

AEMO East Coast Gas System functions

Worked example

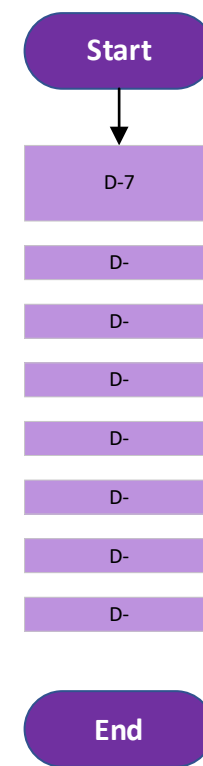


Worked Example Outline

Objective: Provide an overview of considerations and actions that AEMO may take in exercising its East Coast Gas Supply Adequacy functions.

This will include discussion of:

- how AEMO may identify and evaluate a threat or risk.
- how AEMO may Signal threats.
- how AEMO may develop and communicate Directions.
- how may the ECGS functions interface with alternate Market processes.
- how may industry interact with this process.



Timeline to help
us keep track

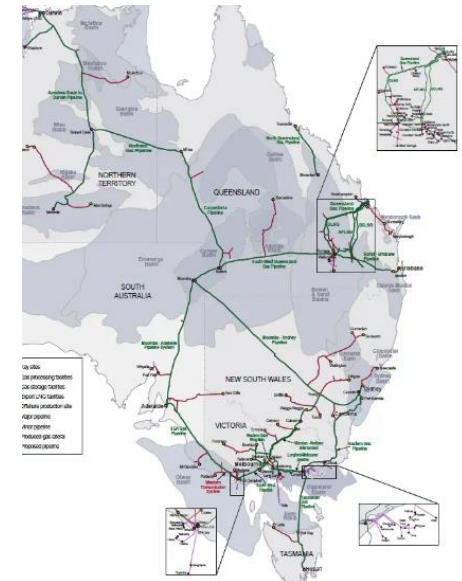
Example Scenario

The exercise will avoid specifics related to supply & demand quantities to instead focus on AEMOs planned processes and actions.

The scenario is grounded in the supply / demand balance outlined in the 2023 GSOO and VGPR though we assume a set of unlikely industry responses that trigger a requirement for AEMO intervention.

Summary:

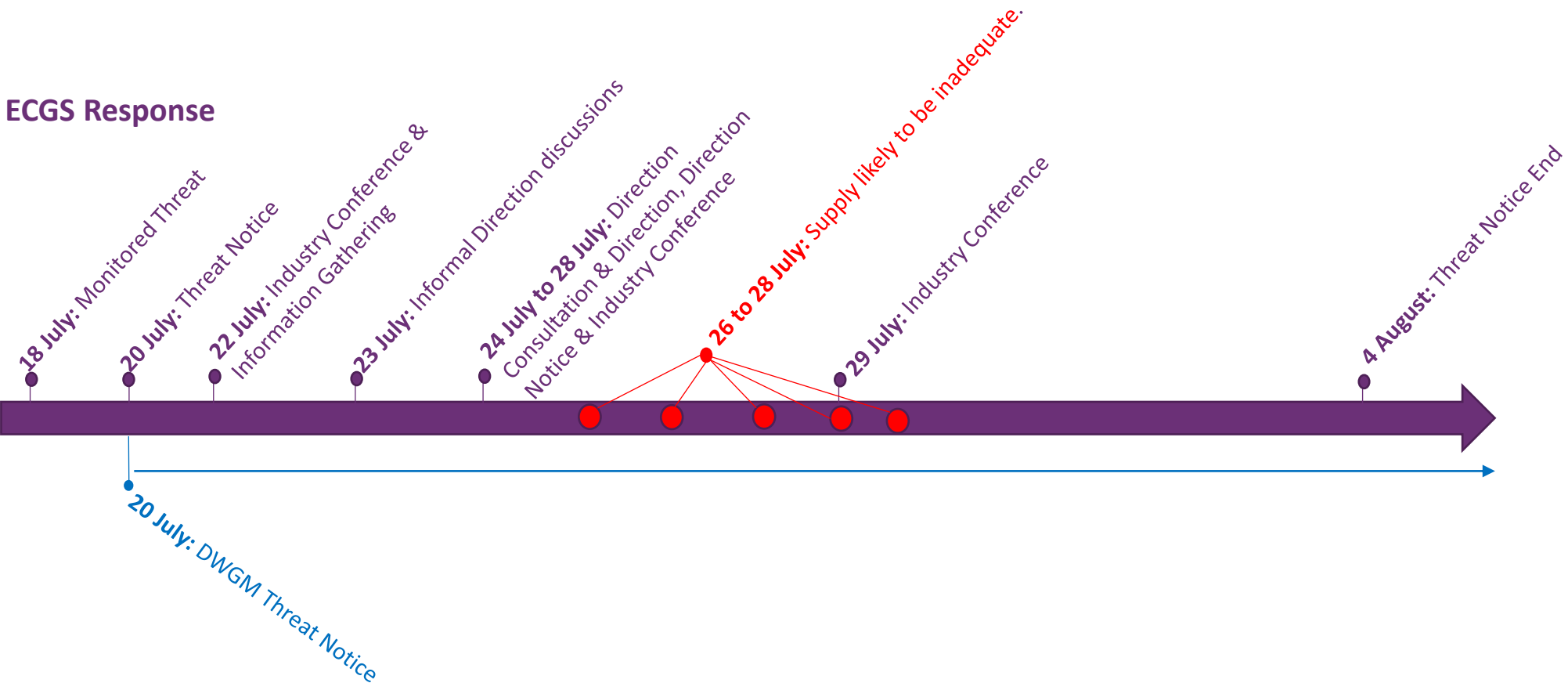
- Cold front across east coast Australia, with multi-jurisdiction co-incident peak day demand.
- Extended period of high GPG consumption resulting from some NEM event.
- Under utilisation of the South West Queensland Pipeline (SWQP) to bring needed gas south.



