WEEKLY GAS MARKET ANALYSIS

29 May – 4 June 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.

AUSTRALIAN ENERGY

REGULATOR

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 require 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 <u>aerinquiry@aer.gov.au</u>, 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.

29 May – 4 June	Victorian market*	STTM Sydney hub**	STTM Adelaide hub**			
Average Price	3.82	3.70	3.89			

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

*weighted average daily imbalance price

**ex ante market price

STTM Gas Markets (Adelaide and Sydney)

Figures S3 and S4 show average ex ante and average ex post prices were higher at both hubs this week than the previous week.

Adelaide STTM hub—Deviations and MOS

Figure S8 shows that, similar to the previous week in Adelaide over deliveries on the MAP coincided with under deliveries on the SEA Gas pipeline and vice versa. The largest on-the-gas-

day deviations into the Adelaide hub this week occurred on the 31 May gas day. Figure 2 examines circumstances on the day.

Gas Date	On-the-gas-day deviations (TJ)*	MOS required (TJ)	Deviations after MSVs (TJ)*
31-May	15.0 on MAP	4.5 MOS increase on MAP	-3.3 at Adelaide Hub
	-16.8 on SEAGas	1.2 MOS decrease on SEAGas	
	-1.5 at Adelaide Hub		

Figure 2: Adelaide hub deviations & MOS allocated

*Note:

1. Positive values represent over-deliveries on pipelines or under-consumption at the hub (compared to scheduled amounts).

2. Negative values represent under-deliveries on pipelines or over-consumption)at the hub (compared to scheduled amounts).

Source: http://www.aemo.com.au INT 652, 701, 703

On the day, there were small on-the-gas day deviations in the Adelaide hub (-1.8 TJ) but significant counter-acting deviations (under/over deliveries) on the MAP (15.0 TJ) and SEAGas (16.5 TJ) pipelines. These pipeline deviations may have contributed to the counter-acting MOS services being provided, with gas being parked on SEAGas (1.2 TJ of MOS decrease service) and loaned from the MAP (4.5 TJ of MOS increase service). The AER is currently making enquiries into the extent to which opposing on-the-gas-day pipeline deviations, which are becoming more frequent in the market, are affecting the requirement for MOS services.

On the day, MOS service payments amounted to approximately \$20 000 (see figure S18). This amount is paid to MOS providers by trading participants relative to their proportion of deviations after Market Schedule Variations (MSV). To reduce these deviations used for funding MOS, trading participants entered into MSVs to swap over-deliveries and under-deliveries on the SEAGas and MAP. This reduced deviations to zero on the STTM pipelines and meant that MOS payments were funded by reference to deviations in the Adelaide hub (-3.3 TJ at Adelaide hub) solely.

MOS Stacks — 1 June to 31 August 2011

On 13 May 2011, AEMO published the estimated maximum quantity of MOS for each pipeline for the 3-month period June to August 2011. Figures 3 and 4 compare MOS offers and requirements for both hubs for the current period (1 March to 31 May) to the next period (1 June to 31 August).



Figure 3: MOS Offers & AEMO MOS estimate – current period (1 March to 31 May)

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MOS Offers & AEMO MOS estimate – next period (1 June to 31 August) Figure 4:

Figures 3 and 4 show that the volume of MOS increase and decrease offers for the Sydney hub on the pressure-controlled Moomba to Sydney pipeline (MSP) continue to be higher than on the flow-controlled Eastern Gas Pipeline (EGP). Similarly, for the Adelaide hub, offers on the pressure-controlled Moomba to Adelaide pipeline (MAP) continue to be higher than on the flowcontrolled SEA Gas pipeline.

As shown in figures 3 and 4, with the exception of the EGP, this quarter's volume of increase and decrease MOS offers are higher on all pipelines than the previous quarter. This may be due to the likelihood of higher gas demand and volatility associated with the winter months.

