
- Roma Brisbane Pipeline (July 2015)
- Moomba Sydney Pipeline (September 2015)

140 See Northern Territory Government website: <https://nt.gov.au/industry/mining-and-petroleum/petroleum-activities/hydraulic-fracturing>.

141 The Hon Daniel Andrews, Premier of Victoria, *Backing the science, protecting farmers and boosting jobs*, media release, 17 March 2020.

142 NSW Government, *NSW gas plan*, 2015, pp. 2-4.

143 APGA, *Gas vision 2050 — delivering a clean energy future*, September 2020, p. 50.

144 APGA, *Gas vision 2050 — delivering a clean energy future*, September 2020, p. 50.

145 AER, *State of the Energy Market 2018*, December 2018, p. 191.

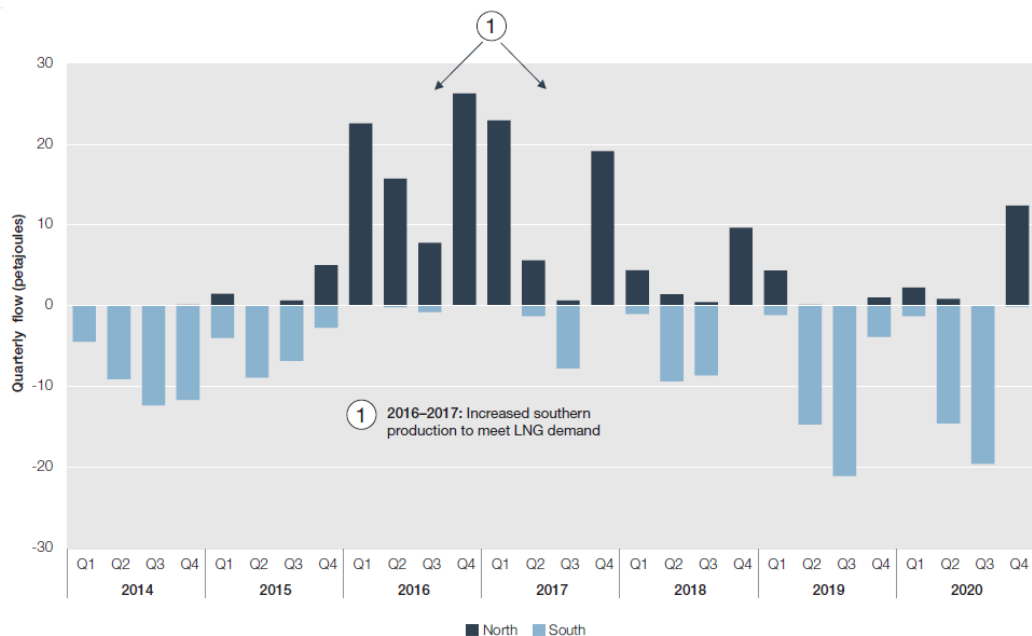
- Moomba Adelaide Pipeline System (September 2015)
- NSW–Victoria Interconnect (2015).

BOX 1: INTER-REGIONAL GAS TRADE

A signature feature of the domestic gas market since 2014 is the role of inter-regional gas trades to manage the supply–demand balance. Key pipelines have been re-engineered as bi-directional, enabling them to respond more flexibly to regional supply and demand conditions.

With the launch of Queensland’s LNG projects in 2015, the projects began drawing substantial volumes of gas from Victoria and South Australia to cover shortfalls in their reserve portfolios. Flows then settled into a cycle of gas flowing south in the Australian winter (to meet heating demand), and north in the Australian summer (the northern hemisphere winter) when Asia’s LNG demand peaks.

Figure B.1: North-south gas flows in eastern Australia (2014-2020)



Source: AER analysis using the Natural Gas Services Bulletin Board.

Note: North/South flows depict net physical flows around Moomba – north or south.

Source: AER, *Source: Wholesale markets quarterly – Q4 2020* Source: , February 2021, p. 45.

More recently, the cycle appears to be shifting towards net southern flows—that is, less gas flowing north in summer, and more flowing south in winter. In the fourth quarter of 2019, net flows were southward. The introduction of the pipeline capacity reforms is contributing to this shift. Significant southbound flows can be linked to pipeline capacity won at auction for routes on the key South West Queensland Pipeline and Moomba Sydney Pipeline.

Conditions in the domestic electricity market also affect trade flows of gas. Following the closure of some coal-fired generators in the southern states, increased demand for gas-

powered generation in those states drew gas south, especially during the Australian winter when heating demand peaks.

The threat of government intervention in the gas market also impacted flows from late 2017. To avoid triggering intervention, Queensland's LNG producers began offering more gas to the domestic market, which increased southbound flows. This action reflected the exporters' commitment to the Australian Government to first offer any uncontracted gas to the domestic market on a competitive basis.

Source: AER, *State of the Energy Market 2020*, July 2020, pp. 200-201.

Note: This box is a replication of the analysis prepared by the AER.

New major gas pipelines

The Northern Gas Pipeline connecting the Northern Territory to the east coast gas market began flowing gas in early 2019. It currently has the capacity to flow 90 TJ of gas per day. Flows have been, on average to date 65 TJ/day.

