the australian PIPELINE industry association Ltd

1965 – 2005 40 YEARS IN PIPELINES

Senate Select Committee on Fuel and Energy

Monday, 22 June, 2009

Australian Pipeline Industry Association

Supplementary Information

TOR (e) the existing set of federal and state government regulatory powers as they relate to fuel and energy products

TOR (h) domestic energy supply and the domestic oil/gas exploration and refinement industry, with particular reference to:

i. the impact of Commonwealth, state and local government regulations on these industries,
ii. increasing domestic oil/gas exploration and refinement activities, with a view to reducing Australia's reliance on imported oil,
iii. other tax incentives, and
iv. securing Australia's future domestic energy supply.

There are two main concerns that APIA has with the existing set of federal government regulatory powers as they relate to the domestic energy supply and, specifically, to gas transmission. These concerns are the impact of regulatory decisions on investment and the tendency of policymakers to expect that processes that apply to electricity can also automatically apply to natural gas.

ECONOMIC REGULATION

When considering access arrangements, economic regulators tend to allow for a low rate of return for gas transmission companies (and, therefore, investors), with a view to providing the users of pipelines with low transportation tariffs. This approach ignores several facts:

- unlike the relationships between energy retailers and consumers, which are also overseen by economic regulators, the relationship between gas transmission infrastructure and its users are relationships between large, sophisticated entities. In most of these cases, the users are the larger parties. **Therefore, the users of gas transmission pipelines do not require government intervention to ensure efficient outcomes;**
- the legal separation of the owners and operators of transmission pipelines from gas wholesalers and retailers, which was mandated in early industry reforms, has largely removed incentives for discriminatory behavior by transmission pipeline companies. **Government intervention in the gas transmission market is not required for the purpose of regulating competition between wholesalers and retailers in the energy market;**
- in driving down the rate of return available to gas transmission investors, the economic regulators are **decreasing the attractiveness of investment in gas transmission infrastructure and this can lead to underinvestment** in this critical infrastructure; and
- in order to avoid the risk of low rates of return mandated by a regulator, investors/gas transmission companies are driven to minimise regulatory exposure through a variety of means, which can lead to **inefficient investments.** This includes building for capacity (under contract) and expanding that capacity only when demand is sufficient for further investment – either by increasing compression or by "looping", which is effectively building a twin, linked ,pipeline and all the costs that such construction incurs.

Clearly, regulatory risk increases the cost of providing gas transmission services, which can impose social costs through:

- undermining the incentive to invest – regulators approving low returns signals to investors that only limited capital should be invested in the gas transmission sector ;
- delaying or distorting investment – the increased risk associated with regulation means that investment can be delayed until, for example, greater throughput can be achieved (or a target level of throughput becomes more certain) making the investment less risky and thus commercial. It also means tends to result in smaller pipelines being built, or smaller pipeline augmentations being built, as a means of protecting investors against regulatory risk. (Limiting pipeline size is prudent if there is a risk that regulators will strand any excess capacity without allowing an offsetting premium to be earned when at-risk capacity experiences high demand. However, reducing pipeline capacity imposes cost on the community on account of foregone scale economy benefits and increased likelihood of capacity constraints.)

In increasing the regulatory risk by driving down the rates of return, the economic regulators are providing an incentive to investors to build smaller, unregulated pipelines initially and subsequently expand capacity only when it is fully contracted. This investment style is more expensive than building spare capacity into the original investment.

Only 34% of gas transmission pipelines in the AER's jurisdiction are regulated, a clear indication that industry seeks to minimise regulatory risk. APIA believes that the challenges facing energy infrastructure industries are best addressed by economic regulators determining a reasonable range for rates of return and selecting an estimate at the higher end of the range to encourage economically efficient investment in spare capacity, and to ensure gas transmission infrastructure continues to be an attractive investment.

CONVERGENCE OF GAS AND ELECTRICITY REGULATION

Energy Market Reform will see the Australian Energy Market Operator (AEMO) commence operation on 1 July 2009. For the first time, electricity markets and gas markets will be managed by a single entity. While there are some synergies between these markets, APIA is concerned at the intention to impose many regulations suitable to the electricity market on the gas market, without recognition of the significant differences that exist between these markets. These differences include:

- Physical differences - gas and gas transmission pipelines have different physical characteristics from electricity and electricity assets. In particular:
    - Storage - pipelines act as storage vessels for gas.
    - Flow - in a majority of transmission pipelines gas flows in one direction, while in electricity transmission, the electricity moves multi-directionally.
    - Recoverability - the provision of electricity is instantaneous whereas for gas there is a time lag. The ability of electricity to be available when a generation plant comes back on line is almost immediate; this is not the case for gas.
    - Compressibility - gas is physically compressible. This impacts on investment considerations relating to pipeline expansion.
- Location differences – gas transmission pipelines connect naturally occurring gas fields with end users. As such, there is little discretion regarding location of transmission pipelines. However, as electricity is generated rather than extracted, there is greater discretion as to where electricity generation and transmission assets are located.