MOS increase and MOS decrease offers for the next period on pipelines at both hubs appear to be adequate to meet AEMO's estimated maximum daily quantity.

Victorian Gas Market

Lower minimum temperatures this week (see Appendix A3), saw higher demand than the previous week (as shown in figure N4), which was met by higher injections into the Declared Transmission System (see figure V3) and resulted in a higher average price than the previous week (\$3.82/GJ compared to \$3.61/GJ, as shown in figure V2).

AEMO issued demand overrides of -2 TJ and -28 TJ on Sunday 29 May and Saturday 4 June respectively. This was in response to market participants' forecasts being higher than AEMO forecasts throughout those gas days (see Appendix A5). On Thursday 2 June, a planned shutdown of the Wollert compressor station from 7 am to 2 pm affected some export capacity to NSW through the NSW-Victoria Interconnect.¹

Monthly statistics

Figures A6 to A8 contain information on unaccounted for gas (UaFG), cumulative prices and total customer transfers. This information was previously published by AEMO in its monthly Victorian Gas Market Reports.

National Gas Market Bulletin Board

Figure N4 shows this week's overall average gas demand and production was higher than the previous week. Higher demand in Tasmania, South Australia and NSW/ACT was partially due to increased demand for gas-powered generation.

Source: http://www.aemo.com.au INT 665

¹ As advised by an AEMO System Wide Notice on Tuesday 31 May 2011.

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
29 May – 4 June	437	36	844	340	52	171	98	119
Financial Year-to-date 2010-11*	378	21	596	285	45	165	94	108
Financial Year-to-date 2009-10**	368	20	557	284	38	168	86	71

*Average daily estimated gas consumption measured from 1 July 2010 to the current week (inclusive)

**Average daily estimated gas consumption measured from 1 July 2009 to the equivalent week in 2009-10 (inclusive) Source: National Gas Market Bulletin Board <u>http://www.gasbb.com.au</u>

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
29 May – 4 June	84	20	219	36	117
Financial Year-to-date 2010-11*	86	24	168	30	148
Financial Year-to-date 2009-10**	85	38	168	23	162

[^]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'

*Average daily estimated gas consumption measured from 1 July 2010 to the current week (inclusive)

**Average daily estimated gas consumption measured from 1 July 2009 to the equivalent week in 2009-10 (inclusive)

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

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)
29 May – 4 June	571	952	409	299
Financial Year-to-date 2010-11*	534	763	271	268
Financial Year-to-date 2009-10**	465	667	282	277

*Average daily estimated gas consumption measured from 1 July 2010 to the current week (inclusive)

**Average daily estimated gas consumption measured from 1 July 2009 to the equivalent week in 2009-10 (inclusive) Source: National Gas Market Bulletin Board http://www.gasbb.com.au



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.

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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

Notes: Negative flows on the NSW-Victoria Interconnect represent flows out of NSW into VIC.





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



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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.

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

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

^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)

	29 May – 4 June	22 May – 28 May	20 Finar	010-11 ncial YTD*	2009-10 Financial YTD**		
Average daily price	3.82	3.61		2.35	1.77		
29 May – 4 June	Sun M	on Tue	Wed	Thu	Fri	Sat	
Daily price	3.18 4.	05 4.07	4.07	3.80	3.80	3.80	

*Average daily imbalance weighted average price from 1 July 2010 to the current week (inclusive)

**Average daily imbalance weighted average price from 1 July 2009 to the equivalent week in 2009-10 (inclusive)

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

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.

Injection Point:	29 May – 4 June	22 May – 28 May	2010-11 Financial YTD*	2009-10 Financial YTD**
Culcairn	0	0	1	14
Longford	559	554	419	368
LNG	10	9	9	8
IONA	113	78	69	82
VicHub	49	63	32	18
SEAGas	2	11	19	42
Bass Gas	55	52	48	33
Otway	0	0	0	7
Mortlake	65	46	24	
TOTAL	852	813	621	572

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



*Average daily estimated gas consumption measured from 1 July 2010 to the current week (inclusive) **Average daily estimated gas consumption measured from 1 July 2009 to the equivalent week in 2009-10 (inclusive) Source: <u>http://www.aemo.com.au</u> (INT 150)

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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.