Event Overview

Overview

AEMO ECGS Response



AEMO DWGM Response

AEMO STTM Response

Adequacy Assessment Overview

18 July

Holistic review of all industry reported data to spot threats, assess risk and identify potential risk mitigating options.

1. Direct review and assessment of industry reported data (and other) primarily using PowerBI dashboards.
2. Modelled System flow assessment, identifying supply/demand solutions using PLEXOS.
3. Industry reporting of threats and risks and discussion of controls.

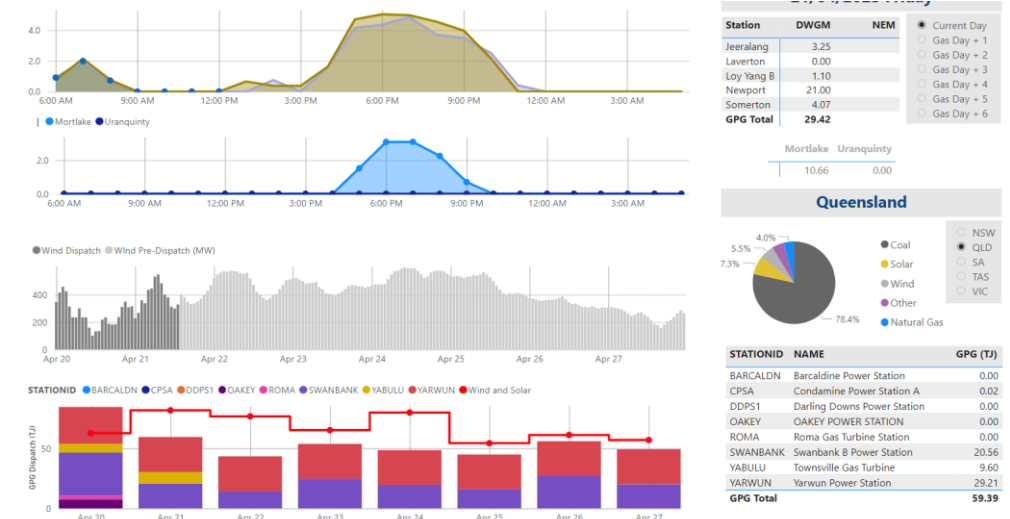
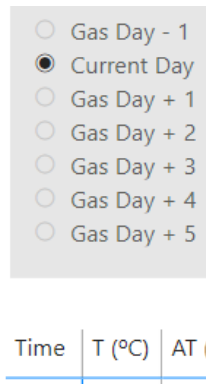
Demand Type Assessments

18 July

Include:

1. Part 27 Demand forecasts by Demand Zone.
2. Part 18 pipeline forecasts.
3. Weather forecast in major population centers (Adelaide, Melbourne, Sydney etc.).
4. NEM 7-day dispatch for GPG forecasts.
5. NEM Lack Of Reserve notifications.

Melbourne		Forecast for Gas Day -						
Gas Day		Min Temp	Max Temp	Wind Sp	Sun Hr	System	GPG	Total
	Tue	11.5	19.0	7	6	445.0	20.9	465.9
	Wed	13.5	17.5	29	4	460.1	0.0	460.1
	Thu	12.0	20.0	14	6	429.7	0.0	429.7
	Fri	12.1	23.0	11	6			
	Sat	15.3	18.4	32	0			
	Sun	12.0	15.1	25	3			
	Mon	10.0	17.4	11	4			

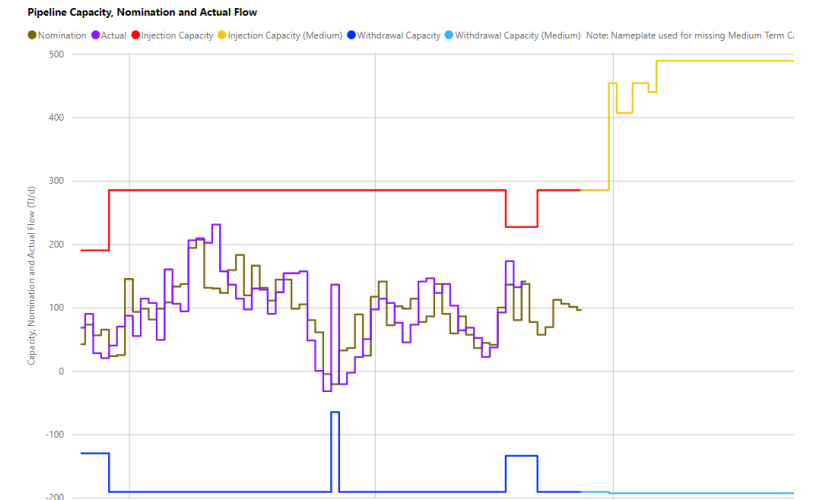


Supply Type Assessments

18 July

Include:

1. Facility Availability (Facility forecast capacity against name plate).
2. Facility Utilisation (nominations against forecast capacities).
3. Operational & contracted linepack, across pipeline zones, pipelines and demand nodes.
4. Storage inventory forecasts

