

27 November – 3 December 2016

Weekly Summary

Average prices remained at higher levels this week. In Queensland, higher prices have occurred alongside higher GPG gas usage, while higher LNG flows to Curtis Island have also continued since APLNG bought its 2nd train online from the start of November. Prices in Victoria were elevated, with the average imbalance price increasing by 25 per cent from the previous week. This followed supply constraints managing the Longford gas plant, running at reduced capacity as it undergoes maintenance following a compressor outage during the previous week. In addition to the works at Longford, pipeline operators conducted pigging operations during the week requiring out of merit order gas injections at Iona.

There were also high MOS charges in the Sydney STTM on two days during the week due to over forecast demand.

Long term statistics and explanatory material

The AER has published an [explanatory note](#) to assist with interpreting the data presented in its weekly gas market reports. The AER also publish a range of [longer term statistics](#) on the performance of the gas sector including gas prices, production, pipeline flows and consumer demand.

Market overview

Figure 1 sets out the average daily prices (\$/GJ) for the current week, and demand levels, compared to historical averages. Regions shown include the Victorian Declared Wholesale Market (**VGM or Victorian gas market**) and for the Sydney (**SYD**), Adelaide (**ADL**) and Brisbane (**BRI**) Short Term Trading Market hubs (**STTM**). Price and demand information is also shown for the voluntary Wallumbilla and Moomba Gas Supply Hubs (**GSH**).

Figure 1: Average daily prices and demand – all markets (\$/GJ, TJ)¹

	Victoria		Sydney		Adelaide		Brisbane		Wallumbilla		Moomba	
	Price	Demand	Price	Demand	Price	Demand	Price	Demand	Price	Quantity	Price	Quantity
27 Nov - 03 Dec 2016	9.08	356	7.39	225	7.33	50	7.70	86	7.53	49	-	-
% change from previous week	25	-17	3	-8	4	-3	6	2	1	-34	-	-

¹ Average daily quantities are displayed for each region, with the exception of Gas Supply Hubs (GSH). The weighted average daily imbalance price applies for Victoria. The prices shown for the GSH in Wallumbilla and Moomba are volume weighted average prices for all products traded across the period. The total quantity contributing to the weighted price is displayed for these GSH.

	Victoria		Sydney		Adelaide		Brisbane		Wallumbilla		Moomba	
	Price	Demand	Price	Demand	Price	Demand	Price	Demand	Price	Quantity	Price	Quantity
16-17 financial YTD	7.92	671	7.31	262	8.33	72	7.00	86	7.86	4540	-	-
% change from previous financial YTD	79	-2	58	6	66	2	88	-6	119	11	-	-

Figure 2 illustrates the daily prices in each gas market, as defined in figure 1.

Figure 2: Daily gas market prices (\$/GJ)

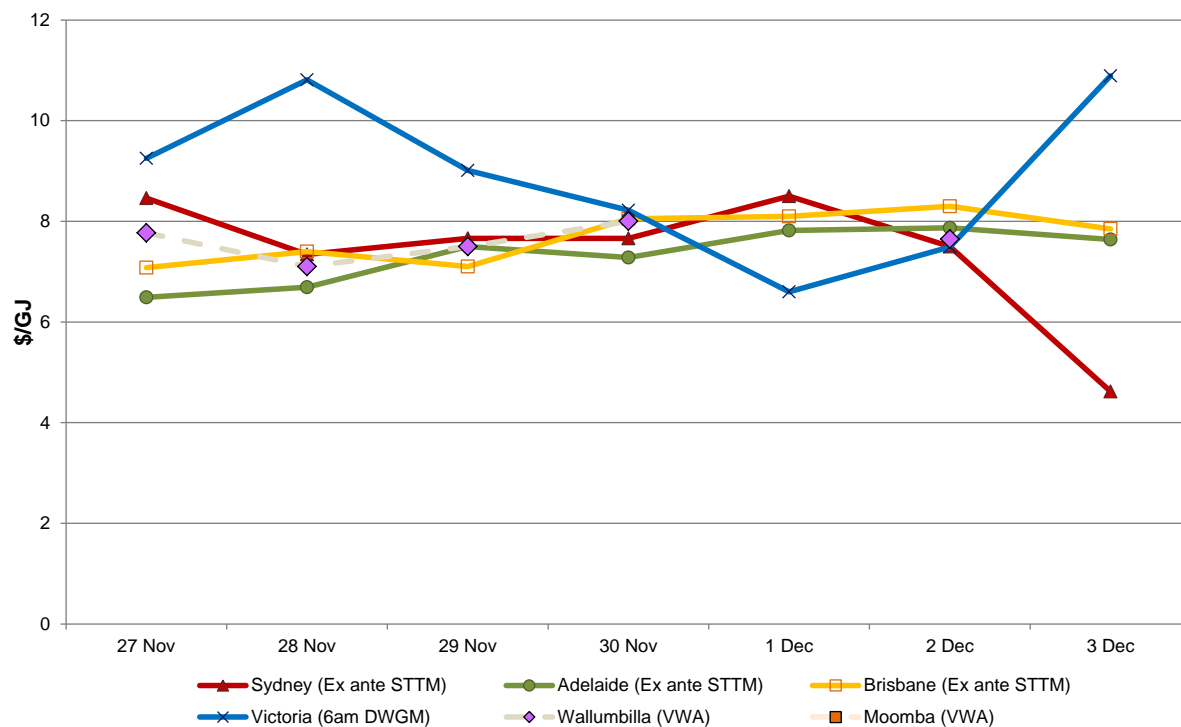


Figure 3 compares average ancillary market payments (VGM) and balancing gas service payments (STTM) against historical averages.

Figure 3: Average ancillary payments (\$000)

	Victoria Ancillary Payments*	Sydney MOS	Adelaide MOS	Brisbane MOS
27 Nov - 03 Dec 2016	0.71	67.06	7.37	0.95
% change from previous week	-	79	-89	-47
16-17 financial YTD		62.12	29.26	1.49
% change from previous financial YTD		171	201	11

* Ancillary payments reflect the compensation costs for any additional injections offered at a price higher than the market price. Note: only positive ancillary payments, reflecting system constraints will be shown here.

More detailed analysis on the VGM is provided in section 1.

Figure 4 shows the quantity and volume weighted prices of products traded in the Gas Supply Hub locations at Wallumbilla and Moomba.