Figure V4: Price structure of bids by injection points

Source: <u>http://www.aemo.com.au</u> (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.

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

Figure V5: Intra-day rebidding of gas injections

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 I CE = Country Energy | Lumo = Lumo Energy (formerly Victoria Electricity) | AGL (QLD) = AGL Sales (Queensland) | Red = Red Energy | Ausgrid = Ausgrid |

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.

System withdrawal zone:	29 May – 4 June	22 May – 28 May	2010-11 Financial YTD*	2009-10 Financial YTD**
Ballarat	37	36	24	22
Geelong^	109	103	90	80
Gippsland	53	50	43	44
Melbourne	560	524	394	373
Northern	100	97	66	55
TOTAL	859	810	618	573

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

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

*Average daily estimated gas consumption measured from 1 July 2010 to the current week (inclusive) **Average daily estimated gas consumption measured from 1 July 2009 to the equivalent week in 2009-10 (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	 Wholesale market operator, Retail market operator, Transmission pipeline system operator 	Wholesale market operator,Retail market operator
Scheduling	 On the day scheduling comprising five pricing and operating schedules at set times. Ad hoc schedules if required. Day ahead and 2-Day ahead schedules (forecast data only). 	 Day ahead market schedules Shippers may vary from their market schedules when they nominate to pipeline operators 2-Day ahead and 3-Day ahead schedules (forecast data only).
Market Price	 Five ex ante prices for imbalances set on the day Ex ante prices in subsequent schedules after the 6am schedule apply to deviations Market price is for commodity only. Transportation is charged separately by pipeline owner 	 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.

Trading Participant	Participant type	No. of		Offers	;	Bids			
		supply offers / withdrawal bid points	ЕGР	MSP	SOA	EGP	dSM	SOA	SYD - NET
AETV Power	Shipper	1				NS			
AGL Energy Sales & Marketing Limited	STTM User, Shipper	4	S	S	s				S
AGL Wholesale Gas Limited	Shipper	2	S	NS					
Ausgrid	STTM User, 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	2	S						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	S		
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		S			
Tyco Water	STTM User								

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

^Offers and bids taken from the (D-1) ex ante schedule

^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

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

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

Trading Participant	Participant type	No. of	Off	ers		Bids	
		offers / withdrawal bid points	AAM	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	NS		
TRUenergy Pty Ltd	STTM User, Shipper	2	NS	S			

^ Offers and bids taken from the (D-1) ex ante schedule

M 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.

	29 May – 4 June	22 May – 28 May	2010-11 Financial YTD*
Ex ante price	3.70	3.54	2.78
Ex post price	3.79	3.58	5.42

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

*Financial Year to date figures exclude market trial data (year-to-date from 1 September 2010) Source: <u>http://www.aemo.com.au</u> INT 651, 657



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

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

			29 May – 4	June	22 May -	- 28 May	2010-11	Financial YTD*
Ex ant	e price		3.89		3.	74		3.10
Ex pos	st price		3.76		3.	70		3.23
* Financia	al Year to d	ate figures ex	clude market tria	l data (year-	to-date from 1	September 2010))	
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		29-May	30-May	31-May	01-Jun	02-Jun	03-Jun	04-Jun
				Ex ante pri	ice		t price	

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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.



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

 Firm
 As available
 From the Hub
 Backhaul
 Pipeline Allocation
 Network Allocation

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



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

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

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.