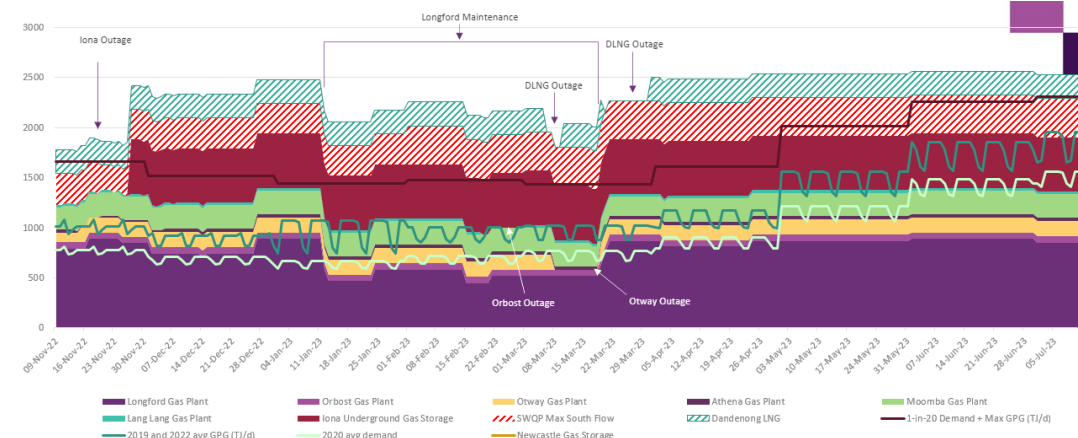


Adequacy & Reliability Assessments

18 July

Review of Industry data:

1. Expected flow balance by zone, pipeline, jurisdiction and region.
2. Regional Capacity balance (ability of forecast supply to meet peak forecast demand).



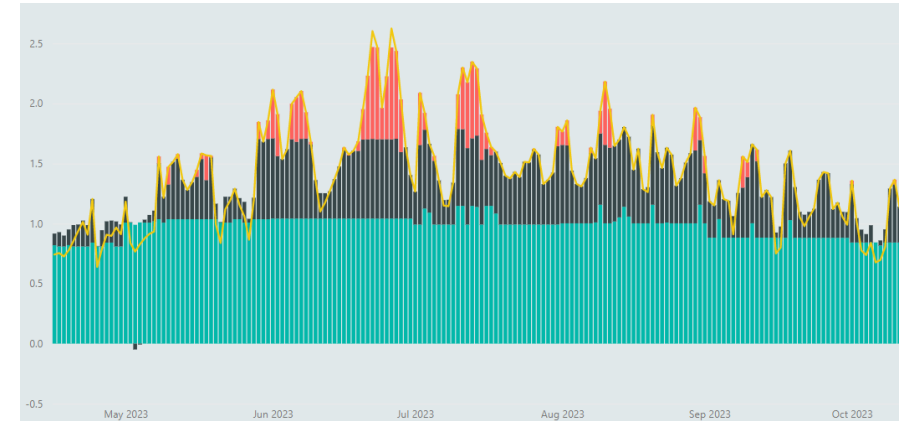
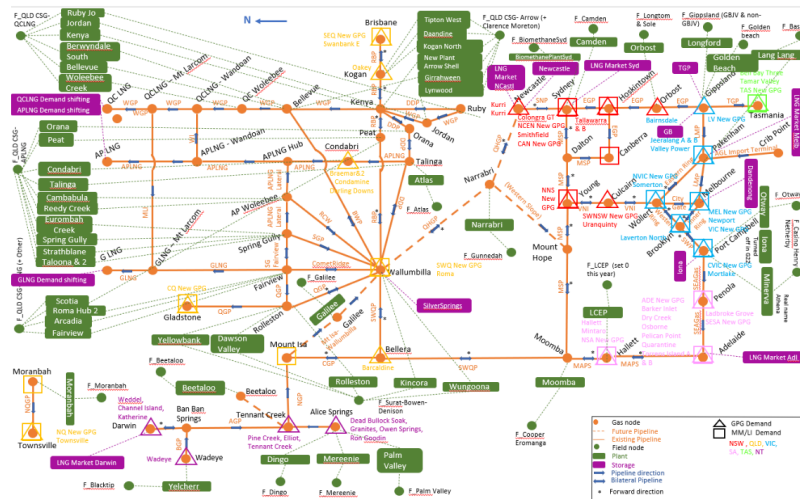
Note: Information presented after 31 March 2023 is publicly available on the GBB.

Adequacy & Reliability Assessments

18 July

Model East Coast Grid flow via PLEXOS

- Initialise with industry reported data (demand, linepack, capacities etc.)
- Test system adequacy subject to changes in Supply & Demand variables.
- Used to assist identification of threats and risk mitigation options.



