Significant price variation report

High MOS payments in the Sydney Short Term Trading Market

28 November 2024
14 December 2024
20 December 2024

March 2025

AUSTRALIAN ENERGY REGULATOR

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1 Obligation

The Australian Energy Regulator (AER) regulates energy markets and networks under national legislation and rules in eastern and southern Australia (known as the National Energy Market), as well as networks in the Northern Territory. Its functions include:

- monitoring wholesale electricity and gas markets to ensure energy businesses comply with the legislation and rules, and taking enforcement action where necessary;
- setting the amount of revenue that network businesses can recover from customers for using networks (electricity poles and wires and gas pipelines) that transport energy;
- regulating retail energy markets in Queensland, New South Wales, South Australia, Tasmania (electricity only), and the ACT;
- operating the Energy Made Easy website, which provides a retail price comparator and other information for energy consumers;
- publishing information on the performance of energy markets, including the annual State of the Energy Market report and biennial effective competition report, to assist stakeholders and the wider community.

In accordance with the National Gas Rules, the AER is required to publish a report whenever there is a significant price variation (SPV) in the Victorian Declared Wholesale Gas Market (DWGM) or Adelaide, Brisbane and Sydney Short Term Trading Markets (STTM). The AER has published guidelines setting out what constitutes a SPV event.[1]

Outcomes that constitute a SPV in the STTM include when market operator service (MOS) service payments exceed $250,000.[2] On three gas days in the Sydney hub, MOS service payments exceeded the $250,000 threshold:[3]

Gas Day	MOS Service Payments
28 November 2024	$1,029,767.86
14 December 2024	$305,682.71
20 December 2024	$322,998.00

[1] Under Rule 355 of Part 19 of the National Gas Rules (Gas Rules), the AER is required to identify and report on any significant price variations (SPVs) in the DWGM. The Victorian SPV reporting triggers are published in the DWGM Significant Price Variation Guideline.

Under Rule 498 of Part 20 of the Gas Rules, the AER is required to identify and report on any significant price variations (SPVs) in the STTM. The STTM reporting triggers are published in the STTM Significant Price Variation Guideline.

[2] There are two kinds of payments which relate to MOS; service payments (which cover the cost of providing the service) and commodity payments (which cover the cost of the actual gas). This report relates to MOS service payments.

[3] A gas day runs from 6AM to 6AM the following day.

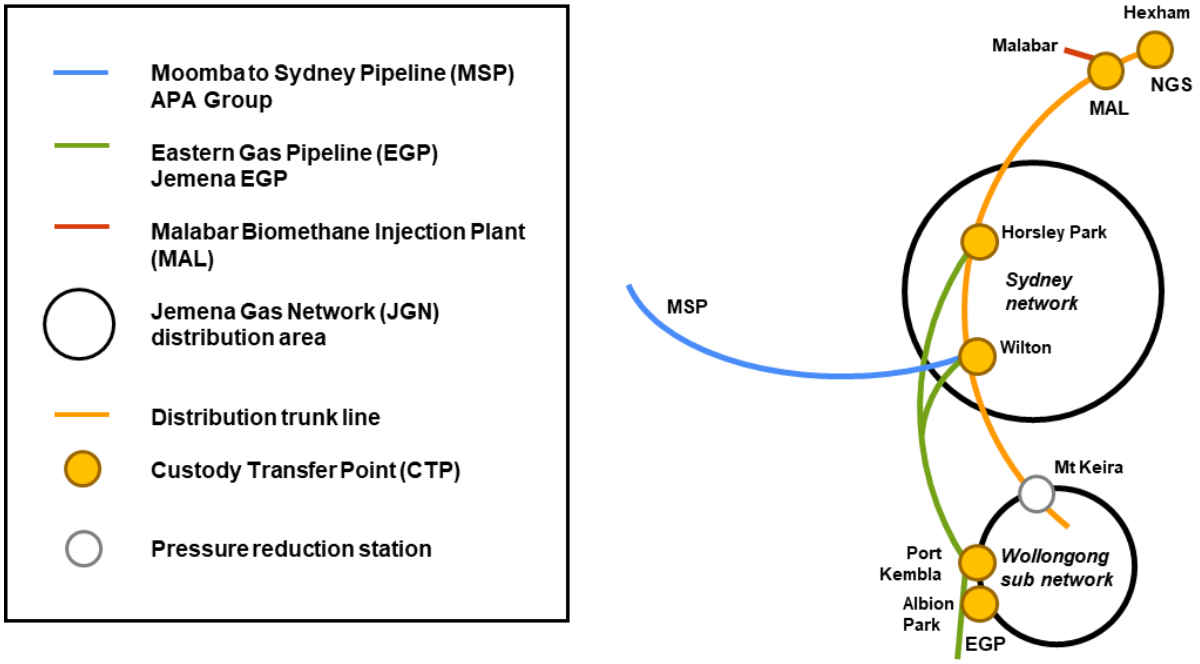
2 The Sydney STTM Hub

Figure 1 illustrates the connection points of the Sydney STTM hub comprising a Sydney network and a Wollongong sub network.

There are two pipelines that can provide MOS to Sydney: the Eastern Gas Pipeline (EGP) and the Moomba to Sydney Pipeline (MSP).

Sydney can also source gas from the Newcastle gas storage facility (NGS). In January 2023, the Malabar (MAL) connection point was added to the hub to connect a biomethane gas production facility to the distribution network.