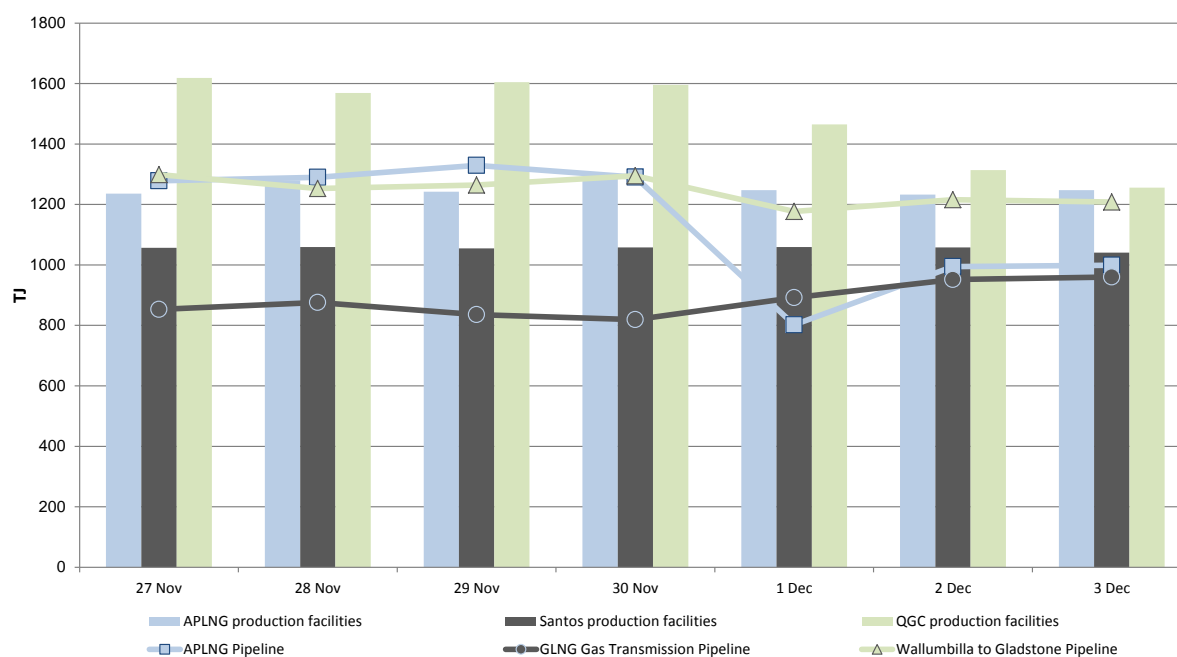
Figure 4: Gas supply hub products traded for the current week (\$/GJ, TJ)*

	RBP		SWQP		MAP		MSP		QGP	
	VWA price	Quantity	VWA price	Quantity	VWA price	Quantity	VWA price	Quantity	VWA price	Quantity
Balance of day	7.46	27.5	8.30	4.5	-	-	-	-	-	-
Daily	-	-	-	-	-	-	-	-	-	-
Day ahead	6.65	2.0	7.53	15.0	-	-	-	-	-	-
Weekly	-	-	-	-	-	-	-	-	-	-
Monthly	-	-	-	-	-	-	-	-	-	-

* Non-netted products are not shown here. For information about these products, refer to figure 6.1.

Figure 5 shows Bulletin Board pipeline flows for the three LNG export pipeline facilities and the production output at related production facilities in the Roma region.

Figure 5: LNG export pipeline and production flows (TJ)*



* Production quantities represent flows from facilities operated by APLNG, Santos and QGC in the Roma region. Gas from individual facilities may also supply the domestic market, other LNG projects or storage facilities.

Detailed market analysis

High prices in Victoria

Figure 1.1 shows that schedule prices in Victoria exceeded \$8/GJ on 27 occasions throughout the week (out of 35 scheduling intervals), reaching \$15.99/GJ at 6 pm on Friday 2 December following a large reduction to injection capacity at Longford.

Market impacts of pigging on the South West Pipeline (SWP)

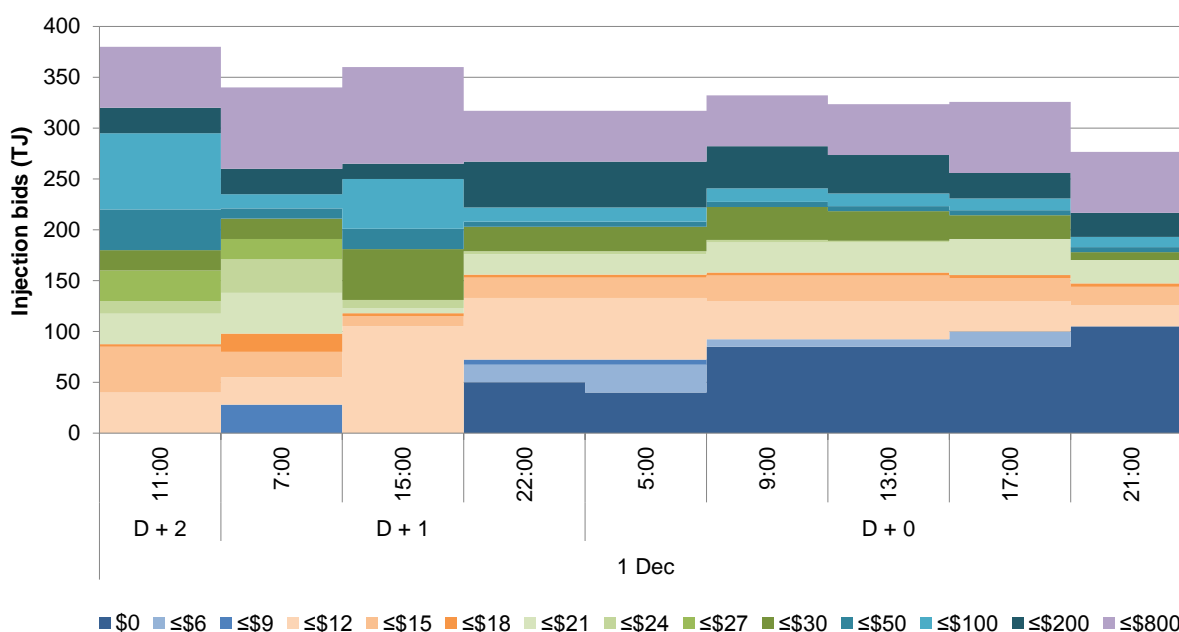
On 1 December, constraints were applied at Iona to increase minimum injections to facilitate “pigging” on the SWP. A pipeline inspection gauge (pig) to inspect the pipeline required a minimum gas flow to push the pig down the pipe.²

This was the first of three pigging runs originally scheduled for the 1 December, 5 December and 8 December³ gas days which resulted in potential threats to system security (the threat of the pig becoming stuck in the pipe without sufficient flow to support it) and led to AEMO issuing notices calling for a market response.

AEMO notified the market that it would need to schedule large amounts of gas out of merit order into the SWP on the basis of preliminary injection prices. However, the amount of out of merit order gas eventually required was small as injection bid prices declined in the lead up to the pigging event meaning more gas from Iona could be scheduled in merit order (see figure 6).

Each of the three pigging days required out of merit order injections. The out of merit order gas injected led to estimated ancillary payments of just under \$110 000 for the 6 am schedule on 1 December, however no market ancillary payments occurred on the gas day.⁴

Figure 6: Injection bids at the Iona underground storage facility for the 1 December gas day (by schedule cut-off time) for the 2 day ahead (D+2), 1 day ahead (D+1) and intra-day (D+0) schedules



² AEMO published market notices leading up to the gas day indicating up to 85 TJ of out of merit order injections were expected at Iona to facilitate the pigging and prevent a threat to system security potentially affecting the Geelong and Western demand zones. Updated notices on the gas day indicated out of merit order requirements of up to 24.9 TJ across the day, later revised down to 9.9 TJ during the final scheduling horizon.