Recently, there have been announcements on future investments in major gas pipelines, such as:

- In August 2020, Central Petroleum, the Australian Gas Infrastructure Group (AGIG) and Macquarie Merenee signed a memorandum of understanding for the Amadeus to Moomba gas pipeline. The final investment decision is expected by the second half of 2021, which would allow the partners to begin construction of the gas pipeline in 2022 with deliveries of the first gas targeted for the first quarter of 2024. The project is planned to be a 950 km long 16-inch gas transmission pipeline which will provide direct access from the Amadeus Basin in the Northern Territory to the Moomba gas supply hub located in South Australia. The proposed gas pipeline is designed to have a free-flow capacity of 124 TJ per day or 45 PJ per year.¹⁴⁶
- In September 2020, Jemena announced a \$400 million proposal to extend the Eastern Gas Pipeline by 185 km from Sydney's west northward to the Hunter Valley. This would connect the Hunter Valley to domestic gas supplies and also allow for bi-directional flow along the pipeline. Jemena anticipated it would be able to supply gas to Hunter Valley industrial sector as well as the proposed LNG import terminal at Newcastle and a new gas-powered generator on the Central Coast.¹⁴⁷
- Jemena and Australian Industrial Energy announced a memorandum of understanding to connect the proposed Port Kembla Gas Terminal with Jemena's Eastern Gas Pipeline by a 12 km, \$70 million underground pipeline. The pipeline is to enable 522 TJ of gas to be supplied into New South Wales from the import terminal per day.¹⁴⁸

¹⁴⁶ Central Petroleum, *Amadeus to Moomba Gas Pipeline*, ASX announcement and media release, 18 August 2020.

¹⁴⁷ Jemena, *Jemena reveals plans to extend Eastern Gas Pipeline*, media release, 28 September 2020.

¹⁴⁸ Jemena, *AIE signs critical gas pipeline deal with Jemena*, media release, 27 November 2020.

- In November 2020, Jemena announced a Memorandum of Understanding with Tamboran Resources¹⁴⁹ to expedite plans to invest over \$5 billion to increase the capacity of its Northern Gas Pipeline while also working to extend it from the Northern Territory's Beetaloo Basin to the Wallumbilla Gas Hub in Queensland.¹⁵⁰ Jemena plans to progressively increase the pipeline's capacity from 90 TJ/d to 1,000 TJ/d through a combination of compression and looping.¹⁵¹

According to the ACCC, there are some positive signs for infrastructure investment. Infrastructure providers are proactively seeking out opportunities to work with suppliers to bring gas to market and are considering a range of investments in existing pipelines and storage.¹⁵²

The ACCC noted that a number of pipeline operators have, for example, entered into memoranda of understanding or development agreements with producers, which are conditional on producers making a final investment decision to proceed with their projects. Some have also started work on planning the development of these pipelines and seeking relevant planning and environmental approvals.¹⁵³

In addition, infrastructure providers are understood to also be considering opportunities to reduce the financial barriers that mid-stream infrastructure can pose for junior producers. The ACCC suggested that while this is a positive step for junior producers, care will need to be taken to ensure vertical integration of infrastructure service providers does not restrict economic efficiency.¹⁵⁴

B.1.5

Use of locational gas swaps

A locational swap involves counterparties swapping the cash flows associated with relative prices (in the case of a financial swap) or the ownership of gas (in the case of a physical swap) in two different markets.¹⁵⁵

During the Biennial liquidity review, market participants indicated to the AEMC that they are increasingly making use of locational swaps, which has the advantage of avoiding paying for transport tariffs and AEMO admin fees when compared with the capacity trading platform.¹⁵⁶

The AER has also noted in the *2020 State of the Energy Market* report that some gas producers enter swap agreements to deliver gas to southern gas customers without physically shipping it along pipelines.¹⁵⁷

149 Tamboran Resources is the junior partner of Santos in the Beetaloo sub-basin.

150 Jemena, *Jemena partners with shale gas experts to develop Beetaloo*, media release, 11 November 2020.

151 Jemena anticipates transporting up to 200TJ/day of gas through the NGP from 2025, with quantities increasing as extensions and expansions to the pipeline is commissioned from the second half of the 2020s.

152 ACCC, *Gas inquiry 2017-2025*, interim report, January 2021, p. 37.

153 ACCC, *Gas inquiry 2017-2025*, interim report, January 2021, p. 46.

154 ACCC, *Gas inquiry 2017-2025*, interim report, January 2021, p. 37.

155 AEMC, *Biennial review into liquidity in wholesale gas and pipeline trading markets*, final report, July 2020, p. 109.

156 AEMC, *Biennial review into liquidity in wholesale gas and pipeline trading markets*, final report, July 2020, p. 101.

157 AER, *State of the Energy Market 2020*, July 2020, p. 201.

One example is Shell's agreement with Santos to swap at least 18 PJ of gas.¹⁵⁸ Under the agreement, Shell draws on its coal seam gas reserves to meet part of Santos's LNG supply obligations in Queensland, while Santos diverts gas from the Cooper Basin to meet demand in southern Australia.¹⁵⁹ This swap allows the producers to increase supply to the domestic market, while enabling Shell to avoid transporting gas on the South West Queensland Pipeline, which is contracted to near full capacity.¹⁶⁰

B.1.6 Additional trading points

In January 2021, AEMO introduced two new trading locations at the GSH in NSW (Wilton and Culcairn) on the Moomba Sydney Pipeline.¹⁶¹ These locations were already frequently used by participants for bilateral trading outside the Sydney GSH. As a result, participants indicated to AEMO that they would benefit from the GSH trading arrangements being available at these locations.

In considering whether to add Wilton and Culcairn to the GSH, AEMO noted the potential benefits of having additional trading locations include:¹⁶²

- Being able to leverage the GSH's standardised products, terms and conditions to trade with a broader range of counterparties than may be possible on a purely bilateral basis.
- Utilising the GSH trading platform, settlement and prudential framework to facilitate trades, minimising costs and administrative burdens for participants.
- Improving price discovery by having standardised products traded and reported on the GSH at these new locations.

B.2 Regulatory changes

The COAG Energy Council has made a number of reforms to encourage liquidity in gas markets. Some of these reforms have acted upon the 15 recommendations made by the AEMC in its 2016 East Coast Wholesale Gas Markets and Pipeline Frameworks Review to redesign the wholesale gas markets, improve access to pipeline capacity and increase transparency in the market.¹⁶³

B.2.1 Pipeline capacity trading reforms

In 2017-2018, the Gas Market Reform Group (GMRG) developed a detailed implementation package for the reforms to pipeline capacity trading that was recommended by the AEMC in its East coast gas review.

