

Standing Council on Energy and Resources Officials

# **Regulation Impact Statement**

## **Gas Transmission Pipeline Capacity Trading**

### **Consultation Paper**

**15 May 2013**

### *Disclaimer*

This Regulation Impact Statement (RIS) is for consultation only and should not be read as a settled or final view of officials, participating jurisdictions, the Standing Council on Energy and Resources (SCER) or the Council of Australian Governments' (COAG) regarding gas transmission pipeline capacity trading. This RIS has been prepared solely to assist with the determination of an appropriate course of action. Stakeholder consultations are being used to inform the policy decision on the preferred approach. The content of submissions will be considered, and where appropriate, incorporated into the Impact Analysis for the final decision RIS.

## EXECUTIVE SUMMARY

This RIS examines the trade in natural gas transmission pipeline capacity and tests the case for, and options for, possible changes to the way in which unused, but contracted, capacity is traded. Stakeholders are encouraged to make submissions to the Standing Council on Energy and Resources (SCER) Secretariat via SCER's website at [www.scer.gov.au](http://www.scer.gov.au) over a six-week period up to 5 p.m. (AEST) on Monday 15 July 2013.

The regulatory framework governing Australia's gas market is set out in the National Gas Law (NGL) and associated National Gas Rules (NGR). The NGL is underpinned by the National Gas Objective (NGO) which is:

“To promote efficient investment in, and efficient operation and use of, natural gas services for the long-term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.”

Access to unutilised pipeline capacity has been raised by a number of stakeholders as an important issue for improving the efficiency of infrastructure, the operation of trading markets and the continuing evolution of Australia's gas markets.

In the eastern states, tight gas supply conditions are expected to occur from 2015 to 2018 due to slower than expected ramp up of new coal seam gas (CSG) supply, coupled with significant new demand from liquefied natural gas (LNG) producers from 2014. These developments reinforce the need for the continued development of efficient domestic gas markets.

In recognition of these issues, and in the pursuit of improved transparency and efficiency of the market, Standing Council on Energy and Resources (SCER) has agreed that Government efforts be focused on actively pursuing two policy principles:

- 1) ensuring supply can respond flexibly to market conditions; and
- 2) promoting market development.

These principles are being given effect through the implementation of an Australian Gas Market Development Plan, agreed to by SCER on 14 December 2012. This RIS is an element of that Plan.

Another element of the SCER's gas market development is the establishment of the Wallumbilla Gas Supply Hub. The Hub will support bilateral trading of unused pipeline capacity via a bulletin board style, web-based information screen that will allow market participants to advertise a willingness to buy or sell gas transportation services. This work compliments, but is separate to, this RIS process.

Australia's eastern market gas transmission pipelines experience differing levels of congestion. The focus of this paper is on trading opportunities relating to gas transmission pipelines that are said to experience contractual congestion. Contractual congestion occurs when market participants are unable to gain direct access to unused capacity on a pipeline because all of a pipeline's capacity is contracted. Capacity

trading can reallocate this idle capacity and facilitate the delivery of additional gas to the market to make more efficient use of existing infrastructure.

Pipeline capacity utilisation data indicates that there are periods throughout the year when some eastern Australian pipelines have significant volumes of unutilised capacity. The unused capacity on these pipelines is predominantly contracted to either gas retailers or industrial consumers. It is understood that seasonal demand variations largely account for the observed variations in capacity utilisation.

It is understood that although there is limited trade in unused capacity, anecdotal evidence suggests that information failure and/or competition failure and the lack of an effective market for trading unused pipeline capacity is causing inefficient gas market outcomes, slowing moves to improve market liquidity and transparency. This may be contributing to the inefficient utilisation of existing pipeline infrastructure. Efficiently using existing infrastructure can discourage, delay or avoid the construction of new capacity, the cost of which will be passed on to consumers.

It is recognised that market participants are able to enter into contractual arrangements with pipeline owners that could underwrite investment to expand existing pipeline capacity. However, participants with relatively small capacity requirements are unlikely to have adequate demand to warrant pipeline owners investing in capacity expansions to meet relatively low levels of incremental demand growth.

Should it be determined there is a problem with the way in which pipeline capacity is traded, there are policy options that could be employed to facilitate the trade in pipeline capacity. These range from improved market information to comprehensive regulatory approaches. Intervention to improve access to pipeline capacity would have a cost and may disrupt contractual arrangements. Therefore, the net benefits of any intervention would require careful analysis.

For the purpose of seeking feedback and assisting stakeholders to frame their responses, a range of policy options have been identified:

- Option 1: Status quo – no change;
- Option 2: Improved information – provision of additional information and the standardisation of contractual terms and conditions;
- Option 3: Voluntary trading platform – establishment of a capacity trading platform with market participants voluntarily offering up unused capacity for trade; or
- Option 4: Mandatory trading obligation – shippers or pipeliners are compelled to release unutilised capacity via a transparent market mechanism.

There are risks associated with all options. A key risk associated with Options 1, 2 and 3 is that existing market participants will not offer up adequate unutilised capacity to meet the demand for this capacity. For Option 3 and 4, a key risk is there may not be adequate demand to justify trading platform establishment and operation costs. Option 4B may raise sovereign risk issues due to intervening in established contractual agreements.

While pipeline capacity issues have been recently raised in the context of the development of the Wallumbilla Gas Supply Hub, resolving this policy is not a necessary condition of the commencement of the Hub. Indeed, when the Hub is operational and its pipeline capacity Bulletin Board has been established, it will be clearer what the level of demand for and supply of unused pipeline capacity is on pipelines associated with Wallumbilla. It is proposed this information be reviewed to further inform policy in this area one year after the Hub commences operation.

To arrive at a fully informed decision, this RIS contains a number of questions for stakeholders' consideration. In making submissions, stakeholders should focus on providing evidence of the potential impacts of the options under consideration. To inform development of a final policy position as part of developing the decision RIS, stakeholders are also requested to provide details about the advantages and disadvantages, costs and benefits and risks associated with each option presented, preferably supported by quantitative evidence. Stakeholders' submissions will be subject to confidentiality considerations and commercial-in-confidence requests will be honoured. Accordingly, stakeholders should clearly indicate whether a submission should remain confidential, either in whole or in part. Any alternative proposals or variation to the options herein presented by stakeholders should be supported by sufficient evidence concerning the benefits and costs associated with the proposed option.

### **Questions for Stakeholders**

SCO seeks feedback from stakeholders regarding:

1. Are there reasons why fuller pipeline capacity utilisation may be either advantageous or not desirable?
2. In Australia, how easy is it to organise and execute novation and/or bare transfer of pipeline capacity?
3. What is the likely size of the benefits, if any, associated with adopting operational transfer and/or contractual transfer for the trade of secondary pipeline capacity in Australia?
4. What operational/system changes would be necessary to allow operational transfer and/or contractual transfer to be used in Australia and what would the likely costs be to making these changes?
5. Have you engaged in capacity trading in Australia and if so: how regularly do you undertake such transactions; what volumes and types of capacity (i.e. firm or 'as available') have you typically traded; and what pipelines have you traded capacity on?
6. If you have experienced difficulties when undertaking capacity trading what specific barriers have you experienced on what particular pipelines and/or what were the particular circumstances?
7. Are there any improvements that could be made to ease the transfer of pipeline capacity?

8. What factors, including market or regulatory factors (that may include the identified factors above) may be limiting secondary capacity trading in Australia?
9. What types of transportation services would stakeholders be most interested in accessing?
10. Would stakeholders be interested in accessing short-term 'as available' interruptible gas transportation capacity?
11. What duration of capacity trades would stakeholders be most interested in seeking?
12. What pipelines and indicative annual capacity volumes would stakeholders be most interested in accessing?
13. What specific additional volumes of gas would producers be willing to supply into which specific markets?
14. Is there a problem with the way in which unused pipeline capacity is currently being traded in Australia and, if so, what are the key issues that have prevented/made difficult access to unused transportation capacity?
15. What aspects of the current capacity trading arrangements work well?
16. Is adequate market information available so that pipeline capacity can be effectively traded? If not, what specific additional information is required?
17. Would the provision of improved market information be adequate to facilitate an increase in secondary capacity trading activity and, if not, what other tools/processes could be developed/pursued?
18. What are the likely advantages, disadvantages, costs, benefits and risks associated with the provision of additional information such as close to real-time data/ex-post data, preferably supported by quantitative evidence?
19. What is the likelihood of industry participating in a voluntary pipeline capacity trading platform? If you consider the likelihood to be low, what are the key issues that could prevent incumbents from releasing unused capacity to the market?
20. What are the types of incentives that would most likely encourage industry to participate in a voluntary pipeline capacity trading platform?
21. What would be your likely costs to establish, operate and/or participate in a voluntary pipeline capacity trading platform?
22. What are the likely advantages, disadvantages, benefits and risks associated with the establishment of voluntary pipeline capacity trading platform, preferably supported by quantitative evidence?
23. Under a mandatory pipeline capacity trading regime, would it be appropriate to mandate incumbents releasing all unused capacity or just a portion of unused capacity?
24. Under a mandatory pipeline capacity trading regime, would it be appropriate to regulate the price (including floor and/or ceiling prices) of capacity?

25. What would be appropriate mechanisms to clear the market under a mandatory pipeline capacity trading regime?
26. What would be other practicalities of introducing a mandatory pipeline capacity trading regime?
27. What would your likely costs be to establish, operate or comply with a mandatory pipeline capacity trading regime?
28. What are the likely advantages, disadvantages, benefits and risks associated with the establishment of mandatory pipeline capacity trading regime, preferably supported by quantitative evidence?
29. What are the practical issues associated with mandatory UIOSI, UIOLI and auction mechanisms?
30. What entity would be the most appropriate to operate a trading platform or auction process?

## ACRONYMS

AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
CGP	Carpentaria Gas Pipeline
COAG	Council of Australian Governments
DTS	Declared Transmission System
DWGM	Declared Wholesale Gas Market
EGP	Eastern Gas Pipeline
FERC	Federal Energy Regulatory Commission
LMP	Longford to Melbourne Pipeline
MAP	Moomba to Adelaide Pipeline
MSP	Moomba to Sydney Pipeline
NEM	National Electricity Market
NGL	National Gas Law
NGO	National Gas Objective
NGR	National Gas Rules
NVI	New South Wales to Victoria Pipeline
QGP	Queensland Gas Pipeline
QSN	QSN Link (Moomba to Ballera)
RBP	Roma to Brisbane Pipeline
RIS	Regulation Impact Statement
SCER	Standing Council on Energy and Resources
SCO	Senior Committee of Officials
SEA Gas	South East Australia Gas
STTM	Short Term Trading Market
SWQP	South West Queensland Pipeline
TSO	Transportation system operator
UIOSI	Use-it-or-sell-it
UIOLI	Use-it-or-lose-it

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## PURPOSE OF THIS REGULATION IMPACT STATEMENT

The purpose of this RIS is to test the case for, and options for, possible changes to the way in which unused natural gas transmission pipeline capacity is traded. Some industry participants have raised concerns about the growing tightness in Australia's eastern gas market and the increased importance this places on maximising opportunities to trade and transport gas, which may currently be frustrated by unclear or unwieldy mechanisms for trading gas transmission pipeline capacity. There are also concerns that the status quo may not be resulting in the most efficient outcomes in terms of maximising capacity utilisation and allocative efficiency.<sup>1</sup>

Consequently, at its December 2012 meeting, Standing Council on Energy and Resources (SCER) Ministers agreed to consider more broadly whether there are appropriate mechanisms available to improve trade in gas transmission pipeline capacity in the eastern gas market. This consultation RIS is part of that process. Stakeholder feedback will assist in determining whether there is a significant problem with the way in which capacity is currently traded and, if so, whether there are appropriate policy responses.

## INTRODUCTION

Australia is experiencing a significant structural change in the domestic production, consumption and trade of natural gas. The continued expansion of liquefied natural gas (LNG) export capacity, the rapid growth of the east coast coal seam gas (CSG) industry and the expected increase in the use of gas as a low-carbon fuel are driving these changes. The development of Queensland's CSG-LNG projects will: require a significant expansion in production capacity and the development of large reserves; provide producers with access to higher international prices; sharpen competition for gas; and drive market development for the next decade or longer.

Some domestic gas transmission pipelines are often operating at close to capacity and there are significant upfront costs involved in building new capacity. It may also be complex and expensive for new entrants to access existing unutilised (although potentially contracted) capacity. Increasing the capacity utilisation of existing domestic gas transmission pipelines may provide an avenue to more efficiently allocate gas in the market and could also facilitate additional gas being delivered to the market.

### *Gas Market Reforms*

The evolution of Australia's domestic gas markets has been accompanied by an extensive market reform program. Over the past 20 years, Australian gas markets have been subject to initiatives designed to support development in line with the long-term interests of consumers. To date, this reform has primarily focused on transmission and distribution competition and access issues and increasing market transparency and flexibility. This has led to the national regulation of pipeline

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<sup>1</sup> Allocative efficiency in this context refers to gas pipeline capacity, and hence gas resources, being allocated to produce the goods and services which are most highly valued and in high demand.

infrastructure that has natural monopoly characteristics to facilitate more efficient investment in and operation of Australia's gas networks.

In the mid-1990s, the Council of Australian Governments (COAG) led the removal of barriers to the interstate trade in gas and the development, and eventual enactment in 2008, of nationally-consistent gas legislation, the National Gas Law (NGL). The NGL includes provisions for third-party access to regulated (referred to as covered) pipelines that display natural monopoly characteristics.

In 2003, COAG agreed to the creation of the Australian Energy Market Commission (AEMC) and Australian Energy Regulator (AER). The AEMC is the rule maker and developer for Australian energy markets while the AER is the regulator for covered pipelines in Australia's eastern markets. In 2007, energy Ministers agreed to establish the Australian Energy Market Operator (AEMO) that operates Australia's eastern energy markets. The above changes were designed to create efficiencies through centralised rule-making, regulatory decision making and enforcement, market operation, and planning.