³ The 8 December pigging run was postponed due to an equipment issue and rescheduled to occur on the 12 December gas day. The three respective pigging runs between Iona and Brooklyn included a cleaning run, a gauging run (calliper pig) to measure pipeline obstructions and intelligent pig run to check for corrosion and metal loss.

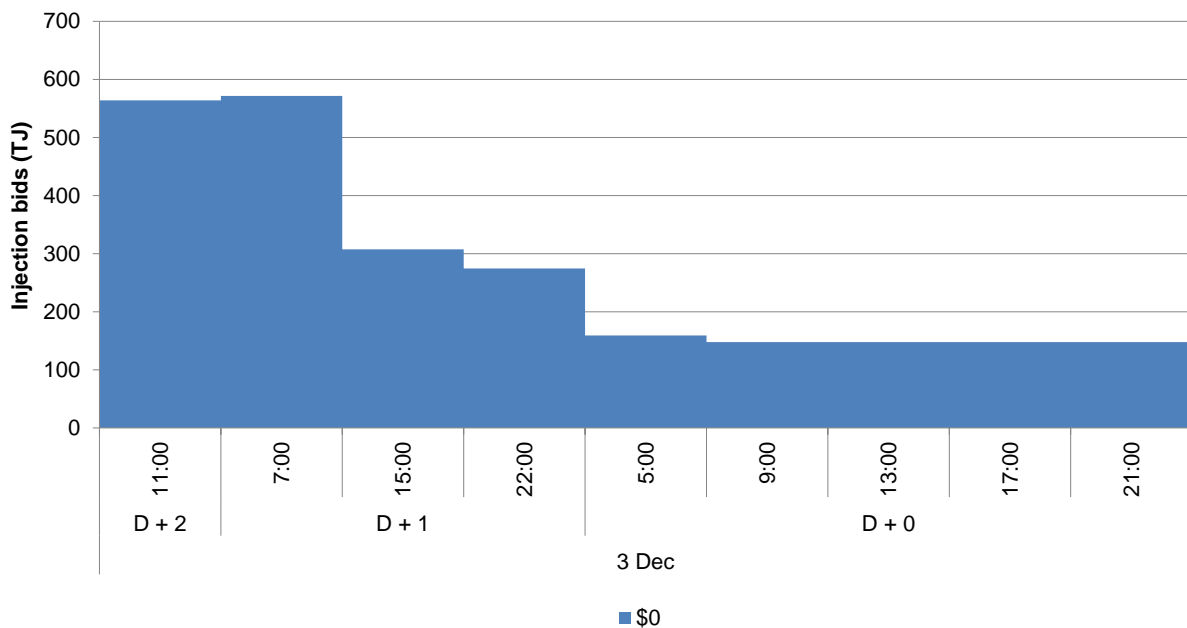
⁴ Ancillary payments reduced following the application of AGINO/AGWNO and uplift hedges, with these market mechanisms recouping the cost of the out of merit order gas requirements. Deviation costs arising from more expensive gas requirements are generally recouped through uplift payments.

NOTE: Actual Gas Injection Negative Offset (AGINO), gas scheduled but not injected, and Authorised Maximum Daily Quantity (AMDQ) hedge participants' exposure to ancillary payments. Specifically, AMDQ is a hedge against congestion uplift.

Market Impact of Longford constraint on 3 December

On 3 December, the daily constraint on injections at Longford was set at 144.66 TJ ahead of the gas day, which was reflected in lower injection bids offered across the 5 schedules at the facility (see figure 7). This was revised down just before the 10 pm scheduling horizon to 134 TJ/day. Out of merit order injections required during the 10 pm schedule led to \$4990 of ancillary payments.

Figure 7: Injection bids at the Longford production facility for the 3 December gas day (by schedule cut-off time) for the 2 day ahead (D+2), 1 day ahead (D+1) and intra-day (D+0) schedules



MOS payments in Sydney

There were high MOS service charges in the Sydney STTM on 28 November (\$136 000) and 1 December (\$121 000) due to over forecast demand. Allocated demand in the hub was 21 TJ lower than scheduled on 28 November and 17 TJ lower on 1 December.

1. Victorian Declared Wholesale Market

In the Victorian gas market, gas is priced five times daily at 6 am, 10 am, 2 pm, 6 pm and 10 pm. The imbalance weighted price on a gas day tends towards the 6 am price⁵ which is the schedule at which most gas is traded.

The main drivers⁶ of price are demand forecasts and bids to inject or withdraw gas from the market. Figures 1.1 to 1.4 below show the daily prices, demand forecasts⁷, and injection/withdrawal bids for each of the five pricing schedules. Figure 1.5 provides information on which system injection points were used to deliver gas, in turn indicating the location and relative quantity of gas injection bids cleared through the market.

Ancillary payments for gas injected above the market price are shown above in figure 3.

Figure 1.1: Prices by schedule (\$/GJ)

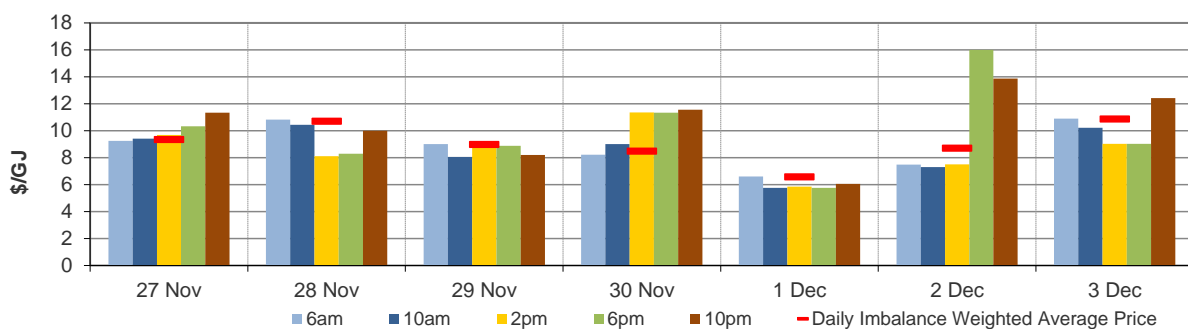
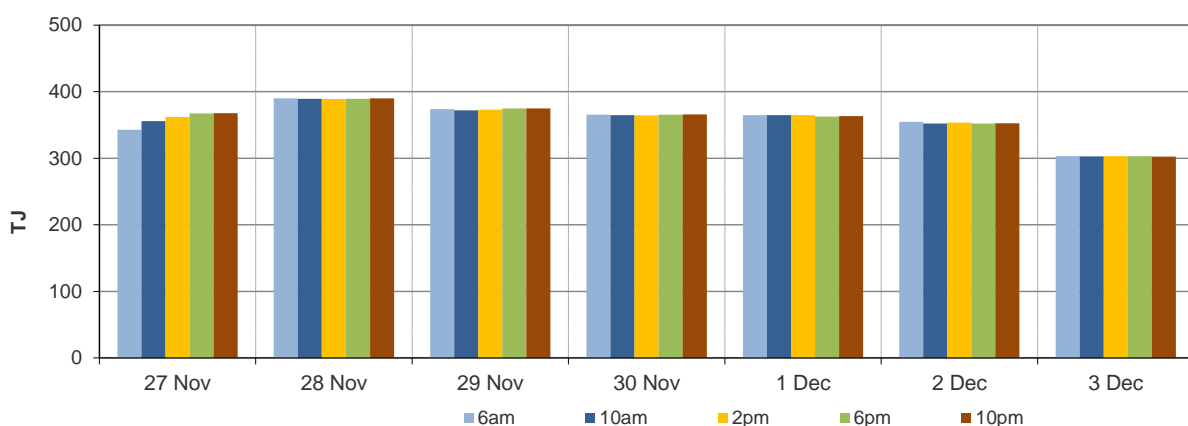