These reforms, introduced in March 2019, made it easier to access pipeline capacity that is not fully used. Capacity on some pipelines is fully contracted to gas shippers who do not fully

¹⁵⁸ Santos, *Santos facilitates delivery of gas into southern domestic market*, media release, August 2017.

¹⁵⁹ EnergyQuest, *Energy quarterly*, March 2020.

¹⁶⁰ AER, *State of the Energy Market 2020*, July 2020, p. 201.

¹⁶¹ See AEMO's website: <https://aemo.com.au/en/consultations/current-and-closed-consultations/gsh-proposed-exchange-agreement-amendment-nsw-trading-locations>.

¹⁶² See AEMO's website: <https://aemo.com.au/en/consultations/current-and-closed-consultations/gsh-proposed-exchange-agreement-amendment-nsw-trading-locations>

¹⁶³ AEMC, *East coast wholesale gas market and pipeline frameworks review*, stage 2 final report, 23 May 2016, pp. 14-15.

use it. The reforms give other parties an opportunity to access this capacity through auctions for unominated capacity and a trading platform for the trade of secondary capacity.¹⁶⁴

With the introduction of these reforms, secondary pipeline capacity can be acquired in two ways:

1. Capacity trading platform (CTP): a voluntary market facilitated by AEMO where shippers can trade secondary capacity ahead of the nomination cut-off time. It provides for exchange-based trading of commonly traded products and a listing service for more-bespoke products. The CTP forms part of the GSH exchange.¹⁶⁵
2. Day-Ahead Auction (DAA): a centralised auction platform that provides the release of contracted but unominated transportation capacity on designated pipelines and compression facilities across eastern Australia. The auction, facilitated by AEMO, enables any shipper to procure residual capacity on a day-ahead basis after nomination cut-off, with a zero reserve price and compressor fuel provided. The DAA framework applies to all transmission pipelines with a nameplate rating of 10 TJ/day or more that are providing third party access and are used to service more than one shipper.¹⁶⁶

Appendix B.1.1 above discusses how both mechanisms have been utilised by the industry since their introduction in March 2019.

B.2.2 Gas transparency measures

In November 2020, the Energy Ministers (formerly the COAG Energy Council) initiated a consultation on the changes required to the National Gas Law and associated regulations and rules to implement the gas transparency measures reform.¹⁶⁷

This process follows on from the recommendations of the ACCC-GMRG joint report and the AEMC's Stage 2 Bulletin Board improvements.¹⁶⁸

The transparency reform measures package seeks to enhance transparency in the eastern and northern Australian gas markets, addressing information gaps and asymmetries relating to gas and infrastructure prices, supply and availability of gas, gas demand, and infrastructure used to supply gas to end-markets.

If the package is approved by Energy Ministers, the legislative changes will be progressed through the South Australian Parliament and flow through to all jurisdictions that have applied the NGL as the law of that jurisdiction. Changes to the NGR will be made as Minister-made rules when the legislative changes come into effect.¹⁶⁹

¹⁶⁴ GMRG, *Capacity trading reform package: final legal and regulatory framework — explanatory note*, November 2018, p. 16.

¹⁶⁵ GMRG, *Capacity trading reform package: final legal and regulatory framework — explanatory note*, November 2018, pp. 24-25.

¹⁶⁶ AEMC, *Biennial review into liquidity in wholesale gas and pipeline trading markets*, final report, July 2020, p. 78.

¹⁶⁷ Energy Ministers, *Measures to improve transparency in the gas market*, consultation paper, November 2020, p. 5.

¹⁶⁸ ACCC and GMRG, *ACCC and GMRG joint recommendations: measures to improve the transparency of the gas market*, December 2018.

See also: AEMC, *East coast wholesale gas market and pipeline frameworks review*, stage 2 final report: information provision, 23 May 2016, pp. 7-9.

¹⁶⁹ Energy Ministers, *Measures to improve transparency in the gas market*, consultation paper, November 2020, p. 5.

Subject to the completion of the legislative amendment process, the transparency measures are expected to take effect in phases with current anticipated dates as follows:¹⁷⁰

- 2021 for the Natural Gas Services Bulletin Board reporting obligations.
- Late 2021 for the Gas Statement of Opportunities reporting, which AEMO will use when preparing the 2022 version.
- As soon as practicable following the conclusion of the ACCC's Gas Inquiry (currently scheduled for 2025) for the AER's new price reporting functions.

B.3 Government initiatives

There have been a few initiatives led by the Australian Government and some jurisdictions in relation to the gas sector that may impact the issue of gas supply adequacy.

B.3.1 Australian Domestic Gas Security Mechanism

The tightening supply-demand balance following the commencement of LNG exports led to concerns in 2017 that gas production may not be sufficient to meet domestic demand. To safeguard domestic gas users against a potential supply shortfall, the Australian Government announced the Australian Domestic Gas Security Mechanism (ADGSM) in April 2017, with implementation from 1 July 2017.

The ADGSM provides the Minister for Resources with the ability to restrict LNG exports where domestic supply is expected to be insufficient. The Minister's decision is informed by assessments made by AEMO and the ACCC.¹⁷¹

The ADGSM has been designed as a measure of last resort in the event of a forecast domestic gas shortage. It is important to note the ADGSM is a temporary supply security measure and not a direct price control mechanism. It aims to ensure there is sufficient gas supply in the domestic market. Increasing domestic gas production remains the most effective method of increasing competition, alleviating market tightness and placing downward pressure on prices.¹⁷²

Heads of agreement

In October 2017, the Australian Government entered into a heads of agreement with the LNG producers. Under the heads of agreement, LNG producers committed to offer sufficient gas to the domestic market to meet expected shortfalls in 2018 and 2019, and to offer uncontracted gas on 'competitive market terms' before offering it to the international market. In September 2018, the heads of agreement was renewed and extended to cover the 2020 calendar year.¹⁷³

¹⁷⁰ Energy Ministers, *Measures to improve transparency in the gas market*, consultation paper, November 2020, p. 5.