Figure 1. The Sydney Hub



3 Background – Market Operator Service (MOS)

MOS, also known as balancing gas, is required to manage everyday pipeline deviations. A pipeline deviation occurs when there is a difference between the total quantity of gas nominated by the pipeline's shippers and the quantity of gas physically delivered. There are two kinds of pipeline deviations; positive (when more gas is delivered) and negative (when less gas is delivered, resulting in gas being 'parked' upstream of the hub on a pipeline).

When actual gas deliveries are higher than final nominations, the difference is allocated as increase MOS and when actual gas flows are lower than final nominations, the difference is allocated as decrease MOS.[4]

AEMO publishes, amongst other things, an estimate of the maximum quantities of increase and decrease MOS likely to be required for a given gas day during a particular calendar month.

Participants are requested to provide monthly MOS offers ahead of the calendar month commencing and must specify the:

- Type of MOS (increase or decrease)
- Price (up to $50/GJ)
- Quantity
- Transmission Pipeline

When MOS is required, the offers are allocated in merit order (i.e., from lowest price to highest price) until the required quantity is met.

If an increase MOS offer is met, gas is moved from the transmission pipeline to the STTM hub. If a decrease MOS offer is used, gas is stored on the transmission pipeline (instead of flowing to the STTM hub).

In the Sydney and Adelaide hubs, one pipeline can provide increase MOS while another provides decrease MOS on the same gas day. This occurrence is known as counter-acting MOS (CMOS), which has the effect of increasing costs to market participants when MOS is not being used to balance differences in forecast supply and demand (as highlighted on November 28 and December 14).

[4] Increase MOS is provided to the hub from gas stored on the pipeline. Participants who loan this gas are compensated for this service through service payments. Decrease MOS requires the use of capacity on the pipeline to store gas which could not be delivered to the hub. Similarly, participants who park this gas are compensated for this service through service payments.

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4 Summary

MOS service payments in the Sydney STTM exceeded $250,000 three times in November to December 2024. Prior to these events, the significant price variation threshold has been triggered eight times since 2014, making high priced MOS events infrequent.

Importantly, MOS service payments are separate to the commodity cost of gas in the market. Generally, MOS service payments are well below the threshold and therefore have a low overall market cost. Across the three events, there was only one day, 28 November, where the MOS service payment was, on a comparative basis, anywhere near the net primary market payment. On this day, around 78 TJ of net gas was bought at an ex-ante price of $14.60 per GJ on the primary market equating to around $1.1 million of commodity cost payments and the MOS payment was $1.3 million (approximately).

Table 1 summarises the main drivers of high MOS service payments that ranged from unplanned reductions in pressure, market participants over forecasting demand and pipeline renominations.

Table 1. Drivers of high MOS service payments in the Sydney STTM

Date	Unplanned reduced network pressure^	Pipeline flow and pressure dynamics	Supply (over or under supply)	Demand (over or under forecasting)	Low pipeline flows	Pipeline renominations
28 November	✓	✓	x	x	x	x
14 December	x	x	✓	✓	✓*	✓*
20 December	x	x	✓	✓	x*	x*

Note:

✓* indicates that the driver did contribute to high MOS service costs on a certain day, but only in combination with other drivers.

x* indicates that the driver was not a main contributor to high MOS service costs on a certain day but it may have some influence over MOS outcomes.

^ The AER has a compliance bulletin designed to avoid MOS when there are pressure reductions. However, this relies on prior knowledge (before the gas day) that network pressures need to be reduced.

Source: AER analysis using STTM data.
Pressure data provided by Jemena Gas Networks (network operator of the Sydney distribution network)
EGP flow data provided by Jemena (pipeline operator of EGP).

For each of the three events, the bulk of the high MOS cost was related to parking gas on the EGP as decrease MOS. For 28 November and 14 December, this was part of a wider requirement for CMOS, whereas for 20 December, gas also had to be parked on the MSP due to over forecasted demand.

In compiling this report, the AER reviewed market data and obtained additional information from 6 participants. Based on the information, the AER has not detected any non-compliance with the rules.

Whilst 3 high priced MOS events within a month is unusual, our analysis indicate that these events were unrelated. Further, the unique circumstances of each event and the factors

considered do not raise any concerns. We also note that there have been no subsequent MOS events so far in 2025.

The AER will continue to monitor low pipeline flows leading to CMOS, demand forecasting accuracy around Christmas and decrease MOS offers on the EGP, which are all factors which may contribute to high priced MOS events. Although the National Gas Rules only require market participants to submit ‘best estimates’ of demand on the gas day, the AER emphasises the importance of accurate forecasts for market efficiency.

5 Analysis

5.1 Unforeseen reduction in the Sydney distribution network's pressure results in CMOS on November 28

On 28 November 2024, CMOS was required with increase MOS on the MSP (42.8 TJ) being offset by a similar amount of decrease MOS on the EGP (43.6 TJ). This resulted in MOS service payments of $1,029,767.86.

