# WEEKLY GAS MARKET ANALYSIS



11 - 17 September 2011

#### **Preface**

As part of its monitoring roles for the National Gas Market Bulletin Board (Bulletin Board) and the Declared Wholesale Gas Market (Victorian Gas Market), the AER publishes a weekly gas market report. Part A of the report looks at gas usage and flows of registered facilities in southern and eastern Australia (as reported on the Bulletin Board). Part B provides a summary of operational and market data in the Victorian Gas Market.

The AER is responsible for monitoring and enforcing compliance with Part 20 of the National Gas Rules (Gas Rules) that authorise and govern conduct in the Short Term Trading Market (STTM). The STTM is a market for the wholesale trading of natural gas at defined hubs between pipelines and distribution systems, and began operation on 1 September 2010. With initial hubs of Sydney and Adelaide, additional hubs are intended for the future. Each hub is scheduled and settled separately, but all hubs operate under the same rules. Part C provides a summary of operational and market data in the STTM.

The Victorian Gas Market lies between the two STTM hubs and shares common production sources with the Adelaide and Sydney hubs. Participation in the Victorian Gas Market and the STTM hubs occurs on the basis of a different set of market rules and requires contractual arrangements with different pipeline owners. Participants operate in only those markets where they have production, gas and pipeline contracts. Some key differences between the STTM and the Victorian Gas Market are set out at the start of Part C.

This report will evolve over time and the nature of information presented may change. The AER welcomes feedback on the report from interested parties. Feedback can be sent to aerinquiry@aer.gov.au, with the subject title 'Comments on weekly gas report'.

#### **Summary**

Average daily prices in the Victorian market and the Sydney and Adelaide hubs are shown in figure 1.

Figure 1: Average daily price (\$/GJ) - All gas markets

11 – 17 September	Victorian market*	STTM Sydney hub**	STTM Adelaide hub**
Average Price	3.00	3.05	3.73

<sup>\*</sup>weighted average daily imbalance price

#### STTM Gas Markets (Adelaide and Sydney)

Figures S3 and S4 show this week's ex ante and ex post prices were lower at both STTM hubs than for the previous week and financial year to date averages.

Figure S5 shows pipeline allocations (deliveries to the hub) exceeded network allocations (hub consumption) on several days at the Sydney hub this week, indicating over-forecasting of hub demand on those days. Figure S3 shows that ex ante prices were higher than ex post prices on those days.

<sup>\*\*</sup>ex ante market price

While ex ante and ex post prices in Adelaide were generally aligned throughout the week, figure S6 shows pipeline deliveries also exceeded hub consumption on most days this week.

The AER is continuing to review the demand forecasting accuracy of participants.

# Victorian Gas Market

Milder weather this week (figure A3) saw lower average daily gas injections (see figure V3) than the previous week, which also led to average daily prices dropping from \$3.20/GJ to \$3.00/GJ (see figure V2).

# **National Gas Market Bulletin Board**

Figure N4 shows overall gas demand and production was lower than the previous week.

There were no instances of late or missing Bulletin Board data this week.

# Part A: National Gas Market Bulletin Board

## Overview of pipeline and production flows

Figure N1 sets out the average daily pipeline flows into each key demand region across the National Gas Market. A list of pipeline facilities for each demand region is provided in Figure A1 of the Appendix.

Figure N1: Average daily pipeline flows (TJ) into each demand region

							QLD	
Average daily flows	NSW	ACT	VIC	SA	TAS	Brisbane	Mt Isa	Gladstone
11 – 17 September	309	32	688	277	50	174	104	123
Financial Year-to-date 2011-12*	390	42	828	306	49	172	102	123
Financial Year-to-date 2010-11**	447	45	905	324	49	188	93	102

<sup>\*</sup>Average daily estimated gas consumption measured from 1 July 2011 to the current week (inclusive)

Figure N2 provides the average daily amount of gas used for GPG (gas-powered generators) in each state.

Figure N2: Average daily gas (TJ) used by gas-powered generators in each state

Average daily gas for GPG usage^	NSW	VIC	SA	TAS	QLD
11 – 17 September	26	9	145	33	139
Financial Year-to-date 2011-12*	73	18	177	34	128
Financial Year-to-date 2010-11**	80	18	183	34	161

<sup>^</sup>Estimated values based on application of implied heat rates for generators within the demand region sourced from ACIL Tasman's 2009 Final Report 'Fuel resource, new entry and generation costs in the NEM'

Notes: Data for each state collected on the following basis:

- 1. NSW Smithfield Energy, Uranquinty, Hunter Valley GT, Colongra and Tallawarra power stations.
- 2. VIC Laverton North, Valley Power, Jeeralang A, Jeeralang B, Somerton, Bairnsdale, and Newport power stations.
- 3. SA Dry Creek GT, Hallet, Pelican Point, Torrens Island, Mintaro, Osborne, Ladbroke Grove, and Quarantine power stations.
- 4. TAS Tamar Valley power stations.
- 5. QLD Braemar 1, Braemar 2, Roma, Oakey, Barcaldine, and Swanbank power stations.

Figure N3 sets out the daily average flows from production and storage facilities from each production zone across the National Gas Market. A list of production/storage facilities for each zone is provided in Figure A2.

Figure N3: Daily average production flows (TJ) for each production zone

Average daily flows	Roma (QLD)	Eastern Victoria	Otway Basin (VIC)	Moomba (SA/QLD)
11 – 17 September	549	826	260	289
Financial Year-to-date 2011-12*	558	920	368	288
Financial Year-to-date 2010-11**	564	1030	347	360

<sup>\*</sup>Average daily estimated gas consumption measured from 1 July 2011 to the current week (inclusive)

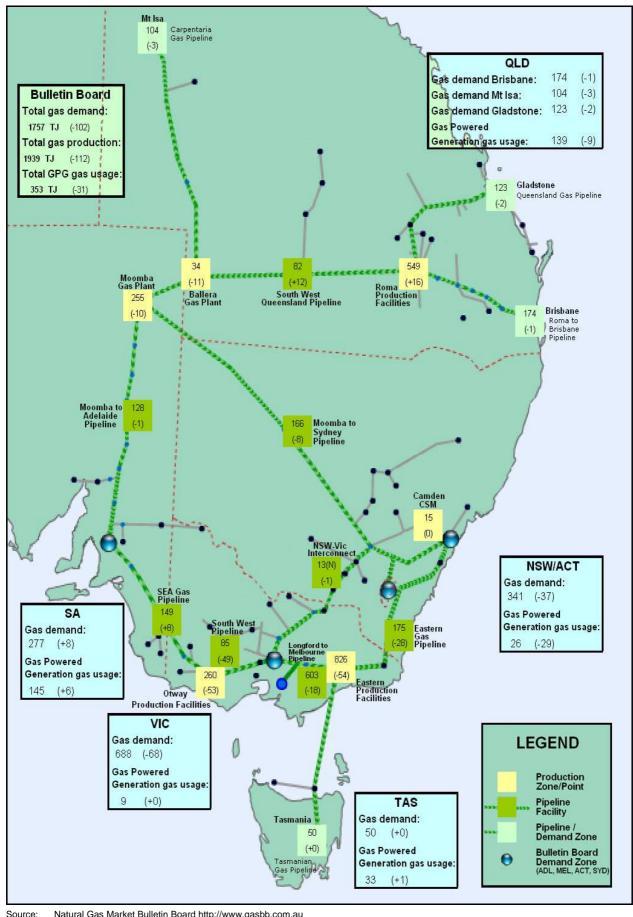
<sup>\*\*</sup>Average daily estimated gas consumption measured from 1 July 2010 to the equivalent week in 2010-11 (inclusive) Source: National Gas Market Bulletin Board <a href="http://www.gasbb.com.au">http://www.gasbb.com.au</a>