Figure 1.2: Demand forecasts (TJ)



⁵ Prices for subsequent schedules are applied only to the differences in scheduled quantities (imbalances) to calculate the weighted price. The 6 am price applies to the entire scheduled quantity in the initial schedule.

⁶ The price might also be affected by transmission or production (contractual) constraints limiting how much gas can be delivered from a locale or System Injection Point (SIP) from time to time.

⁷ These are Market Participants' aggregate demand forecasts adjusted for any override as applied by AEMO from time to time. These forecasts must be scheduled and cannot respond to price like withdrawal bids.

Figure 1.3: Injection bids by price bands (TJ)

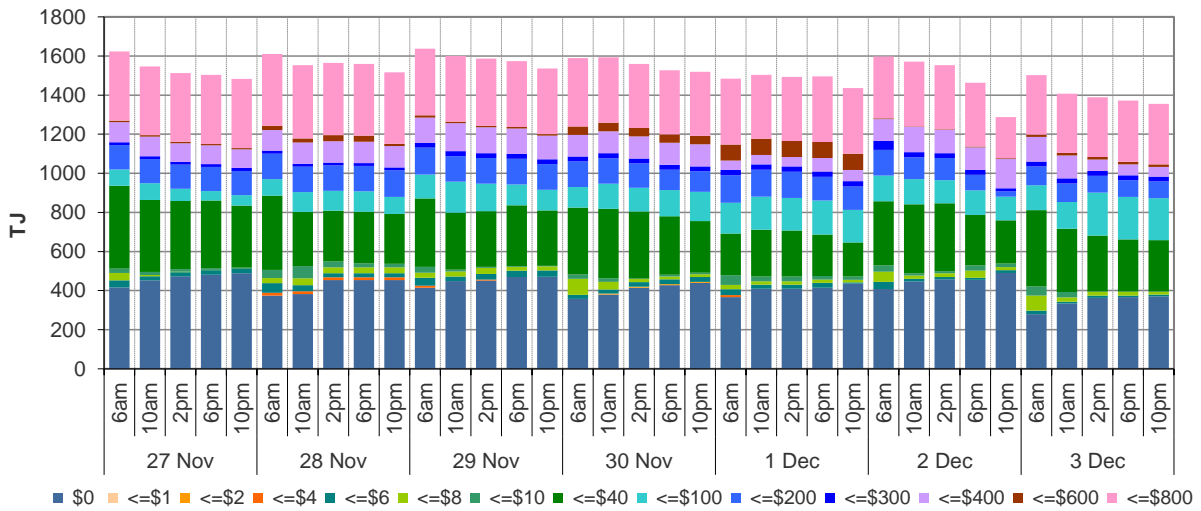


Figure 1.4: Withdrawal bids by price bands (TJ)

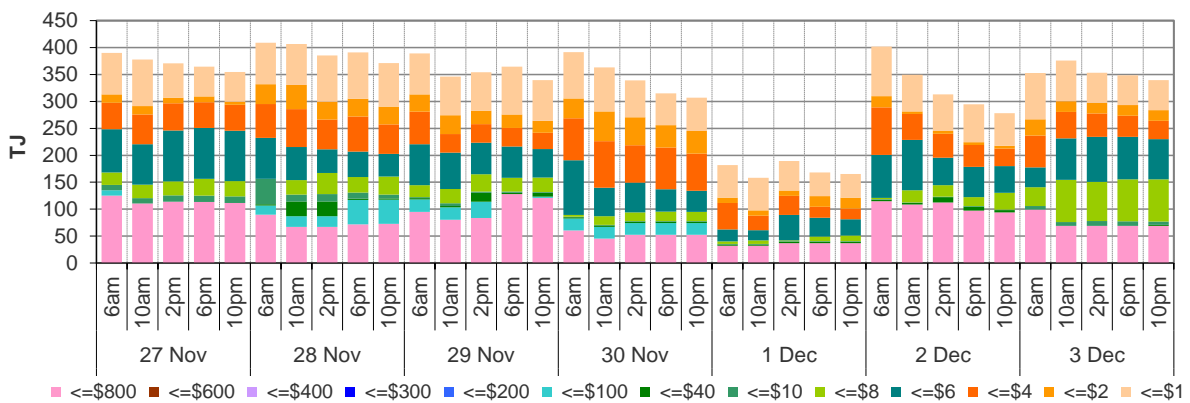
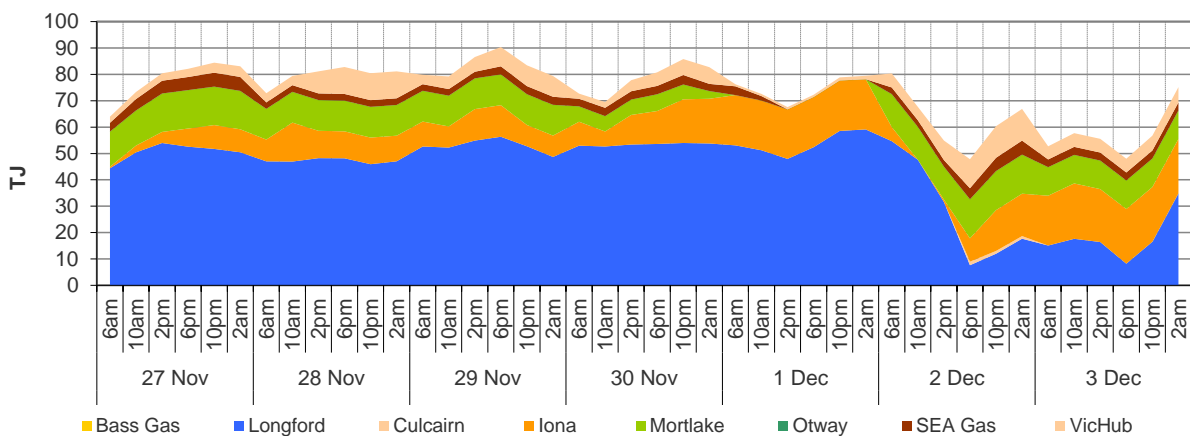


Figure 1.5: Metered Injections by System Injection Point (TJ)



Note that in figure 1.5, the last 8-hour schedule from 10 pm has been separated into two 4-hour blocks to provide a consistent comparison with earlier scheduled injection volumes.