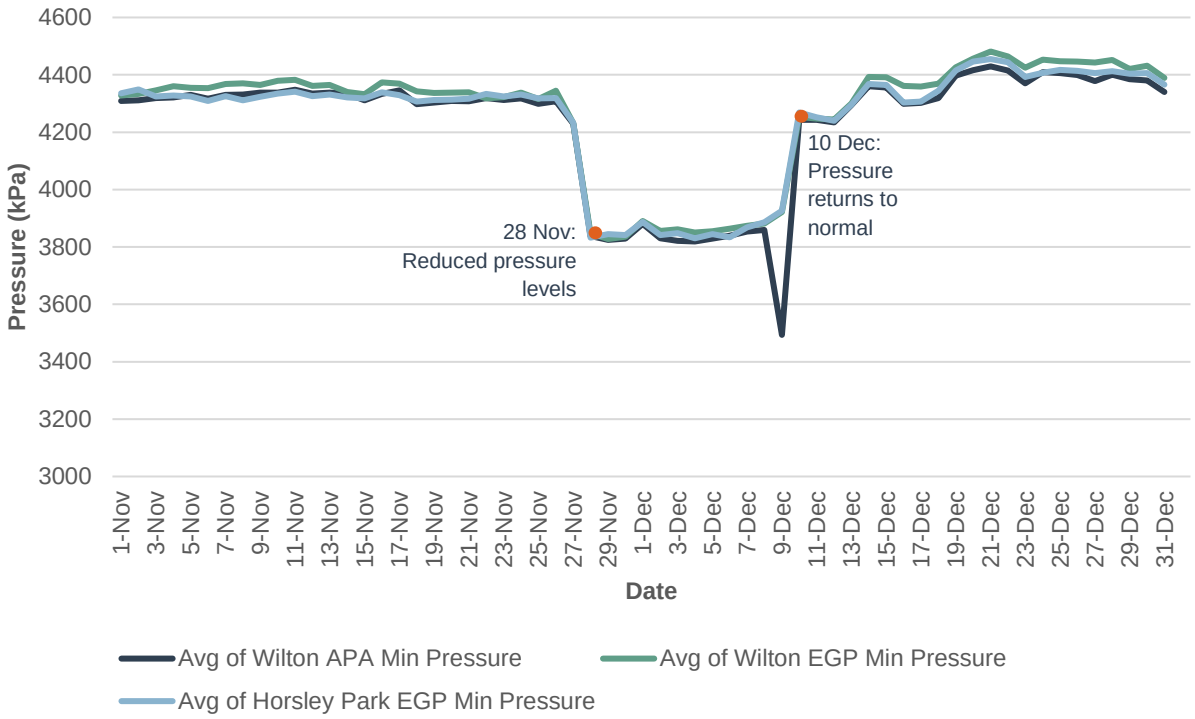
The main factors which led to CMOS were:

- A temporary reduction in the operating pressure of the Sydney STTM network section.
- Physical pipeline dynamics where, in reaction to the drop in pressure levels, unscheduled gas flowed from the pressure-controlled Wilton point on the MSP into the Sydney network. This further led to deliveries on the EGP being pressured out and having to be parked on the pipeline as decrease MOS.

5.1.1 Reduction in pressure levels inside the Sydney hub

On 28 November 2024, Jemena Gas Networks (JGN) found a pipeline defect at Dora Creek while conducting an integrity dig. The issue required temporarily reducing pressure levels in the Sydney distribution network to satisfy operational and safety parameters. As a result, a market notice was sent out by JGN immediately to notify market participants. As part of the market notice, JGN indicated that Wilton delivery pressure would be lowered from approximately 4,300 kPa to 3,800 kPa (Figure 2):

Figure 2. 28 November - daily average minimum pressure levels at Wilton and Horsley Park



Source: AER analysis using pressure data provided by Jemena Gas Networks.

The pressure reduction triggered gas to flow into the Sydney distribution system through the pressure-controlled MSP connection point at Wilton.[5] Gas which was not originally scheduled for supply through the MSP was allocated as increase MOS. Whilst participants can potentially reduce MOS by renominating to reflect physical flows, there were minimal renominations on this day (only 2 GJ of net supply to the hub was renominated).

Gas deliveries scheduled on the EGP were consequently pressured out, as gas from the MSP accommodated a greater portion of the hub's demand than originally scheduled.[6] This is shown in Figure 3. 28 November – EGP Horsley Park hourly flows and pressure and Figure 4. 28 November - EGP Wilton hourly flows and pressure, where lower flows on the EGP connection points at Horsley Park and Wilton indicate supply being backed off.

