

## 6 – 12 November 2016

### Weekly Summary

Figure 2 indicates that prices remained relatively flat throughout the course of the week, however there was a degree of volatility in Victoria.

Figure 3 shows a significant uplift in MOS payments in the Sydney STTM, which triggered a Significant Price Variation (SPV) on the 7 November.

Figure 5.1 shows gas powered generation (GPG) in the NEM increased by 144 TJ this week, largely influenced by higher GPG gas usage in Queensland. This coincided with a significant increase in trade volume in the gas supply hub (GSH) at Wallumbilla, with the majority of gas traded on the Roma to Brisbane Pipeline (RBP).

Figure 5.1 also shows a significant increase in LNG export flows on the APLNG pipeline.

### 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)<sup>1</sup>**

	Victoria		Sydney		Adelaide		Brisbane		Wallumbilla		Moomba	
	Price	Demand	Price	Demand	Price	Demand	Price	Demand	Price	Quantity	Price	Quantity
06 Nov - 12 Nov 2016	5.43	431	6.03	263	6.58	54	7.09	81	7.37	87	-	-
% change from previous week	-18	-6	-5	10	11	-10	9	-4	21	25	-	-

<sup>1</sup> 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	8.03	711	7.34	265	8.52	75	6.93	86	7.87	4402	-	-
% change from previous financial YTD	81	-2	56	5	66	2	82	-7	116	23	-	-

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

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

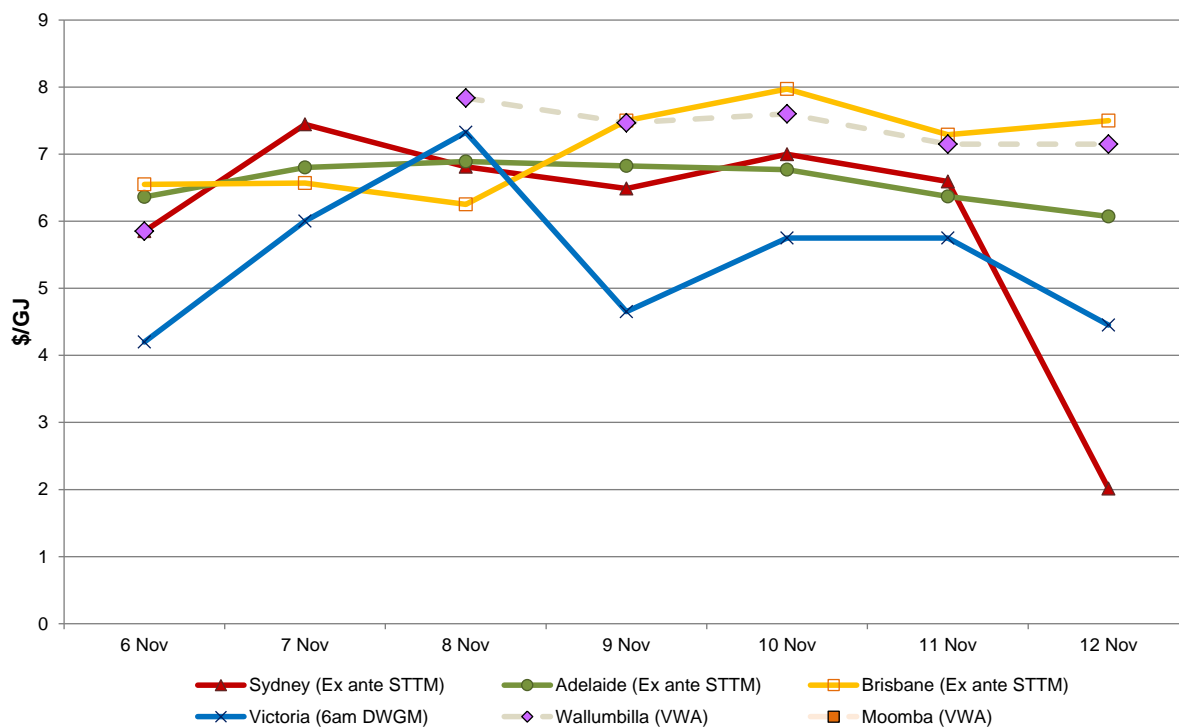


Figure 3 compares average ancillary market payments (VGM) and balancing gas service payments (STTM) against historical averages.

**Figure 3: Average ancillary payments (\$000)**

	Victoria Ancillary Payments*	Sydney MOS	Adelaide MOS	Brisbane MOS
06 Nov - 12 Nov 2016	-	90.79	5.12	1.49
% change from previous week	-	198	-95	-12
16-17 financial YTD	-	63.72	28.03	1.44
% change from previous financial YTD	-	178	168	8

\* 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.