In 2004, the Ministerial Council on Energy (MCE, now SCER) was given specific responsibility from COAG to accelerate development of a 'reliable, competitive and secure natural gas market'. The scope of the industry-led, eastern gas market reform agenda has expanded from networks to facilitating greater provision of market information, including a National Gas Market Bulletin Board and an annual Gas Statement of Opportunities, and the establishment of new, shorter-term trading market options. Spot markets now exist in the Victorian Wholesale Gas Market and Short Term Trading Market (STTM) hubs in Adelaide, Sydney and Brisbane.

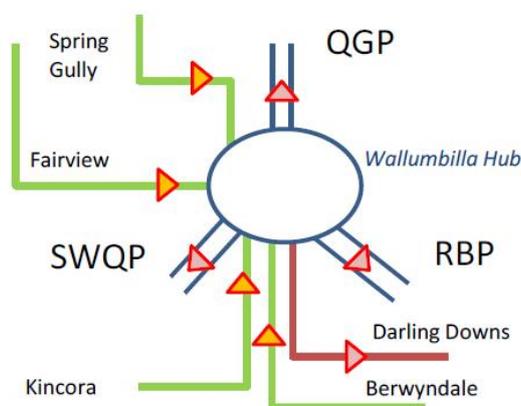
Most recently, SCER has tasked AEMO with implementing a 'Brokerage' model Gas Supply Hub to be located at Wallumbilla, Queensland by 2014 (see Box 1). This initiative has acted as a trigger to further examine natural gas transmission pipeline capacity utilisation because hub services will rely on market participants offering up unused pipeline capacity for trade.

Over the past 20-years, Australia's gas transmission pipeline infrastructure has continued to expand and gas consumption by industry, power generators and households has almost doubled. Electricity generators have installed considerable capacity in gas-fired peaking plants to supplement baseload generation capacity. Gas will continue to play a major role in providing Australia with clean and efficiently produced energy.

### Box 1: Wallumbilla Gas Supply Hub

In 2011, the Queensland Government proposed implementing a Gas Supply Hub (GSH) as part of its Annual Gas Market Review 2011. On 9 December 2011, the Standing Council on Energy and Resources (SCER) agreed to request the Australian Energy Market Operator (AEMO) to prepare a full project scoping and cost report on the development of a GSH model. At its December 2012 meeting, SCER agreed to task AEMO with implementing the 'Brokerage' hub model – for initial application in Wallumbilla in southern Queensland by early 2014.

Wallumbilla was selected for the Hub because it is the location where three gas transmission pipelines converge, namely the: Queensland Gas Pipeline (QGP); Roma to Brisbane Pipeline (RBP); and the South West Queensland Pipeline (SWQP). In addition, pipelines from several coal seam gas (CSG) fields meet at Wallumbilla.



The GSH represents an incremental step towards the development of an upstream gas market. Participation will be voluntary and trading will complement existing long-term contractual arrangements and provide flexibility for participants to buy or sell gas.

The GSH will establish an exchange to match and clear trades using existing physical infrastructure. Buyers and sellers will place bids and offers for a particular quantity of gas being delivered to the relevant hub location. If a bid and offer match on price, the trade will be cleared by AEMO. Buyers will then be responsible for arranging transportation of gas away from the Hub. The success of the Hub will be dependent on market participants accessing unused pipeline capacity to facilitate gas trades.

## EASTERN GAS MARKET

The Australian domestic gas market consists of three distinct regional markets: the eastern market (comprising Queensland, New South Wales, Australian Capital Territory, Victoria, South Australia and Tasmania); the western market (Western Australia); and the northern market (Northern Territory). Due to the vast distances between each region, the construction of pipeline infrastructure to connect these markets is at this time uneconomic.

While transmission pipeline capacity trading is of interest to all Australian jurisdictions, the focus of this RIS is on the eastern gas market because the nature of the eastern market (i.e. a network of inter-connected gas transmission pipelines, some with unused capacity) lends itself to capacity trading opportunities. Further, capacity trading will become increasingly important to:

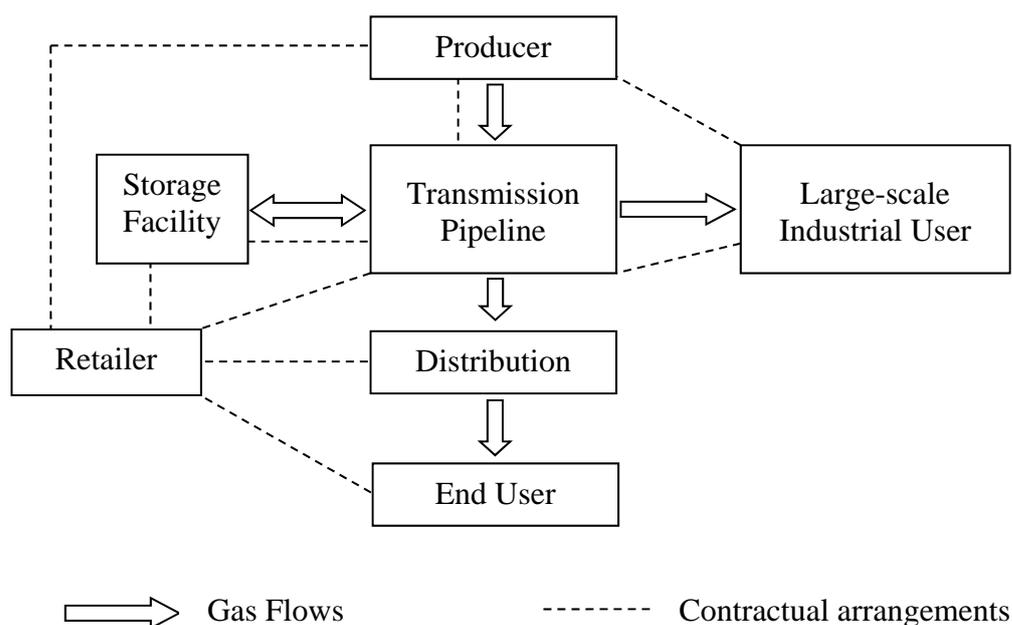
- efficiently re-allocate unused capacity and gas to higher-value uses;
- maximise the efficiency of capital stock;
- incentivise pipeline investment;
- create opportunities for gas trading, particularly at the Gas Supply Hub;
- support gas market growth; and
- assist with bringing additional gas to market.

### *Roles of Market Participants*

In Australia, the gas supply chain (Figure 1) consists of the following sectors:

- upstream gas production facilities: businesses extract gas and process it to a standard that enables it to be sold through domestic or international markets;
- transmission pipelines: transport natural gas from gas fields to demand centres;
- storage facilities: enhance security of supply by facilitating the injection of gas into the transmission system at short notice to better manage peak demand and emergencies. They are predominantly owned by retailers;
- distribution networks: typically consists of high and medium pressure pipes (to transport gas within a demand centre) and low pressure pipelines (servicing end users); and
- gas retailers: sell a range of natural gas products to end users on varying terms.

**Figure 1: Gas Supply Chain**



**Table 1: Eastern Australia Supply Side Participants**

Gas Producers	Eastern Australia Production (12 months to Sept 2012)			Market Share
BHP Billiton	142.4 PJ			19.9%
ExxonMobil	121.1 PJ			16.9%
Santos	97.4 PJ			13.6%
Origin Energy	94.1 PJ			13.2%
BG Group	53.4 PJ			7.5%
ConocoPhillips	45.6 PJ			6.4%
Other	160.7 PJ			22.5%
<b>TOTAL</b>	<b>714.7 PJ</b>			<b>100%</b>
Transmission Pipeline Owners	Pipeline	State	Covered	Capacity/Length
APA Group	LMP	VIC	Yes	1,030 TJ/d; 2,035 km
	SWP	VIC	Yes	353 TJ/d; 144 km
	SEA Gas (50%)	VIC/SA	No	303 TJ/d; 680 km
	NVI	VIC/NSW	Yes	90 TJ/d; 145 km
	MSP	SA/NSW	Light <sup>a</sup>	439 TJ/d; 2,029 km
	RBP	QLD	Yes	233 TJ/d; 440 km
	CGP	QLD	Light	119 TJ/d; 840 km
	SWQP	QLD	No	404 TJ/d; 756 km
	QSN	QLD/SA/NSW	No	212 TJ/d; 180 km
Jemena	QGP	QLD	No	145 TJ/d; 629 km
	EGP	VIC/NSW	No	288 TJ/d; 795 km
QIC Global Infrastructure	MAP	SA	No	241 TJ/d; 1,185 km
GDF Suez Australian Energy	SEA Gas (APA Group, REST)	VIC/TAS	No	300 TJ/d; 680 km
Victorian Funds Managm't Corp	NQGP	QLD	No	108 TJ/d; 391 km
Palisade Investment Partners	TGP	VIC/TAS	No	129 TJ/d; 734 km
Gas Retailers (Active)	Markets			Customers
Origin Energy <sup>b</sup>	NSW, QLD, VIC, SA			3.87 m <sup>c</sup>
AGL Energy	NSW, QLD, VIC, SA			3.25 m <sup>c</sup>
EnergyAustralia	NSW, VIC, SA, ACT			2.8 m <sup>c</sup>
Lumo Energy	VIC			400,000 <sup>c</sup>
Australian Power & Gas	QLD, VIC			341,000
ActewAGL Retail	ACT, NSW			124,000
Red Energy	VIC			n.a.
Simply Energy	VIC, SA			n.a.
Aurora Energy	TAS			n.a.
Tas Gas Retail	TAS			6,000
Dist. Network	Market	Owners		Customers
Multinet	VIC	DUET Group		668,000
SP AusNet	VIC	SP AusNet (Singapore Power International, 51%)		602,000
Envestra	VIC	Envestra (APA Group, 33.4%; Cheung Kong Infra.18.9%)		587,400
Jemena	NSW	Jemena (Singapore Power International)		1,050,000
ACTEWAGL	NSW, ACT	ACTEW (ACT Gov't, 50%; Jemena, 50%)		124,000
Wagga Wagga	NSW	Envestra (APA Group, 33.4%; Cheung Kong Infra.18.9%)		23,800
Central Ranges	NSW	APA Group		7,000
Envestra	QLD	Envestra (APA Group, 33.4%; Cheung Kong Infra.18.9%)		89,100
Allgas Energy	QLD	APA Group (Marubeni 40%; RREEF 40%)		84,400
Envestra	SA	Envestra (APA Group, 33.4%; Cheung Kong Infra.18.9%)		410,700
Tas Gas	TAS	Tas Gas (Brookfield Infrastructure)		8,900
<b>TOTAL</b>				<b>3,656,200</b>

Sources: Australian Energy Regulator (2012) *State of the Energy Market 2012*  
 EnergyQuest (2012) *Energy Quarterly*, November Quarter  
 IBISWorld (2012) *Gas Supply in Australia*  
 Company websites

Notes: a) Partially regulated b) including Country Energy and Integral Energy c) Electricity and gas customers

SWQP - South West Queensland Pipeline LMP - Longford to Melbourne Pipeline EGP - Eastern Gas Pipeline  
 NVI - New South Wales to Victoria Interconnect MSP - Moomba to Sydney Pipeline QGP - Queensland Gas Pipeline  
 SEA Gas - South East Australia Gas MAP - Moomba to Adelaide Pipeline RBP - Roma to Brisbane  
 Pipeline SWP - South West Pipeline CGP - Carpentaria Gas Pipeline QSN - QSN Link  
 NQGP - North Queensland Gas Pipeline TGP - Tasmania Gas Pipeline n.a. - not available

## Gas Supply

During the 12 months to June 2012, eastern Australian natural gas producers supplied 715 petajoules (PJ) of gas into the domestic market. The vast majority of eastern gas demand was met by 22 producers operating across several basins including the Cooper, Gippsland, Otway and Surat-Bowen basins. Of these producers, six accounted for approximately 77% of production with the remaining 16 producers holding between 0.1% and 2.9% of market share (see Table 1 for further details).

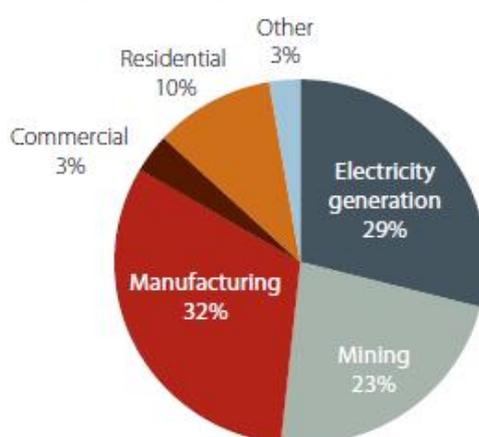
Gas producers sell gas in wholesale markets either directly to end users such as large-scale industrial consumers, mining and power generation consumers or to energy retailers. The terms under which this gas is sold are specified in gas supply agreements (GSAs). Retailers then sell to smaller commercial/industrial users and residential users. Large-scale industrial consumers include brickworks, fertiliser plants, petroleum refineries, paper mills, cement producers and explosives manufacturers.

## Domestic Gas Demand

In 2009-10, approximately 84% of Australia's domestic gas demand came from the manufacturing, electricity generation and mining sectors with residential demand only accounting for 10% as shown in Figure 2.

The gas demand profiles for manufacturing and mining operations tend to be relatively constant throughout the year while electricity generation and residential/commercial demand profiles tend to be subject to time-of-day/week and seasonal variations.

**Figure 2: Australian Primary Consumption of Gas by Sector (2009-10)**



Source: BREE (2012) *Gas Market Report*

## Gas Demand by LNG Projects

On Australia's east coast, there are three CSG-LNG projects under construction in Gladstone, Queensland: Gladstone LNG (Operator – Santos); Queensland Curtis LNG (Operator – BG Group); and Australia-Pacific LNG (Operator – Origin Energy). These projects are expected to begin LNG production in 2014-15 and they will collectively require approximately 1,300 PJ of gas per annum (p.a.) to produce



Pipeline owners underwrite the construction of new pipelines, or major expansions in pipeline capacity, with long-term foundation contracts (typically 10-15 years). These contracts are known as gas transportation agreements (GTAs). Among other things, GTAs specify maximum daily quantities (MDQs) of gas that may be shipped under prescribed terms and conditions. Shippers nominate before each gas day how much of the MDQ they wish to transport.