¹⁷¹ The ADGSM sits within Division 6 of the Customs (Prohibited Exports) Regulations 1958. Details about the operation of the ADGSM are in the Customs (Prohibited Exports) (Operation of the Australian Domestic Gas Security Mechanism) Guidelines 2020. New guidelines came into effect on 6 January 2021.

¹⁷² Department of Industry, Innovation and Science, *Review of the Australian Domestic Gas Security Mechanism*, January 2020.

¹⁷³ ACCC, *Domestic gas users paying too much*, media release, 17 August 2020.

According to the AER, the LNG projects currently utilise various methods to sell more gas domestically, including selling short term gas on the Wallumbilla Gas Supply Hub; launching expression of interest processes for customers for long term gas contracts, and entering bilateral arrangements for short-term and long-term gas contracts.¹⁷⁴

Review of the ADGSM

A review of the ADGSM by the Department of Industry, Innovation and Science concluded in January 2020. A number of industry stakeholders suggested that since the ADGSM had not been triggered, it could not have had any effect. However, others contended the ADGSM has helped eliminate local supply shortages and continues to provide an incentive to suppliers to ensure future domestic gas supply.¹⁷⁵

On 24 January 2020, the Australian Government announced that the ADGSM would be retained until 1 January 2023.¹⁷⁶

New heads of agreement

In January 2021, the Australian Government announced a new heads of agreement with the east coast LNG exporters, replacing the initial agreement. Under this new agreement, LNG exporters agreed to the following commitments until 1 January 2023:¹⁷⁷

1. Uncontracted gas (spot cargoes) will not be offered to the international market unless equivalent volumes of gas have first been offered with reasonable notice on competitive market terms to the Australian domestic gas market.
2. The signatories note that LNG netback prices based on Asian LNG spot prices play a role in influencing domestic gas prices in the East Coast gas market (as referenced by the ACCC LNG netback price series). Individual prices offered to domestic gas users will be internationally competitive and have regard to the producer's cost of supply and factors that may be relevant to users' individual circumstances, including the terms and conditions of their gas supply agreement and any applicable transportation or retailer charges.
 - a. Spot prices offered to the domestic market will have regard to the spot price LNG exporters could reasonably expect to receive for uncontracted gas in overseas markets.
 - b. Term prices offered to the domestic market will have regard to forward term prices LNG exporters could reasonably expect to receive for uncontracted gas in overseas markets.
3. The LNG exporters, as part of the East Coast gas industry, will continue to engage with AEMO on the gas supply balance and provide information to aid in forecasting

174 AER, *State of the Energy Market 2020*, July 2020, p. 195.

175 Department of Industry, Innovation and Science, *Review of the Australian Domestic Gas Security Mechanism*, January 2020.

176 See: <https://www.minister.industry.gov.au/ministers/canavan/media-releases/review-finds-gas-policy-boosts-domestic-supply-and-helps-lower>

177 Department of Industry, Science, Energy and Resources, *Heads of agreement — the Australian east coast domestic gas supply commitment*, January 2021, pp. 1-2.

supply needs for gas-powered generation. This will include supporting efforts to make gas available to meet peak demand periods in the National Electricity Market through the Gas Supply Guarantee recognising that this may include industrial, commercial and residential demand.

4. The LNG exporters' compliance with these commitments will be conveyed to the Australian Government through regular reporting to the ACCC on sales, offers to sell and bids declined, the terms and conditions attached to these transactions and the notice given to the domestic gas market in respect of any offers made. It will also include the price expectations and assumptions for international spot and term markets for the relevant supply period.

The ACCC will monitor and report on the progress of these commitments, as well as the operation and conduct of other market participants including buyers, non-LNG export suppliers, retailers/aggregators and pipeline operators in other areas of the gas market.

B.3.2

Gas acceleration program

In July 2017, the Australian Government announced its \$26 million Gas acceleration program (GAP) which aims to accelerate the responsible development of onshore gas for domestic consumers.

The program encourages direct investment in gas developments. It supports projects with the greatest likelihood of securing new and significant volumes of gas for domestic consumers.¹⁷⁸

In March 2018, grants were awarded to four different projects, which would supply an extra 12.4 PJ of new gas to the east coast market by 30 June 2020 and an extra 27.6 PJ over five years.¹⁷⁹ In June 2018, a fifth project was awarded a grant, the refurbishment of two gas processing plants, which would add a combined gas capacity of 8.7 PJ per year.¹⁸⁰

B.3.3

NSW energy package

In January 2020, the Australian and NSW governments made an agreement to set a target to inject an additional 70 PJ of gas per year into the NSW market and also agreed to a gas market review if this target is not met by 2022. The agreement identified three priority projects underway in NSW to achieve this target:¹⁸¹

- Port Kembla gas import terminal (up to 100 PJ) — which was granted planning approval in April 2019

¹⁷⁸ Ministers for the Department of Industry, Science, Energy and Resources, *\$26 million to fast track new east coast gas projects*, media release, 14 July 2017.

¹⁷⁹ Ministers for the Department of Industry, Science, Energy and Resources, *New east coast supply from gas acceleration program*, media release, 28 March 2018.

¹⁸⁰ Ministers for the Department of Industry, Science, Energy and Resources, *Gas acceleration program continues to benefit east coast supply*, media release, 1 June 2018.

¹⁸¹ Australian Government and NSW Government, *Memorandum of understanding — NSW energy package*, January 2020, p. 8.