<sup>\*</sup>Average daily estimated gas consumption measured from 1 July 2011 to the current week (inclusive)

<sup>\*\*</sup>Average daily estimated gas consumption measured from 1 July 2010 to the equivalent week in 2010-11 (inclusive) Source: <a href="http://www.aemo.com.au">http://www.aemo.com.au</a>

<sup>\*\*</sup>Average daily estimated gas consumption measured from 1 July 2010 to the equivalent week in 2010-11 (inclusive) Source: National Gas Market Bulletin Board <a href="http://www.gasbb.com.au">http://www.gasbb.com.au</a>

Figure N4: Gas production/consumption and pipeline flows (TJ) (changes from the previous week are shown in brackets)



Source: Natural Gas Market Bulletin Board http://www.gasbb.com.au

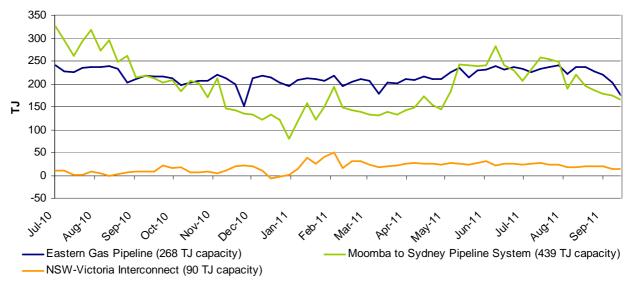
Notes: Direction of aggregate daily flows along the NSW-Vic Interconnect indicated on map by S (South) or N (North).

Numbers in brackets indicate a change in average daily flow from the previous week.

# Gas flows into demand regions

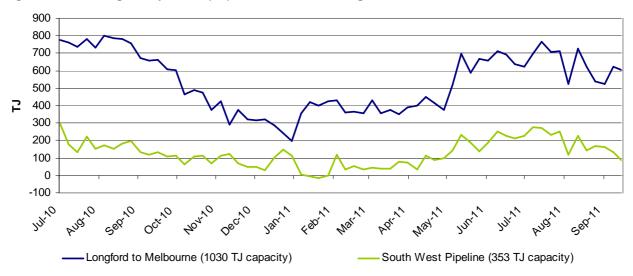
The figures below provide the average daily flows into each of the demand regions served by multiple pipelines and supply sources.

Figure N5: Average daily flows (TJ) into NSW/ACT demand region



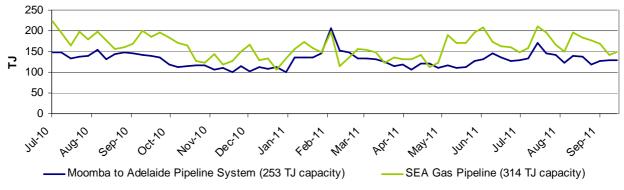
Source: Natural Gas Market Bulletin Board <a href="http://www.gasbb.com.au">http://www.gasbb.com.au</a>
Notes: Negative flows on the NSW-Victoria Interconnect represent flows out of NSW into VIC.

Figure N6: Average daily flows (TJ) into VIC demand region



Source: Natural Gas Market Bulletin Board <a href="http://www.gasbb.com.au">http://www.gasbb.com.au</a>
Notes: Negative flows on the South West Pipeline represent flows out of the VPTS and back into storage at Iona.

Figure N7: Average daily flows (TJ) into SA demand region



Source: Natural Gas Market Bulletin Board http://www.gasbb.com.au

# Part B: Victorian Gas Market

## Participation in the market

Figure V1 shows participant bids submitted at the start of the gas day (6 am) at injection and withdrawal points on the Victorian Declared Transmission System (DTS). The orange shaded boxes indicate that the participant submitted bids at that location on at least one occasion during the week. An "S" indicates that some of this nominated gas was scheduled into the gas market, while "NS" indicates that none of the gas was scheduled. Green shading indicates where a change has occurred from the previous week.

Bids are scheduled in price merit order — this means injection bids which are less than the market clearing price will be scheduled, while withdrawal bids which are greater than the market clearing price will be scheduled into the market.

Figure V1: Injection and withdrawal point bids in the VIC Gas Market^

Market Participant	Participant type	No. of injection /			Inje	ction I	oids in	the V	PTS			Withdrawal bids in the VPTS				
		withdrawal bid points	BassGas	Culcairn	IONA	LNG	Longford	SEA Gas	VicHub	Otway	Mortake	Culcairn	IONA	SEA Gas	VicHub	
AETV Power	Trader	2					NS		NS						NS	
AGL (Qld)	Retailer	1				NS										
AGL	Retailer	3			NS	NS	S						S			
Aurora Energy	Retailer	1					S									
Aust. Power & Gas	Retailer	3			NS	NS	S						S			
Aust. Power & Gas	Trader	1					S									
Coogee Energy	Transmission Customer	1					S									
Essential Energy	Transmission Customer	1										S				
Lumo Energy	Retailer	5		NS	S	NS		S	S							
Lumo Energy	Trader	2			NS				NS				S		NS	
Origin (Vic)	Retailer	6	S	NS	S	NS	S	S				S	NS			
Origin (Uranquinty)	Trader	2					S					S				
Red Energy	Retailer	1					S									
Santos	Retailer	1							S							
Simply Energy	Retailer	3			NS	NS		S					NS	S		
TRU Energy	Retailer	4			S	NS	S		S				NS			
TRU Energy 2	Retailer	1					S									
Visy Paper	Distribution Customer	2					S					S				

^Bids taken from 6 am data for each gas day during the current week.

Source: http://www.aemo.com.au (INT131)

#### **Market Prices**

Figure V2 displays volume-weighted average daily imbalance prices, compared to the 2010-11 financial year-to-date average and the 2009-10 financial year-to-date equivalent as well as daily imbalance prices for each day during the current week.

The daily average market price is a volume weighted imbalance price taking account of trading amounts at five times through the gas day — 6 am, 10 am, 2 pm, 6 pm and 10 pm.

Figure V2: Imbalance Weighted Prices (\$/GJ)

	11 – 17 September	4 – 10 September	2011-12 Financial YTD*		10-11 cial YTD**		
Average daily price	3.00	3.20	3.40	2	2.50		
11 – 17 September	Sun M	Mon Tue	Wed Thu	Fri	Sat		
Daily price	3.03	3.00	2.98 3.02	2.98	2.95		

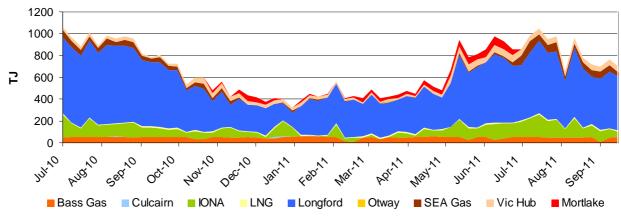
<sup>\*</sup>Average daily imbalance weighted average price from 1 July 2011 to the current week (inclusive)

## **System Injections**

Figure V3 shows the average daily injections into the DTS for the current and previous week, compared with the 2010-11 and 2009-10 equivalent financial year-to-date daily averages.