Gas that is transported under long-term GTAs (usually under foundation contracts) is shipped on a 'firm' basis whereby operators are obliged to transport gas on a non-interruptible basis. However, the transportation of gas is always subject to planned and unplanned interruptions as well as *force majeure*<sup>3</sup> provisions, which allow pipeline operators to interrupt firm services without incurring liability.

Operational management of pipelines is undertaken by pipeline operators who are generally the same business entities that own the asset, but in some cases, either a third party or one of the joint venture owners of the asset operates the pipeline on behalf of the owner/s. In this RIS, pipeline owners and operators are collectively referred to as pipeliners.

Pipeliners sell transportation capacity to retailers, large-scale industrial consumers and some producers (collectively known as shippers). In eastern Australia, retailers sell the overwhelming majority of gas and it is understood that retail sales account for more than 90% of the south-eastern gas market. Retailers' shipping arrangements are therefore the main determinant of capacity utilisation in this region. In contrast, Queensland is predominately a wholesale market with the majority of gas (86%) sold to industrial customers who take gas directly from transmission pipelines. Therefore, the main determinant of capacity utilisation in Queensland is industrial users. NSW has a similar market to Queensland with industrial and electricity generation consumption dominating.

Retailers also arrange with gas distribution network operators to supply gas to end users via local gas distribution networks. There are 12 active gas retailers in eastern Australia with typically only 1-2 transmission pipelines servicing each demand centre.

Network operators own reticulated pipeline distribution networks within demand centres, providing the means for gas retailers to deliver gas to end users. In the east, there are 11 gas distribution networks (see Table 1 for details).

In Australia, pipeline capacity management is handled by either the contract carriage approach or the market carriage approach. Under contract carriage, pipeliners enter into bilateral GTAs with shippers. However, under the market carriage model, an independent system/market operator manages pipeline capacity through a pool approach. The pipeline owner makes the relevant pipeline system available to the system/market operator under contract (the service envelope agreement). Users of a market carriage pipeline are not able to reserve capacity on the pipeline.

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<sup>3</sup> *Force majeure* is an event that occurs outside the control of parties to a contract and which could not have been foreseen, planned for or evaded through the exercise of due care (e.g. natural disaster).

Contract carriage is used for transmission pipelines in all states and territories except for Victoria where the market carriage model is used for the Victorian declared transmission system (DTS) that encompasses the SWP, LMP and NVI pipelines. AEMO manages the operation of DTS pipelines and also operates the Victorian declared wholesale gas market (DWGM) which applies to the DTS.

The focus of this RIS is on pipeline capacity trade that relates to pipelines managed under the contract carriage approach.

### *Concentration and Ownership*

During the past 10-15 years, some downstream market participants have strengthened their positions. However, CSG-LNG developments are changing this dynamic. The historical factors that have increased concentration of ownership in downstream power have been:

- disaggregation of the upstream supply through introduction of a number of new CSG start-ups: majors such as BG, Shell have mitigated this effect by recently acquiring CSG companies, however, the upstream market remains segregated compared to the duopoly era of the Cooper and Gippsland basins as the dominant producers;
- aggregation of downstream companies: privatisation in Victoria, SA and Queensland electricity and gas retail markets has aggregated downstream market power, with AGL, EnergyAustralia and Origin as the dominant entities. The recent retail privatisation in NSW has continued this trend; and
- vertical integration strategies (gas and electricity) by Origin, AGL and more recently EnergyAustralia.

As a result, production and consumption in the market tends to be dominated by two segments:

- the LNG producers (and domestic producers which can supply these projects) that have access to international markets and can commercialise reserves independent of the domestic market; and
- large vertically integrated retailers (AGL, Origin and to a lesser extent EnergyAustralia) that control access to downstream domestic market channels (including their own power stations etc.) and have upstream equity production.

For the transportation component of the market, the overwhelming majority of these pipeline assets are owned by only two companies; APA Group and Jemena.

Table 2 details the current state of activity in the major eastern Australian pipelines and which pipelines tend to be retailer-dominated and those that have some level of diversity where some industrial customers have also entered into GTAs with pipeline owners.

**Table 2: Major Firm Shippers in Eastern Australian Pipelines**

Pipeline	Major Shippers	Comment
RBP	Mostly large industrial customers including Incitec, Stanwell (Swanbank E power station) and BP's refinery.  Retailers supply Brisbane market (only 15-20 PJ/a).	Diverse pipeline, with a variety of users. The RBP has a large number of delivery points, to which not all shippers have contractual access.
QGP	Mostly large industrial customers such as QAL and Comalco.  AGL and Origin are also present.	Currently fully contracted and pipeline transport is under pressure. Some users have insufficient pipeline capacity and are curtailing gas supply because of pipeline issues.
SWQP and QSN	<i>Western bound flow</i> (current direction): Virtually 100% of capacity contracted to AGL and Origin.  <i>Eastern bound flow</i> (expected flow from 2015): Santos major shipper to GLNG and Origin.	Retailer domination of SWQP capacity limits competition for gas supply to NWQ and southern markets.
CGP	Mostly large industrial NWQ mining customers.  AGL will become a significant shipper from May 2013.	NWQ customers purchase gas at Ballera. With Santos' SWQ Cooper Basin supply constrained, only AGL and Origin can supply at Ballera via the SWQP.
MSP	AGL is the dominant existing shipper.	AGL's long-term transportation requirement in the MSP will be reduced once it can begin CSG production from the Sydney and Gloucester basins.
MAP	Origin and AGL are the major shippers. Three SA industrial customers are also shippers.	Retailers dominate MAP firm transportation.
EGP	Existing foundation EGP transportation by BHP has been on sold to retailers.	Retailers dominate EGP firm transportation.
SEA Gas	Retailers and GDF Suez Australian Energy.	Retailers dominate SEA Gas firm transportation.

### *Recent Market Outcomes*

In the eastern states, tight gas supply conditions are expected to occur from 2015 to 2018 due to slower than expected ramp up of new CSG supply, coupled with significant new demand from LNG producers from 2014. Gas prices are also rising due to higher costs of production and competition for gas from LNG producers.

In recognition of these issues, and in the pursuit of improved transparency and efficiency of the market, SCER has agreed that Government efforts be focused on actively pursuing two policy principles of: 1) ensuring supply can respond flexibly to market conditions; and 2) promoting market development. These principles are being given effect through the implementation of an Australian Gas Market Development Plan, agreed to by SCER on 14 December 2012.

While the vast majority of producers have historically sold gas to retailers and large consumers under confidential, long-term contracts, recently there has been some growth in shorter-term contracts and spot market gas trades, although precise details concerning these sales and their quantum are not publicly known.

As discussed in the pipeline capacity utilisation section below, there have often been periods throughout the year when eastern pipelines have significant volumes of

unutilised capacity (e.g. SWQP, MSP, MAP, Sea Gas, LMP and EGP). The unused capacity on these pipelines is predominantly contracted to retailers. There have also been periods when pipeline capacity in Queensland is not fully utilised (e.g. RBP, QGP and CGP). The unused capacity on these pipelines is predominantly contracted to industrial customers.

## REGULATORY ENVIRONMENT

The NGL and subordinate National Gas Rules (NGR) commenced 1 July 2008, bringing regulation of natural gas pipelines under the national energy framework. The NGL and NGR introduced regulatory and access arrangements for pipelines as discussed below. The NGL and NGR are applied in all jurisdictions, except Western Australia, through the passage of legislation in South Australia and application Acts in all other jurisdictions. Instead of an application Act, Western Australia enacted the NGL and NGR through complimentary legislation on 1 January 2010.

### *Regulated Transmission Pipelines*

Various tiers of regulation apply to pipelines, based on competition and significance criteria. Pipelines are either uncovered (i.e. not covered by regulation), lightly regulated, fully regulated or partially regulated (i.e. only a portion of the pipeline is regulated).

Six of Australia's 14 major eastern gas transmission pipelines are covered by economic regulation (see Table 1 for further details). The rationale for the economic regulation of gas pipelines is that these assets are considered to be natural monopolies. Consequently, access and/or price regulations are applied to limit owners' market power and promote market efficiency.

In jurisdictions other than Western Australia<sup>4</sup>, the Australian Energy Regulator (AER) regulates certain pipelines under the NGL and NGR. Full regulation requires a pipeline owner to periodically submit to the AER an access arrangement for approval. On covered pipelines, pipeliners are obligated to offer capacity in accordance with an access arrangement that sets out the terms and conditions under which third parties can access available firm capacity. Access is dependent on the availability of uncontracted capacity. Regulations and rules have not been instituted to specifically maximise or optimise capacity utilisation and pipeliners or shippers are not compelled to offer contracted but unused capacity. Access arrangements must specify at least:

- one reference service likely to be sought by a significant part of the market;
- a reference tariff for that service;
- capacity trading requirements;
- queuing requirements (if applicable) to determine user priorities for spare capacity;
- how the pipeline is to be expanded or extended; and
- how access requests are to be dealt with.

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<sup>4</sup> The Economic Regulation Authority regulates pipelines in Western Australia.

The AER also assesses the revenues needed to cover efficient costs and provide a commercial return on capital, then derives reference tariffs for the pipeline. Access arrangements are periodically reviewed by the AER.

Under light regulation, the pipeline provider determines its own tariffs. The provider must then publish relevant access prices and other terms and conditions on its website. In the event of a dispute, a party seeking access to the pipeline may ask the AER to arbitrate.

Certain pipelines were automatically covered when the regulatory regime commenced. Pipelines may become covered if they meet certain criteria set out in the NGR. Covered pipelines may become uncovered if they no longer meet those criteria. Industry can also apply for a no coverage determination that provides for a 15-year exemption from regulatory coverage for greenfields pipelines in limited circumstances.

### ***Unregulated Transmission Pipelines – Negotiated Outcomes***

For uncovered pipelines (i.e. 8 of 14 eastern pipelines), third party access is negotiated bilaterally on commercial terms and conditions that may differ from those set through regulatory processes. Disputes are also resolved via commercial processes as set out in individual GTAs.

While GTAs or GSAs are not specifically mentioned in energy laws or rules, certain elements thereof are (e.g. access rights, *force majeure* and dispute resolution details).

GSAs generally include the following:

- party's responsibilities and obligations;
- annual quantities (including seasonal variations);
- monthly estimates and daily nomination details;
- supply term;
- supply arrangements including permitted interruption and quantity variation details;
- price review mechanisms;
- billing and payment obligations and details;
- gas quality and measurement details;
- sufficiency of proved and probable gas reserves details;
- provisions in the advent of default or termination;
- resolution of disputes;
- confidentiality details;
- *force majeure* provisions; and
- credit provisions.

While GSAs typically include many of the above elements, the terms and conditions of individual contracts may differ considerably and are commercial-in-confidence.

GTAs generally include the following:

- forecast, nomination and scheduling;
- trading of MDQ (including trading by shipper and restrictions on trade details);
- receipt and delivery point details and obligations;
- system use gas;
- gas imbalance allowances;
- additional charges such as overrun, imbalance and daily imbalance charges;
- park and loan arrangements;
- rights and obligations of the transporter;
- shipper's warranty and linepack<sup>5</sup> details;
- prioritisation of delivery details;
- gas quality and measurement;
- access rights;
- data and information exchange details;
- transportation charges;
- insurance details;
- provisions in the advent of default or termination;
- resolution of disputes;
- confidentiality details;
- *force majeure* provisions; and
- credit provisions.

While GTAs typically include many of the above elements, they are commercial-in-confidence and the terms and conditions of individual contracts may differ considerably.

## **SOURCES OF TRANSMISSION PIPELINE CAPACITY**

The Australian pipeline industry is based on an investment model that minimises risk and it would be very rare for a pipeline owner to expand pipeline capacity without a long-term contract to justify the capital investment. There is very little capacity created that is not underwritten with long-term contractual arrangements, although that capacity may not always be utilised.

### ***Expansion***

In addition to building new pipelines as greenfield investments, over time, pipeline owners have the option to install additional compression units on their pipelines and therefore provide additional transportation capacity on a particular route. Another option to increase capacity is via 'looping' (duplicating part of, or all of) an existing pipeline, thereby increasing flow and storage capacities.

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<sup>5</sup> Linepack is the quantity of gas contained in a pipeline and represents its storage capacity.

It is understood that the majority of eastern market pipelines could have their capacities expanded by way of installing additional compression.<sup>6</sup> This represents a relatively low-cost means to increase the amount of gas that could be shipped on a pipeline. However, it is noted that beyond a point, there are diminishing marginal returns associated with the installation of additional compression capacity. Further, upgrades to compression facilities and pipeline infrastructure are generally required to be underwritten by long-term contracts.

In the case of covered pipelines, access arrangements include queuing requirements that must contain a process or mechanism (or both) for establishing an order of priority between prospective users of spare or developable capacity (or both) in which all prospective users are treated on a fair and equal basis. In the case of uncovered pipelines, shippers seeking capacities above constructed capacity need to negotiate with pipeline owners to underwrite capacity expansions.

It is noted that in some overseas markets when pipeliners are approached with queries concerning expanding capacity, there is a requirement for pipeliners to put forward a public ‘open season’ request seeking as many interested parties as possible to support the development of new pipeline infrastructure. In Australia, there is no mandated requirement for pipeliners to conduct ‘open season’ processes.

### *Unutilised Capacity*

It is understood that shippers may build in a margin to their MDQs to ensure that they will have adequate gas to cover expected peak gas demand throughout the year. Shippers who have nominated gas flows less than their MDQs are free to trade the unused portion of their MDQs, subject to the terms and conditions of their GTAs. Mechanisms for effecting such trades are discussed in detail below.