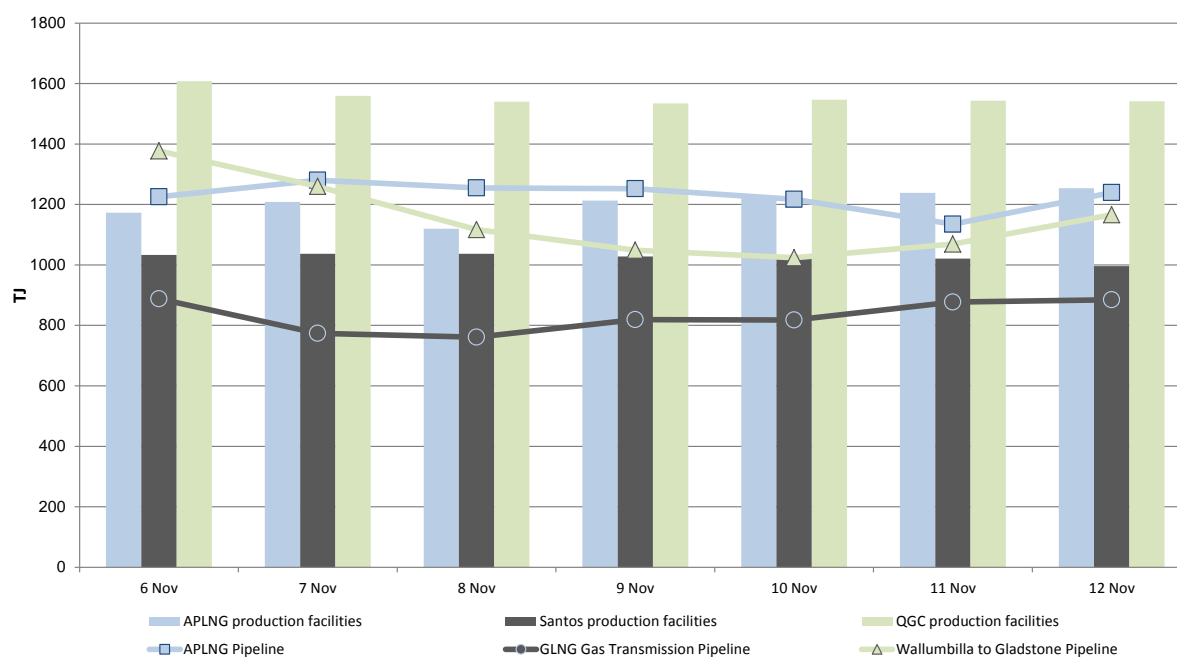
**Figure 4: Gas supply hub products traded for the current week (\$/GJ, TJ)\***

	RBP		SWQP		MAP		MSP		QGP	
	VWA price	Quantity	VWA price	Quantity	VWA price	Quantity	VWA price	Quantity	VWA price	Quantity
<b>Balance of day</b>	7.44	22.8	-	-	-	-	-	-	-	-
<b>Daily</b>	7.40	10.0	-	-	-	-	-	-	-	-
<b>Day ahead</b>	7.29	44.0	7.50	10.0	-	-	-	-	-	-
<b>Weekly</b>	-	-	-	-	-	-	-	-	-	-
<b>Monthly</b>	-	-	-	-	-	-	-	-	-	-

\* 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

On 7 November 2016, a significant price variation (SPV) occurred in the Sydney STTM. The \$329 793 service payment for MOS exceeded the \$250 000 threshold set out in the Significant Price Variation Guidelines published on the AER website. Under Rule 498 of the Gas Rules, the AER is required to identify and report on any significant price variations (SPVs) in the STTM.

Preliminary analysis indicates the main causes are a large demand error (over forecasting) and a large reduction to scheduled back haul on Moomba to Sydney Pipeline (MSP) without a corresponding reduction to scheduled supply quantity on the MSP or Eastern Gas Pipeline (EGP).

A compression issue on the EGP from 9 November triggered an alert for potential Contingency Gas in the Sydney STTM (no contingency gas was required). The Bulletin Board displayed a red flag<sup>2</sup> for deliveries on the EGP for the following day, and the STTM facility capacity was reduced from 335 TJ to 203 TJ from 11 November.<sup>3</sup> While capacity restrictions have triggered market mechanisms, figure 2.2 shows there was sufficient low priced capacity offered to prevent significant increases to market prices.<sup>4</sup>

Despite a significant reduction to demand<sup>5</sup> in Sydney on 10 November and a corresponding decrease to supply of close to 46 TJ, there was still a net decrease MOS requirement of just over 18.5 TJ which resulted in service payments of almost \$130 000 on the gas day. Figure 2.4 illustrates the high MOS requirements and service payment which occurred on the 7 and 10 November gas days.

Figure 3.4 shows counteracting MOS in Adelaide, which occurred daily throughout the previous week, did not occur this week. This coincided with a higher proportion of gas being supplied to the hub on the Moomba to Adelaide Pipeline.

In Queensland, prices were higher and peaked on Thursday 10 November at just under \$8/GJ. Demand forecasts were high through the middle to latter part of the week and daily maximum temperatures were above average on these days. High gas prices coincided with a peak in Gas Powered Generation in Queensland and New South Wales.

There was price volatility in Victoria through the week due to a combination of a full Iona outage for planned maintenance, Culcairn controlled withdrawal limitations due to planned maintenance at the Euroa Compressor Station, and poor demand forecasting by market participants.

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<sup>2</sup> A RED LCA flag indicates involuntary load shedding of 'firm' load is likely or happening on the gas day. This was active on the Bulletin Board for the 10 November gas day.

<sup>3</sup> Participants reduced their low priced EGP offers on 11 November, but these increased again on the following day. Since the majority of the supply to the hub was still being sourced from the EGP despite delivery issues, this triggered capacity constraint prices on three days (\$2.01/GJ on 12 November, \$1.51/GJ on 13 November and \$7.34/GJ on 14 November). There was 17.6 TJ, 17.4 TJ and 5 TJ of as available gas deliveries exposed to capacity payments on the respective days.

Limited low priced supply on the Moomba to Sydney Pipeline (MSP) over the same period has also triggered pipeline flow direction constraints (PFDCs) on a number of days (facilitating economic matching of back haul demand bids above the market price). Each supplier on the MSP is paid the PFDC price (in addition to the ex ante price) by the participants whose bids were scheduled on the pipeline.