Assessment Outcome

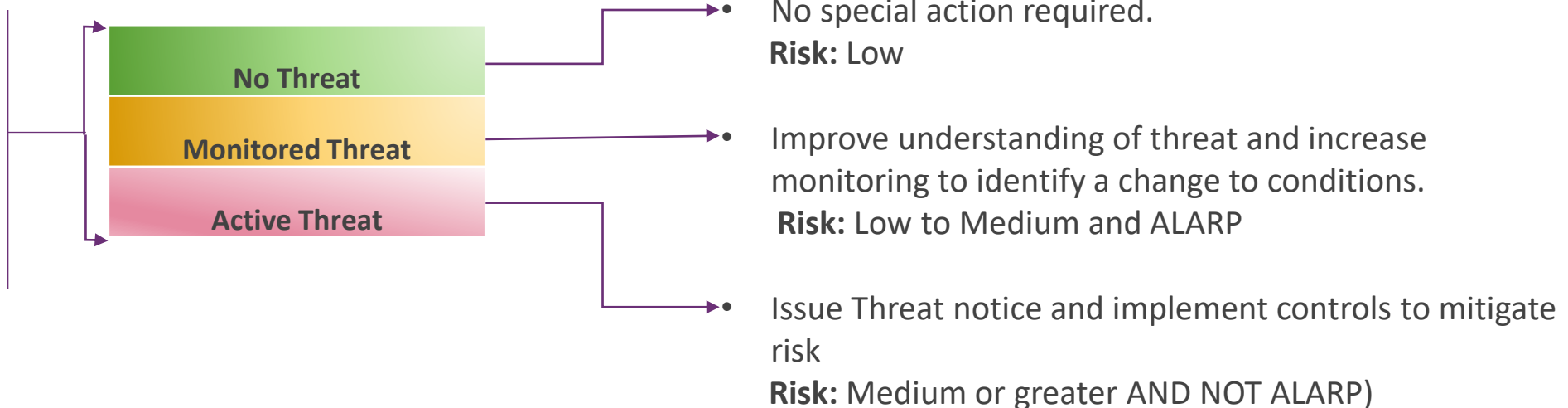
18 July

AEMO will conduct a qualitative Risk Assessment to determine a threat's potential to impact East Coast Gas Supply Adequacy.

Medium	Medium	High	Critical	Critical
Low	Medium	High	Critical	Critical
Low	Medium	High	High	Critical
Low	Low	Medium	Medium	High
Low	Low	Medium	Medium	High

Threat Identification categories

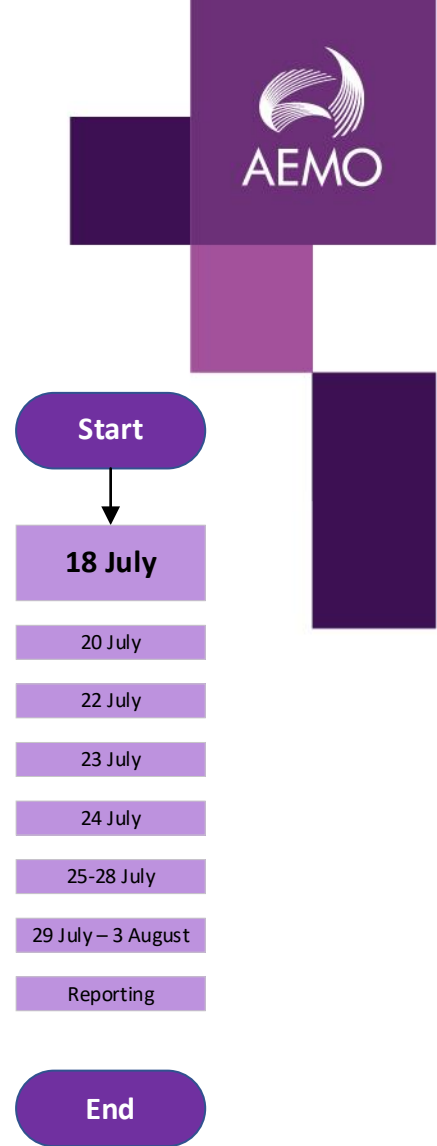
- Availability
- Flow
- Storage
- Linepack
- Demand



Adequacy Assessment

18 July

- Demand:
 - high GPG related to environmental and NEM conditions
 - high residential and C&I demand. Anticipate an increase to demand from an emerging east coast wide cold front.
- Flow:
 - Demand will exceed supply into Moomba to Sydney Pipeline (MSP) and Eastern Gas Pipeline (EGP) for at least the next two days (and likely beyond).
- Storage:
 - high rate of draw down on IonaUSG. Facility inventory now at the low end of its typical range.



Assessment Outcome

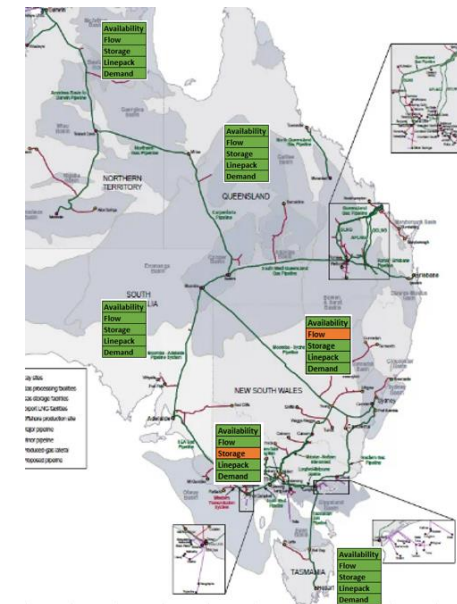
18 July

Threat Description:

1. Potential for very high demand may threaten supply adequacy on a daily basis south of Moomba.
2. Extended high demand period may deplete IonaUGS inventory, such that IonaUGS storage may not deliver at nameplate capacity later in the season.