- Port of Newcastle gas import terminal (approximately 110 PJ) — declared a NSW Critical State Significant Infrastructure project in August 2019
- Narrabri gas project (approximately 70 PJ) — to be determined by the NSW Independent Planning Commission.

B.3.4 Gas-fired recovery plan

The Prime Minister announced the Australian Government's gas-fired recovery plan on 15 September 2020. This was aimed at leveraging the natural gas industry to "help re-establish a strong economy as part of the Government's JobMaker plan, making energy affordable for families and businesses and supporting jobs as part of Australia's recovery from the COVID-19 recession."¹⁸²

The government's vision for a gas-fired recovery for Australia's economy is expected to be delivered through a number of measures across three key action areas:

- **Unlocking supply:** This includes setting new gas supply targets with jurisdictions and "enforcing potential 'use-it or lose-it' requirements" in production and exploration licences. The government has also set aside \$28.3 million to 'unlock' five key gas basins including Beetaloo Basin (Northern Territory), North Bowen Basin (Queensland) and Galilee Basin (Queensland). The new agreement with the Queensland LNG exporters is also captured under this action as well as investigating a gas reservation scheme.
- **Efficient transportation:** Under this action, the government aims to identify priority pipelines and critical infrastructure (such as compression facilities, storage facilities and LNG import terminals) for investment as part of an inaugural National Gas Infrastructure Plan (NGIP). It also intends to improve the regulation of pipelines to enhance competition and transparency as well as improve access to pipeline capacity through the secondary pipeline capacity market.
- **Empowering consumers:** This includes plans to establish the Wallumbilla GSH as an 'Australian Gas Hub', a review of the ACCC's calculation of the LNG netback price, and using the NGIP to develop 'customer hubs' or a book-build program.

B.4 Outlook

AEMO is responsible for publishing, on an annual basis, the Gas Statement of Opportunities (GSOO)¹⁸³ and the Victorian Gas Planning Report.¹⁸⁴

In addition, since April 2017 the ACCC has been directed by the Australian Government to conduct a wide-ranging inquiry into the supply and demand for natural gas in Australia. The ACCC publishes its findings twice a year.¹⁸⁵

¹⁸² Prime Minister of Australia, *Gas-Fired Recovery*, media release, 15 September 2020.

¹⁸³ NGR, rule 135KC.

¹⁸⁴ NGR, rule 323.

¹⁸⁵ The reports are available at the ACCC's website on: <https://www.accc.gov.au/regulated-infrastructure/energy/gas-inquiry-2017-2025>

B.4.1 Tightening linkages between gas and electricity

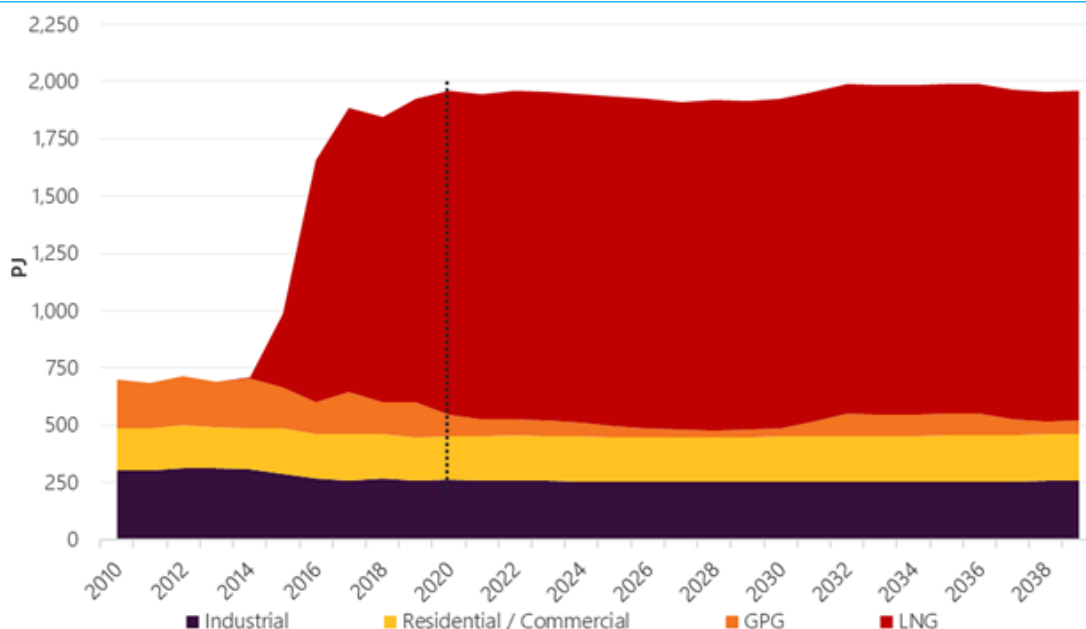
AEMO has noted that the east coast electricity and gas markets have transitioned from a period of abundant gas reserves and an over-supplied NEM to a situation where the supply-demand balance is tight in both the gas and electricity markets. As a result, adequacy issues in one sector are now increasingly likely to drive adequacy issues in the other.¹⁸⁶

Now, a range of events in both the gas and electricity sectors have increased uncertainty for market participants, particularly in the short term when supply adequacy is already tight, gas fields are in decline and the NEM generation fleet is ageing. In addition, the generation and transmission investment needed to replace and manage the retirement of major coal-fired power stations is not yet committed. In this rapidly changing environment, any single event, or combination of events, may significantly impact the forecast outlook facing the sectors.

B.4.2 Demand outlook

The 2020 GSOO demand outlook does not show significant increases in overall demand for gas, as illustrated in figure B.2 below, given the dominance of LNG export demand in the overall outlook. However, the figure does indicate variability in gas demand for gas-powered generation with an overall downward trend to 2030.