A pipeline flow direction constraint price was set on the Moomba to Sydney Pipeline (MSP) on 6 November at \$0.80/GJ. While there was sufficient low priced capacity on the MSP to cater for additional back haul, offers to supply gas on the EGP were far cheaper and this resulted in only 2 TJ of forward haul being scheduled on the MSP to set the market price (\$5.85/GJ). An additional 15.984 TJ of supply was scheduled (priced up to \$6.65/GJ) to cater for additional back haul (priced above \$7.66/GJ) on the MSP as a result of the PFDC mechanism being applied.

Following the capacity reduction on the EGP, a number of PFDCs were applied in provisional and ex ante schedules for gas days from 12 November. The ex ante PFDC on 12 November reached \$4.94/GJ.

<sup>4</sup> The ex ante price fell on 12 November (\$2.01/GJ) and 13 November (\$1.51/GJ). The red flag on the EGP and corresponding decrease in Sydney demand on the 10 November gas day resulted in the ex post price falling by \$5 (to \$2/GJ), as evident in figure 2.1.

<sup>5</sup> Demand reduced by over 50 TJ in the hub, with a further decrease in back haul on the EGP (this may have been related to a reduction in gas consumption in the NEM following Tallawarra power station decreasing its output to zero from 7.30 pm the day before, 9 November AEST).

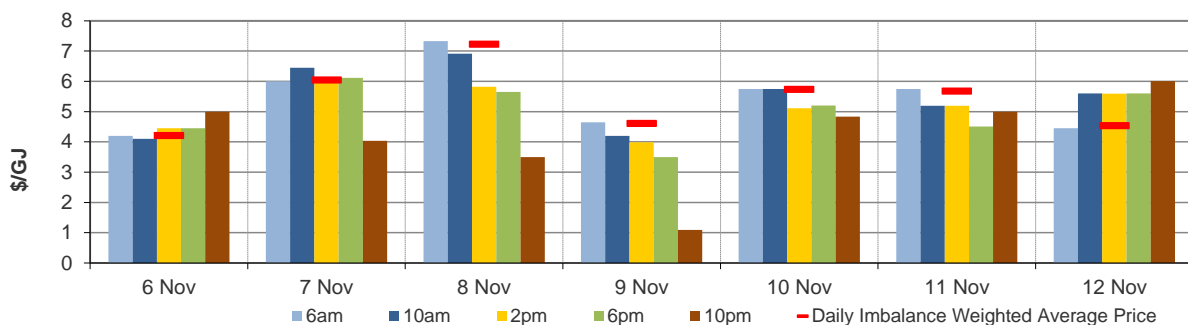
## 1. Victorian Declared Wholesale Market

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 price<sup>6</sup> which is the schedule at which most gas is traded.

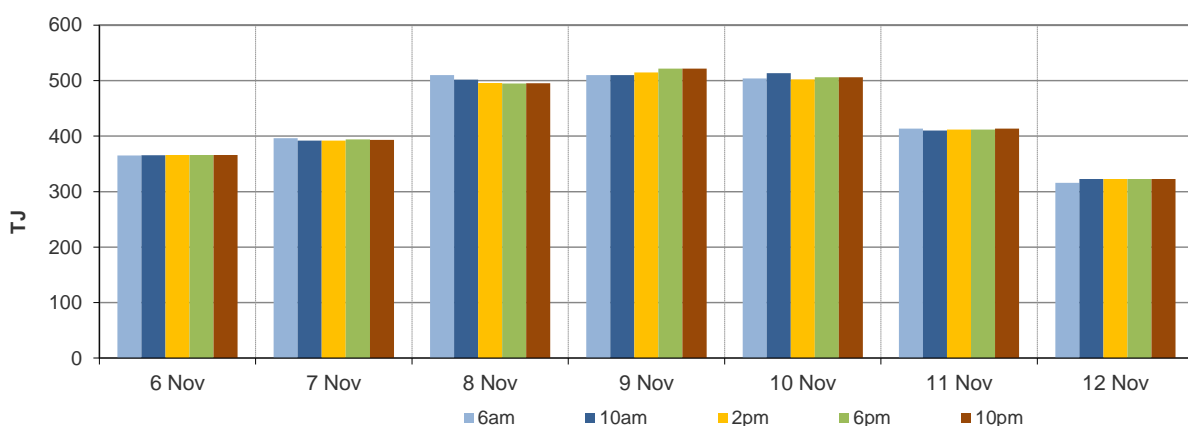
The main drivers<sup>7</sup> of price are demand forecasts and bids to inject or withdraw gas from the market. Figures 1.1 to 1.4 below show the daily prices, demand forecasts<sup>8</sup>, and injection/withdrawal bids for each of the five pricing schedules. Figure 1.5 provides information on which system 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)**