Risk: Low

Threat status: Monitored Threat (Flow & Storage)



AEMO Response

18 July

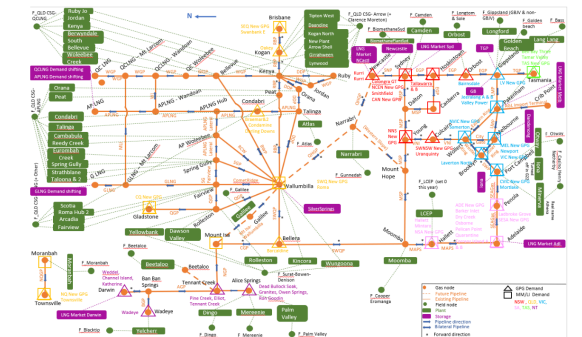
AEMO determine:

1. enhanced monitoring and improved understanding of potential threat is necessary.

Monitored Threat Response

Conduct additional Modelled System Flow runs to test system sensitivity to changes in supply and demand. Sensitivities include:

- Co-incident peak day demand (or series of near co-incident peak days) demand)
- Continued high GPG demand
- Temporary complete or partial reduction in Production/Storage/Pipeline capacity.



Adequacy Assessment

20 July

- Demand:
 - Emergence of east coast wide cold front with high heating load
 - High GPG related to continued NEM event
- Flow:
 - Supply into the MSP and EGP continue to be less than demand.
 - Shortfalls in supply is being met by consumption of linepack. MSP and EGP linepack is expected to draw down quickly.
 - Modelled System Flow (Plexos) indicate a requirement for increased supply from Qld.
 - Modelling also indicates an increased likelihood of early IonaUGS depletion (before end of winter).
- Linepack:
 - Operational & contracted quantities within pipelines south of Moomba are trending lower.
- Storage:
 - Very high demand has reduced IonaUGS inventory below the low end of its typical range.
- Bi-lateral discussions:
 - Pipeline Operator: confirm linepack status and the potential impact if trends continue.
 - Determine if GPG have (or are considering) options to run on alternate fuels.
 - Confirm critical Facility availability over the next 7-days.
 - Confirm IonaUGS inventory and concerns regarding inventory levels.



Assessment Outcome

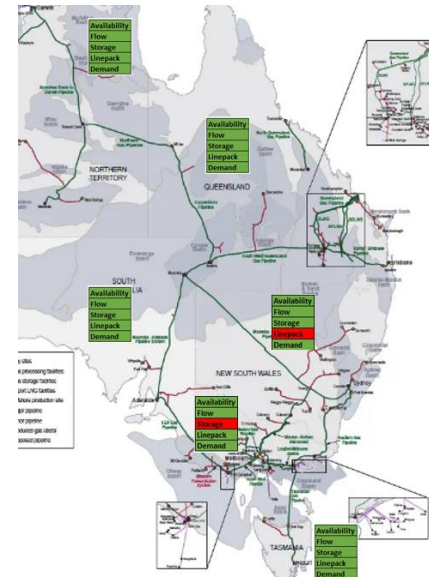
20 July

ECGS Adequacy assessment identifies a potential or actual risk or threat:

1. Linepack: Pipeline linepack in the EGP and MSP.
2. Storage: IonaUGS inventory may be drawn down to a level that impacts supply capacity.

Risk: Medium and not ALARP

Threat Status: Active Threat (Linepack & Storage)



AEMO Response

20 July

AEMO determine:

1. risk to linepack must be Signaled to Industry as a risk to ECGS supply adequacy.
2. risk to IonaUGS inventory is best addressed via the DWGM TTSS mechanism.

East Coast Gas System:

- **Issue ECGS Threat notice & request industry response.**

Declared Wholesale Gas Market (DWGM):

- **Issue a Threat to System Security for IonaUGS inventory.**

Short Term Trading Market (STTM):

- No action.

Threat Notice

20 July

AEMO will issue an ECGS Threat Notice via SMS and email to Part 27 registered entity contacts. AEMO will also publish the Notice on AEMOs website.

[Email content]

- a) the identified risk or threat event summary is:
- Supply nominations into the EGP and MSP are insufficient to meet demand.
 - Shortfalls in supply is being met by consumption of linepack. MSP and EGP linepack is expected to draw down quickly.
 - If trends continue, linepack may become insufficient to offset deviations between supply and demand.
- e) the industry response, if any, to mitigate the threat is to:
- Where possible match Participant forecast demand with nominations.
 - Increase nominations into the MSP with supply from Queensland.
 - Provide accurate and complete 7-day nominations and forecasts where possible to improve supply planning.

Adequacy Assessment

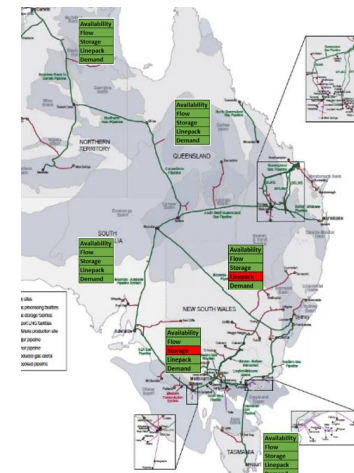
22 July

- Threat likelihood increased.
 - Very high demand.
 - No evidence of increased nominations into EGP and MSP.
 - Continued draw down on MSP and EGP linepack.
- Bi-lateral discussions:
 - Pipeline Operators: on going discussion of risk to supply adequacy from linepack depletion.