Figure V3: Average daily flows (TJ) from Injection Points on the DTS

Injection Point:	11 – 17 September	4 – 10 September	2011-12 Financial YTD*	2010-11 Financial YTD**
Culcairn	0	0	0	1
Longford	500	520	546	667
LNG	9	10	10	9
IONA	47	76	124	115
VicHub	51	57	49	28
SEAGas	39	57	63	48
Bass Gas	53	47	46	50
Otway	0	0	0	0
Mortlake	0	0	0	
TOTAL	699	766	838	918



<sup>\*</sup>Average daily estimated gas consumption measured from 1 July 2011 to the current week (inclusive)

<sup>\*\*</sup>Average daily imbalance weighted average price from 1 July 2010 to the equivalent week in 2010-11 (inclusive) Source: <a href="http://www.aemo.com.au">http://www.aemo.com.au</a> (INT 041)

<sup>\*\*</sup>Average daily estimated gas consumption measured from 1 July 2010 to the equivalent week in 2010-11 (inclusive) Source: <a href="http://www.aemo.com.au">http://www.aemo.com.au</a> (INT 150)

## **Bidding Activity**

Figure V4 compares the price structure of gas bid at each of the injection points on the DTS, within three price bands of \$0/GJ, \$0/GJ to \$4/GJ, and \$4/GJ and above, for the current week and for the previous week.

100%

Figure V4: Price structure of bids by injection points

40% 20% 0% Previous Current Previous Previous Current Previous Current Current Current Current Current Previous Previous Current Current Current Previous Previous Previous Previous Longford Culcairn LNG Vic Hub SEA Gas Otw ay Bass Gas Mortlake **TOTAL** lona **WUGS** ■ \$0 bids ■ \$0 - \$4 bids ■ \$4+ bids Source: http://www.aemo.com.au (INT 131) - bids submitted for the 6am schedule on each day of the week. Notes: Figures in the table are rounded off the nearest round number (TJ); the maximum allowable bid is \$800/GJ.

Figure V5 provides a table of injection points on the DTS where market participants submitted intra-day renominations, for each day of the week.

Figure V5: Intra-day rebidding of gas injections

Injection Point:	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Culcairn							
Longford	AETV Origin TRU Aurora	AETV Origin TRU Aurora	AETV AGL Origin TRU Aurora	AGL Origin TRU Aurora	AETV AGL Origin TRU Aurora	AETV AGL Origin TRU Aurora	AETV TRU Aurora
LNG							
lona	TRU APG	TRU APG Simply Lumo	TRU APG Simply Lumo	TRU APG Simply Lumo	TRU APG Simply Lumo	TRU APG Simply Lumo	Origin TRU APG Simply Lumo
VicHub	AETV	AETV Lumo	AETV Lumo	AETV TRU Lumo	AETV TRU Lumo	AETV TRU Lumo	AETV Lumo
SEAGas	Simply	Simply	Simply		Simply	Origin Simply	Origin Lumo
Bass Gas							
Mortlake							

Source: http://www.aemo.com.au (INT 131)

Notes: Origin = Origin Energy | AGL = AGL Sales | TRU = TRUenergy | Simply = Simply Energy | AETV = AETV Power |
APG = Australian Power & Gas | CE = Country Energy | Lumo = Lumo Energy (formerly Victoria Electricity) |
AGL (QLD) = AGL Sales (Queensland) | Red = Red Energy | Ausgrid = Ausgrid | Aurora = Aurora Energy |

# **System withdrawals**

Figure V6 shows the average daily gas usage on the DTS for the current and previous week, compared with the 2010-11 and 2009-10 equivalent financial year-to-date daily averages.

Figure V6: Average daily withdrawals (TJ) from system demand zones on the DTS

System withdrawal zone:	11 – 17 September	4 – 10 September	2011-12 Financial YTD*	2010-11 Financial YTD**
Ballarat	30	34	38	44
Geelong <sup>^</sup>	92	100	102	104
Gippsland	46	48	51	57
Melbourne	462	502	559	633
Northern	76	81	92	83
TOTAL	705	765	841	921

<sup>^</sup>Data presented also includes withdrawals for the Western system withdrawal zone or Western Transmission System (WTS).

<sup>\*</sup>Average daily estimated gas consumption measured from 1 July 2011 to the current week (inclusive)
\*\*Average daily estimated gas consumption measured from 1 July 2010 to the equivalent week in 2010-11 (inclusive) Source: http://www.aemo.com.au (INT 150).

# Part C: STTM MARKET DATA

#### What is the STTM?

The STTM is a market for the trading of natural gas at the wholesale level at defined hubs between pipelines and distribution systems. Currently the STTM has two hubs: Sydney and Adelaide. The AER first commenced reporting on the STTM in September. The report deliberately contains a significant amount of information on the STTM. It is envisaged that over time as readers become familiar with the market, the amount of information will be reduced, while being mindful not to compromise the quality of the report.

Although the STTM and Victorian gas markets (discussed in Part B of this report) are both spot markets for gas, there are a number of key differences. Some of these differences are listed in the table below.

Key area of difference	Victoria Gas Market	STTM
AEMO role	<ul> <li>Wholesale market operator,</li> <li>Retail market operator,</li> <li>Transmission pipeline system operator</li> </ul>	<ul> <li>Wholesale market operator,</li> <li>Retail market operator</li> </ul>
Scheduling	<ul> <li>On the day scheduling comprising five pricing and operating schedules at set times. Ad hoc schedules if required.</li> <li>Day ahead and 2-Day ahead schedules (forecast data only).</li> </ul>	<ul> <li>Day ahead market schedules</li> <li>Shippers may vary from their market schedules when they nominate to pipeline operators</li> <li>2-Day ahead and 3-Day ahead schedules (forecast data only).</li> </ul>
Market Price	<ul> <li>Five ex ante prices for imbalances set on the day</li> <li>Ex ante prices in subsequent schedules after the 6am schedule apply to deviations</li> <li>Market price is for commodity only.         Transportation is charged separately by pipeline owner     </li> </ul>	One ex ante market price set the day before the gas day     One ex post imbalance price set the day after the gas day     Price includes both commodity and delivery to the hub and represents purchase of gas at the hub
Linepack management (pipeline balancing mechanism)	AEMO defines linepack target depending on operational conditions and is generally set seasonally not daily.     Linepack account covers costs that includes costs of day to day linepack variations	On the day pipeline balancing through Market Operator Service (MOS), provided by MOS offers from shippers
Transmission pipeline constraint management	Ancillary payments for higher priced gas scheduled that relieves constraints     Uplift payments to fund ancillary payments	Capacity payments from shippers with non-firm contracts to shippers with firm contracts if a pipeline is constrained (based on the pipeline capacity price)

AEMO's website (<u>www.aemo.com.au</u>) contains documents that provide further detail on how the STTM works, including a glossary of terms.

#### **Participation in the market**

Figures S1 and S2 show participant supply offers and withdrawal bids submitted in the Sydney and Adelaide STTM hubs. The orange shaded boxes indicate that the participant submitted offers and bids at that location on at least one occasion during the week. An "S" indicates that some of this gas was scheduled into the gas market, while "NS" indicates that none of the gas was scheduled. Green shading indicates where a change has occurred from the previous week.