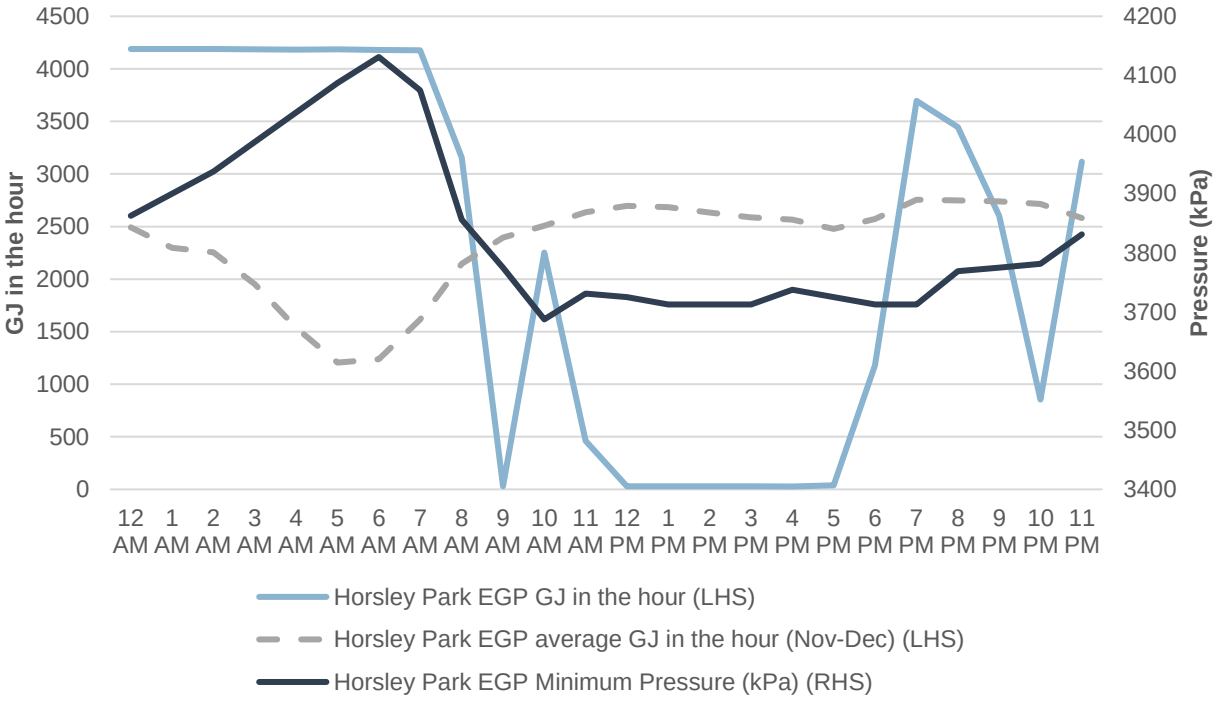
For example, during the workday (9am - 5pm), flows at Horsley Park was approximately 0 GJ, with a small peak at 10am. The peak potentially indicates an effort to push more gas into the Sydney network, though this is ultimately unsuccessful as flows quickly declined by 11am.

[5] Pressure controlled system points will flow gas into the distribution system whenever the pressure in the network is low enough to require gas supply. In contrast, flow-controlled system points will not flow gas into the network unless participants nominate to flow the gas. The main connection point between the MSP and the Sydney network is via a pressure-controlled point at Wilton. The EGP connection points into the main trunkline at Wilton and Horsley Park are flow controlled, which means the transmission pipeline operator (Jemena) determines the quantity and timing of gas being supplied into the market.

[6] EGP deliveries are "pressured out" when there is too much gas in the trunkline such that the pipeline operator (Jemena) must hold off from supplying more gas into the market, even if it was originally scheduled.

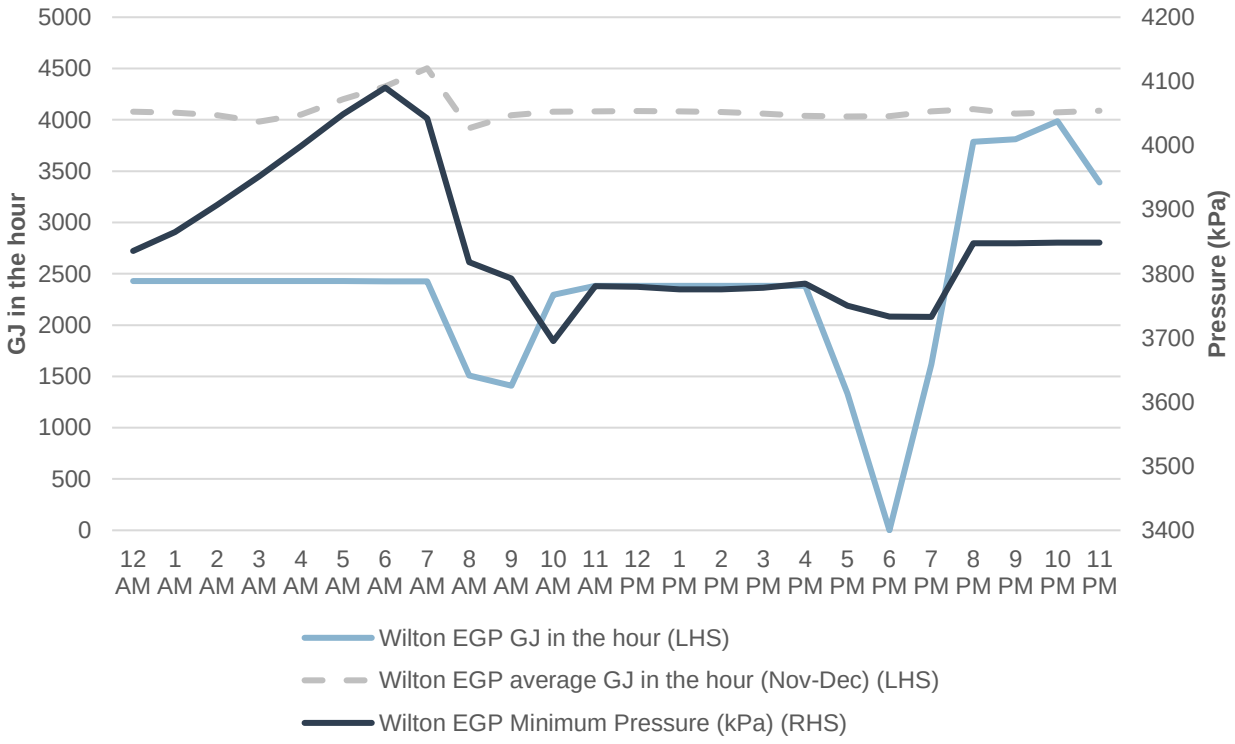
Gas deliveries on the EGP being pressured out resulted in a large quantity of gas being parked on the pipeline as decrease MOS resulting in the bulk of the high MOS service costs for the day.