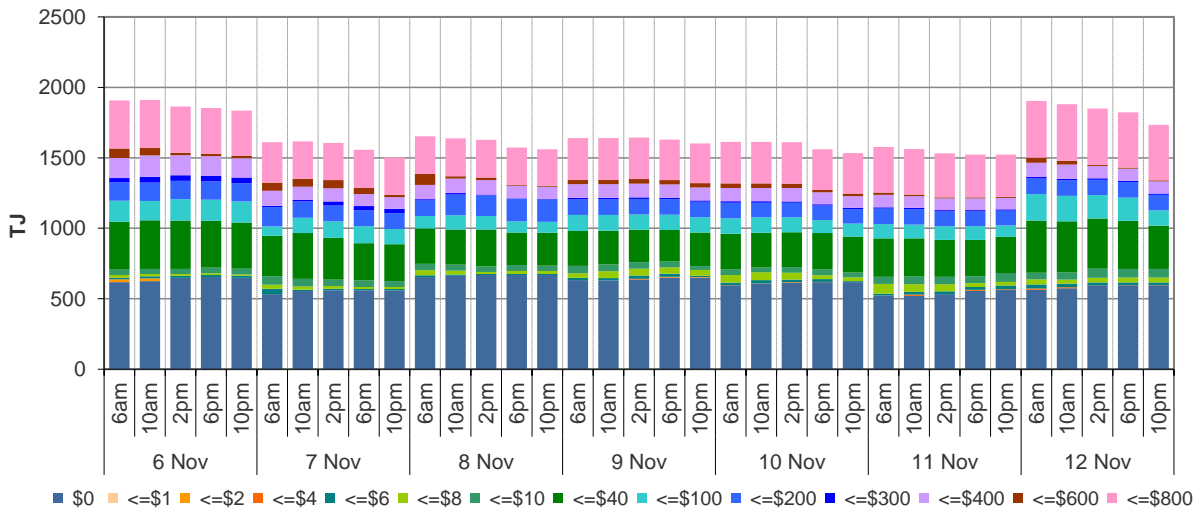


<sup>6</sup> Prices for subsequent schedules are applied only to the differences in scheduled quantities (imbalances) to calculate the weighted price. The 6 am price applies to the entire scheduled quantity in the initial schedule.

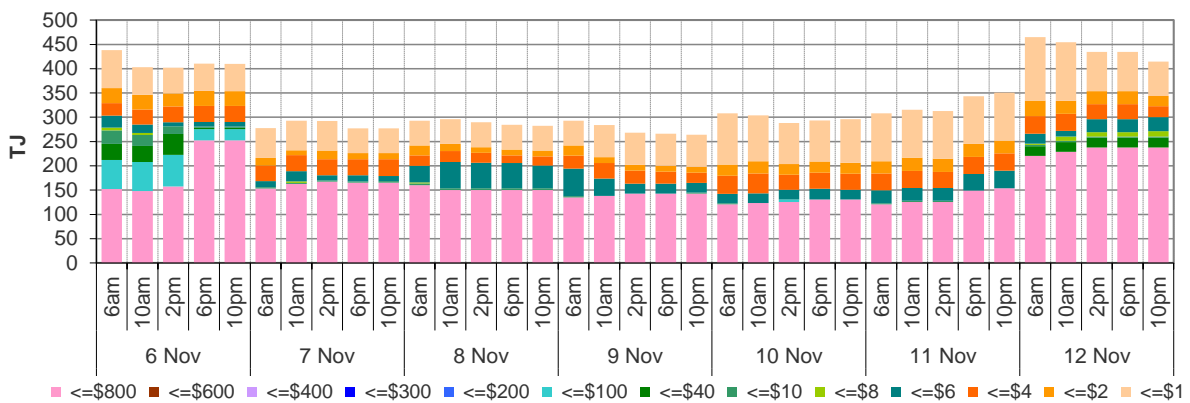
<sup>7</sup> The price might also be affected by transmission or production (contractual) constraints limiting how much gas can be delivered from a locale or System Injection Point (SIP) from time to time.

<sup>8</sup> 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.

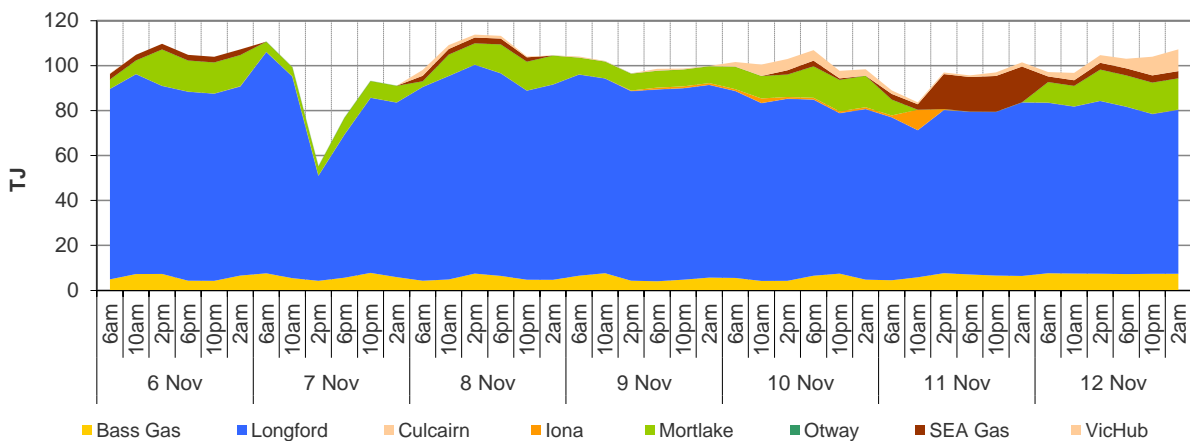
**Figure 1.3: Injection bids by price bands (TJ)**



**Figure 1.4: Withdrawal bids by price bands (TJ)**



**Figure 1.5: Metered Injections by System Injection Point (TJ)<sup>9</sup>**



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.

<sup>9</sup> On 7 November, AEMO scheduled profiled injections at Longford to support critical function testing at the EGP Longford compressor station. Constraints were also applied to the VicHub injection/withdrawal meters on the day for the same purpose (constrained to 0 GJ/h from 6 am).

## 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.<sup>10</sup> 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](#).