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



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

Source: http://www.aemo.com.au INT 652, 659 EGP=Eastern Gas Pipeline, MSP=Moomba to Sydney Pipeline, ROS=Rosalind Park Production facility





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

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)



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 re-offers 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
FGP	D-3 to D-2	BluSc EA OneStl(NSW) SANTOS TRU		EA SANTOS TRU	EA SANTOS TRU	APG EA TRU	EA OneStl(NSW) TRU	EA TRU
	D-2 to D-1	EA	EA SANTOS TRU	BluSc EA OneStl(NSW)	APG BluSc Delta EA TRU	BluSc EA OneStl(NSW) SANTOS TRU	BluSc EA SANTOS TRU	EA SANTOS TRU
MSP	D-3 to D-2	AGL(ESM) EA Origin TRU	AGL(ESM)	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU	AGL(ESM) Origin TRU
	D-2 to D-1	AGL(ESM) EA TRU	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU	AGL(ESM) EA Origin TRU
ROS	D-3 to D-2				AGL(ESM)			
	D-2 to D-1			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 OneStI(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= Australiian 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
	D-3 to D-2		AETV Lumo		Lumo	Lumo		Lumo
EGP	D-2 to D-1	AETV Lumo TRU	TRU	Lumo TRU	Lumo TRU	TRU	Lumo TRU	Lumo TRU
MSP	D-3 to D-2	Lumo	Lumo		Country Lumo	Lumo	Lumo	Lumo
	D-2 to D-1	Lumo		Country Lumo	Country Lumo	Country Lumo	Country Lumo	Country Lumo
NETSYD1	D-3 to D-2							
	D-2 to D-1							
POS	D-3 to D-2							
NU3	D-2 to D-1							Lumo

Source: http://www.aemo.com.au INT 659 Country= Country Energy | AETV = Aurora Energy Tamar Valley I Country= Country Energy I TRU= TRUenergy Pty Ltd I 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
ΜΔΡ	D-3 to D-2	AGL(SA) Origin	ABC AGL(SA)	AGL(SA) Origin	AGL(SA) Origin TRU	AGL(SA) Origin TRU	AGL(SA) Origin Simply TRU	AGL(SA) Origin TRU
WAF	D-2 to D-1	ABC AGL(SA)	ABC AGL(SA) Origin	ABC AGL(SA) Origin	ABC AGL(SA) Origin	AGL(SA) Origin Simply	AGL(SA) Origin	AGL(SA) Origin
SEA-GAS	D-3 to D-2	Origin Simply TRU	Simply	Origin TRU	Simply TRU	TRU	Origin Simply TRU	Origin TRU
JEA-GAS	D-2 to D-1	Simply TRU	Origin TRU	Simply TRU	TRU	Origin Simply TRU	Origin 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
мар	D-3 to D-2					Simply		
	D-2 to D-1				Simply			Simply
	D-3 to D-2							
NETADLI	D-2 to D-1							
SEA CAS	D-3 to D-2							
SEA-GAS	D-2 to D-1							

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

Simply= Simply Energy

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 deviation² 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

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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



Source: <u>http://www.aemo.com.au</u> INT 663, 664, 665 EGP=Eastern Gas Pipeline, MSP=Moomba to Sydney Pipeline, ROS=Rosalind Park Production facility

2-Jun

3-Jun

SEAGAS - Allocation

SEAGAS - Decrease

SEAGAS - Increase

4-Jun



Figure S18b: Adelaide MOS payments/charges





29-May 30-May 31-May 1-Jun

MAP - Allocation

MAP - Decrease

MAP - Increase

Deviations

50

40

30

20 10

-10

-20 -30

-40

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

	29 May – 4 June	22 May – 28 May	2010-11 Financial YTD*
Quantity (TJ)	3.13	5.98	4.16
Charges (\$)	81.29	217.33	586.31

* **Financial** Year to date figures exclude market trial data (year-to-date from 1 September 2010) Source: <u>http://www.aemo.com.au</u> INT663

Figure S22: Average Daily Market Variations - Adelaide Hub

	29 May – 4 June	22 May – 28 May	2010-11 Financial YTD*
Quantity (TJ)	4.40	3.18	1.07
Charges (\$)	295.37	244.46	48.79

* Financial Year to date figures exclude market trial data (year-to-date from 1 September 2010) Source: <u>http://www.aemo.com.au</u> INT663

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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.