On a day-before basis, shippers provide final nominations to pipeline operators of the pipeline capacities they will require for the following day (the gas day).<sup>7</sup> Pipeline operators then aggregate nominated daily gas flows and determine the total volume of gas that will need to be flowed the following day.

In cases where the total MDQs for a particular pipeline equal the full capacity of a pipeline, the pipeline is fully contracted. On fully-contracted pipelines, unless unutilised capacity is traded, or additional pipeline capacity is constructed, no further firm capacity can be offered.

If firm shippers on a particular pipeline do not nominate their full MDQ entitlements, it is highly likely that firm shippers’ gas flows will be less than the pipeline’s capacity on a given day. In these circumstances, pipeliners may offer gas transportation services on an ‘as available’ basis whereby gas is delivered on an interruptible basis, utilising the above free capacity. This class of transportation service is provided at the pipeliner’s discretion and will generally only be provided if the pipeliner is very

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<sup>6</sup> It is noted that the next stage of EGP expansion is via looping, with most of the other pipelines via compression.

<sup>7</sup> For planning purposes, shippers are also required to provide pipeliners with detailed, longer-term forecasts for their daily gas transportation requirements.

confident that there will be adequate capacity to meet both firm and ‘as available’ requirements.

For example, a pipeline may have a nameplate capacity of 100 terajoules (TJ)/day. The pipeliner may have firm contracts in place that total 100 TJ/day but these shippers only nominate a total of 65 TJ flow for the following day. If these shippers decide not to trade their unused capacities, the pipeliner may choose to offer up to the market, on an ‘as available’, interruptible basis, 35 TJ of pipeline capacity, depending on the original contract terms.

As a result, pipeliners can effectively sell some capacity twice, initially under the original contract and again, if a shippers do not use fully their MDQ entitlements, on an ‘as available’ basis. These services are able to be offered concurrently because pipeline operators can interrupt ‘as available’ services should firm shippers decide to re-nominate during the gas day (intra-day) and increase their capacity requirements above that previously nominated, up to their MDQs.

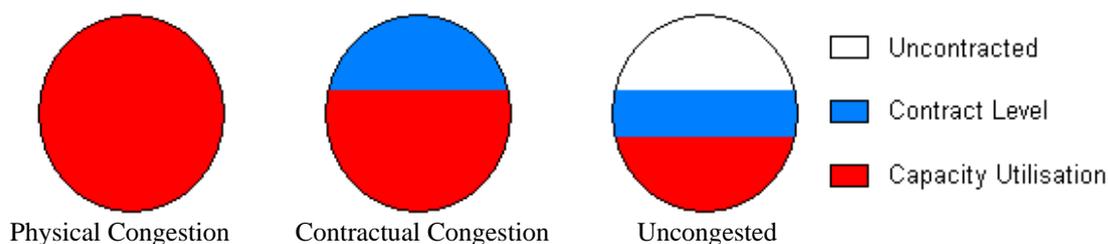
On pipelines that are fully contracted, if intra-day nominations result in all MDQs being fully used, ‘as available’ shippers may not have all their gas transported. In this way, ‘as available’ shippers bear all the risk of not being able to take delivery of gas on a given day.

## CURRENT TRANSMISSION PIPELINE CAPACITY UTILISATION

Australia’s eastern market gas transmission pipelines experience differing levels of congestion ranging from ‘physical congestion’ to ‘contractual congestion’ to uncongested. Each of these states are explained below:

- **Physical congestion:** market participants are unable to gain access to capacity because there is a physical shortage of capacity in the pipeline. In this situation, the pipeline has all of its capacity contracted and capacity is being 100% utilised. The only way to deliver additional gas to the market would be to undertake new investment in additional capacity.
- **Contractual congestion:** market participants are unable to gain direct access to capacity on a pipeline because all of a pipeline’s capacity is contracted. Although all the capacity is contracted, the capacity is not being fully utilised. Capacity trading could deliver additional gas to the market and make more efficient use of existing infrastructure.
- **Uncongested:** a pipeline’s capacity is not fully contracted. Market participants can generally gain access to capacity via direct negotiation with pipeliner.

**Figure 7: Degrees of Pipeline Congestion**



It is recognised that there are seasonal demand variations (particularly in the south) and unused capacities are generally higher in the warmer months when gas demand for heating (both residential and commercial) is generally lower. Further, on high demand pipelines such as the RBP, QGP, EGP and CGP, although there appears to be unused pipeline capacity during periods of lower demand, during periods of peak demand, there may only be small volumes of unused capacity, or none at all.

Further, it is noted that the construction of some pipelines has been underwritten on the back of single contracts with retailers for firm capacity. Over time as new pipelines have been developed, some demand centres are now serviced by competing pipelines. For example, the establishment of the:

- EGP has provided competition to the MSP; and
- SEA Gas pipeline has provided competition to the MAP.

It is understood that post competition, foundation retail shippers<sup>8</sup> found themselves holding pipeline capacity that was no longer needed. Further, it is understood that these shippers subsequently reduced their capacity requirements on these pipelines when contracts were re-negotiated.

Jemena notes on its website<sup>9</sup> that it has firm capacity available (i.e. pipeline capacity is not fully contracted) on its EGP. In contrast, SEA Gas states on its website that it does not have firm capacity available.<sup>10</sup> Similarly, it is understood that APA Group generally does not have firm capacity available on its eastern market pipelines.<sup>11</sup> However, it is unclear what firm volumes may be available. Uncontracted firm capacity will change over time as contracts expire and demand centres are supplied with gas from different production centres.

### *AEMO Data on Utilisation*

Some publicly-available information concerning aggregated pipeline capacity utilisation is accessible online via AEMO's National Gas Market Bulletin Board site.<sup>12</sup> Nominated daily flows and actual flow data are published daily on the Board. This data represents aggregated firm and 'as available' flow volumes.

AEMO's Bulletin Board data shows that on all pipelines there were volumes of unused pipeline capacity. During certain periods, the following pipelines had considerable volumes of unused capacity: SWQP; LMP; NVI, SWP, SEA Gas; MAP; and MSP. There are lesser volumes of unused capacity on the RBP; QGP; EGP; and CGP.<sup>13</sup>

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<sup>8</sup> Foundation retail shippers underwrote the construction of pipelines with long-term contracts.

<sup>9</sup> <http://jemena.com.au/what-we-do/assets/eastern-gas-pipeline/capacity-available.aspx>

<sup>10</sup> <http://www.seagas.com.au/current-opportunities.php>

<sup>11</sup> APA Group states that it currently does not have capacity available on the MSP  
<http://apa.com.au/media/199315/2012%2008%2022%20full%20year%20presentation.pdf>

<sup>12</sup> <http://www.gasbb.com.au>

<sup>13</sup> Appendix B contains charts showing pipeline capacity utilisation data.

However, caution needs to be exercised with some of the Bulletin Board figures. For example, depending on the age of a pipeline and other engineering factors, the practical carrying capacity and the understood nameplate capacity of a particular pipeline may differ considerably. For example, the Bulletin Board notes that MSP, one of Australia's oldest pipelines, has a capacity of 439 TJ/day. However, due to ongoing maintenance involving corrosion repair activities, the MSP's operating pressure has been lower than its design pressure and therefore it has not been operating at full capacity.

From the above, it is noted that on pipelines that are subject to physical congestion (e.g. QGP) all the capacity has been fully contracted and is generally being fully utilised. The QGP is an example of a pipeline that predominantly services industrial customers whose demand profile remains reasonably constant throughout the year. Therefore, shippers on such pipelines may have limited capacity to participate in voluntary secondary trading. Further, to access capacity on these pipelines, market participants may need to buy capacity from the pipeliner, which may involve underwriting an investment in a capacity upgrade.

Regarding the effect that regulation has on pipeline capacity utilisation, there does not appear to be a correlation between the level of regulated access arrangements<sup>14</sup> and pipeline capacity utilisation. This is not surprising given that mandated access arrangements have been instituted to facilitate negotiations surrounding price and other conditions for the initial sale of primary capacity to shippers.

For example, the RGP and LMP are fully regulated and while the RGP consistently has high capacity utilisation, the LMP's capacity utilisation varies widely throughout the year, largely a function of seasonal demand. Likewise, the QGP and MAP are unregulated and have quite different levels of capacity utilisation as discussed above.

The above suggests that for some pipelines, including those experiencing contractual congestion (e.g. MSP), trading has the potential to increase utilisation of existing capacity. Even on uncongested pipelines (e.g. MAP) there is an opportunity for pipeline owners to compete with existing shippers for the sale of firm capacity.

SCO seeks feedback from stakeholders regarding:

1. Are there reasons why fuller pipeline capacity utilisation may be either advantageous or not desirable?

### *Are opportunities to trade being fully utilised?*

While virtually all pipeliners are likely to hold non-firm, or 'as available', interruptible gas transportation capacity, it is understood that, at present, pipeliners are generally more interested in negotiating longer-term transportation contracts for significant volumes rather than short-term contracts or deals for smaller or ad-hoc volumes. This is because standalone short-term and/or small-quantity transactions represent low-value propositions for pipeliners and they may be more interested in

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<sup>14</sup> As described at the Regulatory Environment section of this document (see pg. 11).

pursuing other activities aimed at maximising revenue. There may also be significant transaction costs, for example it is understood that negotiations for ‘as available’ capacity can take between 2-4 weeks (or longer) to finalise.

It is understood that shippers that book firm capacity on a long-term basis can negotiate ‘as available’ services as part of their larger deal with pipeliners. Some pipeliners may also offer up smaller volumes of ‘as available’ capacity on a shorter basis if pursuing goals such as strategic relationship building. However, it is understood that generally, apart from large users of firm pipeline services, it is difficult for small users to negotiate ‘as available’ services with pipeliners.

For firm capacity it is likely that, except for a few days a year when gas demand peaks (e.g. very cold days in Victoria), contracted retailers and possibly large-scale industrial customers are unlikely to fully utilise their MDQs, as discussed previously and evidenced by historic capacity utilisation data shown in Appendix B. Therefore, on any given day it is highly likely that unused firm gas transmission volumes will exist. This creates an opportunity, which is not necessarily exercised, for the trade in short-term, secondary firm capacity.

The availability of this class of firm transmission capacity will be dependent on whether or not existing shippers offer it up to the market. Ultimately, shippers with unused firm capacity will weigh up the costs and benefits of trading their unused capacities. It is noted that there may be limited incentives to offer up this capacity, particularly in the absence of an undemanding capacity transaction mechanism.

In summary, it appears likely that the level of trading activity is currently lower than it could be given the transaction costs involved and the possibility that the current market structure may mean there are only limited incentives, and perhaps even strategic dis-incentives, to bringing this capacity to market.

## **CAPACITY TRADING TRANSACTIONS**

Transportation capacity sold by pipeline owners in the first instance is referred to as primary capacity trade and subsequent trade in this capacity is referred to as secondary trade. While secondary trading of unused capacity is the focus of this RIS, pipeliners participate in the market as sellers of primary capacity.

### ***Transaction Types***

While in Australia the trade in secondary pipeline capacity is being undertaken by either novation or bare transfer, in overseas markets, capacity is also being traded using additional mechanisms as discussed below.

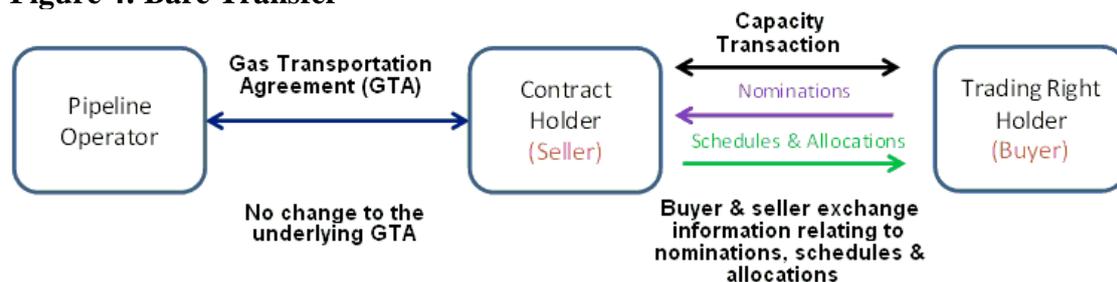
#### **1. Novation**

Novation is a permanent transfer of capacity whereby a shipper assigns all or part of their capacity to a third party and the assignee must enter into a new GTA with the pipeliner for the assigned capacity.

## 2. Bare Transfer

A bare transfer is a temporary transfer of capacity from a contract holder (seller) to a trading right holder (buyer) where the contract holder continues to be responsible to the pipeline operator for all financial and operational obligations. As shown in Figure 4, there is no change to the underlying contractual agreement between the pipeline operator and the contract holder. As there is no relationship between the trading right holder and the pipeline operator, all of the operational requirements of the transportation service are managed through the contract holder. The pipeline operator is not involved with a bare transfer trade and the transaction is likely to be completed without the knowledge or consent of the pipeline operator.

**Figure 4: Bare Transfer**



## 3. Gas/Capacity Swap

Gas/capacity swaps are a type of bare transfer involving two transactions. For example, Producer A in the Gippsland Basin may want to ship 20 TJ of gas to a customer in Adelaide but does not have adequate capacity on the SEA Gas pipeline to effect a transaction. However, Producer B at Moomba has 20 TJ of uncontracted gas and also unused capacity on the MAP. Producer B also has an existing GSA (and an underlying GTA) to supply a customer in Sydney. Producer A agrees to a gas swap with Producer B whereby A ships 20 TJ of gas to B's customer in Sydney (assuming A has unused capacity on the EGP) and B ships 20 TJ of gas to A's customer in Adelaide. In this way, an extra 20 TJ is delivered to market without A's gas physically travelling to its customer in Adelaide.

Another type of swap can occur if Retailer A needs an extra volume of gas and strikes a deal with Retailer B to use some of Retailer B's capacity allocation. Retailer B provides required capacity to Retailer A and B agrees to provide A with the borrowed capacity at a later date and/or on a different pipeline.