Threat Description: as per ECGS Threat Notice

Risk: Medium and not ALARP

Threat Status: Active Threat (Linepack & Storage)



Start

18 July

20 July

22 July

23 July

24 July

25-28 July

29 July – 3 August

Reporting

End

AEMO Response

22 July

AEMO determine:

1. to strengthen communication of the risk to Industry and identify the potential use of ECGS Directions.
2. a need to gather information required by AEMO to perform its ECGS functions

Easy Coast Gas System:

- Threat Notice issued (20 July)
- **Information gathering.**
- **Hold Industry Conference.**

DWGM:

- Threat to System Security (IonaUGS inventory) issued 20 July.

STTM:

- No action.

Other:

- None.

Information Gathering

22 July

AEMO gather information necessary to assess risk and identify control options. This information will be requested under NGL 91F.

- where possible AEMO will consult with a relevant entity before issuing an information request.
- requests will be made in writing and emailed to the reporting entity.

LNG Exporters:

- Provide a 14-day forecast of daily domestic supply quantities.

Self contracting users consuming $< 10\text{TJ/day}$:

- Provide a 14-day forecast of daily demand

Industry Conference

22 July

AEMO will issue an ECGS Industry Conference Notice via SMS and email to registered entity contacts.

[SMS] AEMO will be hosting an East Coast Gas System adequacy and reliability industry conference at 13:00 AEST Saturday 22/07/23. See email for details.

ECGS Industry Conference agenda:

- Overview of the event as outline in the Threat Notice.
- Discussion of the required industry response including observations that it has not been achieved.
- Outline alternative risk control options if the industry response does not resolve risk which may include AEMOs use of Directions under the ECGS functions.

Adequacy Assessment

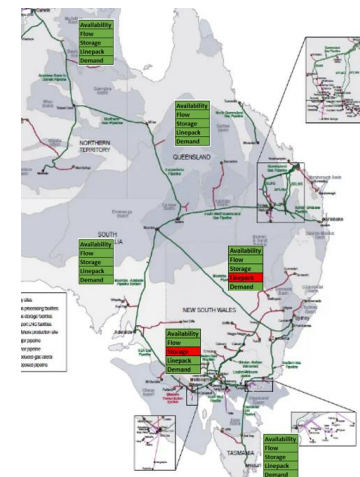
23 July

- As per previous day, risk profile is increasing
 - No evidence of the requested Industry response.
 - Linepack depletion continues threaten supply adequacy on the EGP & MSP.
- Bi-lateral discussions:
 - Pipeline Operators: discussion on the risk of continued linepack depletion. Identify a potential shortfall in supply on the MSP on 26 July.

Threat Description: as per ECGS Threat Notice

Risk: High

Threat Status: Active Threat (Linepack & Storage)



AEMO Response

23 July

AEMO determine:

1. the request for industry response may not be sufficient to mitigate risk to supply adequacy.
2. intervention via the ECGS Direction process may be required to mitigate risk.
3. preparation for the use of ECGS Directions must commence.

East Coast Gas System:

- Threat notice & request for industry response (20 July).
- Industry conference held (22 July).
- **Hold informal Direction discussions.**

DWGM:

- Threat to System Security (IonaUGS) issued 20 July

STTM:

- No action

Other:

- None.

Informal Direction Agenda

23 July

Informal consultation will address:

- how a Direction (or series of Directions) could be structured to achieve the desired outcome, including any alternative to the proposed directions.
- the ability of the participant to comply with the defined Direction.
- safety and technical issues may be relevant to compliance.

Informal Direction Discussions

23 July

Direct gas from Qld where there is available supply, to NSW where there is a risk to supply adequacy.

- Producer to make gas available for purchase.
- Shipper to purchase that gas and offer it into the Sydney STTM.

Pipeline Operators:

- confirm the timing and magnitude of the required supply to mitigate risk.
- identify Shippers with rights to transport gas from a receipt connection to the Sydney STTM.
- to identify supporting Directions to ensure delivery of gas to the Sydney STTM.

Producers:

- identify supply that may be made available for purchase as a designated location.

Shippers:

- requirement to purchase and transport gas into the MSP.
- offer that gas into the Sydney STTM.

Adequacy Assessment

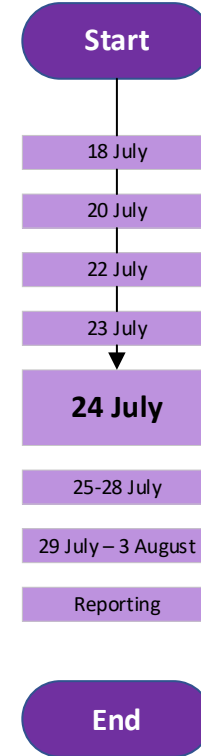
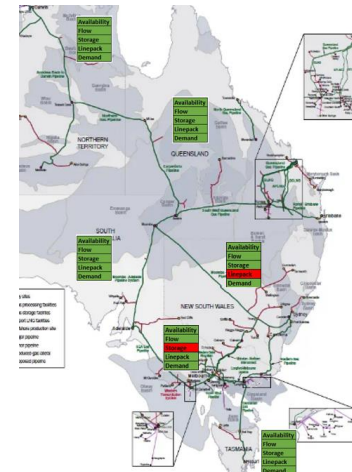
24 July

- As per previous day, increasing risk profile
 - No evidence of the requested Market response.
 - Demand exceeds supply into NSW.
 - Continued linepack depletion in EGP and MSP threatens supply adequacy.
- Bi-lateral discussions:
 - Pipeline Operators: confirm risk to supply adequacy on 26 July.