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	100	99	96	95	98	98	98	119	79	98	94	86
QLD Gas Pipeline	117	123	N/A	121	N/A	116	N/A	142	76	119	108	71
Roma to Brisbane Pipeline	142	158	176	184	184	183	171	219	76	171	165	168
South West QLD Pipeline	176	175	165	157	168	165	166	181	82	167	149	137
NSW/ACT												
Eastern Gas Pipeline	220	246	N/A	N/A	N/A	N/A	N/A	268	79	233	212	202
Moomba to Sydney Pipeline	218	274	229	239	228	287	208	439	43	240	187	186
NSW-VIC Interconnect	34	37	37	19	25	43	22	90	19	31	17	-5
VIC												
Longford to Melbourne	581	776	774	719	574	638	544	1030	48	658	494	419
South West Pipeline^	188	197	223	185	174	149	186	353	29	186	102	124
SA												
Moomba to Adelaide Pipeline	110	148	165	134	123	127	115	253	50	132	127	131
SEA Gas Pipeline	185	251	248	226	179	198	172	314	50	208	158	153
TAS												
Tasmanian Gas Pipeline	56	57	53	51	N/A	47	50	129	35	52	45	38

Figure A1: Daily flows (TJ) for pipeline facilities

*Average daily estimated gas consumption measured from 1 July 2010 to the current week (inclusive)

**Average daily estimated gas consumption measured from 1 July 2009 to the equivalent week in 2009-10 (inclusive)

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

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.

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	90	89	89	91	92	91	87	140	67	90	93	92
Fairview	119	126	128	128	128	133	128	130	88	127	115	112
Kenya Gas Plant	52	52	52	53	56	62	64	160	33	56	53	56
Kincora	14	13	15	15	15	15	15	25	28	15	7	2
Kogan North	7	7	7	7	7	8	7	12	77	7	9	9
Peat	6	6	8	9	8	8	7	15	61	7	9	9
Rolleston	11	11	8	10	9	6	9	30	34	9	10	11
Scotia	25	22	22	29	29	29	29	29	93	27	27	23
Spring Gully	47	47	48	48	47	47	48	69	70	47	48	43
Strathblane	47	47	48	48	47	47	48	69	70	47	48	43
Taloona	29	29	29	29	28	28	29	42	69	29	29	26
Yellowbank	11	10	11	10	10	11	10	30	38	10	11	12
Talinga	100	99	100	102	101	101	91	108	62	99	67	16
Moomba (SA/QLD) Moomba Gas Plant	284	309	317	310	309	295	270	430	60	299	258	266
Ballera	0	0	0	0	0	0	0	150	7	0	11	12
Eastern (VIC)												
Orbost Gas Plant	85	85	85	81	83	85	85	100	36	84	36	18
Lang Lang Gas	56	55	54	55	55	54	55	70	68	55	48	33
Longford Gas Plant	757	930	967	903	721	762	653	1145	59	813	680	616
LNG Storage Dandenong	0	0	0	0	0	0	0	158	0	0	0	0
Otway Basin (VIC)												
Minerva Gas Plant	71	71	71	81	81	81	81	84	74	76	62	70
Otway Gas Plant	191	191	160	192	191	193	190	205	59	187	121	125
lona Underground Gas Storage	152	174	218	153	112	85	128	440	20	146	87	87

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

*Average daily estimated gas consumption measured from 1 July 2010 to the current week (inclusive) **Average daily estimated gas consumption measured from 1 July 2009 to the equivalent week in 2009-10 (inclusive)

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

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.