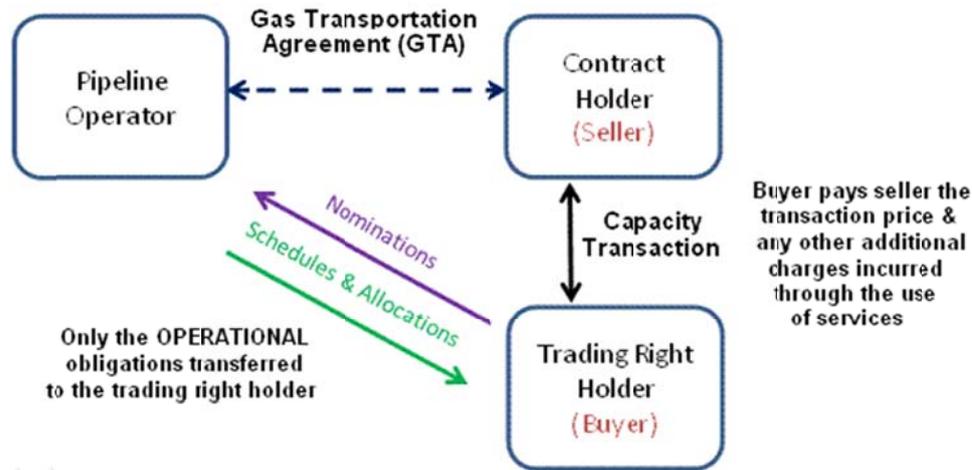
While bare transfer has been used for the temporary transfer of capacity in Australia, operational transfer and contractual transfer are being used in European markets and may also be suitable for the Australian market. These alternative trading options may hold potential to make capacity trading more attractive to shippers who hold unused capacity due to reduced operational and financial responsibilities.

## 4. Operational Transfer

Operational transfer involves the temporary transfer of capacity from a contract holder (seller) to a trading right holder (buyer) whereby only operational obligations (e.g. scheduling and delivery points) pass from the seller to the buyer. As shown in Figure 5, under an operational transfer the contract holding shipper continues to be

responsible for all financial obligations to the pipeline operator. At the end of the transaction, all of operational obligations return to the original contract holder.

**Figure 5: Operational Transfer**

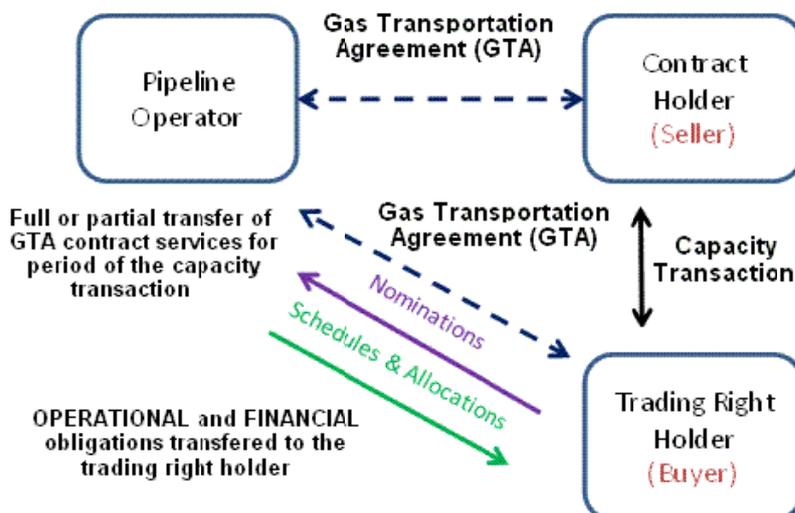


Operational transfer is the basis for secondary trading of pipeline capacity on short term-basis in European markets. It is likely that functionality within Australian markets can support this model of trading. However, there are likely to be system and process changes required by pipeline operators to give effect to and manage the transfers between shippers.

5. Contractual Transfer

Contractual transfer involves the temporary transfer of capacity from a contract holder to a trading right holder whereby all financial and operational obligations pass from the seller to the buyer. As shown in Figure 6, a contractual transfer is similar to the permanent transfer of pipeline services, except that the transfer is only for the period of the transaction (where the transaction could be as short as a single gas day). At the end of the transaction, all financial and operational obligations return to the original contract holder.

**Figure 6: Contractual Transfer**



A contractual transfer is the basis for secondary trading of pipeline capacity products over medium to long-term in European markets. As for operational transfer, implementation of this service in Australia is likely to require changes to pipeline management systems to give effect to and manage the contract transfers between shippers.

The buyer must be a party to the relevant allocation agreements prior to entering into a transaction. This could be achieved by substituting the buyer for the contract holder in the allocation agreement for the term of the transaction. This approach may also require changes to systems in existing markets to facilitate the transfer of contract capacity between shippers.

SCO seeks feedback from stakeholders regarding:

2. In Australia, how easy is it to organise and execute novation and/or bare transfer of pipeline capacity?
3. What is the likely size of the benefits, if any, associated with adopting operational transfer and/or contractual transfer for the trade of secondary pipeline capacity in Australia?
4. What operational/system changes would be necessary to allow operational transfer and/or contractual transfer to be used in Australia and what would the likely costs be to making these changes?

### *Capacity Trading Activity in Australia*

The information on the quantum of capacity trade in Australia is very limited. It is understood that both unused firm and ‘as available’ capacity are currently being traded on a bilateral basis, but this trade is rare. Further, it is noted that there is:

- no requirement for participants to report capacity trades;
- very limited publicly-available data showing the quantum of this trade; and
- no transparent market mechanism to allocate unused pipeline capacity.

It is understood that this trade may be limited to those with existing market positions and often comes as a package deal with gas supply. This trade may be based around sellers’ terms rather than what the buyer may be seeking. For example, a buyer may seek pipeline capacity for a week, but may actually need to purchase capacity for six months.

It is noted that in some overseas markets it is standard practice for pipeliners to publish information on contracted positions and capacity utilisation. Further, there are also mechanisms operating to promote pipeline capacity trading on a daily basis (see Appendix A for details).

As discussed above, there is ‘as available’ pipeline capacity available on most pipelines and, subject to mutual agreement on required volume and contract duration, pipeliners may be able to provide transportation on an ‘as available’ basis. It is

understood that market participants who may be seeking ‘as available’ capacity would find it challenging to manage the combination of securing an ‘as available’ GTA and a non-firm GSA.

Regarding specifically the trade in unused *firm* capacity, as part of STTM operations, AEMO records the contract holders and trading right holder of capacity on which offers to supply gas to the Adelaide, Brisbane and Sydney STTM hubs must be based. AER analysis indicates that as at March 2013 there were only a few recorded trades of pipeline capacity. That is, typically the contract holder of pipeline capacity and the trading participant were the same retailer, producer or industrial customer. The AER noted that there were only a few active current ‘trades’ of pipeline capacity. A large volume transaction on SEA Gas and some transactions on the RBP indicate some willingness of retailers/producers to onsell capacity. However, it is also notable that capacity trades have generally been between large retailers and large customers or between two large retailers. Generally, smaller gas retailers have not got access to capacity from other contract holders.

The above firm capacity trading observations only relate to the STTM and it is the only hard data that is publicly available. It is recognised that the other capacity trading may be occurring that does not relate to the STTM. However, the quantum of this trade is unknown.

It is noted that although shippers that hold unused firm capacity are free to trade this capacity, it is understood that short-term bare transfers, including gas swaps, may be rare. A lack of bare transfer trading may be due to a number of factors including:

- The lack of standard contract terms and conditions: this brings with it a significant management overhead than can make negotiations for trades, especially for short periods, administratively prohibitive;
- The contract holder is required to continue managing nominations, scheduling, allocations and the management of imbalances: this imposes an administrative overhead and may also increase operational risk for the seller;
- Financial considerations including how and when settlement occurs, managing credit risk and the settlement of ad-hoc charges such as pipeline imbalances;
- Potential impact on market position: retailers may consider that their release of unused capacity could enable their competitors to increase market share; and/or
- Limited unmet demand for contracted but unused capacity because market participants who rely on gas/transportation already have contracts in place.

### *Demand for Capacity Trading*

It is recognised that large industrial consumers and gas powered generators (GPGs) either arrange their own shipping under long-term contractual arrangements or buy gas from a retailer. The types of businesses that may be interested in accessing unused capacity on a short to medium-term basis may include: industrial consumers who need unanticipated additional capacity; new entrants to the gas retail sector who wish to test the waters; GPGs seeking additional volumes to optimise daily output; and gas producers seeking discrete trading opportunities.

SCO seeks feedback from stakeholders regarding:

5. Have you engaged in capacity trading in Australia and if so: how regularly do you undertake such transactions; what volumes and types of capacity (i.e. firm or 'as available') have you typically traded; and what pipelines have you traded capacity on?
6. If you have experienced difficulties when undertaking capacity trading what specific barriers have you experienced on what particular pipelines and/or what were the particular circumstances?
7. Are there any improvements that could be made to ease the transfer of pipeline capacity?
8. What factors, including market or regulatory factors (that may include the identified factors above) may be limiting secondary capacity trading in Australia?

### *Gas Transportation Services*

Capacity as it has been referred to above is not a homogeneous product and pipeliners can offer a range of transportation services for the delivery of gas. Being specific about these services would be important to any move to standardised or regulated capacity trade. It is understood that limited firm and 'as available' capacity trade occurs in Australia. The services that transportation capacity buyers may be interested in could include:

- **'As available'**: non-firm service usually nominated and confirmed the day before but can be interrupted on the day. Generally, pipeline owners appear to be conservative in their assessment of 'as available' capacity and generally do not offer this service unless it is highly likely they can transport the gas;
- **Firm Spot**: in eastern Australia this service is not commonly offered, however, it is understood to have been used in Western Australia. A firm spot service is similar to 'as-available' where capacity is confirmed the day before, however, once parties agree on the quantity, it is a firm transport arrangement;
- **Firm Short-term**: a firm transport service but with a term applicable more than 1 day but up to 6 months;
- **Firm Long-term**: a firm transport service with a term applicable more than 6 months; and
- **Backhaul**: a service where gas transportation is in an opposite direction of the aggregate physical flow of gas in the pipeline (i.e. the capacity buyer is located upstream of the gas supply point).

Stakeholders may also be interested in accessing other types of capacity, including those listed above. While there is very little information about demand for such services, anecdotal evidence suggests that the market would be most interested in the firm spot, firm short-term and backhaul services.

SCO seeks feedback from stakeholders regarding:

9. What types of transportation services would stakeholders be most interested in accessing?
10. Would stakeholders be interested in accessing short-term 'as available' interruptible gas transportation capacity?
11. What duration of capacity trades would stakeholders be most interested in seeking?
12. What pipelines and indicative annual capacity volumes would stakeholders be most interested in accessing?
13. What specific additional volumes of gas would producers be willing to supply into which specific markets?

## **METHODS OF FACILITATING CAPACITY TRADING**

The expansion of secondary pipeline capacity trading activity may require mechanisms to lower transaction costs, improve incentives, and/or remove disincentives for trade between buyers and sellers. There are a number of mechanisms that can be used to trade unused capacity including: bilateral negotiation; exchange-based trade; and auction.

### ***Bilateral Negotiation***

As previously outlined, bilateral trading refers to the direct negotiation of capacity transactions between a contract holding shipper (seller) and a trading right holder (buyer). The execution of trade and settlement and credit risk management arrangements are managed outside the market by the counterparts to the transaction.

As part of the detailed design for the Wallumbilla Gas Supply Hub, AEMO has proposed that the Hub will support bilateral trading of unused pipeline capacity. AEMO will develop a bulletin board style, web-based information screen that will allow market participants to advertise a willingness to buy or sell specific gas transportation services.

The listing of spare capacity will be located alongside the exchange trading screens for the proposed physical gas products making it more convenient for participants to manage their trading requirements. Participants with an interest in trading unused gas transportation services will be able to manually upload details relating to the receipt and delivery points, term and their contact details to facilitate the commencement of a bilateral negotiation. Table 3 shows an illustrative snapshot of a capacity listing webpage.

**Table 3: Illustrative Trading Screen**

Receipt Point	Delivery Point	From Date	To Date	Interest	Listing Party
Wallumbilla	Gladstone	01-May-14	14-May-14	Sell	Gas Trading Company
Longford	Sydney	28-Apr-14	29-Apr-14	Buy	Energy Retailer
Wallumbilla	Brisbane	01-Apr-14	31-Jul-14	Buy	Industrial Consumer

In the example above, the Gas Trading Company is offering a portion of its gas transportation service from Wallumbilla to Gladstone. Participants that have an interest in buying this service would be able to retrieve the contact details for the Gas Trading Company from the market system and then make contact to commence bilateral negotiation of the quantity, price and terms of a capacity transaction.

The above is being complemented by AEMO’s work on developing standardised terms and conditions for bilateral capacity trading that will assist with making capacity trade easier.

### *Exchange-Based Trade*

An alternative to bilateral negotiation is the exchange-based trading of capacity products. Exchange-based trading would simplify the trading process for participants, promote competition between potential buyers and sellers and complement the exchange trading of physical gas products. However, the realisation of the full trading efficiencies that exchange trading can offer requires the selection of transportation services that are of interest to a large number of potential buyers and sellers. Products for the transportation of gas between major supply and demand hubs (e.g. from Wallumbilla to the Brisbane STTM hub) are more likely to generate interest between buyers and sellers that is necessary to build trading liquidity.

However, it should be noted that this approach may not be a solution to the capacity trading concerns raised by all participants, in particular, shippers located upstream of existing demand hubs (i.e. shippers wanting backhaul services). In practice, the technically available backhaul capacity will vary from day to day: aggregate backhaul must be equal to or less than aggregate forward haul transactions, and minimum pressure levels must be maintained within the pipeline for safety and security of supply reasons. Consequently, where pipeliners offer backhaul services, it will generally be on an ‘as available’ basis.

The exchange platform that is being implemented as part of the Gas Supply Hub could be utilised to list products for the trading of pipeline capacity, however, a suitable pipeline capacity trading market operator would need to be established.