Offers and Bids are scheduled in price merit order—this means offers that are less than the market clearing price will be scheduled, while withdrawal bids that are greater than the market clearing price will be scheduled into the market.

Figure S1: Supply Offers and Withdrawal Bids (Sydney Hub)^

Trading Participant	Participant type	No. of		Offers	3		Bi	ds	
		supply offers / withdrawal bid points	EGP	MSP	ROS	EGP	MSP	ROS	SYD - NET
AETV Power	Shipper								
AGL Energy Sales & Marketing Limited	STTM User,Shipper	3	S	S	S				
AGL Wholesale Gas Limited	Shipper	2	S	S					
Australian Power & Gas Pty Ltd	STTM User,Shipper	1	S						
BHP Billiton Petroleum (Bass Strait) PL	Shipper								
BlueScope Steel	STTM User,Shipper	1	S						
Commonwealth Steel Company Pty Limited	STTM User								
Delta Electricity	STTM User,Shipper	1							S
Essential Energy	STTM User,Shipper	2	S				S		
Esso Australia Resources Pty Ltd	Shipper								
Lumo Energy (NSW) Pty Ltd	STTM User								
Lumo Energy Australia Pty Ltd	Shipper	2	NS			NS	NS		
OneSteel Coil Coaters Pty Ltd	STTM User								
OneSteel Manufacturing Pty Ltd	STTM User,Shipper	1	S						
OneSteel NSW Pty Ltd	STTM User,Shipper	1	S						
OneSteel Trading Pty Limited	STTM User								
Origin Energy LPG Limited	STTM User,Shipper								
Origin Energy Retail Ltd	STTM User,Shipper	1		S					
Santos Direct Pty Ltd	STTM User,Shipper	1	S						
TRUenergy Pty Ltd	STTM User,Shipper	2	S	S		NS			
TRUenergy Pty Ltd No. 2	STTM User,Shipper	1		S					
Tyco Water	STTM User								

<sup>^</sup>Offers and bids taken from the (D-1) ex ante schedule

Figure S2: Supply Offers and Withdrawal Bids (Adelaide Hub)^

Trading Participant	Participant type	No. of	Off	ers		Bids	
		supply offers / withdrawal bid points	MAP	SEAGAS	MAP	SEAGAS	ADL - NET
AGL South Australia Pty Limited	STTM User,Shipper	1	S				
AGL Wholesale Gas (SA) Pty Ltd	Shipper	2	S	S			
Adelaide Brighton Cement Ltd	STTM User,Shipper	1	S				
Lumo Energy (SA) Pty Ltd	STTM User						
Lumo Energy Australia Pty Ltd	Shipper						
OneSteel Manufacturing Pty Ltd	Shipper						
Origin Energy Retail Ltd	STTM User,Shipper	2	S	S			
Pelican Point Power Limited	Shipper						
Simply Energy	STTM User,Shipper	2	NS	S			
TRUenergy Pty Ltd	STTM User,Shipper	2	S	S	s		

<sup>^</sup> Offers and bids taken from the (D-1) ex ante schedule

<sup>^</sup>STTM Users also submit price-taker bids to satisfy customer demand, which are not included in this table Source: http://www.aemo.com.au.INT 651, 659, 668

Source: http://www.aemo.com.au INT 651, 659, 668 EGP=Eastern Gas Pipeline, MSP=Moomba to Sydney Pipeline, ROS=Rosalind Park Production facility, SYD-NET=Sydney Hub

<sup>^</sup> STTM Users also submit price-taker bids to satisfy customer demand, which are not included in this table Source: http://www.aemo.com.au INT 651, 659, 668

MAP=Moomba to Adelaide Pipeline, SEAGAS=SEA gas pipeline, ADL-NET=Adelaide Hub

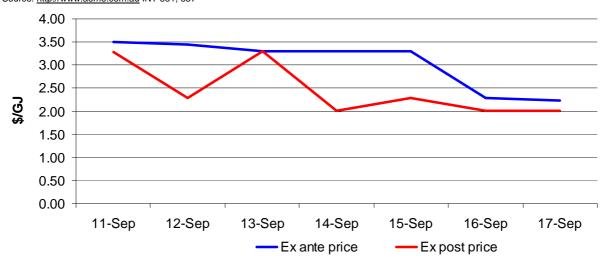
# Ex ante and Ex post Market Prices

Figures S3 and S4 show ex ante and ex post prices at the Sydney and Adelaide Hubs. Differences between the ex ante and ex post price may arise where there are significant differences between price taker bids (demand forecasts) for the hub and actual demand in the hub. When this occurs, this leads to more or less gas being scheduled in the ex post market and a divergence between the ex ante and ex post prices.

Figure S3: Ex ante vs Ex post Price - Sydney Hub (\$/GJ)^

	11 – 17 September	4 – 10 September	2011-12 Financial YTD*
Ex ante price	3.05	3.28	3.46
Ex post price	2.45	2.87	2.97

\*Financial Year to date figure from 1 July 2011 to the current week (inclusive) Source: <a href="http://www.aemo.com.au">http://www.aemo.com.au</a> INT 651, 657

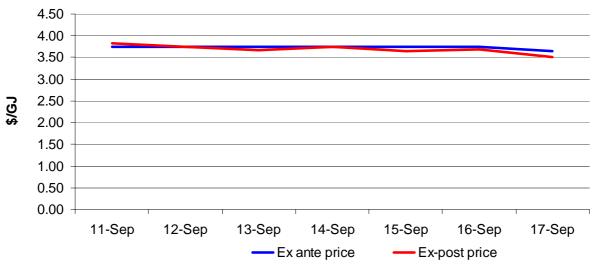


Source: http://www.aemo.com.au INT 651, 657

Figure S4: Ex ante vs Ex post Price - Adelaide Hub (\$/GJ)

	11 – 17 September	4 – 10 September	2011-12 Financial YTD*
Ex ante price	3.73	3.84	3.87
Ex post price	3.69	3.97	3.90

\*Financial Year to date figure from 1 July 2011 to the current week (inclusive) Source: http://www.aemo.com.au INT 651, 657



Source: http://www.aemo.com.au INT 651, 657

#### Scheduled gas

"Firm" and "non-firm" gas is scheduled to the STTM hubs. Firm capacity describes a facility contract that has the highest haulage priority. Non-firm (as available) capacity refers to facility contracts with lower order priority.

Gas can also be scheduled from the STTM hubs. This happens when Shippers "backhaul" gas from the hub or Users bid to take gas from the hub (including price taker bids).

Figures S5 and S6 show scheduled versus allocated gas at each hub. To understand the figures, the quantities of firm and non-firm gas scheduled via offers to the hub are indicated by the columns marked "T" (or **to** the hub). Firm offers are indicated by light purple shading and as available gas is indicated by maroon shading. Bids to take gas from the hub are indicated by columns marked "F" (or **from** the hub). User bids are indicated by light yellow shading and backhaul is indicated by dark blue shading.

The red line shows network (or in other words hub or demand side) allocations and the green line shows pipeline allocations. Allocations show actual gas flows for the day based on pipeline and network metered data.

By comparing the level of the red line to the columns marked "F", it can be shown whether demand (allocation) was higher than scheduled. Similarly, comparing the green line to the columns marked "T" shows how the actual flow of gas (allocation) compared to what was scheduled.