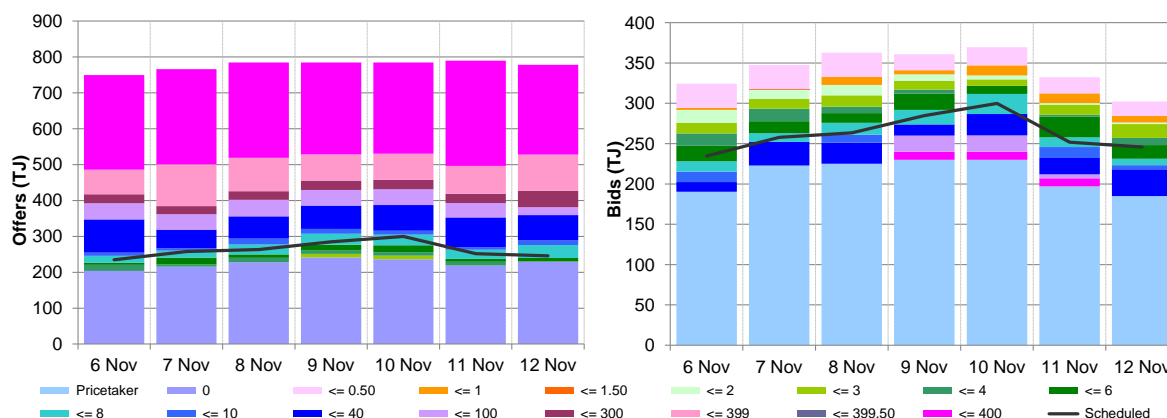
Market Operator Service balancing gas (MOS) payments arise because the amount of gas nominated on pipelines for delivery on a gas day will either exceed or fall short, by some amount, of the amount of gas consumed in the hub. In such circumstances, MOS payments are made to participants for providing a service to park gas on a pipeline or to loan gas from a pipeline to the hub.<sup>11</sup>

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)	5.85	7.44	6.81	6.49	7.00	6.59	2.01
Ex ante quantity (TJ)	235	258	263	285	300	252	246
Ex post price (\$/GJ)	6.00	6.49	6.90	5.50	2.00	6.52	2.01
Ex post quantity (TJ)	237	240	267	259	236	250	244

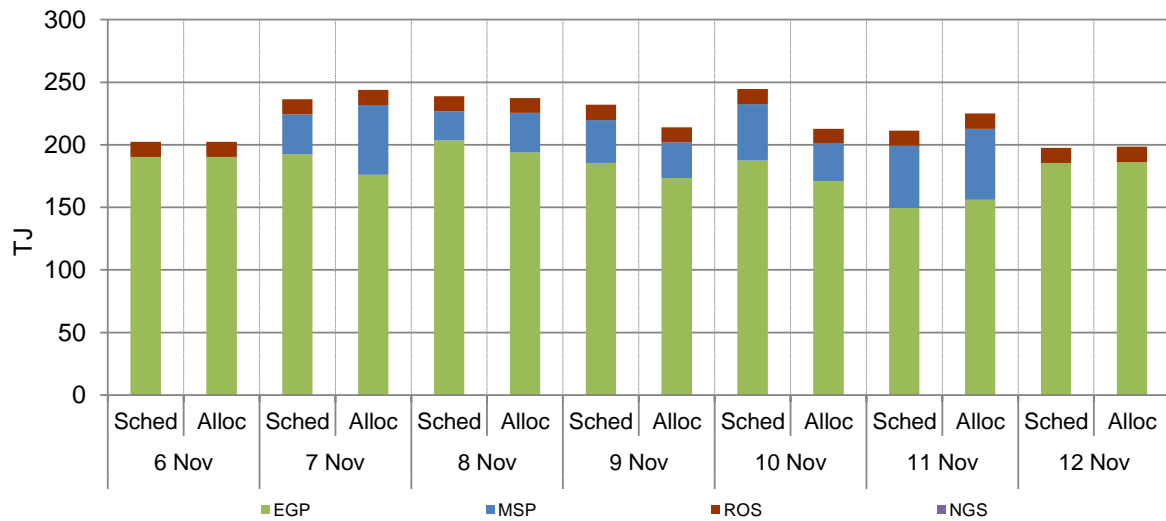
**Figure 2.2: SYD daily hub offers and daily hub bids in price bands (\$/GJ)**



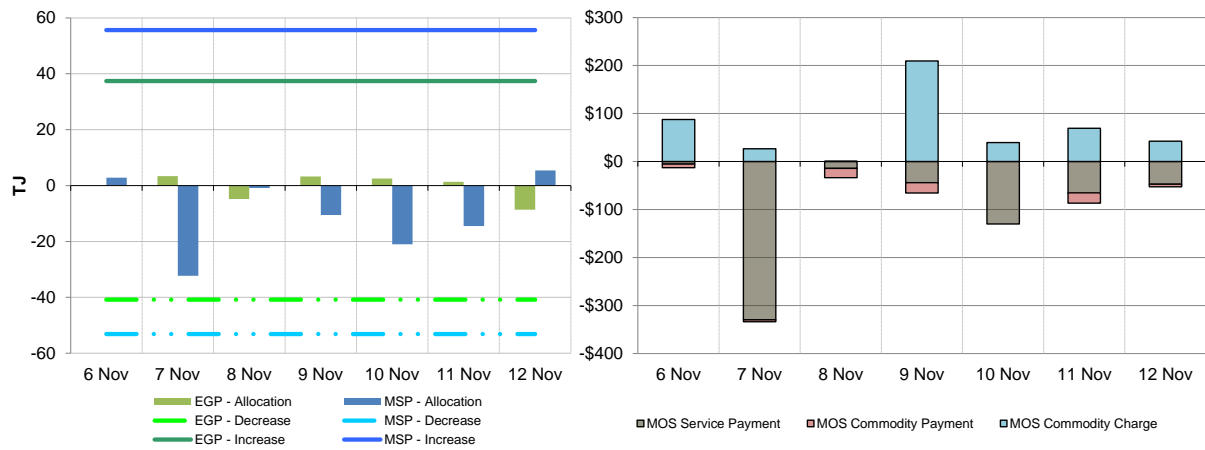
<sup>10</sup> The main driver of the amount of gas scheduled on a gas day is the 'price-taker' bid, which is forecast hub demand that cannot respond to price and which must be delivered, regardless of the price.