Figure B.2: Gas demand outlook – central scenario (2010-2039)



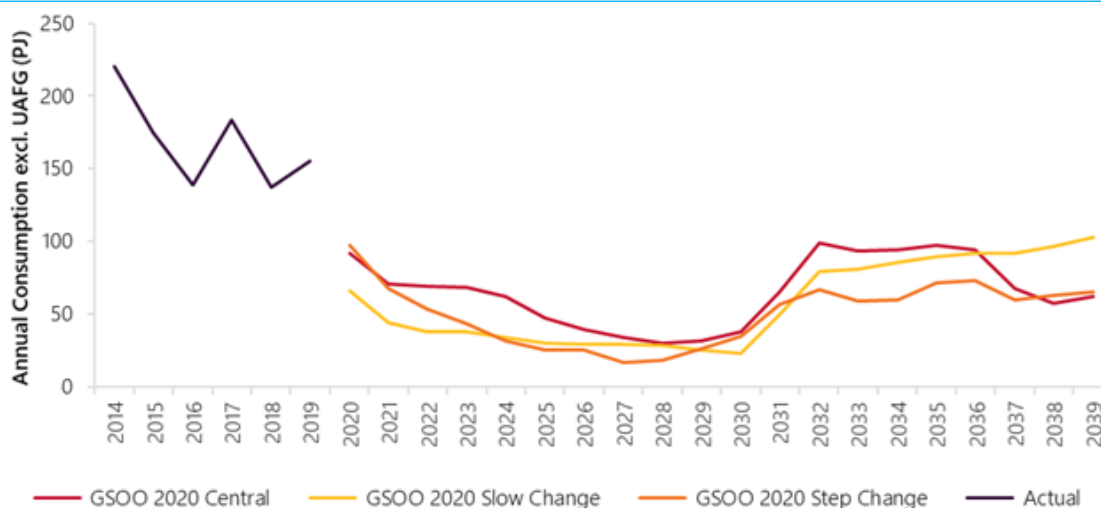
Source: AEMO, 2020 Gas Statement of Opportunities, p. 4.

¹⁸⁶ AEMO, 2020 Gas Statement of Opportunities, March 2020, p. 49.

Gas-powered generation demand is forecast to be significantly lower on average. This reflects the increasing supply of electricity capacity from renewable generators and improved regional interconnection in the NEM.

The variability (and overall downward trend for the medium term) in demand from gas-powered generators can be seen more clearly in figure B.3 below from AEMO, showing actual demand from 2014 to 2019 and forecasts (under three scenarios) to 2039.

Figure B.3: Gas-powered generation demand outlook – all scenarios (2014-2039)



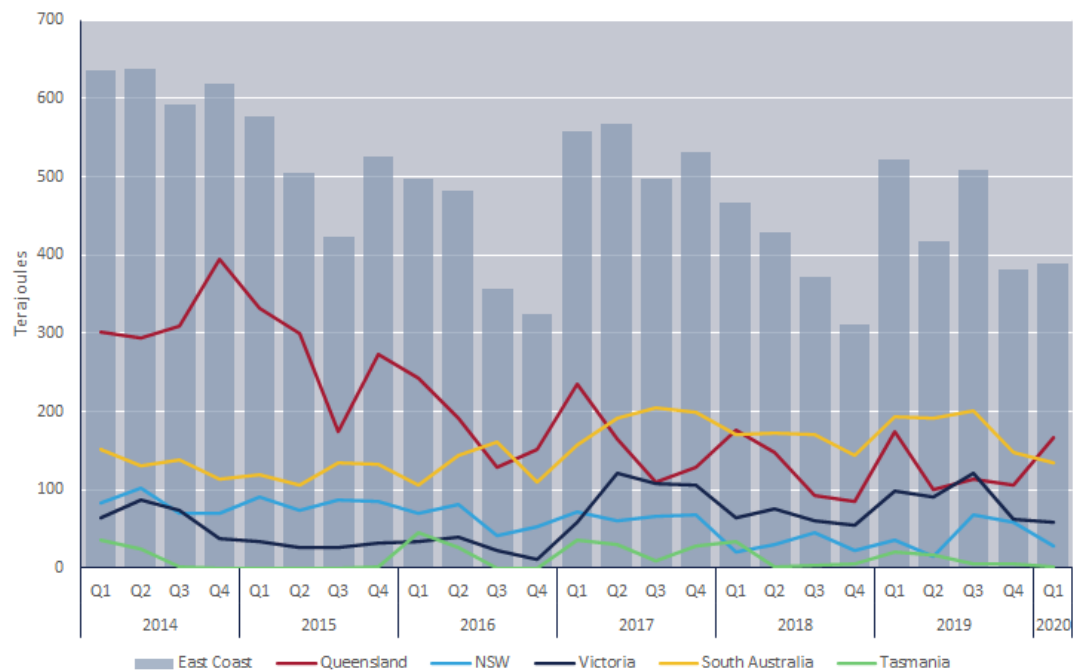
Source: AEMO, *2020 Gas Statement of Opportunities*, p. 28.

According to AEMO, forecasting gas-powered generation demand is complicated by uncertainties because of its volatility.

Among domestic sources of demand for gas, gas-powered generation is the most volatile as seen in figure B.4 below. This is because gas is a relatively expensive fuel for electricity generation, so gas generators typically operate as flexible or peaking plants that can be switched on at short notice to capture high prices in the electricity market.

Gas demand for power generation, therefore, tends to be seasonal and often peaking in summer (although also sometimes winter) when electricity demand and prices are higher. It also varies with the amount of renewable generation available in the NEM (which is less expensive but weather dependent and so variable).

Figure B.4: Quarterly gas demand for gas-powered generation (2014-2020)



Source: AER, *State of the Energy Market 2020*, p. 199.