250 200 150 100

F

Τ

14-Sep

F

Pipeline Allocation

Τ

15-Sep

F

Т

17-Sep

Network Allocation

Т

16-Sep

Figure S5: Allocated vs scheduled ex ante quantity - Sydney Hub (TJ)^

Firm As available From the Hub Backhaul Source: <a href="http://www.aemo.com.au">http://www.aemo.com.au</a> INT 651, 652, 658 and 664 (MOS allocations removed)

12-Sep

Т

F

Τ

13-Sep

F

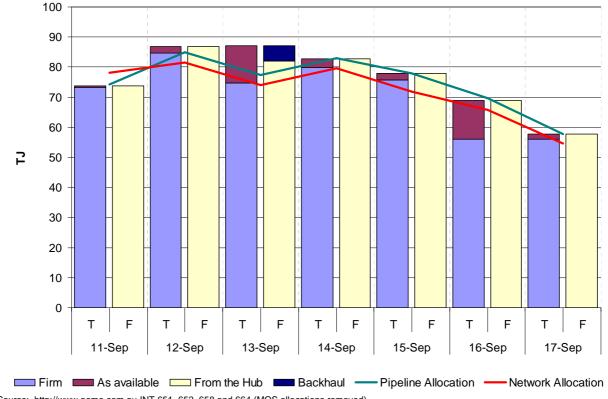
F

Т

11-Sep

0

Figure S6: Allocated vs scheduled ex ante quantity - Adelaide Hub (TJ)



Source: http://www.aemo.com.au INT 651, 652, 658 and 664 (MOS allocations removed)

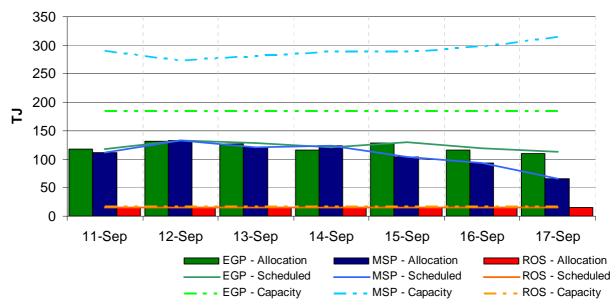
#### **Pipeline Facility Allocations**

A number of pipelines supply the Adelaide and Sydney hubs. Figures S7 and S8 show, for each hub, the allocation (or actual flow) of gas to each of the pipeline facilities supplying the hub, the quantity of gas scheduled (ex ante) on the pipeline and the capacity of the pipeline.

For a gas day, the pipeline operator delivers gas to the hub, and users withdraw gas from the hub. However, the quantities delivered to or withdrawn from the hub may not, and generally will not, match with the ex ante schedules. In addition, during the day, as gas requirements become better known, and if permitted by their contracts, shippers may renominate quantities ("intraday nominations") with their pipeline operators.

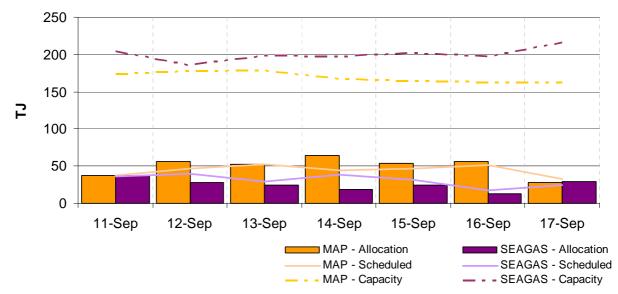
Differences between the amount of gas scheduled and what was actually allocated can result in variations between the ex ante and ex post price, as the ex post price is related to the offers actually allocated while ex ante is related to the offers scheduled.

Figure S7: Allocated vs scheduled pipeline quantities - Sydney Hub (TJ)



Source: <a href="http://www.aemo.com.au">http://www.aemo.com.au</a> INT 652, 653, 658 and 664 (MOS allocations removed) EGP=Eastern Gas Pipeline, MSP=Moomba to Sydney Pipeline, ROS=Rosalind Park production facility

Figure S8: Allocated vs scheduled pipeline quantities - Adelaide Hub (TJ)



Source: <a href="http://www.aemo.com.au">http://www.aemo.com.au</a> INT 652, 653, 658 and 664 (MOS allocations removed) MAP=Moomba to Adelaide Pipeline, SEAGAS=SEA gas pipeline

#### Offers and Bids

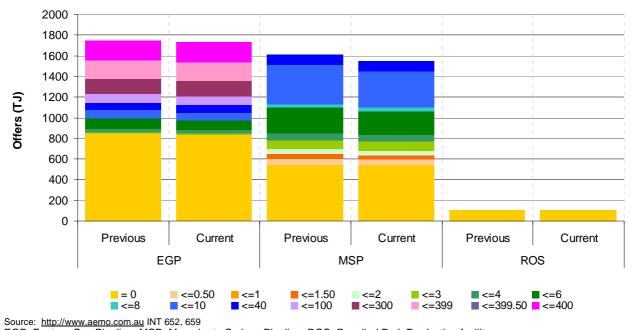
Trading Participants submit offers to sell gas into an STTM hub and withdrawal bids to take gas from a hub. Figures S9 and S11 show for the Sydney and Adelaide hubs respectively, total offers within various price bands for the current week compared to the previous week for each of the pipeline facilities.

Figures S10 and S12 show for the Sydney and Adelaide hubs respectively, total bids within various price bands for the current week compared to the previous week for each of the pipeline facilities and the hubs themselves (NETSYD1 and NETADL1).

These figures also include information on price-taker bids. A price-taker bid is a bid for a quantity of gas that the user will accept at any price. Only STTM users are able to place price-taker bids, that is, to purchase gas at any price. These bids (which represent customer demand forecasts) must be submitted on a daily basis. Price-taker bid data is read against the right-hand-

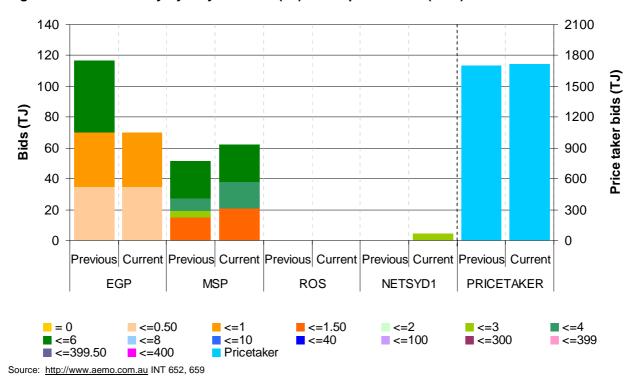
side axis. Because scheduling is price-driven, offers for lower-priced gas are scheduled ahead of offers for higher-priced gas and bids for higher-priced gas are scheduled ahead of bids for lower-priced gas.