<sup>11</sup> 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)<sup>12</sup>**



<sup>12</sup> 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.



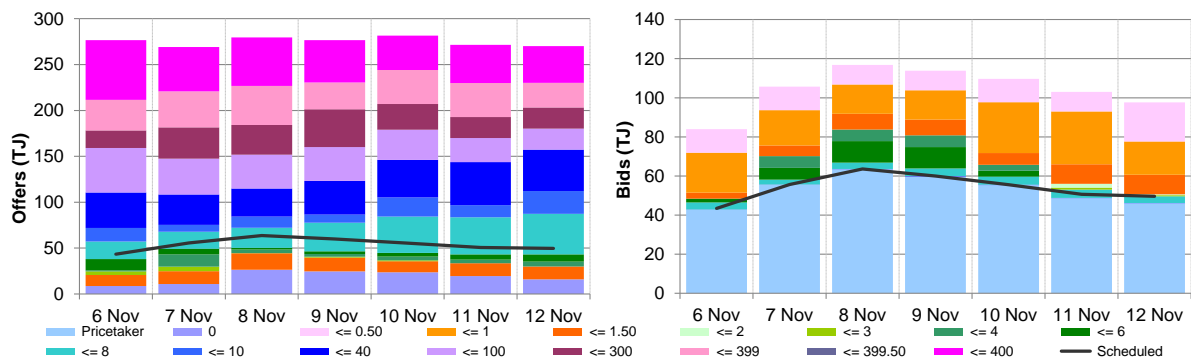
### 3. Adelaide STTM

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.

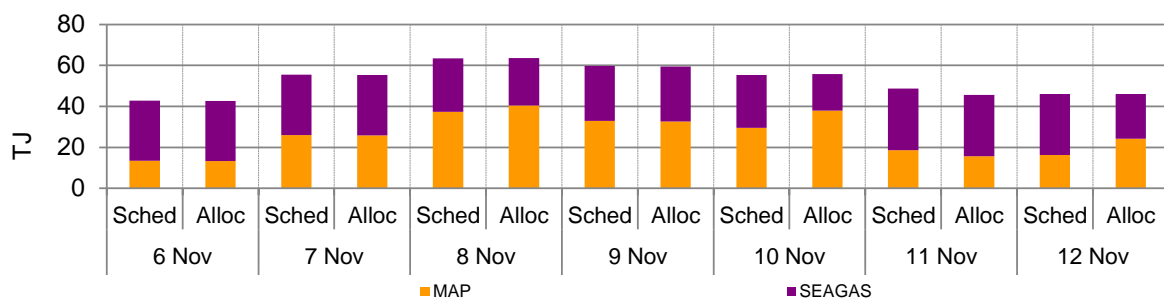
**Figure 3.1: ADL STTM daily ex ante and ex post prices and quantities**

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Ex ante price (\$/GJ)	6.36	6.80	6.89	6.82	6.77	6.37	6.07
Ex ante quantity (TJ)	43	56	64	60	56	51	50
Ex post price (\$/GJ)	6.43	6.55	6.84	6.82	6.70	6.11	6.07
Ex post quantity (TJ)	45	54	60	58	55	47	51

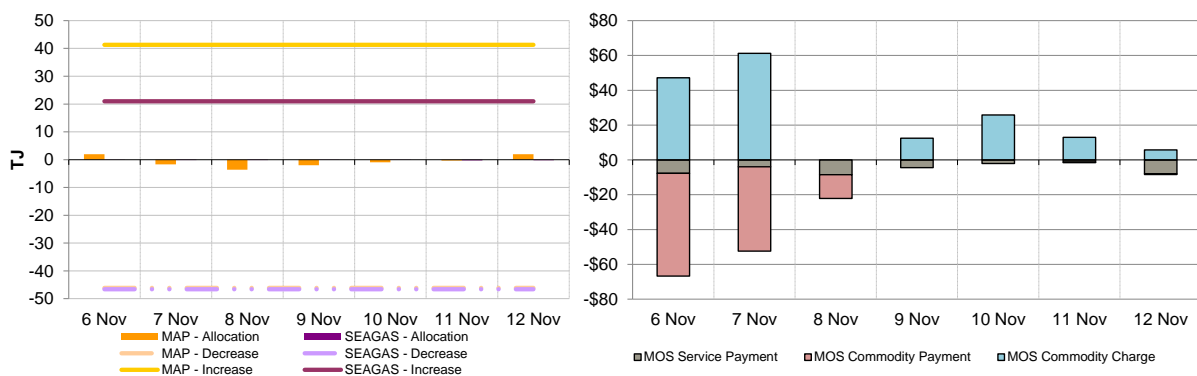
**Figure 3.2: ADL daily hub offers and daily hub bids in price bands (\$/GJ)**



**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)**



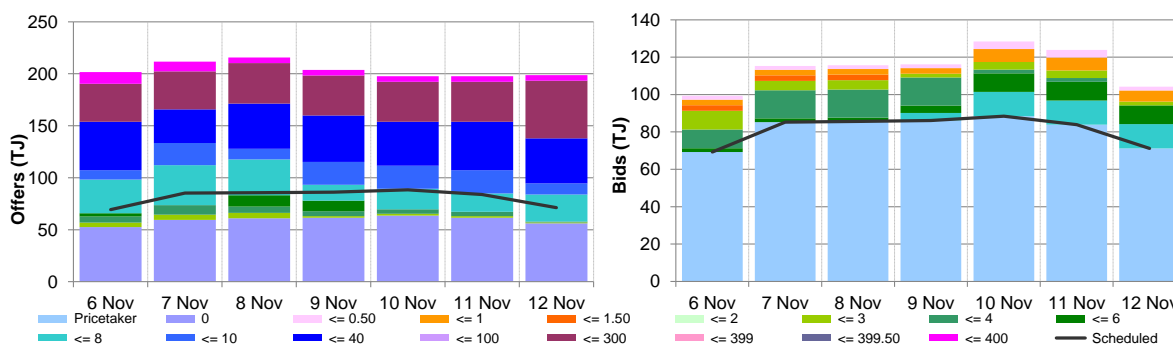
## 4. Brisbane STTM

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.