Figure 3. 28 November – EGP Horsley Park hourly flows and pressure



Note: GJ in the hour - the number of GJ that passed through the site in that hour.
Average GJ in the hour – the number of GJ that passed through the site in that hour on average, based on data from November to December 2024.
Minimum pressure – represents the minimum pressure level in that hour, measured in kilopascals (kPa).
Source: AER analysis using EGP flow and pressure data provided by Jemena Gas Networks.

Figure 4. 28 November - EGP Wilton hourly flows and pressure



Note: GJ in the hour - the number of GJ that passed through the site in that hour.
Average GJ in the hour – the number of GJ that passed through the site in that hour on average, based on data from November to December 2024.
Minimum pressure – represents the minimum pressure level in that hour, measured in kilopascals (kPa).
Source: AER analysis using EGP flow and pressure data provided by Jemena Gas Networks.

After the 28 November, repairs were carried out on Dora Creek until the 10th of December as scheduled. Based on our engagement with JGN, it does not appear as though the market could have been notified of the issue any earlier. Generally, market notices are not issued for integrity digs alone as the result rarely requires reducing pressure levels, which makes the events on 28 November exceptional.

5.1.2 MOS requirements

The high MOS service costs were caused by CMOS allocations, where approximately 43 TJ of increase MOS on the MSP was offset by a similar quantity of MOS on the EGP (Table 2).

Table 2. 28 November - MOS service payment quantities and cost breakdown

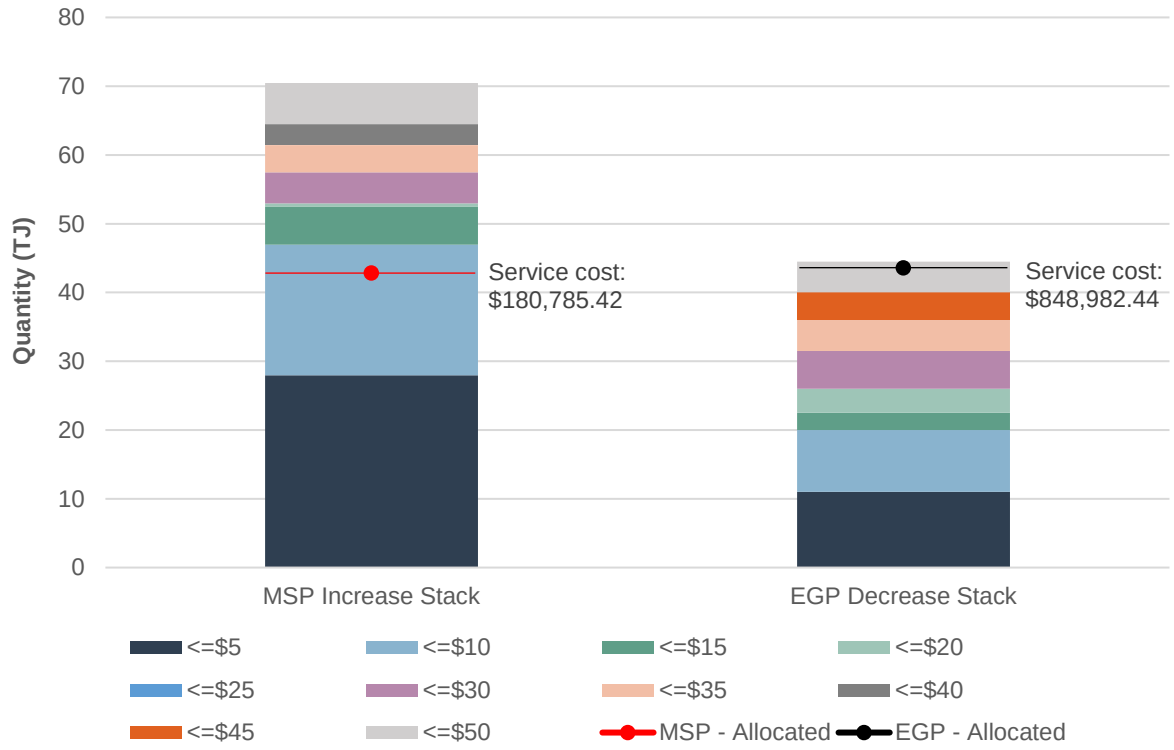
Facility	MOS type	MOS stack allocation (TJ)	MOS Cost (pay-as-bid)	Total Cost
EGP	Decrease	43.6	$848,982.44	$848,982.44
MSP	Increase	42.8	$180,785.42	$180,785.42
Total		86.4	$1,029,767.86	$1,029,767.86

Source: AER analysis using STTM data

Figure 5 shows that the November EGP decrease MOS stack was relatively smaller and more expensive than the MSP increase MOS stack – indicating high prices to park gas on the EGP. In total, 4 participants offered 44.5 TJ into the EGP decrease stack for November, as opposed to 8 participants offering 70.5 TJ into the MSP increase stack at lower prices.

Since almost all the daily volume on the EGP decrease stack was allocated on the 28 November, market participants paid for MOS at a higher price range (around 40% of the allocated pay-as-bid offers were over $30). This contributed to the bulk of the high MOS service costs for the 28 November.