Rising gas fuel costs linked to Queensland's LNG industry, along with a shortage of gas supplies linked to state-based moratoria on gas exploration and production, reduced demand for gas-powered generation in that state from 2015 to 2018. As a result, gas-powered generation dropped from 18 per cent of Queensland's electricity output in 2015 to nine per cent in 2019.

However, in Victoria and South Australia, where coal generation retirements and rising outages among the remaining coal-fired generators made gas-powered generation critical to meeting electricity demand in those states. In particular, when the Hazelwood power station closed in 2017, gas-powered generation increased in both states. In addition, in 2019 some major coal generators experienced lengthy, unexpected outages. As a result, gas-powered generators increased output to cover the shortfall. Compared with 2018, gas-powered generation rose from five to seven per cent in Victoria, and from 52 to 54 per cent in South Australia.¹⁸⁷

These recent experiences indicate that gas-powered generation demand could be significantly higher than forecast if there are delays in the commissioning of new renewable capacity or interconnections, unexpected generation retirement, additional unplanned outages of coal-fired power stations or regional interconnectors, or unanticipated hot weather events. Given the risks associated with these developments and the potential size of the

¹⁸⁷ AER, *State of the Energy Market 2020*, July 2020, p. 198.

shortfall, an additional supply of gas may be required in the south to ensure that supply is sufficient to meet forecast demand from 2024.

B.4.3

Supply outlook

The most recent reports from AEMO, the AER and the ACCC have suggested more exploration and development in southern Australia, pipeline expansions and/or LNG imports could mitigate the gas supply risks facing the east coast of Australia.

Long term supply conditions are uncertain for a number of reasons. First, developed resources may not always perform in the future as expected, some production sources may decline faster than expected.

Second, forecasts make assumptions about what supply may be provided by undeveloped gas fields with uncertain reserves. The more supply forecasts rely on assumptions about undeveloped gas fields with uncertain reserves, the more unreliable the forecasts are likely to become given their reliance on more speculative sources of supply. While some development proposals in eastern Australia show promising signs, others face significant regulatory hurdles linked to environmental concerns, among other things.

In response to this ongoing supply uncertainty, the Australian Government and some state governments have launched initiatives to encourage new projects to supply the domestic market. In addition to the ADGSM, the Gas Supply Guarantee, GAP and the ACCC gas inquiry, these initiatives include:¹⁸⁸

- Consultation on a National Gas Reservation Scheme by the Australian Government, with a final decision on this scheme expected by February 2021.
- Collaboration between the Australian Government, the Queensland Government and industry to electrify LNG production facilities. These facilities currently use their own gas as a power source, which would be freed up for domestic market usage.
- Exploration by the Australian Government into introducing hydrogen to the gas distribution pipelines as part of its national hydrogen strategy.

ACCC gas inquiry report

In its latest report, the ACCC stated that it expects there to be sufficient gas supply to be produced to meet forecast domestic and export demand in the east coast gas market in 2021. However, this outcome is an uncertain one for the southern states because a large proportion of the gas supply needed to meet the anticipated demand is expected to come from undeveloped 2P reserves.¹⁸⁹

The ACCC suggested the usual uncertainty associated with gas-powered generation demand as another relevant factor that could have an impact on the gas supply-demand balance in the southern states during the near-term.¹⁹⁰

¹⁸⁸ AER, *State of the Energy Market 2020*, July 2020, pp. 210-212.

¹⁸⁹ ACCC, *Gas inquiry 2017-2025*, interim report, January 2021, p. 7, p. 17.
2P reserves are proven and probable reserves; proven gas reserves plus gas reserves that are deemed to be at least 50 per cent likely to be commercially recoverable by gas producers.

¹⁹⁰ ACCC, *Gas inquiry 2017-2025*, interim report, January 2021, pp. 8-10.

As a result, the ACCC anticipated that new sources of supply and related infrastructure will be required to avoid a potential shortfall in supply from 2P reserves on the east coast from 2026, and from as early as 2024 in the southern states. In its view, this could be met by an LNG import terminal or the successful development of more speculative domestic sources of supply to ensure that sufficient gas supply is available to meet its forecast demand during this period.¹⁹¹ The ACCC noted the progress of the Port Kembla LNG import terminal and commented that if it is operational by 2024, it should provide sufficient supply to avoid the projected shortfall in both the southern states and the broader east coast market until 2028.¹⁹²

LNG prices

The AER recently commented on the impact of LNG prices on supply and demand in the east coast gas market. It considered that in the short term, low international LNG prices are likely to increase supply from Queensland into the domestic market. This may have the effect of reducing the supply of gas drawn from the Victorian fields down to minimum contracted levels and extending the life of those fields. However, in the long term, lower international prices may suppress exploration and development expenditure, reducing the longer-term supply outlook.¹⁹³

AEMO's integrated system plan

AEMO's 2020 ISP includes a discussion on future gas supply availability. It notes that gas supplies from existing and committed gas developments are already tightening, particularly in the southern states. AEMO warns that after some gas fields cease production between mid-2023 and mid-2024, gas supply restrictions and curtailment of gas-powered generators may be necessary, particularly during peak winter days.¹⁹⁴

To avoid this outcome, AEMO states that southern Australia would need to either develop new local sources (and pipeline infrastructure), progress LNG import terminals or address pipeline limitations from northern Australia. Stronger electricity interconnection between different NEM regions would also reduce reliance on gas-powered generators and therefore help to mitigate the risk of gas supply disruptions or shortfalls.

191 ACCC, *Gas inquiry 2017-2025*, interim report, January 2021, p. 10.

192 ACCC, *Gas inquiry 2017-2025*, interim report, January 2021, p. 12.

193 AER, *State of the Energy Market 2020*, July 2020, p. 209.

194 AEMO, *2020 Integrated System Plan*, July 2020, p. 56.

C EMERGENCY MANAGEMENT FOR ELECTRICITY AND GAS

In some jurisdictions, emergency management for the energy sector includes granting the relevant Minister the power to give directions to market participants in order to respond to an energy supply emergency.