2. Sydney STTM

In each STTM hub, a daily gas price is calculated before the gas day (the ex ante price) and after the gas day (the ex post price). The main drivers of these prices are participant demand forecasts, and offers to inject or bids to withdraw gas traded at the hub.⁸ Divergences in ex ante and ex post prices for a gas day may occur due to differences in scheduled (forecast) and allocated (actual) quantities. Pipeline acronyms are defined in the [user guide](#).

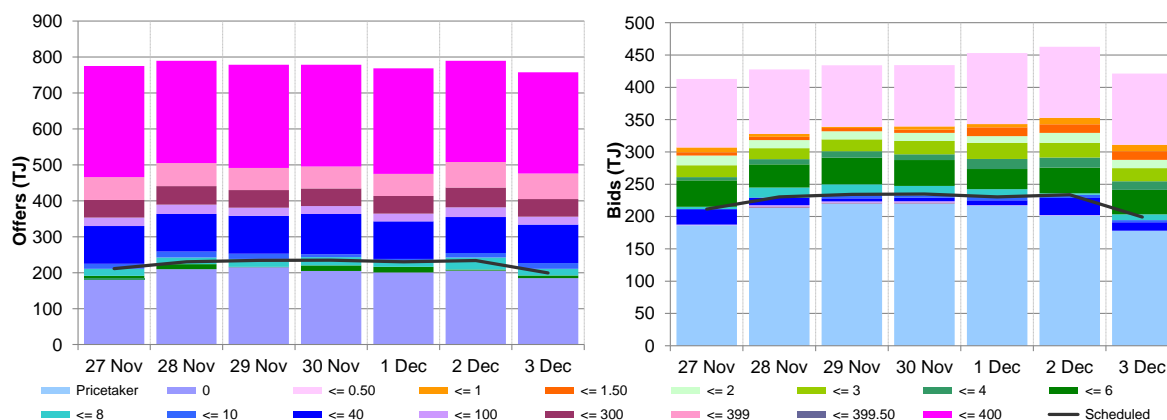
Market Operator Service balancing gas (MOS) payments arise because the amount of gas nominated on pipelines for delivery on a gas day will either exceed or fall short, by some amount, of the amount of gas consumed in the hub. In such circumstances, MOS payments are made to participants for providing a service to park gas on a pipeline or to loan gas from a pipeline to the hub.⁹

Figures 2.1 and 2.2 show daily prices, demand, offers and bids. Figures 2.3 and 2.4 show gas scheduled and allocated on pipelines to supply the hub, indicating the location and relative quantity of gas offers across pipelines and also the amount of MOS allocated for each pipeline.

Figure 2.1: SYD STTM daily ex ante and ex post prices and quantities

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Ex ante price (\$/GJ)	8.46	7.34	7.66	7.66	8.50	7.50	4.62
Ex ante quantity (TJ)	211	230	234	235	230	234	199
Ex post price (\$/GJ)	8.46	7.66	7.66	7.34	7.35	6.41	7.21
Ex post quantity (TJ)	211	234	234	228	223	215	211

Figure 2.2: SYD daily hub offers and daily hub bids in price bands (\$/GJ)



⁸ The main driver of the amount of gas scheduled on a gas day is the 'price-taker' bid, which is forecast hub demand that cannot respond to price and which must be delivered, regardless of the price.

⁹ MOS service payments involve a payment for a MOS increase service when the actual quantity delivered exceeds final gas nominations for delivery to a hub, and a payment for a MOS decrease service when the actual quantity delivered is less than final nominations. As well as a MOS 'service' payment, as shown in figure 2.4, MOS providers are paid for or pay for the quantity of MOS sold into the market or bought from the market (MOS 'commodity' payments/charges).

Figure 2.3: SYD net scheduled and allocated gas hub supply (excluding MOS)

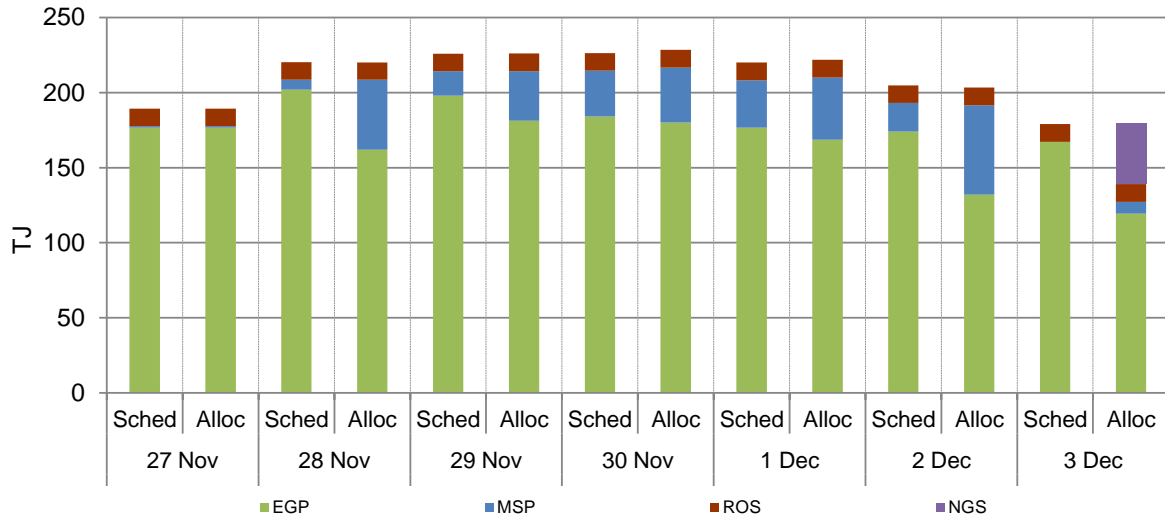
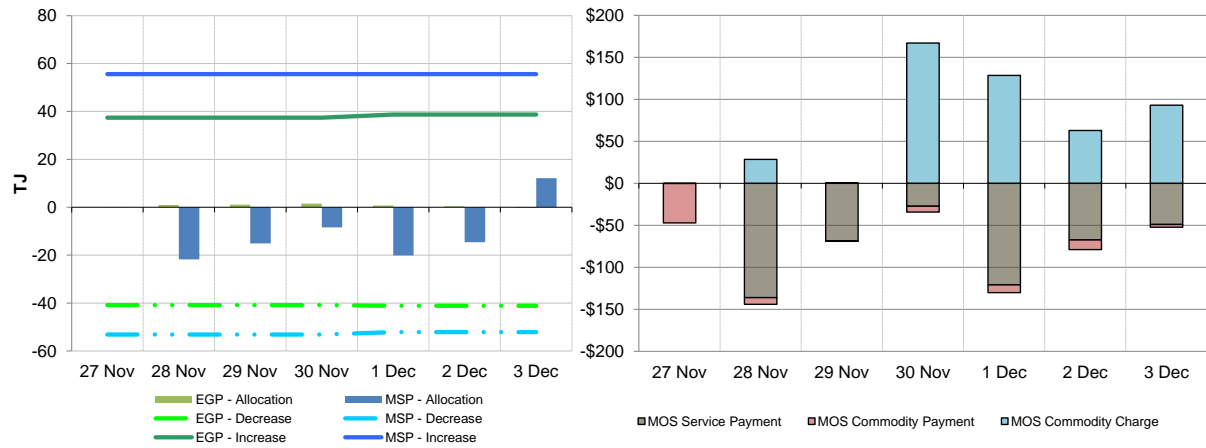