Figure 5. 28 November - MOS stacks, allocation requirements and service costs



Source: AER analysis using STTM data.

5.2 Pipeline renominations and low demand lead to CMOS on December 14

On 14 December 2024, Sydney's MOS service payments breached $250,000, reaching $305,682. High MOS service payments were a result of CMOS requirements, where 23 TJ of increase MOS was required on the MSP, offset by a similar amount of decrease MOS on the EGP (26.5 TJ).

The main factors which led to CMOS were:

- Participants renominating supply from the MSP to the EGP on the gas day, resulting in very low flows from the MSP into the Sydney hub.
- A lack of demand to meet supply from the EGP, leading to gas being parked on the pipeline.

5.2.1 Participants renominating supply from MSP to the EGP

The MSP was originally scheduled to supply net 17 TJ of gas into the Sydney hub on 14 December.[7] However, on the gas day, some participants renominated supply from the MSP onto the EGP, some in relatively large amounts. Renominations are routine to assist in balancing gas flows around the east coast gas network. However, in this event, renominations exacerbated low flows on the MSP.

Consequently, the MSP's net allocations into the Sydney hub went negative prior to MOS, at -23.02 TJ. As the trunkline in the Sydney distribution network operates at a lower pressure, it is not possible to have physical flows out of Wilton onto the MSP. Therefore, against the MSP's allocations (before MOS), some pipeline gas went into the Sydney hub as increase MOS.

This resulted in 23 TJ of increase MOS being used on the MSP, essentially offsetting the MSP's negative allocations from the hub. This increase MOS also meant that the MSP's overall facility allocation (including MOS) was at least 0 GJ, as required under the National Gas Rules, r.419.[8] Overall, the MSP only supplied 2 GJ of gas into the Sydney hub on this day.

This is one of several times non-trivial amounts of MOS has been a result of negative overall pipeline nominations (before MOS) for a gas day and it is something industry participants should be aware of as potentially adding to MOS requirements. The AER will continue to monitor in terms of frequency and impact on markets.

5.2.2 Not enough demand in the Sydney hub to meet EGP supply

Supply scheduled on the EGP exceeded how much demand was in the Sydney hub resulting in 26.5 TJ of gas being parked on the pipeline as decrease MOS (Table 3). The difference

[7] Net flows supplying the hub are calculated as forward haul (supply into the hub) minus back haul (moving gas in the opposite direction of the pipeline's flow, away from the hub).

[8] See: National Gas Rules – Rule 419. The rule requires pipeline operators to submit a STTM facility allocation notice on a daily basis (no later than 4.5 hours after the start of each gas day). Under the rule, the STTM facility allocation must not be less than zero. In the context of the MSP, this means that the net gas flow into the Sydney hub (including MOS) cannot be negative.

between the forecasted demand (D-1, the day prior to the gas day) and actual demand indicates that participants over forecasting further added to the decrease MOS requirements.

Table 3. 14 December - Sydney hub demand vs supply on the EGP[9]

	Sydney Demand (TJ)	EGP supply to Sydney hub (TJ)
Forecasted/Scheduled	210.9	225.3
Actual/Allocated	199.4	198.8
Difference	11.5	26.5

Source: AER analysis using STTM data and data provided by Jemena (EGP's pipeline operator).

5.2.3 MOS requirements

The high MOS service costs were driven by CMOS allocations, with 23 TJ of increase MOS allocated on the MSP and 26.5 TJ of decrease MOS on the EGP (Table 4).

Table 4. 14 December - MOS service payment quantities and cost breakdown

Facility	MOS type	MOS stack allocation (TJ)	MOS Cost (pay-as-bid)	Total Cost
EGP	Decrease	26.5	$262,246.81	$262,246.81
MSP	Increase	23.0	$43,436.90	$43,436.90
Total		49.5	$305,682.71	$305,682.71

Source: AER analysis using STTM data.

The bulk of the cost on this day arose from parking gas on the EGP, as indicated by the EGP decrease MOS stack having higher prices (Figure 6).

[9] Demand forecast values are based off D-1 data submitted under Part 20, r.410. EGP scheduled and allocated figures for the Sydney STTM are provided by the EGP's pipeline operator, Jemena. "Scheduled" reflects pipeline nominations on the EGP. It does not reflect what was originally scheduled ex-ante in the market on the EGP.

Figure 6. 14 December - MOS stacks, allocation requirements and service costs

Source: AER analysis using STTM data.

For December, 8 participants offered into the MSP increase stack and 4 participants offered into the EGP decrease stack. Approximately 59.6% of the quantities offered in the EGP decrease MOS stack were used on 14 December, resulting in moderately high pay-as-bid offers being met.

The AER made enquiries of market participants for this gas day and there is no indication based on responses that any of these participants acted in a manner to benefit off a MOS event including those who renominated across pipelines. In discussing these events with market participants, the AER stressed the importance of providing accurate forecasts and highlighted opportunities for participants to review their demand forecasting and renominations behaviour on days where there is awareness around low pipeline flows.

5.3 Over forecasting of demand lead to MOS for December 20

On 20 December 2024, 32.8 TJ of MOS was required resulting in MOS service costs of $322,998. The total MOS quantity was made up of 28.8 TJ of decrease MOS on the EGP, and 4.03 TJ of decrease MOS on the MSP.