Threat Description: as per ECGS Threat Notice

Risk: Critical

Threat Status: Active Threat (Linepack & Storage)



AEMO Response

July 24

AEMO determine:

1. the request for industry response is not sufficient to mitigate risk to supply adequacy.
2. intervention via the ECGS Direction process is required to mitigate risk

East Coast Gas Supply:

- Threat notice issued & Industry response requested (20 July).
- Industry conference (22 July).
- **Direction Consultation (Pipeline Operators, Producers, Shippers)**
- **Direction**
- **Direction Notice**
- **Industry Conference**

DWGM:

- Threat to System Security (IonaUGS) issued 20 July

STTM:

- No Action.

Other:

- NGERAC notification that ECGS Directions will be issued to mitigate threat.

Direction summary

24 July

Producer:

- Make gas available for purchase at a connection point on the SWQP.

Shipper:

- Purchase gas from Producer and transport it to the MSP.
- Offer purchased gas into the Sydney STTM for supply on 26 July.

Pipeline Operators:

- Other directions may be required to increase supply and manage the consumption of linepack as determined through Direction discussions/consultations.

Direction Consultation

24 July

AEMO will conduct formal Direction Consultation with identified entities that can provide a required service.

Direction Consultation will include discussion of:

- the proposed direction.
- the ability of the entity to comply.
- safety and technical issues.
- any need for related directions, or as an alternative to the proposed direction.

ECGS Direction

24 July

The Direction will be issued by email and include the following details:

- reference to the Threat for which the direction has been given.
- statement that a request for an industry response is not sufficient to mitigate risk to supply adequacy and that intervention via the ECGS Direction process is required to mitigate risk.
- the authority under which AEMO makes this Direction.
- specifics of the Direction as discussed in formal consultation.
- the intended duration of the Direction.

Direction Notice

24 July

AEMO will issue a Direction Notice to industry via email and SMS in addition to publishing it on AEMOs website:

- AEMO has made directions to relevant entities to prevent, reduce or mitigate the identified risk or threat.
- AEMO has Directed entities to increase supply to the Sydney STTM Hub.
- The Direction will apply to the supply of gas on Gas Day 26 July.

Note: confidential information will be withheld unless prior agreed with the directed party.

Industry Conference

- AEMO will hold an Industry Conference to discuss information contained within the Direction and take feedback from Industry.

Adequacy Assessment

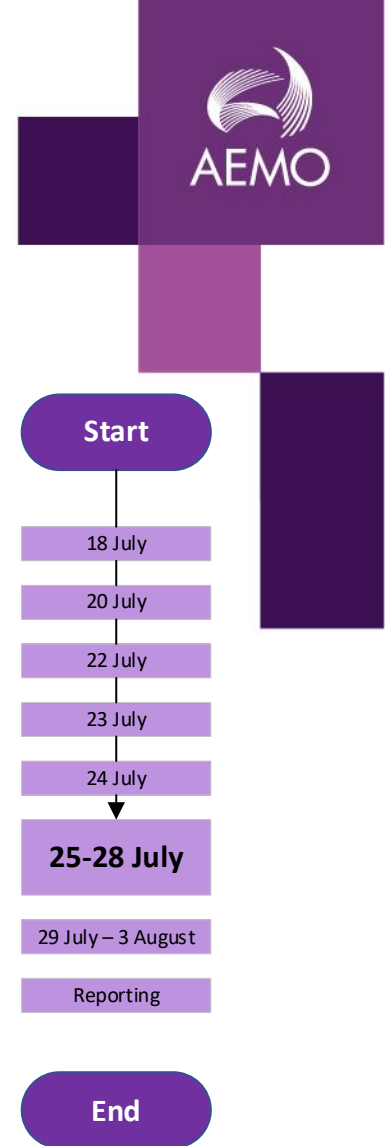
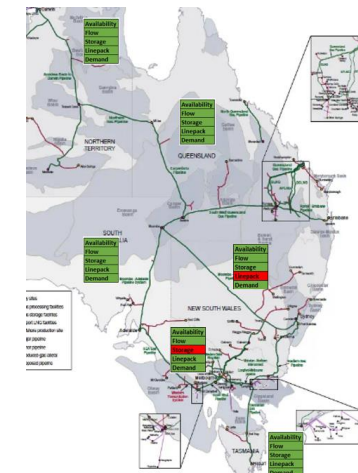
25 July - 28 July

- Like 24 July but with AEMO intervention:
 - No evidence of the requested industry response
 - Demand is expected to exceed supply in NSW without AEMO intervention on 27, 28, 29 and 30 July.
 - With AEMO intervention supply into the MSP and EGP exceed demand on each gas day with small increases to linepack.
- Bi-lateral discussions:
 - Pipeline Operators: provide information required to evaluate the threat to supply adequacy including the magnitude and location of that threat.

Threat Description: as per ECGS Threat Notice

Risk: Critical

Threat Status: Active Threat (Linepack & Storage)



AEMO Response

25 July – 28 July

AEMO determine:

1. ECGS Directions must be issued to increase supply into Sydney STTM on 27, 28, 29 & 30 July.

East Coast Gas Supply:

- Threat notice issued & Industry response requested (20 July).
- Industry conference (22 July).
- **Direction Consultation (Pipeline Operators, Producers, Shippers)**
- **Direction**
- **Direction Notice**

DWGM:

- Threat to System Security (IonaUGS) issued 20 July.

STTM:

- No Action

Direction Consultation & Notification

25 July – 28 July

AEMO conducts the Direction consultation and notification process as performed on 24 July for each day in which AEMO determine intervention via a ECGS Direction is necessary.