Figure 2.4: SYD MOS allocations (Tj), service payments and commodity payments/charges (\$000)¹⁰



¹⁰ The commodity cost of MOS illustrated on the right of the figure represents the commodity quantity at the D+2 ex ante price. Commodity payments and charges for a given gas day relate to quantities traded two days earlier. That is, the commodity cost for services provided on Sunday will appear in the chart for Tuesday, when the D+2 price is set. In contrast, service payments are shown alongside the day they occurred.

3. Adelaide STTM

The Adelaide STTM hub functions in the same way as the Sydney STTM hub. The same data that was presented for the Sydney hub is presented for the Adelaide hub in the figures below.

Figure 3.1: ADL STTM daily ex ante and ex post prices and quantities

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Ex ante price (\$/GJ)	6.49	6.69	7.50	7.28	7.82	7.87	7.64
Ex ante quantity (TJ)	43	51	55	54	52	57	41
Ex post price (\$/GJ)	6.49	6.69	7.32	7.37	7.91	7.87	7.87
Ex post quantity (TJ)	45	51	51	54	57	61	44

Figure 3.2: ADL daily hub offers and daily hub bids in price bands (\$/GJ)

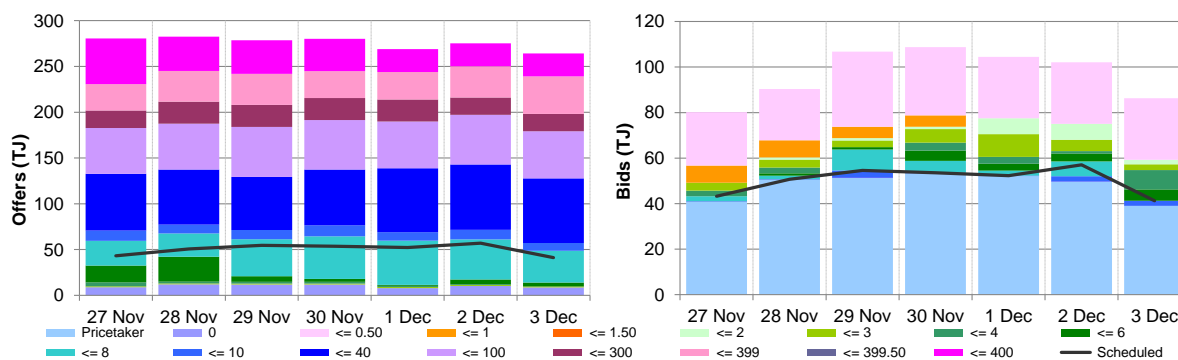


Figure 3.3: ADL net scheduled and allocated gas hub supply (excluding MOS)

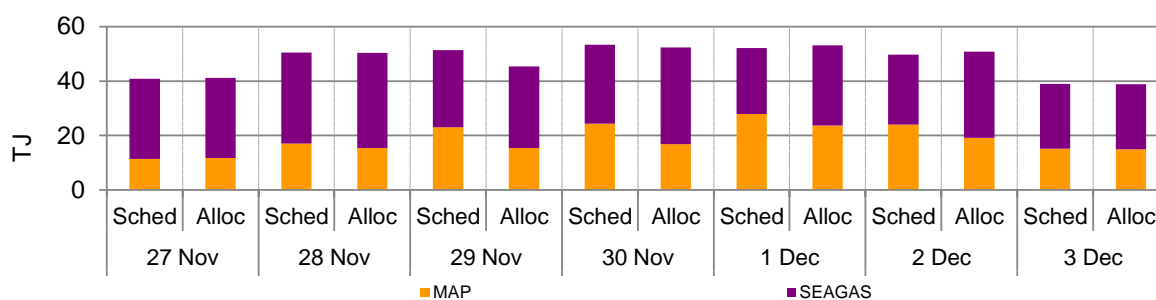
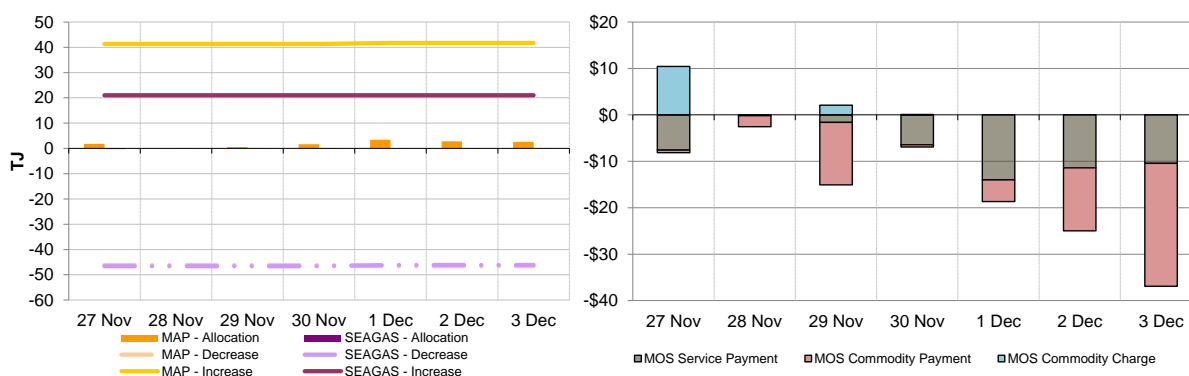


Figure 3.4: ADL MOS allocations (TJ), service payments and commodity payments/charges (\$000)



4. Brisbane STTM

The Brisbane STTM hub functions in the same way as the Sydney STTM hub. The same data that was presented for the Sydney hub is presented for the Brisbane hub in the figures below.