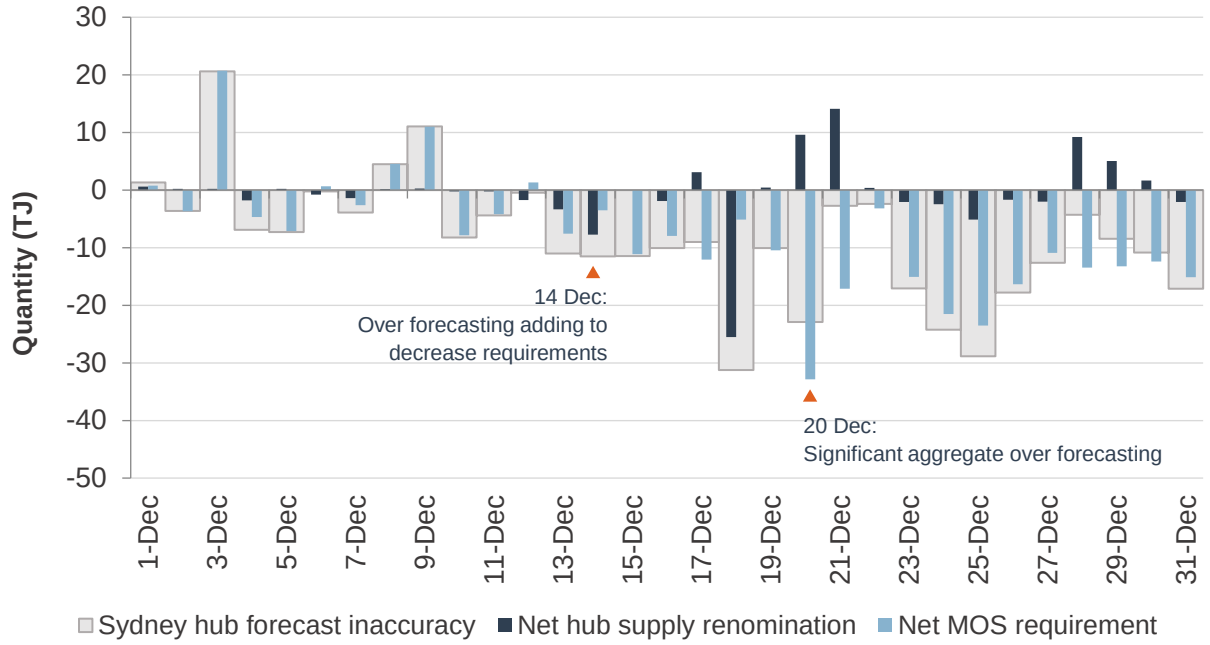
The main factor which led to large MOS service payments were participants over forecasting demand. A day before the gas day, a provisional schedule is set when participants nominate the amount to be injected and withdrawn from the pipeline. These amounts are aggregated, and the pipeline operator facilitates transporting the determined quantity of gas to meet the forecasted demand. However, as actual demand was lower on the gas day than what was forecasted, unused gas was parked on the pipelines as it was no longer required by participants and thus not withdrawn.

The main contributors to over-forecasting demand were uncertainty around consumer gas usage during the Christmas time and gas plant outages which led to an inability to accurately forecast demand by participants. Whilst some participants attempted to mitigate the impact, their ability to do so was hindered by low flows on the MSP constraining back haul nominations.

5.3.1 Demand over forecasting in the Sydney hub

Participants over forecasted demand on Saturday 20 December therefore requiring gas to be parked on the EGP and MSP. The top 3 participants who had the most inaccurate demand forecasts, over forecasted by around 21 TJ collectively. Upon engagement with these participants, 2 out of 3 of them attributed their over forecasting to the inherent uncertainty of demand over the Christmas and New Years period. Consistent with this explanation, Figure 7 shows over forecasting on Christmas eve and Christmas day at similar levels to 20 December.

Figure 7. Sydney hub forecasting inaccuracies and supply renominations



Note: **Sydney hub forecast inaccuracy** - The forecast inaccuracy is the difference between actual and forecast demand in the Sydney hub (actual minus forecast) and represents the quantity of increase (positive) or decrease (negative) MOS that would potentially be required to balance the deviation.
Net hub supply renominations - Changes to supply nominations from scheduled. A subtraction of 1 TJ of gas from the scheduled supplied to the hub (or an additional 1 TJ of gas scheduled as backhaul but not nominated/allocated) will show as -1 TJ, representing the influence this would have on the net (decrease) MOS requirement with no change in demand.
Net MOS requirement - The net MOS requirement (increase MOS minus decrease MOS) is equivalent to the difference between:

- The forecast demand inaccuracy inside the hub; and
- The changes made to the net hub supply (forward haul minus back haul)

Source: AER analysis using STTM data.

Whilst participants attempt to estimate demand based on historical consumption around Christmas, forecasting for this period has challenges as their customers (both residential and industrial) may reduce their operations earlier than expected. In this case, participants noted that demand did indeed soften earlier than anticipated, leading them to over forecast in the lead-up to Christmas.

Further, a separate participant experienced a plant shut down on 18 December which impacted their demand forecasts. For 20 December, this participant initially forecasted their demand to be at a lower level, but delays in commencing repairs at the plant led to actual demand being significantly less still. Although the participant tried to reduce the impact and their net sales into the hub, their ability to do so was limited by factors discussed below.