Direction 2: issued 25 July

- Make gas available
- Purchase gas
- Offer into Market on 27 July

Processes:

- Direction consultation
- Direction
- Direction Notice

Direction 3: issued 26 July

- Make gas available
- Purchase gas
- Offer into Market on 28 July

Processes:

- Direction consultation
- Direction
- Direction Notice

Direction 4: issued 27 July

- Make gas available
- Purchase gas
- Offer into Market on 29 July

Processes:

- Direction consultation
- Direction
- Direction Notice

Direction 5: issued 28 July

- Make gas available
- Purchase gas
- Offer into Market on 30 July

Processes:

- Direction consultation
- Direction
- Direction Notice

Adequacy Assessment

29 July - 3 August

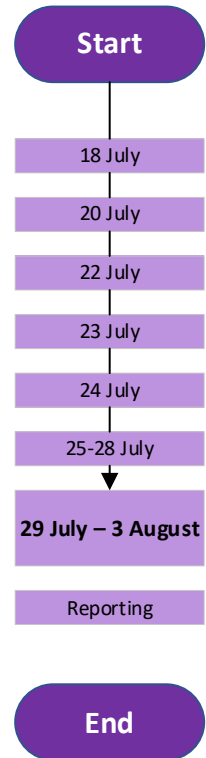
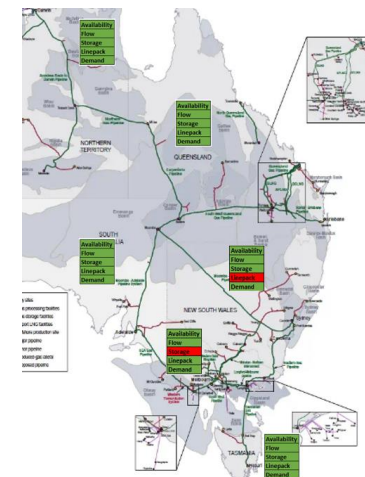
- Demand:
 - Typical winter season demand profile (NEM issues resolved; cold front passed)
- Flow:
 - Nominations indicate supply into the MSP and EGP will exceed demand from 31 July.
- Linepack:
 - Operational & contracted quantities have stabilised or increased across pipelines south of Moomba but remain below typical levels.
- Bi-lateral discussions:
 - Pipeline Operators: to evaluate the threat to supply adequacy and the magnitude and location of that threat.

Threat Description:

Linepack in the MSP has improved but may not be relied upon to support significant deviations in supply and demand.

Risk: High

Threat Status: Active Threat (Linepack & Storage)



AEMO Response

29 July

AEMO determine:

1. an industry response is sufficient to mitigate risk to ECGS supply adequacy.

East Coast Gas System:

- Industry conference.

DWGM:

- Threat to System Security (IonaUGS) issued 20 July

STTM:

- No action.

Industry Conference

29 July

ECGS Industry Conference agenda:

- Overview of the event.
 - Threat to supply adequacy related to very low linepack on MSP and EGP
 - AEMO Directions will increase supply to the Sydney STTM on 30 July.
 - From 31 July supply nominations into pipelines are sufficient to meet demand.
 - AEMO are not currently planning to issue further ECGS Directions but may if the risk to supply adequacy increases.
- Discussion of the required industry response (as detailed in Threat Notice).
 - Where possible match Participant forecast demand with nominations.
 - Increase nominations into the MSP with supply from Queensland.
 - Provide accurate and complete 7-day nominations and forecasts where possible to improve supply planning.

Adequacy Assessment

4 August

ECGS Assessment highlights:

- Demand:
 - Typical winter season demand profile.
- Flow:
 - Nominations indicate supply into the MSP and EGP will exceed demand for the next gas day and subsequent days.
- Linepack:
 - Operational & contracted quantities have rebuilt to the low end of the typical seasonal range.
- Bi-lateral discussions:
 - Pipeline Operator: confirm linepack volumes have been sufficiently restored to downgrade the assessed threat and risk.

Threat Description: Supply and demand are tightly balanced, linepack should be sufficient to maintain supply adequacy and reliability.

Risk: Medium and ALARP

Threat Status: Active Threat (Flow & Storage)

Start

18 July

20 July

22 July

23 July

24 July

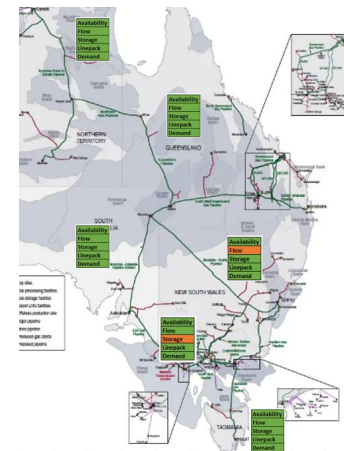
25-28 July

29 July – 3 August

4 August

Reporting

End



AEMO Response

4 August

AEMO determine:

1. the risk to supply adequacy does not meet the Procedures threat/risk criteria.

East Coast Gas System:

- ECGS Threat End Notice.

DWGM:

- Threat to System Security (IonaUGS) issued 20 July

STTM

- No action.

Threat End Notice

4 August

AEMO issue a ECGS Risk or Threat – End Notice via SMS and email:

[SMS] *AEMO has determined the identified risk or threat to adequacy or reliability of supply within the East Coast Gas System for the period 20 July 2023 to 3 August 2023 has ended. See email for details.*

AEMO Event Reporting

AEMO will publish post-intervention reports:

4 September: Preliminary Post Intervention Report

4 December: Final Post Intervention Report



For more information visit

aemo.com.au