Figure 4.1: BRI STTM daily ex ante and ex post prices and quantities

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Ex ante price (\$/GJ)	7.08	7.40	7.10	8.05	8.10	8.30	7.85
Ex ante quantity (TJ)	75	91	94	93	90	84	73
Ex post price (\$/GJ)	7.08	7.40	6.99	7.73	8.10	8.30	7.71
Ex post quantity (TJ)	76	92	92	91	90	85	72

Figure 4.2: BRI daily hub offers and daily hub bids in price bands (\$/GJ)

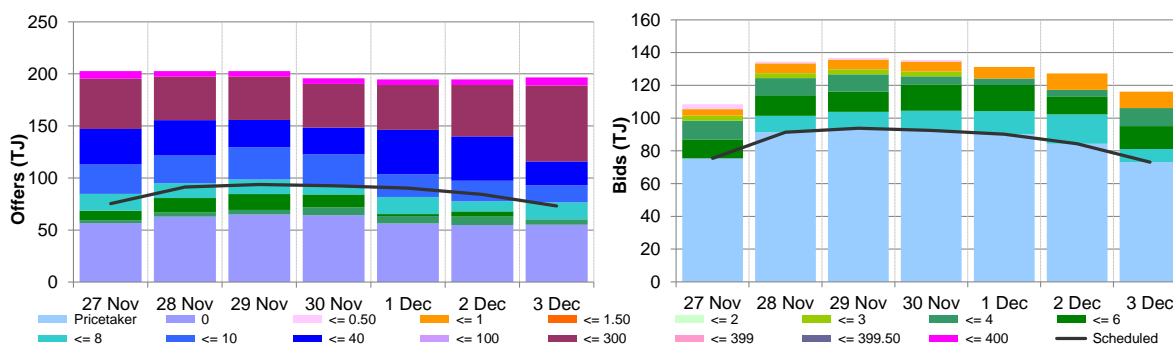


Figure 4.3: BRI net scheduled and allocated gas hub supply (excluding MOS)

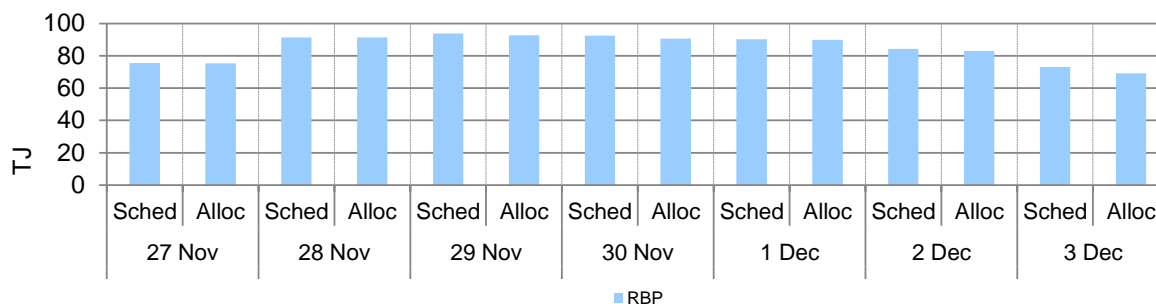
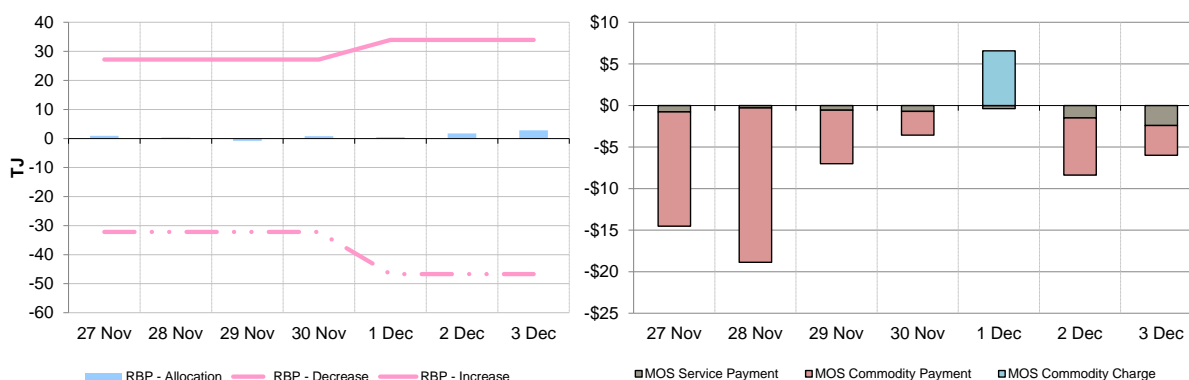


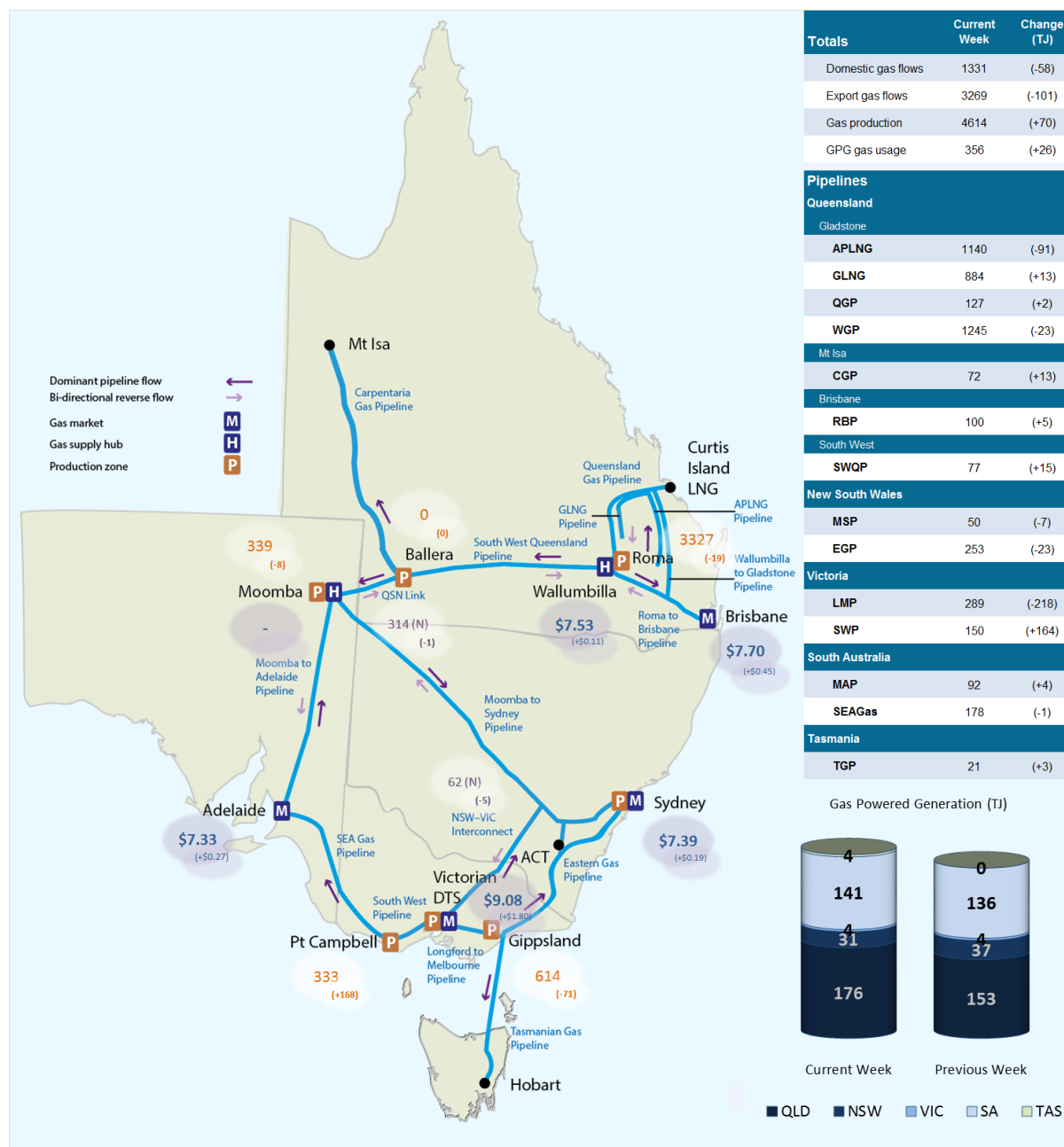
Figure 4.4: BRI MOS allocations (TJ), service payments and commodity payments/charges (\$000)