It is noted that a capacity trading exchange jointly developed and operated by pipeline operators could realise greater market efficiencies than developments by individual operators for the following reasons:

- **Standardisation of terms:** joint development by pipeline operators is more likely to result in common terms and conditions across pipelines making it more efficient for shippers that operate nationally to trade;

- **Cost:** a single joint development by pipeline operators would avoid the duplication of the bulk of the costs associated with the development of a trading exchange including the trading systems and legal drafting of the contract framework; and
- **Efficient trading:** the more exchanges that a participant needs to access and operate within the higher the transaction costs. The most efficient trading approach is one where physical gas and transportation trade in the same location, under similar terms and settlement frameworks.

An example of exchange trading of capacity products is shown in Table 4.

**Table 4: Illustrative Exchange Platform for Day-Ahead (1 May 2014)**

Spot Transport	Qty (GJ)	Bid	Ask	Qty (GJ)
Wallumbilla to Brisbane	5,000	0.85	1.25	4,000
Wallumbilla to Gladstone	2,000	0.61	0.88	3,000
Longford to Sydney	1,000	1.25	1.55	6,000

Buyers and sellers would need to be registered as trading participants. Participants would submit orders to buy or sell capacity for the defined transportation service as they would if they were trading a physical gas product. In the example above, a participant is willing to sell 4,000 GJ of pipeline capacity for services between Wallumbilla and the Brisbane STTM hub for \$1.25/GJ for gas day 1 May 2014. When the buy and sell orders can be matched, a capacity transaction between the two participants would be created.

The capacity products listed would cover the same time periods as those for the physical gas products (e.g. day-ahead, balance-of-month and month-ahead). The alignment of products would allow participants to bundle together their gas and transportation requirements.

The exchange trading of capacity products is likely to improve the price discovery and trading process for shippers. However, there are a number of hurdles to the development of exchange traded products including the standardisation of terms and conditions, settlement and credit risk management.

- **Standard Terms and Conditions:** It would not be feasible to create and list products for many different combinations of receipt and delivery points. To develop the necessary trading liquidity it would be important to select a set of receipt and delivery points that can be accessed by many potential buyers and sellers.
- **Management of Imbalances:** The standard terms and conditions for a capacity trading product would need to include obligations on the buyer in relation to their use of the transportation service. The contract holding shipper would also require the ability to recover any additional charges levied by the pipeline operator due to an imbalance caused by the trading right holder. For example, if receipt or delivered volumes transported by the third party shipper vary from the pipeline schedule, then the contract holding shipper may incur an imbalance charge from the pipeline operator.

- ***Nomination Process and Information Exchange*** : The transfer of capacity services requires parties to a capacity transaction to exchange information relating to nominations, schedules and allocations. A standard set of processes would need to be developed and would then need to be incorporated into the exchange rules and the relevant product specifications.
- ***Settlement and Credit Risk Management***: The centralised settlement and credit risk management model proposed for the Gas Supply Hub could be extended to support the exchange trading of capacity products. However, the proposed settlement framework for the Gas Supply Hub would require modification to cater for capacity transactions including the delivery of information and settlement of pipeline imbalances.

It is noted that the bilateral settlement of capacity transactions cannot be supported within the exchange trading framework proposed for the Gas Supply Hub. Bilateral settlement requires each trader to establish separate credit support arrangements with the participants it wishes to trade with. The exchange would then require the functionality to only match transactions for participants that have established credit support arrangements.

### ***Auction***

The matching of purchase and sale orders could be conducted through an auction process similar in nature to existing energy markets (e.g. Settlement Residue Auction in the National Energy Market). An auction mechanism would require the standardisation of terms and conditions and can be seen as an alternative to the exchange trading of capacity products.

An auction process would be applicable in particular to a process for the allocation of spare capacity that would not involve a selling party. This could be the case where a shipper loses the right to pipeline capacity they are not using as described under a ‘use-it-or-lose-it’ scenario as described below.

Once a day, or at some other pre-defined time<sup>15</sup>, potential sellers would make their capacity available to the auction. Buyers of these services would submit bids for the services indicating the volume and price at which they would be willing to transact. The auction process would determine the quantity of capacity transactions and would set a price at which they are transacted at similar to the scheduling process within the existing gas markets.

The inclusion of physical dynamics in the auction and capacity allocation process could extend the model to cater for trading of capacity between various receipt or delivery points or where the pipeline or sections of the pipeline are physically congested. This type of model would be most valuable on a pipeline where there are many different receipt and delivery points. On a pipeline that is physically congested,

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<sup>15</sup> Forward-dated trading products covering a month or quarter in the future could be auctioned less frequently. For example, settlement residue units in the National Energy Market are auctioned on quarterly basis.

this type of model could allocate capacity to parties that are able to derive the most economic benefit from the constrained set of transportation services.

## STATEMENT OF THE PROBLEM

In determining whether a regulatory response may be necessary, consideration needs to be given to whether or not a significant problem with the pipeline capacity trading market exists. This consultation RIS seeks information to better understand the nature and extent of any problem.

**Anecdotal evidence suggests that information failure and/or competition failure and the lack of an effective market for trading unused pipeline capacity is causing inefficient gas market outcomes, slowing moves to improve market liquidity and transparency.**

This may be contributing to the inefficient utilisation of existing pipeline infrastructure. Efficiently using existing infrastructure can discourage, delay or avoid the construction of new capacity, the cost of which will be passed on to consumers. A transparent and well-functioning capacity trading market also provides transparent investment signals to expand transmission capacity.

Industry consultations have identified that some stakeholders are interested in accessing short-term and/or long-term firm gas transportation capacity that could enable additional gas transactions to occur. Rather than enter into new contracts with pipeliners that would underpin an expansion of existing pipelines, these stakeholders are interested in accessing existing contracted, but unused, pipeline capacity.

Although on certain pipelines, there are times during which considerable volumes of contracted but unused pipeline capacity exist, some stakeholders have highlighted difficulties they have experienced with accessing this capacity. The following comments have been made by stakeholders:

- at times gas market participants can secure short-term gas supply or short-term transportation but not both at the same time and as a result they have not been able to execute a short-term gas deal;
- gas spot trading is currently hindered by the ability of shippers to secure unused transportation capacity on a short-term basis; and
- trading liquidity at the proposed Gas Supply Hub will be significantly hindered without the complementary development of arrangements to facilitate the trading of spare transportation capacity.

Australia's eastern gas market pipelines experience differing levels of congestion. As discussed at pages 16-17, depending on the time of year, the LMP, SWP, SEA Gas, NVI, SWQP<sup>16</sup> and MSP have considerable volumes of contracted but unused capacity. There may be reasons why it could be operationally desirable to have these volumes of unused capacity idle, however, these pipelines could also be considered as

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<sup>16</sup> It is noted that post 2014-2015, considerable additional volumes of gas from Santos' portfolio will be transported on the recently expanded SWQP.

contractually congested. These pipelines represent approximately 72% of the eastern market's total transmission capacity.

The CGP, QGP and RBP tend to have high capacity utilisation rates and have much smaller volumes of unused capacity, depending on the time of year. These pipelines could be considered as close to physically congested and represent approximately 14% of the eastern market's total transmission capacity.

It is understood that EGP and MAP have firm capacity available and therefore are considered to be uncongested. They represent approximately 15% of the eastern market's total transmission capacity.

In summary, some stakeholders suggest that:

- despite the existence of unutilised, but contracted, gas transmission pipeline capacity and demand for this capacity, some users have not been able to access unused capacity;
- negotiations aimed at gaining access to unused capacity can be lengthy, complicated and expensive and therefore negotiation timeframes can be prohibitive; and
- incumbent shippers holding unused capacity should be compelled to offer this unused capacity to the market.

As previously noted, the overwhelming majority of gas and transportation capacity is traded under confidential, long-term contracts while it is understood that very small volumes of gas and capacity are traded on a short-term basis. While there is no publicly-available price data for contracted volumes, gas prices for balancing trade at the STTM and the Victorian DWGM are available from the AER.<sup>17</sup> These figures show that there are significant price differentials between state markets. For example, over the period 17-23 March 2013, the following average prices were realised: Victoria \$4.34/GJ; Adelaide \$4.76/GJ; Sydney \$4.88/GJ; and Brisbane \$7.28/GJ. These differentials represent arbitrage opportunities for stakeholders who can offer up gas and have access to gas transportation capacity.

It is recognised that market participants are able to enter into contractual arrangements with pipeline owners that could underwrite investment to expand existing pipeline capacity. However, participants with relatively small capacity requirements are unlikely to have adequate demand to warrant pipeline owners investing in capacity expansions to meet relatively low levels of incremental demand growth.

There are a number of potential reasons why the market may be failing to supply unused capacity including:

- a. significant management overheads, especially those incurred while negotiating short-term capacity trading agreements, may make negotiations administratively prohibitive;

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<sup>17</sup> AER, Wholesale Markets - Market Performance, Weekly Gas Market Report 17-23 March 2013, <http://www.aer.gov.au/node/451>

- b. the on-going management of nominations, scheduling, allocations, imbalances: may impose prohibitive administrative overheads and may also increase operational risk for the seller;
- c. financial considerations including how and when settlement occurs, managing credit risk and the settlement of ad-hoc charges such as pipeline imbalances;
- d. potential impact on market position; and/or
- e. limited interest by holders of unused capacity due to perception that there is no demand for unused short-term capacity.

Regarding items a and b, high transaction costs may result in incumbent shippers and/or pipeliners not pursuing negotiations for small-volume capacity trades or trades with parties lacking established market positions as discussed at pages 17-18.

Regarding item d, this would be an indication that the current market structure may be resulting in competition failure whereby a limited number of incumbent shippers control unused capacity and are exercising market power to effectively either block the entrance of new market participants (e.g. new gas retailers) or limit the supply from producers (both existing and/or new participants) that would improve market contestability.

Regarding item e, this could indicate that market information failure/asymmetry may be occurring whereby either incumbents or parties seeking capacity lack adequate information concerning the demand for, or supply of, unused capacity and therefore trading activity is limited. Further, the lack of a centralised market clearing repository means there may not be an easy way for market participants who want to trade capacity to identify one another.

Further, it is understood that the relatively small number of shippers in the market has not seen the establishment of shipping brokers that could offer standard contracts, post capacity prices or offer any services that a market maker would traditionally provide to reduce trading costs.

However, there may be other reasons why incumbents do not seek to mitigate costs and maximise their revenues via selling unused capacity. Factors, such as market or regulatory, may be distorting the incentives for incumbents to offer up of unused capacity.

Regarding regulatory gaps (i.e. whether current regulations are impeding capacity trade or whether additional regulation is necessary to promote market efficiency), it is noted that the NGL/NGR are nationally consistent and there are no jurisdictional differences that could be inhibiting capacity trade. It is also noted the intent of the current regulatory regime is not to specifically optimise or maximise capacity utilisation and the NGL/NGR does not deal with secondary capacity trade. For covered pipelines, current regulations only obligate pipeliners to offer capacity in accordance with an access arrangement that sets out the terms and conditions under which third parties can access uncontracted firm capacity. Therefore, currently it is not clear whether there is a market failure that could warrant a regulatory intervention.

Although it is not clear how strong the demand for unutilised capacity is, it is unlikely that the current market for gas transmission transportation is preventing wide-scale unmet demand for transportation capacity being filled. However, as noted above, some market participants have stated they have not been able to secure access to unused pipeline capacity and there may be scope for the better utilisation of these assets.

The flow-on implications from the inefficient trade in unused pipeline capacity may include limited:

- access to capacity to transport additional gas;
- ability for manufacturing industry to transport discrete volumes of gas, including additional gas that could be purchased direct from producers;
- ability for electricity generators optimise gas utilisation and generation capacity;
- scope for producers to undertake cross-border gas trades with resultant lost arbitrage opportunities; and
- opportunities for new retailers to enter market and improve competition.

The above circumstances are providing a new imperative to examine avenues for improvement of the efficiency of existing pipeline infrastructure and therefore maximise opportunities for gas trading between regions.

## **OBJECTIVES**

The regulatory framework governing Australia’s gas market is set out in the NGL and associated NGR. The NGL is underpinned by the National Gas Objective (NGO) which is:

“To promote efficient investment in, and efficient operation and use of, natural gas services for the long-term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.”

In line with the principles of the NGO, gas markets that incorporate transparent, flexible and well-functioning gas transmission pipeline capacity trading regimes can: provide an ability to go to market for price; ease the transfer of gas title; allow competitive access to unutilised pipeline capacity; reward for efficient pipeline investment; enhance participation by end users in spot markets; and improve consumer confidence in the gas market.

If it was assessed that a significant problem existed with the current transmission pipeline capacity trading market, changes consistent with the NGO could be made to support continued gas market development. Such changes could be made to improve:

- gas transmission network efficiency;
- market transparency; and
- market contestability.

## OPTIONS

If it were assessed that a significant problem with the pipeline capacity trading market did exist, it would need to be determined whether a policy response was appropriate and, if so, what would be the most effective and efficient response to employ.

In an international context, there are numerous initiatives associated with pipeline capacity trading operating abroad (see Appendix A for examples). Although they offer insights into how pipeline capacity trading can be managed, it is recognised that each of the models listed have been developed to suit each country's unique market parameters (e.g. Great Britain's model is a balancing system rather than a trading platform).

It is noted that AEMO's work on the Wallumbilla Gas Supply Hub includes market-based initiatives to:

- list available pipeline capacity using a bulletin board approach that would allow participants to advertise a willingness to buy or sell transportation services; and
- develop standardised terms and conditions for secondary capacity trading that may help expedite gas transactions and facilitate the transfer of title.

These initiatives will assist with improving market transparency and can contribute to facilitating gas transactions. However, it is noted that AEMO's Wallumbilla capacity trading work compliments, but is separate to, this RIS process and any policy options that may be adopted.