Figure S9: Total weekly Sydney hub offers (TJ) within price bands (\$/GJ)



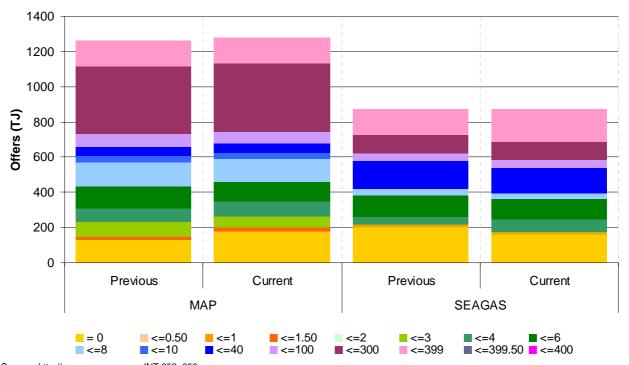
EGP=Eastern Gas Pipeline, MSP=Moomba to Sydney Pipeline, ROS=Rosalind Park Production facility

Figure S10: Total weekly Sydney hub bids (TJ) within price bands (\$/GJ)



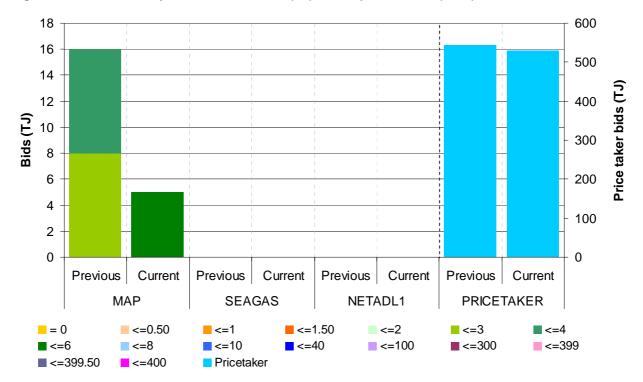
EGP=Eastern Gas Pipeline, MSP=Moomba to Sydney Pipeline, ROS=Rosalind Park Production facility, NETSYD1=Sydney Hub

Figure S11: Total weekly Adelaide hub offers (TJ) within price bands (\$/GJ)



Source: http://www.aemo.com.au INT 652, 659 MAP=Moomba to Adelaide Pipeline, SEAGAS=SEA gas pipeline

Figure S12: Total weekly Adelaide hub bids (TJ) within price bands (\$/GJ)



Source: http://www.aemo.com.au INT 652, 659

MAP=Moomba to Adelaide Pipeline, SEAGAS=SEA gas pipeline, NETADL1=Adelaide Hub

# Re-offers and re-bids

In the STTM, offers and bids must first be submitted three days before the gas day (D-3), leading to an initial provisional price and schedule for the gas day. Re-offers and re-bids are then allowed for the D-2 schedule and finally for the D-1 "ex ante" schedule.

Re-offers and re-bids can lead to significant changes between D-3 and D-2 provisional prices and the ex ante price. Figures S13, S14, S15 and S16 show the participants that made inter-day reoffers and re-bids at the hubs for the different pipeline facilities.

Figure S13: Inter-day resubmission of offers at Sydney Hub

Pipeline	Schedule	Sun	Mon	Tue	Wed	Thu	Fri	Sat
	D-3 to D-2	AGL(ESM) BluSc TRU	SANTOS TRU	SANTOS TRU	Lumo OneStI(NSW) SANTOS TRU	OneStI(NSW) SANTOS TRU	TRU	SANTOS TRU
EGP	D-2 to D-1	SANTOS TRU	SANTOS TRU	BluSc SANTOS TRU	BluSc OneStl(NSW) SANTOS TRU	BluSc TRU	APG BluSc OneStl(NSW) SANTOS TRU	BluSc SANTOS TRU
MSP	D-3 to D-2	AGL(ESM) Origin TRU	AGL(ESM) EA TRU	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU	AGL(ESM) Origin TRU	AGL(ESM) EA Origin TRU
	D-2 to D-1	AGL(ESM) EA TRU	AGL(ESM) EA Origin	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin	AGL(ESM) EA Origin TRU
ROS	D-3 to D-2				AGL(ESM)	AGL(ESM)	AGL(ESM)	
	D-2 to D-1			AGL(ESM)	AGL(ESM)			

Source: http://www.aemo.com.au INT 659
BluSc= BlueScope Steel I Country= Country Energy I Origin=Origin Energy Retail Ltd I TRU= TRUenergy Pty Ltd I

AGL(WG)= AGL Wholesale Gas Limited I EA=EnergyAustralia I OneStl(NSW)= OneSteel NSW Pty Ltd I

SANTOS= Santos Direct Pty Ltd I AGL(ESM)= AGL Energy Sales & Marketing Pty Ltd I Lumo = Lumo Energy Australia Pty Ltd |

APG= Australian Power & Gas Pty Ltd |

EGP=Eastern Gas Pipeline, MSP=Moomba to Sydney Pipeline, ROS=Rosalind Park Production facility

Figure S14: Inter-day resubmission of bids at Sydney Hub

Pipeline	Schedule	Sun	Mon	Tue	Wed	Thu	Fri	Sat
FOR	D-3 to D-2	TRU						
EGP	D-2 to D-1							
MSP	D-3 to D-2	Country			Country Lumo			Country
iiioi	D-2 to D-1			Country		Country	Country	
NETSYD1	D-3 to D-2							
NEISIDI	D-2 to D-1							
	D-3 to D-2							
ROS	D-2 to D-1						Country	

Source: http://www.aemo.com.au INT 659

Country = Country Energy | AETV = Aurora Energy Tamar Valley | Country = Country Energy | TRU = TRUenergy Pty Ltd |

Lumo= Lumo Energy Australia Pty Ltd I

EGP=Eastern Gas Pipeline, MSP=Moomba to Sydney Pipeline, ROS=Rosalind Park Production facility, NETSYD1=Sydney Hub

Figure S15: Inter-day resubmission of offers at Adelaide Hub

Pipeline	Schedule	Sun	Mon	Tue	Wed	Thu	Fri	Sat
MAR	D-3 to D-2	AGL(SA) Origin TRU	AGL(SA) Origin TRU	AGL(SA) Origin TRU	AGL(SA) Origin TRU	AGL(SA) Origin TRU	ABC AGL(SA) Origin TRU	AGL(SA) Origin TRU
MAP	D-2 to D-1	ABC AGL(SA) Origin TRU	ABC AGL(SA) Origin	ABC AGL(SA) Origin TRU	ABC AGL(SA) Origin	ABC AGL(SA) Origin	ABC AGL(SA) Origin	ABC AGL(SA) Origin
SEA-GAS	D-3 to D-2	Origin TRU	Origin TRU	TRU	Origin Simply TRU	Origin TRU	Origin Simply TRU	Origin Simply TRU
SEA-GAS	D-2 to D-1	Origin TRU	TRU	Origin Simply TRU	Origin TRU	Origin Simply TRU	Origin Simply TRU	Origin Simply TRU

Source: http://www.aemo.com.au INT 659

ABC= Adelaide Brighton Cement Ltd I AGL(WGSA)= AGL Wholesale Gas (SA) Pty Ltd I Origin=Origin Energy Retail Ltd I Simply= Simply Energy I TRU= TRUenergy Pty Ltd I AGL(SA)= AGL South Australia Pty Limited I MAP=Moomba to Adelaide Pipeline, SEAGAS=SEA gas pipeline

Figure S16: Inter-day resubmission of bids at Adelaide Hub

Pipeline	Schedule	Sun	Mon	Tue	Wed	Thu	Fri	Sat
MAD	D-3 to D-2							
MAP	D-2 to D-1			TRU				
NETADI 4	D-3 to D-2							
NETADL1	D-2 to D-1							
SEA-GAS	D-3 to D-2							
SEA-GAS	D-2 to D-1							

Source: <a href="http://www.aemo.com.au">http://www.aemo.com.au</a> INT 659

Simply= Simply Energy I TRU= TRUenergy Pty Ltd I

#### **Market Operator Service**

The Market Operator Service (MOS) is a daily mechanism for allocating balancing gas provided by pipelines to maintain pressures at receipt points. This balancing gas is the difference between what was scheduled by a pipeline operator (the pipeline schedule) and the actual quantities of gas that flowed on a pipeline on the day.