5.3.2 Low flows on the MSP constraining back haul nominations

Participants can potentially mitigate the impact of over forecasting through intraday back haul nominations. Back haul involves withdrawing gas from the pipeline upstream to the delivery point but in the opposite direction of physical flow. For example, gas deliveries into the Sydney distribution network is forward haul from Moomba to Sydney, while back haul involves moving gas in the opposite direction contractually from Sydney to Moomba.

Back hauling gas would have the effect of reducing a pipeline's overall net supply into the hub. This potentially means that less gas would need to be parked on pipelines when there is an oversupply of gas where demand is not met.

However, on 20 December and surrounding days, participants noted that back haul nominations on the MSP were partially constrained. This is due to low flows into the Sydney hub from the MSP around this time. Therefore, whilst some participants tried to mitigate the impact of over forecasting demand, it proved difficult to do so through intraday back haul nominations on the MSP on this day.

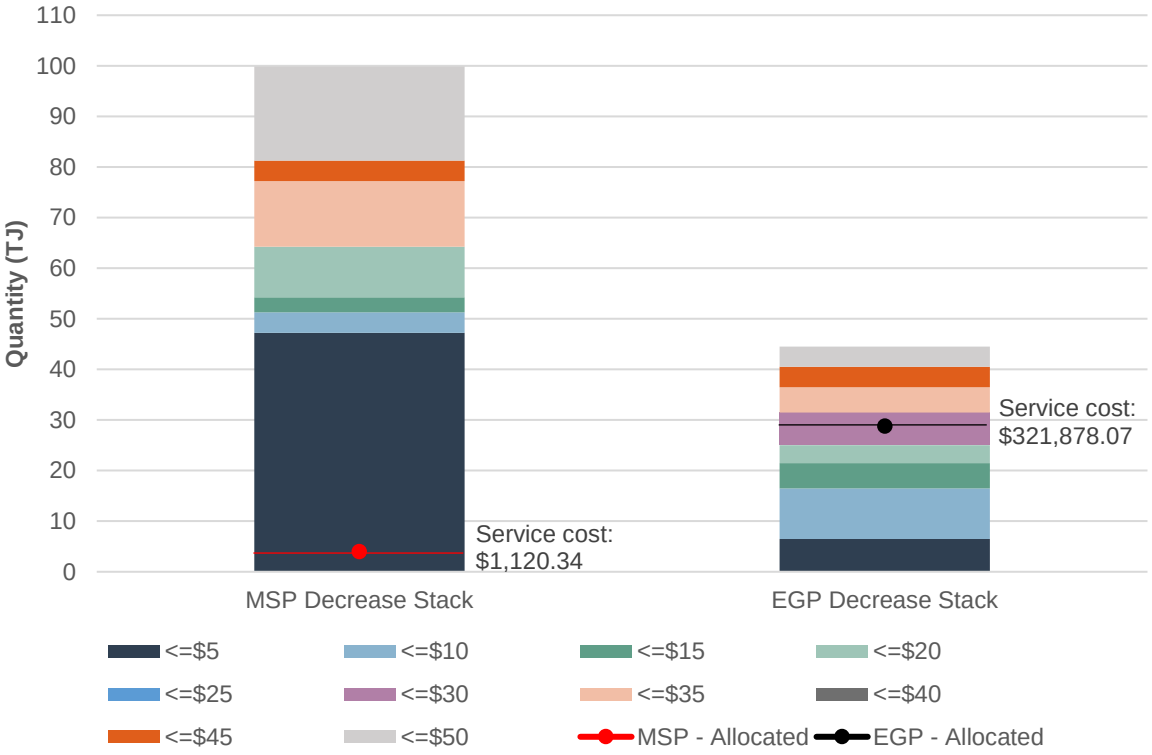
5.3.3 MOS requirements

High MOS service costs were due to the need to park gas on the MSP and EGP (Table 5 and Figure 8). On the day, the EGP provided 28.8 TJ of the decrease MOS requirement, with the MSP providing the remaining 4.03 TJ. The gas parked on the EGP made up the bulk of the high MOS service costs, as 64.8% of the EGP decrease stack was allocated. This resulted in moderately high pay-as-bid offers, where around 25% of the total MOS allocated was priced between $20 - $30.

Table 5. 20 December – MOS service payment quantities and cost breakdown

Facility	MOS type	MOS stack allocation (TJ)	MOS Cost (pay-as-bid)	Total Cost
EGP	Decrease	28.8	$321,878	$321,878
MSP	Decrease	4.03	$1,120	$1,120
Total		32.83	$322,998	$322,998

Figure 8. 20 December - MOS stacks and allocation requirements



Source: AER analysis using STTM data.

6 Acronyms and Abbreviations

ACCC	Australian Competition and Consumer Commission
ACT	Australian Capital Territory
AER	Australian Energy Regulator
CC	Creative Commons
CMOS	Counteracting Market Operator Service
CTP	Custody Transfer Point
DWGM	Declared Wholesale Gas Market
EGP	Eastern Gas Pipeline
GJ	Gigajoule
JGN	Jemena Gas Network
kPa	Kilopascal
LHS	Left Hand Side
MAL	Malabar
MOS	Market Operator Service
MSP	Moomba to Sydney Pipeline
NGS	Newcastle Gas Storage
RHS	Right Hand Side
ROS	Rosalind Park
SPV	Significant Price Variation
STTM	Short Term Trading Market
TJ	Terajoule