With respect to Australia, a spectrum of responses, ranging from a minimalist approach to full regulation, could be employed to encourage the trade in unused pipeline capacity. For the purpose of seeking feedback and assisting stakeholders to frame their responses, a range of policy options have been set out below. The options are:

Option 1: Status quo;

Option 2: Improved information provision and the standardisation of contractual terms and conditions;

Option 3: Voluntary trading platform and an incentive for incumbents to release capacity; or

Option 4: Mandatory trading obligations requiring incumbents to release unutilised capacity to all market participants on either an 'as available' or firm basis.

### *Option 1: Status Quo*

This no change option sees market participants who hold contracted, but unused, pipeline capacity not being obligated to offer up capacity to the market. If they choose, they can sell unused capacity by pursuing bilateral capacity trades.

SCO seeks feedback from stakeholders regarding:

14. Is there a problem with the way in which unused pipeline capacity is currently being traded in Australia and, if so, what are the key issues that have prevented/made difficult access to unused transportation capacity?
15. What aspects of the current capacity trading arrangements work well?

### *Option 2: Information Provision*

A common concern regarding gas markets is the lack of transparency including the access to and timely provision of information that would better enable market participants to make more informed decisions. Access to better information can improve market efficiency and pricing outcomes.

This option could involve publishing rolling data concerning unused pipeline capacity on the National Gas Market Bulletin Board or on pipeliners' websites. Information could include:

- close to real-time data that would facilitate trading; and
- ex-post data (end of day/week) that would illustrate actual capacity utilisation.

It is noted that pipeliners already provide capacity utilisation data for all major eastern market pipelines to AEMO on a day before (nominated) and end-of-day (actual) basis and AEMO currently publishes this data.

This option will require the upgrading of AEMO's and/or pipeliners' systems. This option could also include undertaking work to standardise contractual terms and conditions and develop business tools and processes that could expedite and ease the transfer of title.

SCO seeks feedback from stakeholders regarding:

16. Is adequate market information available so that pipeline capacity can be effectively traded? If not, what specific additional information is required?
17. Would the provision of improved market information be adequate to facilitate an increase in secondary capacity trading activity and, if not, what other tools/processes could be developed/pursued?
18. What are the likely advantages, disadvantages, costs, benefits and risks associated with the provision of additional information such as close to real-time data/ex-post data, preferably supported by quantitative evidence?

### *Option 3: Voluntary Trading Platform*

This option would see the establishment of a capacity trading platform with market participants voluntarily offering up unused capacity for trade. The platform could be either operated by a government body, a pipeliner or a third party.

It is recognised that some current market participants may not require a capacity trading regime. That is, the existing large retailers (AGL, Origin and EnergyAustralia) are unlikely to be buyers of capacity services because they already have contracts in place for required transmission capacity.

Appropriately structured incentives could be developed that would create an opportunity cost to encourage the supply of unused firm capacity by shippers and/or pipeliners with ‘as available’ capacity. In order for incumbent shippers/pipeliners to voluntarily participate in platform trading, the financial benefit they could gain would need to account for the cost of the capacity (including intangibles) and the sale price would need to encompass sellers’ transaction costs.

Although incentives would not mandate the release of primary capacity, if carefully structured, they could provide a strong incentive to parties to trade capacity on the secondary market. In order for the incentives to be effective they would need to be imposed fairly and equally across all holders of primary capacity.

If a trading platform was established, a number of issues would need to be resolved. These would include:

- what body would be most appropriate to operate the platform;
- funding the platform’s operation;
- the development of standard terms and conditions;
- the provision of market information;
- the management of imbalances;
- the nomination process and exchange of information; settlement and credit risk management.

The types of products and underlying service provisions offered would need to be carefully considered. While ‘as available’ capacity could be offered under conditions similar to those currently existing (i.e. interruptible), this may not be the type of service that users of a capacity trading market would be most interested in.

This option would need to make use of the market information provisions and standard contract terms as discussed previously.

SCO seeks feedback from stakeholders regarding:

19. What is the likelihood of industry participating in a voluntary pipeline capacity trading platform? If you consider the likelihood to be low, what are the key issues that could prevent incumbents from releasing unused capacity to the market?
20. What are the types of incentives that would most likely encourage industry to participate in a voluntary pipeline capacity trading platform?
21. What would be your likely costs to establish, operate and/or participate in a voluntary pipeline capacity trading platform?
22. What are the likely advantages, disadvantages, benefits and risks associated with the establishment of voluntary pipeline capacity trading platform, preferably supported by quantitative evidence?

#### *Option 4: Mandatory Trading Obligations*

Introducing mandatory trading obligations would compel shippers or pipeliners to release unused capacity. This would be a challenging option to progress and would require clear evidence of:

- a) a significant problem existing that materially affects the operation of the market (i.e. detrimental to the NGO); and
- b) inadequate effort being made by market participants to voluntarily address any significant identified issues.

Mandating the release of unused capacity could either involve compelling:

- pipeliners to transparently offer up unused capacity on an 'as available', interruptible basis, referred to in this RIS as use-it-or-lose-it (UIOLI); or
- shippers to transparently offer up unused firm capacity, referred to in this RIS as use-it-or-sell-it (UIOSI).

It is recognised that in the international context the terms UIOLI and UIOSI may refer to a variety of differing concepts.

These options fall toward the full regulatory end of the policy spectrum and may require legislative changes to mandate the release of unused capacity.

Given that the AER only has a role in regulating relatively few covered pipelines, thought would need to be given to what changes to legislation would need to be made and what role the AER could play in a changed regime.

Both mandatory trading options would need to make use of the market information provisions and may require the introduction of standard contract terms as previously discussed.

Consideration would need to be given to the duration over which capacity rights would be offered (e.g. daily or longer term).

Regarding the potential application of UIOLI and UIOSI, Table 5 shows who would receive the revenue from the sale of contracted but unused capacity under each scheme, what type of capacity could be offered and why alternatives are not appropriate.

**Table 5: Revenue from Sale of Contracted but Unused Capacity**

<b>Capacity</b> <b>Revenue</b>	<b>Firm</b>	<b>As Available</b>
<b>Pipeliners</b>	<b>NOT APPROPRIATE</b> <ul style="list-style-type: none"> <li>• Property rights issues</li> </ul>	<b>UIOLI</b>
<b>Shipper</b>	<b>UIOSI</b>	<b>NOT APPROPRIATE</b> <ul style="list-style-type: none"> <li>• Not core business</li> <li>• Technical and operational issues</li> </ul>

**Option 4A: UIOLI**

This option would oblige pipeliners to offer up ‘as available’ capacity via a transparent mechanism if shippers did not nominate their full MDQ entitlements.

Mandating the trade of unused capacity on an ‘as available’ basis, would provide incumbent shippers with an option to undertake intra-day nominations and renominate up to their MDQs on a given gas day. Therefore, UIOLI would likely be the most acceptable mandatory option for incumbent shippers.

This option would require developing mechanisms to:

- Determine the quantity of capacity that pipeliners would be required to offer up. Consideration would need to be given to shippers’ nominated MDQ requirements as well as historical and seasonal usage patterns;
- Reallocate capacity to primary capacity holders if they decide to re-nominate intra-day; and
- Transparently offer up capacity to the market.

**Option 4B: UIOSI**

This option would oblige shippers to trade unused firm capacity via a transparent market mechanism if they did not fully use their MDQs. Importantly, the rights of existing shippers would need to be carefully considered.

This option would require developing mechanisms to:

- Transparently offer up capacity to the market. This could be via a trading platform, an auction or by some other method; and

- Price capacity with due consideration given to encompassing a margin to cover sellers' administrative costs for transactions.

For both UIOLI and UIOSI, consideration would need to be given to:

- How to fund selected mechanisms;
- What body would be most appropriate to operate a trading platform/auction; and
- What operating and regulatory arrangements would be necessary.

SCO seeks feedback from stakeholders regarding:

23. Under a mandatory pipeline capacity trading regime, would it be appropriate to mandate incumbents releasing all unused capacity or just a portion of unused capacity?
24. Under a mandatory pipeline capacity trading regime, would it be appropriate to regulate the price (including floor and/or ceiling prices) of capacity?
25. What would be appropriate mechanisms to clear the market under a mandatory pipeline capacity trading regime?
26. What would be other practicalities of introducing a mandatory pipeline capacity trading regime?
27. What would your likely costs be to establish, operate or comply with a mandatory pipeline capacity trading regime?
28. What are the likely advantages, disadvantages, benefits and risks associated with the establishment of mandatory pipeline capacity trading regime, preferably supported by quantitative evidence?
29. What are the practical issues associated with mandatory UIOSI, UIOLI and auction mechanisms?
30. What entity would be the most appropriate to operate a trading platform or auction process?

## IMPACT ANALYSIS

Consistent with the COAG best practice regulation guidelines, this RIS will identify the stakeholders likely to be affected by each option and assess the associated benefits and costs. In analysing each option, this RIS will assess the impact on those issues identified in the problem section, and whether the identified objectives can be achieved.

With regards to the anticipated impacts across Australia's three distinct gas markets (north, west and east), any possible changes to the status quo are not expected to have a significant impact on either the western or northern markets. It is noted that there is very limited information available concerning pipeline capacity utilisation in the west and north. Regarding the west, given that the majority of gas is used for manufacturing and mining activities, the demand profile on most western pipelines is

likely to be relatively flat and capacity utilisation is likely to be relatively high. Regarding the north, given the relatively: low volumes of gas being transported; few sources of supply; low demand; and there are several fields in decline or at the end of life, it is anticipated that contractual congestion may not be a problem.

Regarding international experience, although there appears to be little empirical evidence available concerning the direct impacts of altered capacity trading arrangements, the United States of America's market has seen significant reform of the gas sector over a long period of time. Restructuring of the industry has occurred in waves, focusing on improved competition in gas sales and improved transparency and access to transportation capacity and services. One of the most significant restructures was the Federal Energy Regulatory Commission's (FERC's) Order 636 that was issued in 1992. FERC recognised that even though the previous wave of reforms had led to major changes, considerable hurdles remained to achieving a fully competitive interstate gas market. Order 636 was expansive in its coverage, including the adoption of capacity assignment mechanisms commonly referred to as UIOLI provisions that promoted the separation of gas sales and gas transport capacity access. Bulletin boards and service level expectations were increased to highlight the availability and trading of capacity, encourage the development of trading hubs and numerous other rules to promote transparency and the development of markets. By the mid-1990s, FERC Order 636, along with ongoing industry evolution and adoption of first-wave reforms, saw the onset of a vibrant and liquid gas industry that is continuing to evolve and provide both consumers and investors with benefits of pricing and supply security.

In making submissions, stakeholders are requested to provide details, preferably supported by quantitative evidence, about the costs and benefits associated with each option to inform the development of policy positions. Stakeholders' submissions will be subject to confidentiality considerations and commercial-in-confidence requests will be honoured. Accordingly, stakeholders should clearly indicate whether a submission should remain confidential, either in whole or in part. Where appropriate, SCER will publish how evidence was used to inform the development of the final policy position as part of the decision RIS.

Stakeholders are requested to provide a breakdown of the costs of the options to their individual businesses, including operational and financing costs. If necessary, this could be in a separate, commercial-in-confidence document. SCO will aggregate any information on costs to gain an industry-wide perspective and the data will not be able to be attributed to a single entity. Stakeholders should focus on providing evidence of the potential impacts of the options under consideration.

In addition, SCO seeks input on the short and long-term implications of each option for different stakeholders. Consequently, SCO requests that submissions provide information on short and long-term outcomes and a relative weighting to provide an indication of significance.

## ***OPTION 1 – Status Quo***

### **Benefits**

The key benefit of Option 1 is that existing shippers who hold unused capacity would maintain their market positions.

### **Costs**

There are no costs involved with Option 1.

### **Risks**

It is anticipated that market participants who are interested in accessing temporary transportation capacity are likely to be most interested in firm transportation services. Unless unused firm capacity is offered up to market, participants who currently do not have access to unused capacity will not be able to participate in gas trades.

This will limit the liquidity of the gas market and, in particular, limit the viability of the Wallumbilla Gas Supply Hub. It is noted that on some pipelines where industrial customers dominate firm transportation capacity, these parties may offer up sufficient unused capacity to create a market.

However, given that some stakeholders have expressed concerns that they have not been able to access unused pipeline capacity in the past, it is unclear whether the current market will see adequate unused capacity offered to the market on pipelines where unused capacity is dominated by retailers.

The key risks of Option 1 include:

- Adequate unused capacity that would facilitate gas trade may not be offered to the market; and
- The market may operate to the detriment of the NGO resulting in higher costs to consumers.

## ***OPTION 2 - Information Provision***

### **Benefits**

The key benefits for stakeholder groups of Option 2 include:

#### ***Industry Participants and Consumers***

- Lower barriers to market entry for new retailers;
- Improved contestability may result in wider choice of gas retailers and potentially competitive pressure could result in lower prices; and
- Better-informed decision making; and

#### ***Policy Makers***

- Better-informed decision making.

### **Costs**

The key costs to stakeholder groups of Option 2 include:

#### ***AEMO***

- Upgrading data/administrative systems.

### *Shippers and Pipeliners*

- Possible upgrading of existing data/administrative systems.

### **Risks**

The key risks of Option 2 are that:

- Incumbent shippers may not offer up sufficient unused capacity to facilitate the establishment of a meaningful market; and
- The market may operate to the detriment of the NGO resulting in higher costs to consumers.

### *OPTION 3 - Voluntary Trading Platform*

#### **Benefits**

The key benefits for stakeholder groups of Option 3 include:

#### *Pipeliners*

- Transparent capacity trading would provide a mechanism to reveal the value of pipeline capacity rights and should assist informing efficient investment and operational decisions.

#### *Incumbent Shippers*

- Mitigate costs by more easily trading unused capacity.

#### *Industry Participants and Consumers*

- Market participants with insufficient contracted capacity able to more easily access capacity to ship gas;
- Transparent discovery of secondary pipeline capacity volume and price;
- Lower barriers to market entry for new retailers;
- Improved contestability may result in wider choice of gas retailers and potentially competitive pressure could result in lower prices;
- More efficient use of existing infrastructure; and
- Better-informed decision making.

#### *Policy Makers*

- Better-informed decision making.