MOS offers are made by participants who have contracts with pipeline facilities to "park" gas (on the pipeline) or "loan" gas (from the pipeline). Based on these contracts, two types of MOS are offered: increase offers to increase flows on a pipeline to a hub; and decrease offers to decrease flows on a pipeline to a hub. Where a pipeline deviation occurs on a gas day and there is a requirement for MOS from a MOS provider (either an increase or decrease offer), the MOS provider is paid according to their MOS offer price (the MOS service payment).

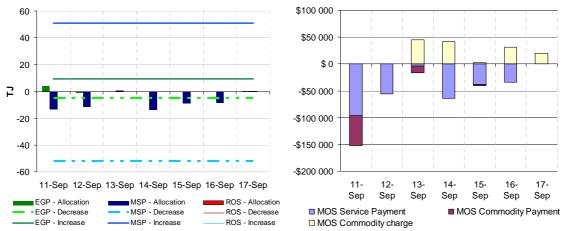
In addition, where this MOS service is required, AEMO pays or charges the MOS provider for the MOS gas allocation on the gas day at the ex ante market price two days after the gas day, which covers the cost of restoring its inventory of MOS gas (the MOS commodity payment or charge). The MOS provider can then choose to submit bids or offers for the gas it needs to replace or run down its MOS gas allocation on the gas day.

Figure S17a and S18a show quantities of MOS allocated on a daily basis compared to total MOS increase and decrease offers (from potential providers) on each pipeline at each hub. MOS allocations are shown by the columns in these figures; whereas total MOS increase and decrease

offers on each pipeline are shown by horizontal lines (as indicated in the legend). Figures S17b and S18b show MOS service payments and MOS commodity payments or charges. Payments fall below the horizontal axis and charges are displayed above the axis.

Figure S17a: Sydney MOS allocations

Figure S17b: Sydney MOS payments/charges

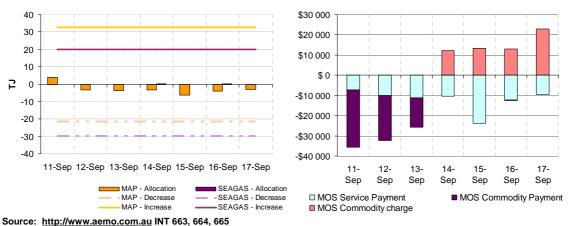


Source: http://www.aemo.com.au INT 663, 664, 665

EGP=Eastern Gas Pipeline, MSP=Moomba to Sydney Pipeline, ROS=Rosalind Park Production facility

Figure S18a: Adelaide MOS allocations

Figure S18b: Adelaide MOS payments/charges

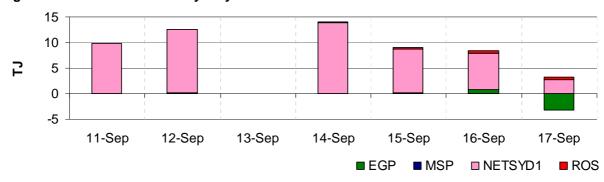


MAP=Moomba to Adelaide Pipeline, SEAGAS=SEA gas pipeline

#### **Deviations**

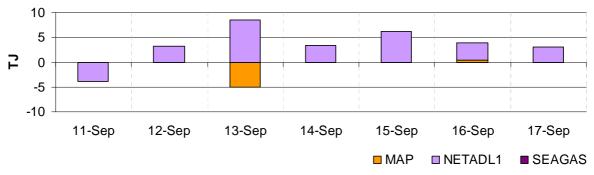
Deviations occur when the gas flowed on pipelines into hubs on a gas day differ from the modified market schedule, or when gas taken out of the hub is different to the schedule. The most likely reason for deviations is where participants incorrectly forecast the demand of customers within the hub. As discussed previously, figures S5 and S6 show allocated quantities versus scheduled. Where they differ, there is a deviation. Net deviations may lead to requirements for MOS services. Figures S19 and S20 show net deviations at the STTM hubs.

Figure S19: Net Deviations - Sydney Hub



Source: http://www.aemo.com.au INT652

Figure S20: Net Deviations – Adelaide Hub



Source: http://www.aemo.com.au INT652

#### **Market Schedule Variations**

When a shipper deviates from the ex ante schedule, it can submit a "market schedule variation" (MSV) to AEMO. The variation must be matched by an opposite variation from either another shipper or a user. Market schedule variations allow shippers to adjust their schedules in line with their pipeline allocations and so avoid deviation charges. A variation can include flows from the hub, which must also be matched with variation of flows to the hub.

Variations that cause a change in withdrawals at the hub attract a variation charge (but no deviation charge), which is designed to encourage more accurate day-ahead forecasting. The variation charge has a sliding scale such that the bigger the variation, the bigger the charge. However, variations that do not change the demand at the hub are exempt. Figures S21 and S22 show MSV quantities and charges at the STTM Hubs.

Figure S21: Average Daily Market Variations - Sydney Hub

	11 – 17 September	4 – 10 September	2011-12 Financial YTD*
Quantity (TJ)	6.07	5.90	5.38
Charges (\$)	138.18	95.55	157.74

\*Financial Year to date figure from 1 July 2011 to the current week (inclusive) Source: <a href="http://www.aemo.com.au">http://www.aemo.com.au</a> INT 651, 657

Figure S22: Average Daily Market Variations - Adelaide Hub

	11 – 17 September	4 – 10 September	2011-12 Financial YTD*
Quantity (TJ)	2.13	0.84	1.24
Charges (\$)	165.18	3.21	51.25

\*Financial Year to date figure from 1 July 2011 to the current week (inclusive)

Source: http://www.aemo.com.au INT 651, 657

# **APPENDIX**

Figures A1 and A2 display the daily gas flows from each pipeline and production/storage facility in the National Gas Market over the current week. The nameplate capacity or MDQ (Maximum Daily Quantity) for each facility are also provided, along with the proportion of MDQ used on average over the current week and the year to date at each facility. Flow data not provided by bulletin board polling time is indicated by N/A.