5. National Gas Bulletin Board

Figure 5.1 shows average daily actual flows for the current week¹¹ from the Bulletin Board (changes from the previous week's average are shown in brackets). Average daily prices¹² are provided for gas markets and gas supply hubs. Average daily quantities are provided for gas powered generation for each region.

Figure 5.1: Gas market data (\$/GJ, TJ); Production and Pipeline flows (TJ)¹³



¹¹ **Domestic gas flows** are calculated as the total of: **SA** = MAP + SEAGAS; **VIC** = SWP + LMP + (absolute quantity of negative flows only on the 'NSW-VIC interconnect'); **NSW/ACT** = EGP + MSP; **TAS** = TGP; **QLD (Brisbane)** = RBP; **QLD (Mt Isa)** = CGP; and **QLD (Gladstone)** = QGP.

Export gas flows are calculated as the total of: the APLNG pipeline; the GLNG pipeline; and the Wallumbilla to Gladstone pipeline.

GPG volumes may include gas usage that does not show up on Bulletin Board pipeline flows.

¹² GSH supply is the average daily volume of gas 'traded', while price is a volume weighted average.

¹³ Numbers for QSN Link, Port Campbell (Otway basin) and Gippsland (Eastern Victoria) have been adjusted to account for changes to Bulletin Board flows which came into effect from 6 October (see [gas report 2-8 October 2016](#)). Individual facilities are now required to report 'receipts' separate to 'deliveries', rather than net flows.

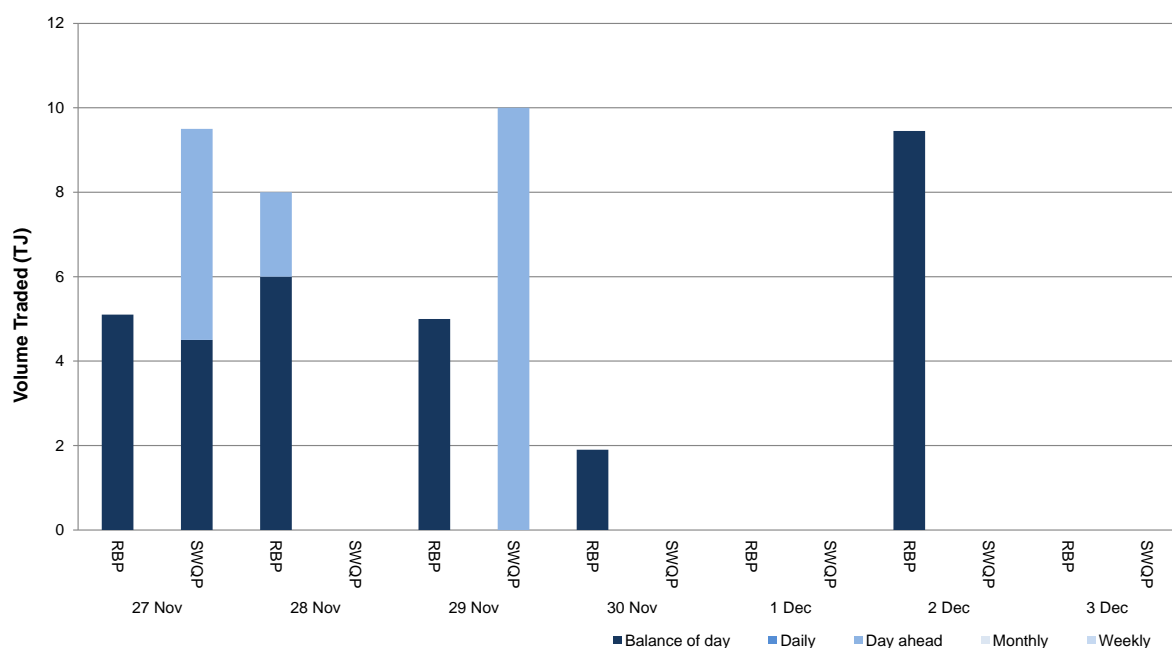
6. Gas Supply Hub

The Gas Supply Hub (**GSH**) was established in March 2014 for the trading of gas at Wallumbilla. The GSH is a voluntary market¹⁴ for the supply of gas traded¹⁵ between separate participants, with products listed for sale and purchase at delivery points on three major connecting pipelines at Wallumbilla – the **QGP**, the **SWQP** and the **RBP**. There are separate products for each pipeline (each pipeline is considered a trading location, and each has a number of delivery points) and delivery period (daily, day-ahead, balance-of-day, weekly and monthly products). In June 2016, a new supply hub at Moomba was created to facilitate trade on the **MAP** and **MSP**, and also allow for trading between the Wallumbilla and Moomba markets on the SWQP through a spread product (representing the price differential between the two hubs).

This week in the Wallumbilla hub there were 10 trades for just under 49 TJ of gas at a volume weighted price of \$7.53/GJ. These consisted of balance-of-day and day-ahead products on both pipelines (29.45 TJ valued around \$7.41/GJ on the RBP, and 19.5 TJ at \$7.71/GJ on the SWQP).

Figure 6.1 shows the quantity of gas traded by product type for each trading day on pipeline trading locations in the Wallumbilla and Moomba Gas Supply Hubs.

Figure 6.1: GSH traded quantities



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¹⁴ Market trade is facilitated through an electronic trading platform, with standardised terms and conditions and a market settlement facility for the short-term trading of physical gas and related products. The market is designed to complement existing bilateral gas supply arrangements and gas transportation agreements, through the placement of anonymous offers (to sell) or bids (to buy) at specified quantity and price increments, which are automatically matched on the exchange to form transactions.

¹⁵ Volume weighted average prices and traded quantities provided in this report may include off-market trades, which are not included in AEMO's reference price calculations.