These powers are only available where an emergency has been "declared or proclaimed" in writing and published. The declaration or proclamation remains in force for a limited period (for example, 14 days) and may be revoked at any time.

The current arrangements and powers are outlined below.

C.1 South Australia

The Minister for Energy and Mining may give directions to any market participants that the Minister thinks are reasonably necessary to respond to an electricity supply emergency, including to require any specified persons who engage in the generation of electricity, or any class of such persons, to generate electricity in accordance with those directions.¹⁹⁵

Where the volume of gas available for supply through a distribution system is insufficient or likely to become insufficient to meet customer requirements, the Minister for Energy and Mining may give directions to the gas system operator or a person who sells gas to ensure the most efficient and appropriate use of the available gas.

The Minister may also direct customers not to draw gas from the system except for the purposes (if any) allowed by the directions.¹⁹⁶

C.2 Victoria

The Minister for Energy, Environment and Climate Change may give directions that the Minister thinks necessary to ensure the safe, economical or effective supply of electricity and increase the available supply of electricity, including to:

- give any directions that are necessary to control, direct, authorise conduct in relation to, restrict or prohibit the supply, distribution, sale, use or consumption of electricity
- direct a person or body to maintain or operate any services required to ensure the generation, supply or distribution of electricity.¹⁹⁷

The Minister may also, having regard to the needs of the community, give any directions that the Minister thinks necessary to regulate the use of the available supply of gas, including to:

- give any directions that are necessary to control, direct, authorise conduct in relation to, restrict or prohibit the extraction, production, supply, distribution, sale, use or consumption of gas

¹⁹⁵ *Emergency Management Act 2004 (South Australia)*, ss. 27B and 27C.

¹⁹⁶ *Gas Supply Act 1997 (South Australia)*, s. 37.

¹⁹⁷ *Electricity Industry Act 2000 (Victoria)*, s. 96.

- direct a person or body who extracts, produces, transmits or distributes gas to extract it for, or produce it, transmit it or distribute it to a person specified in the direction
- direct a person or body to comply with any terms and conditions relating to the extraction, production, supply, distribution, sale, use or consumption of gas the Minister determines.¹⁹⁸

The Chairperson of Energy Safe Victoria is also empowered to make directions (such as to regulate the use of available gas) where there is a gas safety emergency.¹⁹⁹

C.3 New South Wales

The Minister for Energy and Environment may give directions that the Minister considers are reasonably necessary to respond to the electricity supply emergency, including:

- to impose requirements relating to the carrying out of activities that may affect the production or supply of electricity; and
- to impose other requirements that relate directly to the production, use or supply of electricity.²⁰⁰

In the case of a proclamation of an emergency, the Governor may also make a regulation controlling, directing, restricting or prohibiting the sale, supply, use or consumption of the proclaimed form of energy, whether generally or for any purpose or purposes specified in the regulation.²⁰¹

While other jurisdictions also possess emergency powers, these are focused on load shedding or gas curtailment rather than directing participants to generate electricity or supply gas to a particular person or location.²⁰²

C.4 Queensland

The Minister for Energy, Renewables and Hydrogen to make an order rationing the use of electricity if satisfied that an electricity entity cannot supply the electricity needed by its customers and the making of the order is necessary to enable continued supply of electricity by restricting electricity use to the level of available supply.²⁰³

The Minister may also give a direction to an industry participant, customer or AEMO to do or not do something to ensure the safe supply of processed natural gas to customers in an area the subject of insufficiency of supply declaration.

198 *Gas Industry Act 2001 (Victoria)*, ss. 206-207.

199 *Gas Safety Act 1997 (Victoria)*, ss. 106-107.

200 *Electricity Supply Act 1995 (New South Wales)*, s. 94B.

201 *Energy and Utilities Administration Act 1987 (New South Wales)*, s. 25.

202 For example, *Electricity Supply Industry Act 1995 (Tasmania)*, *Electricity Act 1994 (Queensland)* and *Gas Supply Act 2003 (Queensland)*.

203 *Electricity Act 1994 (Queensland)*, s. 24.

Examples of possible insufficiency of supply directions include a direction to control, direct, restrict, or prohibit the production, distribution, supply, or the consumption or use of, processed natural gas.²⁰⁴

C.5 Tasmania

The Minister for Energy may make an emergency restriction order restricting the use of electricity if the Minister is satisfied that the order is necessary to restrict electricity use to the level of available or sustainable supply.²⁰⁵

If the Minister reasonably believes that the supply of gas being conveyed by gas infrastructure is, or is likely to be, disrupted or become insufficient, the Minister may give directions (by notice) to the licensee of the gas infrastructure to ensure the most efficient, safe and appropriate use of available gas.

The Minister may also direct customers not to draw gas from the gas infrastructure otherwise than in accordance with the notice.²⁰⁶

C.6 Australian Capital Territory

The Minister for Water, Energy and Emissions Reduction may approve a scheme to restrict the use of electricity if satisfied that it is necessary to: facilitate the provision of efficient, reliable and sustainable electricity services; protect the interests of consumers; manage the safety and security of the electricity network; or protect public safety.²⁰⁷

204 *Gas Supply Act 2003 (Queensland)*, s. 254.

205 *Electricity Supply Industry Act 1995 (Tasmania)*, s. 67.

206 *Gas Industry Act 2019 (Tasmania)*, s. 89.

207 *Utilities (Electricity Restrictions) Regulation 2004 (ACT)*, s. 6. The ACT also has broader emergency management powers in its *Emergencies Act 2004 (Part 7)* and *Utilities Act 2000 (Part 16)*.