Figure A1: Daily flows (TJ) for pipeline facilities

Demand zone and pipeline facility	Sun	Mon	Tue	Wed	Thu	Fri	Sat	MDQ (TJ)	YTD average capacity usage (%)	Current week average daily flows	Current YTD average daily flows*	Previous YTD average daily flows**
QLD												
Carpentaria Pipeline	106	104	103	101	102	105	105	119	86	104	102	93
QLD Gas Pipeline	127	126	125	122	116	123	124	142	86	123	123	102
Roma to Brisbane Pipeline	154	183	179	188	184	170	158	219	79	174	172	188
South West QLD Pipeline	91	86	69	84	87	79	80	181	73	82	132	131
NSW/ACT												
Eastern Gas Pipeline	168	189	184	173	185	173	156	268	83	175	223	226
Moomba to Sydney Pipeline	170	210	205	175	158	136	109	439	48	166	209	265
NSW-VIC Interconnect	0	0	27	25	22	10	12	90	23	13	20	6
VIC												
Longford to Melbourne	684	758	601	619	648	537	377	1030	62	603	639	740
South West Pipeline^	111	123	73	92	101	30	63	353	53	85	189	164
SA												
Moomba to Adelaide Pipeline	112	153	128	139	127	129	110	253	53	128	135	141
SEA Gas Pipeline	148	209	139	176	150	136	86	314	54	149	171	182
TAS												
Tasmanian Gas Pipeline	48	54	54	50	50	49	42	129	38	50	49	49

<sup>\*</sup>Average daily estimated gas consumption measured from 1 July 2011 to the current week (inclusive)

Source: Natural Gas Market Bulletin Board <a href="http://www.gasbb.com.au">http://www.gasbb.com.au</a>

Notes: Operational ranges for each pipeline facility range from a minimum of 20 per cent to a maximum of 120 per cent of the respective MDQs. The exceptions are the South West Queensland Pipeline and the NSW-VIC Interconnect which have operational ranges 40 per cent to 120 per cent and 0 to 120 per cent of MDQ respectively.

<sup>\*\*</sup>Average daily estimated gas consumption measured from 1 July 2010 to the equivalent week in 2010-11 (inclusive)

Figure A2: Daily flows (TJ) for production / storage facilities compared to operational ranges and use of production/storage capacity

Production zone and production / storage facility	Sun	Mon	Tue	Wed	Thu	Fri	Sat	MDQ (TJ)	YTD average capacity usage* (%)	Current week average daily flows	Current YTD average daily flows*	Previous YTD average daily flows**
Roma (QLD)												
Berwyndale South	97	97	97	97	96	94	95	140	67	96	93	99
Fairview	81	81	80	80	94	94	94	130	80	86	104	123
Kenya Gas Plant	94	94	95	92	85	85	90	160	49	91	79	62
Kincora	10	7	10	10	10	8	7	25	41	9	10	4
Kogan North	7	7	7	9	7	7	7	12	57	7	7	10
Peat	8	8	8	8	8	7	7	15	52	8	8	10
Rolleston	10	11	11	11	11	11	11	30	32	11	10	11
Scotia	30	30	30	30	30	27	30	29	92	29	27	28
Spring Gully	45	43	41	41	42	42	44	69	64	43	44	54
Strathblane	45	43	41	41	42	42	44	69	64	43	44	54
Taloona	27	26	25	24	25	26	26	42	63	26	27	33
Yellowbank	9	9	9	9	9	9	9	30	32	9	10	13
Talinga	92	95	103	107	84	81	81	120	81	92	97	54
Moomba (SA/QLD) Moomba Gas Plant Ballera	311 25	282	272 49	267 35	268 27	226 37	161 27	430 150	64	255 34	274 14	347
ballera	25	30	49	33	21	31	21	150	9	34	14	13
Eastern (VIC)												
Orbost Gas Plant	69	69	69	69	69	69	68	100	68	68	68	0
Lang Lang Gas Plant	52	53	54	54	53	54	54	70	66	53	46	50
Longford Gas Plant	791	888	720	741	742	597	453	1145	70	705	807	980
LNG Storage Dandenong	0	0	0	0	0	0	0	158	0	0	0	0
Otway Basin (VIC)												
Minerva Gas Plant	45	45	45	40	35	35	35	73	87	40	64	80
Otway Gas Plant	155	154	154	175	179	73	81	205	77	139	157	143
Iona Underground Gas Storage	84	142	101	74	75	56	36	440	33	81	147	124
*Avorago daily ostim												

Notes: Operational ranges for each production and storage facility range from minimum of 0 per cent to a maximum of 120 per cent of the respective MDQs. The exception is the Longford Gas Plant which has a minimum operational range of 20 per cent to 120 per cent of its MDQ.

<sup>\*</sup>Average daily estimated gas consumption measured from 1 July 2011 to the current week (inclusive)

\*\*Average daily estimated gas consumption measured from 1 July 2010 to the equivalent week in 2010-11 (inclusive)

Source: Natural Gas Market Bulletin Board http://www.gasbb.com.au

Figure A3 provides the average minimum and maximum temperatures for each of the demand regions for the current week. The average temperatures for the previous week are also provided. (Note: only the demand regions where temperature is a driver of gas demand are included).

Figure A3: Average daily temperatures (°C) at each demand region

Average daily temperatures (°C)		QLD (Brisbane)	NSW (Sydney)	ACT (Canberra)	VIC (Melbourne)	SA (Adelaide)	TAS (Hobart)
11 – 17 September	Average min.	9.8	11.3	-1.1	9.1	8.4	7.5
	Average max.	25.9	22.2	18.5	19.1	21.6	16.4
4 – 10 September	Average min.	12.8	11.9	0.6	9.1	8.8	6.9
	Average max.	22.9	19.9	16.7	17.8	17.0	15.3

Source: http://www.bom.gov.au/climate/dwo

Figure A4 shows the market prices at each of the scheduling intervals on each day during the current week. The imbalance weighted average prices for each gas day are also provided.

Figure A4: Daily Victorian gas market prices (\$/GJ) at each scheduling interval

11 – 17 September		Scheduling Interval										
	6am	10am	2pm	6pm	10pm	Weighted Average Price						
Sun	3.06	2.86	2.86	1.62	3.23	3.03						
Mon	3.01	2.23	2.98	3.30	3.16	3.01						
Tue	3.01	2.86	2.60	2.31	3.00	3.00						
Wed	3.01	2.50	2.33	2.31	2.96	2.98						
Thu	3.01	3.50	2.87	2.39	3.39	3.02						
Fri	3.00	3.30	3.00	2.22	1.77	2.98						
Sat	3.00	3.38	3.00	2.50	1.07	2.95						

Source: http://www.aemo.com.au (INT 041).

Figure A5 compares the market participants and market operator demand forecasts and each of the scheduling intervals on each gas day during the current week. Total actual demand for each gas day is also provided, along with the total demand override (if any) from AEMO.

Figure A5: Daily demand forecasts (TJ) and daily demand overrides (TJ)

Gas Day	Demand Forecasts	Schedule					Total
	(TJ)	1	2	3	4	5	Demand Override (TJ)
11-Sep	MP:	817	832	823	823	824	-7
	AEMO:	796	780	775	755	803	
	MP as % of AEMO	103	107	106	109	103	
12-Sep	MP:	886	871	873	889	888	. 0
	AEMO:	848	854	875	872	872	
	MP as % of AEMO	104	102	100	102	102	
13-Sep	MP:	713	676	675	678	679	0
	AEMO:	710	671	665	656	661	
	MP as % of AEMO	100	101	101	103	103	
14-Sep	MP:	730	713	708	707	707	0
	AEMO:	707	707	683	668	686	
	MP as % of AEMO	103	101	104	106	103	
15-Sep	MP:	730	736	729	732	729	-2
	AEMO:	681	690	668	711	720	_
	MP as % of AEMO	107	107	109	103	101	
16-Sep	MP:	586	591	587	583	584	0
	AEMO:	647	615	611	617	570	]
	MP as % of AEMO	91	96	96	94	102	
17-Sep	MP:	406	422	421	418	420	-15
	AEMO:	421	433	449	435	401	
	MP as % of AEMO	96	97	94	96	105	

Source: http://www.aemo.com.au (INT 108, INT 126, INT 153)