### **Costs**

The key costs to stakeholder groups involved with Option 3 include:

#### *Market Operator*

- Trading platform establishment and operational costs.

### **Risks**

The key risks of Option 3 include:

- Incumbent shippers may not offer up sufficient unused capacity to facilitate the establishment of a meaningful market;

- There may be limited/inadequate demand for unused capacity and therefore trading platform establishment and operation costs may not be justified; and
- The market may operate to the detriment of the NGO resulting in higher costs to consumers.

### ***OPTION 4A - Mandatory Trading Obligations: UIOLI***

#### **Benefits**

The key benefits for stakeholder groups of Option 4A include:

##### ***Pipeline***

- Transparent capacity trading would provide a mechanism to reveal the value of pipeline capacity rights and should assist informing efficient investment and operational decisions.

##### ***Industry Participants and Consumers***

- Market participants with insufficient contracted capacity able to more easily access 'as available' capacity to ship gas;
- Lower barriers to market entry for new retailers;
- Improved contestability may result in wider choice of gas retailers and potentially competitive pressure could result in lower prices;
- Transparent discovery of secondary pipeline capacity volume and price;
- Better-informed decision making; and
- More efficient use of existing infrastructure.

##### ***Policy Makers***

- Better-informed decision making.

#### **Costs**

The key costs to stakeholder groups involved with Option 4A include:

##### ***Pipeline***

- Operational costs to transparently offer up capacity.

##### ***Australian Governments/Regulatory Agencies***

- Legislative/regulatory change costs.

#### **Risks**

The key risks of Option 4A include:

- Operational costs may not be justified if there is limited/inadequate demand for released 'as available' capacity.

## ***OPTION 4B - Mandatory Trading Obligations: UIOSI***

### **Benefits**

The key benefits for stakeholder groups of Option 4B include:

#### ***Incumbent Shippers***

- Mitigate costs by more easily trading unused firm capacity.

#### ***Pipeline owners***

- Transparent capacity trading would provide a mechanism to reveal the value of pipeline capacity rights and should assist informing efficient investment and operational decisions by pipeline owners.

#### ***Industry Participants and Consumers***

- Market participants with insufficient contracted capacity able to more easily access firm capacity to ship gas;
- Lower barriers to market entry for new retailers;
- Improved contestability may result in wider choice of gas retailers and potentially competitive pressure could result in lower prices;
- Transparent discovery of volume and price for secondary pipeline capacity;
- More efficient use of existing infrastructure; and
- Better-informed decision making.

#### ***Policy Makers***

- Better-informed decision making.

### **Costs**

The key costs involved with Option 4B include:

#### ***Incumbent Shippers***

- The property rights of existing shippers would be impacted.

#### ***Market Operator***

- Trading platform establishment and operational costs.

#### ***Australian Governments/Regulatory Agencies***

- Legislative/regulatory change costs.

### **Risks**

The key risks of Option 4B include:

- Concerns may be raised regarding sovereign risk due to intervening in established contractual agreements of existing GSAs and/or GTAs; and
- Trading/auction platform establishment and operation costs may not be justified if there is limited/inadequate demand for released firm capacity.

## CONSULTATION

AEMO's work on the Gas Supply Hub includes consultation via an Industry Reference Group that first met on 28 February 2012. During meetings, some industry representatives highlighted difficulties they have experienced with accessing unused pipeline capacity.

Officials undertook informal industry consultations during 2012. During this period, representatives from producers, retailers, industrial consumers, pipeline owners and AEMO were consulted. Officials then drafted an internal discussion paper that was considered by SCER at its 14 December 2012 meeting. Since then, representatives from the AER, AEMC and energy supply sector have been consulted. The discussion paper and subsequent consultations have been used as the basis for drafting this consultation RIS.

This consultation RIS is released for a period of six weeks and submissions can be made up until 5 p.m. on Monday 15 July 2013. This consultation RIS is available on the SCER and Office of Best Practice Regulation websites. The contents of this consultation RIS were agreed to by officials prior to its release. Interested stakeholders are encouraged to answer the specific questions listed throughout this document.

Submissions may be made to the SCER Secretariat (see SCER website for details: [www.scer.gov.au](http://www.scer.gov.au)).

In addition to reviewing submissions, officials will be undertaking formal consultations with key industry stakeholders.

## EVALUATION AND CONCLUSION

Because information concerning the demand for and supply of unused pipeline capacity is not readily available, currently, it is difficult to justify a change from the status quo. Once submissions for this RIS have been received and consultation has been undertaken, it will be clearer whether or not a significant problem exists with the supply of unused pipeline capacity and what the likely level of demand is for unused capacity. Further, the RIS process will also assist with facilitating a comprehensive assessment of the likely quantitative costs and benefits associated with each option and whether any change to the status quo could deliver a net benefit.

Further, once the Wallumbilla Gas Supply Hub is operational and its pipeline capacity Bulletin Board has been established, it will be clear what the level of demand for and supply of unused pipeline capacity is on pipelines associated with Wallumbilla. However, it is acknowledged that the issue of unused pipeline capacity trading is not only restricted to Wallumbilla, but is of broader interest to Australia's gas markets.

Taking the above into account, it is proposed that the status quo be maintained until after the Wallumbilla Gas Supply Hub has been operational for a period of one year. At that time, it is proposed that a review be undertaken to assess the level of demand for unused pipeline capacity and whether or not adequate unused capacity has been offered to the market.

## **IMPLEMENTATION AND REVIEW**

The above options will be tested in discussion with stakeholders as part of the RIS consultation process. Following this, SCER will be presented with a decision RIS for its consideration prior to the end of 2013. The decision RIS will then be released which may contain a more detailed schedule of the proposed implementation of the preferred response. The decision RIS may also provide information about a future review of the issue/preferred response.

## APPENDIX A – INTERNATIONAL EXPERIENCE

Examples of how unused pipeline capacity is managed in an international context include:

- United States of America’s Federal Energy Regulatory Commission (FERC) *Open Access Same-Time Information System*;
- Great Britain’s *National Balancing Point* (a virtual trading location);
- Netherlands’ *APX-ENDEX*;
- Germany’s *TRAC-X*;
- France’s and Belgium’s *Capsquare*; and
- Germany’s, Netherlands’ and Denmark’s *Link4Hubs*.

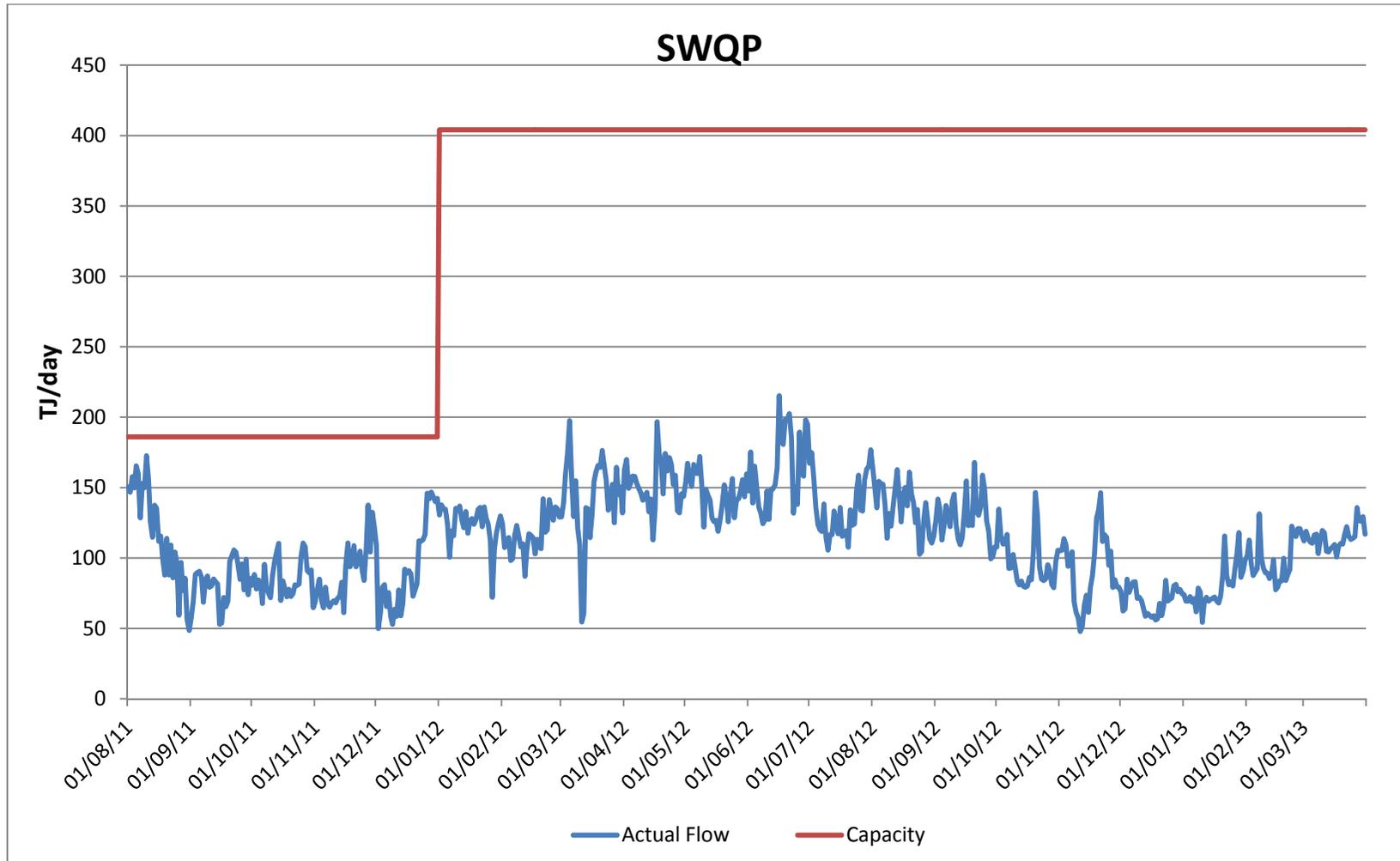
**Table A1: Pipeline Capacity Trading Initiatives**

Exchange/Location	Description	Product/Features	Comments
Netherlands APX-ENDEX	<p>Part of the 2008 pilot program for the development of secondary trading of capacity.</p> <ul style="list-style-type: none"> <li>• Capacity products developed for the pipeline interconnect between Holland and Germany allowing users to transfer gas to or from the Dutch gas hub (the Title Transfer Facility).</li> </ul>	<ul style="list-style-type: none"> <li>• Secondary trading of firm capacity usage rights.</li> <li>• Day-ahead, weekend contracts</li> <li>• Centralised settlement and credit risk management.</li> </ul>	<ul style="list-style-type: none"> <li>• Transactions issued directly to transport system operator (TSO).</li> <li>• APX-ENDEX also offers physical gas trading products.</li> </ul>

Exchange/Location	Description	Product/Features	Comments
<p><b>Germany</b></p> <p>TRAC-X</p>	<p>Established in 2005 by German TSOs to facilitate secondary trading of gas transportation services.</p> <ul style="list-style-type: none"> <li>• Web-based trading platform allowing contract holders to trade or auction capacity.</li> <li>• In response to European gas market initiatives, in 2010 TRAC-X also tasked with auctions for primary capacity allocation for German pipelines.</li> </ul>	<ul style="list-style-type: none"> <li>• Short-term secondary capacity transactions are based on operational transfer and bilateral settlement</li> <li>• Medium-term secondary capacity transactions are based on contractual transfer.</li> <li>• Buyer takes on financial obligations direct to the TSO</li> <li>• Trading occurs 9am-11am Monday to Friday.</li> <li>• Seller can filter out buyers that they have not established credit support.</li> </ul>	<ul style="list-style-type: none"> <li>• Transactions executed on the exchange are sent straight to the relevant TSO to perform the transfer of capacity from the buyer to the seller.</li> <li>• Buyer makes nomination direct to the TSO.</li> </ul>
<p><b>Belgium</b></p> <p><b>France</b></p> <p>Capsquare</p>	<p>Capsquare is a web-based platform to buy or sell natural gas transmission capacity on the secondary market in:</p> <ul style="list-style-type: none"> <li>• Belgium’s Fluxys Transmission Network and Storage Installation; and</li> <li>• France’s GRTgaz network</li> </ul>	<ul style="list-style-type: none"> <li>• Short to medium-term capacity transactions.</li> <li>• Bilateral settlement.</li> </ul>	<ul style="list-style-type: none"> <li>• Capsquare sends details of capacity transactions to the relevant TSO so that the capacity usage rights can be transferred from the seller to the buyer.</li> </ul>

Exchange/Location	Description	Product/Features	Comments
<p><b>Germany</b> <b>Netherlands</b> <b>Denmark</b></p> <p>Link4Hubs</p>	<p>Web-based platform for the trading of cross-border pipeline capacity between Germany, Netherlands and Denmark.</p>	<ul style="list-style-type: none"> <li>• Day ahead capacity product developed by TSO.</li> <li>• Capacity available for purchase based on operators' assessments of available capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• Trading participants register with the relevant TSOs prior to trading.</li> </ul>
<p><b>United States</b></p> <p>Open Access Same-Time Information System</p>	<p>FERC requires pipeline operators to publish details of available services, operating capacity and scheduled capacity on the Open Access Same-Time Information System (OASIS) website.</p>	<ul style="list-style-type: none"> <li>• Information about transportation services available intraday: <ul style="list-style-type: none"> <li>– Unsubscribed: quantity of capacity that has not be sold that is available for sale as a firm service.</li> <li>– Operationally available: quantity of capacity not used by shippers that is available for sale as an interruptible service.</li> </ul> </li> </ul>	

**APPENDIX B – DAILY PIPELINE CAPACITY UTILISATION** (1 Aug 2011 – 31 May 2013)



Source: AEMO, National Gas Market Bulletin Board, various actual gas flow documents, [online] [www.gasbb.com.au/viewArchive.aspx?node=archive](http://www.gasbb.com.au/viewArchive.aspx?node=archive)