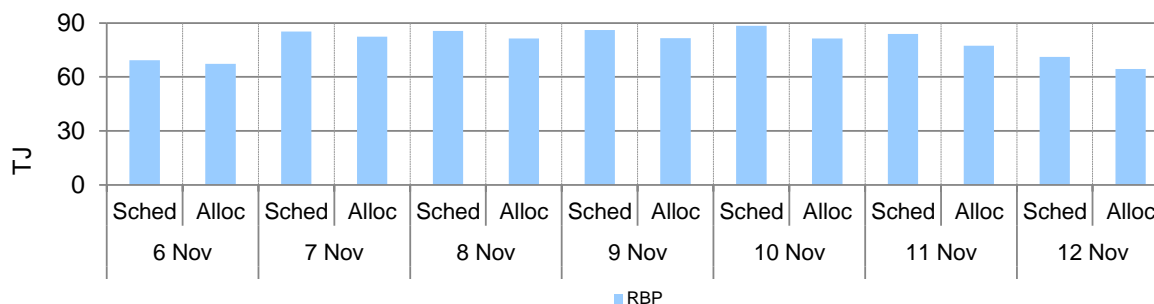
**Figure 4.1: BRI STTM daily ex ante and ex post prices and quantities**

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Ex ante price (\$/GJ)	6.55	6.57	6.25	7.50	7.97	7.29	7.50
Ex ante quantity (TJ)	69	85	86	86	88	84	71
Ex post price (\$/GJ)	6.25	6.57	6.25	7.16	7.59	7.20	7.30
Ex post quantity (TJ)	68	82	84	83	83	78	68

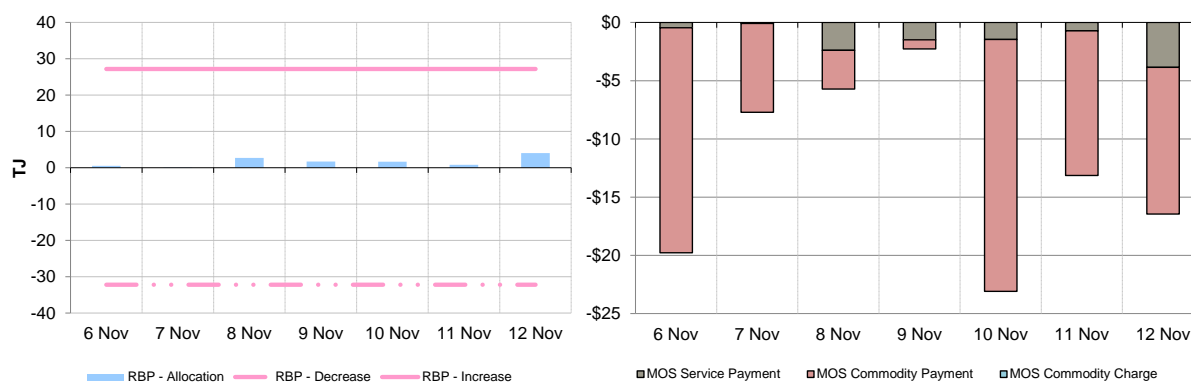
**Figure 4.2: BRI daily hub offers and daily hub bids in price bands (\$/GJ)**