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).

Average daily temperatures (°C)		QLD (Brisbane)	NSW (Sydney)	ACT (Canberra)	VIC (Melbourne)	SA (Adelaide)	TAS (Hobart)
29 May – 4 June	Average min.	12.4	12.4	3.8	8.1	8.0	4.4
	Average max.	22.5	19.2	16.0	16.9	17.4	14.7
22 May – 28 May	Average min.	12.8	11.1	2.1	11.0	10.1	7.0
	Average max.	22.6	19.0	15.3	16.2	15.1	15.4

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

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.

29 May – 4 June	Scheduling Interval					Daily Imbalance Weighted Average
	6am	10am	2pm	6pm	10pm	Price
Sun	3.17	3.17	3.79	3.52	3.49	3.18
Mon	4.05	4.33	3.76	3.76	4.33	4.05
Tue	4.06	4.31	4.48	3.54	4.50	4.07
Wed	4.04	4.46	4.24	3.90	4.27	4.07
Thu	3.80	4.00	3.80	3.50	3.91	3.80
Fri	3.80	3.80	4.00	3.85	3.99	3.80
Sat	3.87	3.01	3.40	1.10	4.80	3.80

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

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.

Gas Day	Demand Forecasts (TJ)		Total				
		1	2	3	4	5	Demand Override (TJ)
29-May	MP:	771	756	766	765	764	-2
	AEMO:	757	718	759	762	749	
	MP as % of AEMO	102	105	101	100	102	
30-May	MP:	946	950	944	942	942	0
	AEMO:	934	912	905	913	913	
	MP as % of AEMO	101	104	104	103	103	
31-May	MP:	926	933	939	942	942	0
	AEMO:	914	942	957	966	962	
	MP as % of AEMO	101	99	98	97	98	
1-Jun	MP:	777	816	816	817	818	0
	AEMO:	847	850	852	853	861	
	MP as % of AEMO	92	96	96	96	95	
2-Jun	MP:	714	719	720	718	718	0
	AEMO:	710	717	698	706	710	
	MP as % of AEMO	101	100	103	102	101	
3-Jun	MP:	730	733	732	730	730	0
	AEMO:	688	715	707	733	728	
	MP as % of AEMO	106	103	103	100	100	
4-Jun	MP:	780	717	732	730	723	-28
	AEMO:	733	696	695	677	672	
	MP as % of AEMO	106	103	105	108	108	

Figure A5:	Daily demand	forecasts ((TJ) and	dailv demand	overrides	(TJ)
. igaio / io:	Bany aomana	101000000		aany aomana	010111400	(

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

Figures A6 to A8 present information that was previously published by AEMO in its monthly Victorian Gas Market Reports.

Figure A6 shows "unaccounted for gas" as a percentage of the gas used on a 28-day rolling average basis. A positive "unaccounted for gas" indicates more gas purchased than sold, and negative indicates more gas is purchased from a supplier than sold to customers. The difference may be caused by measurement errors, leakages, pressure regulation, construction activities, theft or damage to the pipeline system. The increased quantity over November 2009 was related to pigging substitutions.

Figure A6: Unaccounted for Gas – 28 Day Rolling Average



Source: http://www.aemo.com.au (INT 312)

Figure A7 shows the cumulative weekly price and the cumulative price threshold (CPT), which is set at \$3700. The cumulative price is measured over a rolling weekly period, (35 scheduling intervals). When the cumulative price breaches the CPT, an administered price cap (APC) is applied to the market at \$40/GJ. AEMO may declare the end of an administered price period subsequent to the cumulative price falling below the threshold.



Figure A7: Cumulative Price and Threshold

Figure A8 shows the monthly (and current month to date) retail customer transfers lodged, completed or cancelled in the Victorian gas market.



Figure A8: Customer Transfers

Source: http://www.aemo.com.au (INT 311)