- Market operations and arrangements differences - the gas market has a different role and structure from the electricity market.
    - Role of the grid - the role of the electricity grid in the operation of the market is significantly different from the role of gas transmission pipelines. The electricity transmission grid has a key role integrating the electricity market. In contrast gas transmission pipelines have a lesser integration role as they tend to link individual production regions to market centres over long distances with varying degrees of interconnection.
    - Market dispatch arrangements - gas has less complicated market and dispatch arrangements as gas has more predictable flows and demand due to the contracting regime that exists in gas, the ability to use storage and fewer complex network interactions.
- Investment differences - gas pipeline investment (both greenfield and brownfield investment) is typically entrepreneurial in nature and is underpinned by commercially negotiated bilateral contracts for pipeline capacity. The commercial contracting approach results in transmission pipeline companies being focused on ensuring new investment is economic and underpinned by emerging and existing contracted demand. Electricity transmission and distribution investment is more likely than gas investment to be driven by planning and regulatory obligations and is less likely to be underpinned by explicit contracts.
- End use markets - gas usage is dominated by power generation, including power generation for the mining sector, and major industrial users such as fertiliser plants and mineral processing plants. In most States, gas is generally an input into electricity production rather than a competing energy source. Electricity usage is much more widely spread across different geographical and demographic markets. In addition, most gas end use markets have at least a degree of competition with alternative fuels or end user production options.
- Investment Recovery and Stranding
    - recovery of the majority of electricity transmission and distribution investment is achieved by including the investment in interconnected, regulated networks. Recovery of gas transmission investment is often more problematic due to the point-to-point nature of gas assets and the concentration of gas end users. These factors mean that non performing gas transmission investments are more easily identified and stranded. In addition, gas pipelines are also at risk of being stranded due to field depletion or large end-users seeking supplies from alternative fields, moving sites or closing sites;
    - the gas regulatory regime places transmission pipelines at the risk of having un-contracted capacity and thereby receiving no revenue (because of tariffs being set on the basis of an inflexible depreciation schedule which assumes a return of capital over the expected physical life of the pipe (in excess of 60 years).

ToR (g) the role of alternative sources of energy to coal and alternative fuels to petroleum and diesel, including but not limited to: LPG, LNG, CNG, gas to liquids, coal to liquids, electricity and bio-fuels such as, but not limited to, ethanol

In the short to medium term, natural gas can play a vital role in reducing Australia's greenhouse gas emissions. It is also quite possible natural gas will remain a key energy source in the longer term. Emissions from Australia's stationary energy sector totalled 287.4 million tonnes of carbon dioxide equivalent in 2006[1], 52.3% of the total national emissions of 549.9 million tonnes of

[1] National Greenhouse Gas Inventory 2006, *Australian Greenhouse Office, Department of the Environment and Water Resources, June 2008.*

carbon dioxide equivalent. The vast majority of these emissions result from coal fired electricity. Natural gas fired electricity is significantly cleaner than coal fired electricity, and for every coal fired power station that is replaced with a gas fired power station millions of tonnes of carbon dioxide equivalent emissions (exact figures are not available, as every power station is different) would be saved.

Natural gas is the cleanest fossil fuel energy source available. When used in electricity generation, natural gas generates around 40% of the carbon dioxide emissions of a black coal power station and less than 33% of the emissions of a brown coal power station. Gas fired power stations also use around 20% of the water required for coal fired power stations, and in some cases have virtually zero water usage.

Indeed, Environment Victoria found, in its November 2008 paper *Turning it around: environment solutions for Victoria* that:

> *"The most significant early impact (in the stationary energy sector) comes from the use of gas as early as possible to deliver early reductions in greenhouse gas emissions. Indeed, possible uncertainty in short term investment in coal-fired generation presents an early opportunity for a greater reliance on Gas Powered Generation (GPG) to meet Victoria's base-load energy requirements. Whether coal-fired generation completely goes off-line, or even just varies its generation activities in the interim period until CCS comes on-line, there is certainly an opportunity to move to a greater reliance on GPG. However, it is stressed that this wedge would require urgent and major energy infrastructure investment in Victoria."*

Natural gas fired power stations also enjoy an economic advantage over many other types of electricity generation, including lower construction costs. Natural gas compares favourably to most base load electricity generation options, as shown in the table below. When the CPRS creates an economic value for emissions, the comparative advantage of gas fired power generation could increase further.

As the merits of natural gas are obvious, there should not be a need for Government policy to encourage its use. Policies such as the CPRS should result in a marked increase in the use of natural gas, particularly for electricity generation.

However, in the presence of significant government policies supporting the use of coal and renewables in electricity generation, there is no longer a 'level playing field' on which all energy options compete, and it is appropriate that Government give consideration to developing policies to ensure the growth of gas an appropriate fuel for electricity generation.

Electricity base load generation options:[1]

Technology	**Commercial Operation**	**Construction Cost $/kW**	**Fuel Cost $/MWh(SO)**	**CO2 kg/MWh(SO)**
Ultra-supercritical coal (USC). The most advanced coal power stations.	currently available	1400 - 1950	8 - 14	785-860
USC with CCS	CCS available 2020	3000 - 3500	11 - 20	~ 100
Natural Gas Combined Cycle (CCGT). The most advanced gas power stations.	currently available	800 - 940	>28	345
CCGT with CCS	CCS available 2020	1300 – 1700	>33	~ 50
Integrated Gasification Combined Cycle (IGCC). Coal is converted to gas and then used as fuel.	2015	2100 – 2600	9 - 14	785 - 840
IGCC with CCS	CCS available 2020	3100 - 3500	9 - 16	~ 100
Nuclear	Currently available but no regulatory regime	2800 – 3000	5	0

[1] NSW Power Generation and CO2 Emissions Reduction Technology Options 2007

Solar Thermal.	Currently available but in early phase	~ 4600	0	0
Hot dry rocks.	Research underway	unknown, site specific	0	0
Hydro	Currently available	site specific	0	0
Biomass thermal	Currently available	2000	0* - 30	0