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



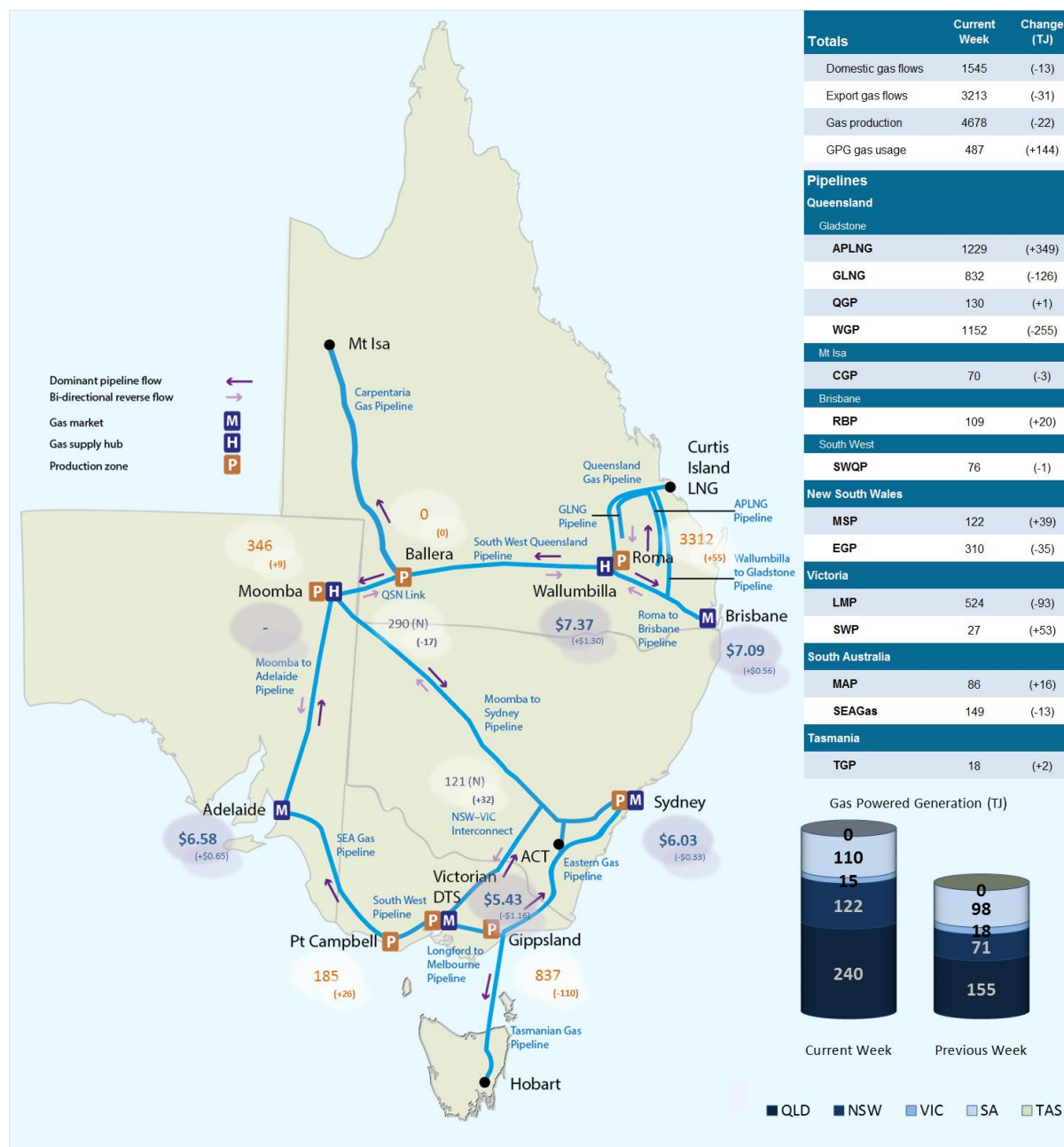
**Figure 4.4: BRI MOS allocations (TJ), service payments and commodity payments/charges (\$000)**



## 5. National Gas Bulletin Board

Figure 5.1 shows average daily actual flows for the current week<sup>13</sup> from the Bulletin Board (changes from the previous week's average are shown in brackets). Average daily prices<sup>14</sup> 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)<sup>15</sup>



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**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.

14

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

15

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.

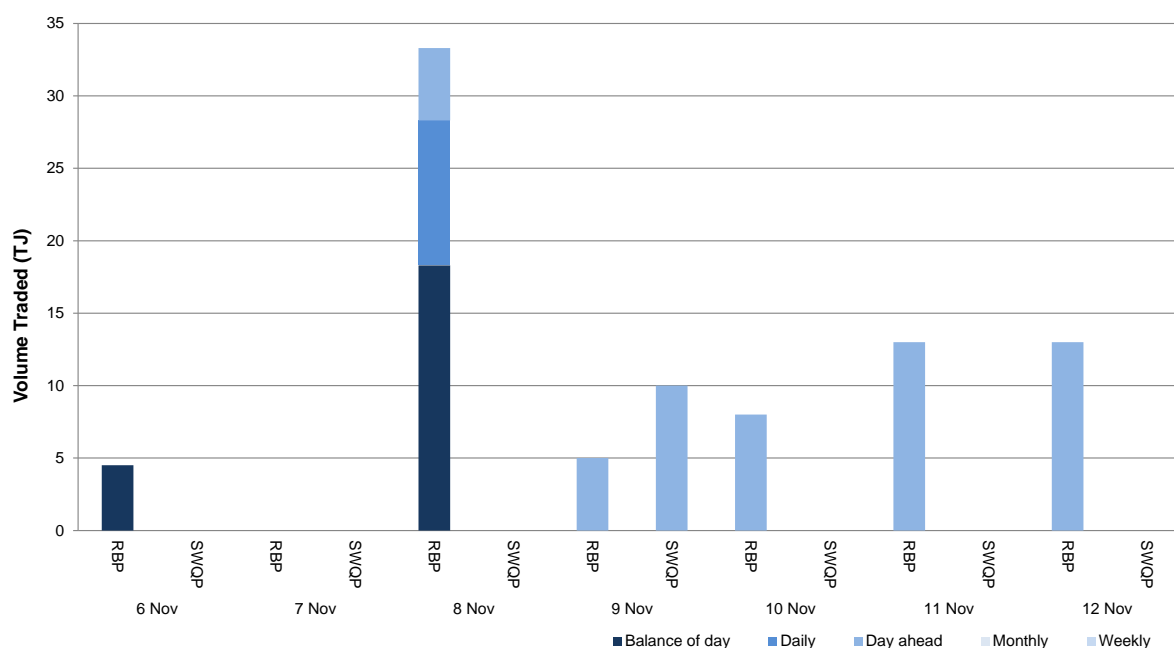
## 6. Gas Supply Hub

The Gas Supply Hub (**GSH**) was established in March 2014 for the trading of gas at Wallumbilla. The GSH is a voluntary market<sup>16</sup> for the supply of gas traded<sup>17</sup> 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).

There were 13 trades this week for 86.8 TJ of gas at a volume weighted price of \$7.36/GJ in the Wallumbilla hub. Trades on the RBP consisted of five day-ahead, two daily and five balance-of-day products (76.8 TJ at \$7.35/GJ), with one day-ahead product on the SWQP (10 TJ at \$7.50/GJ).

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**



### Australian Energy Regulator November 2016

<sup>16</sup> 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.

<sup>17</sup> 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.