Jemena Gas Networks (NSW) – Access Arrangement Information - Appendix 5.1

Gas Market Environment

26 August 2009

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1 Introduction

The purpose of this Appendix 5.1 is to précis the major sections of the National Institute of Economic and Industry Research (**NIEIR**) report which address the environment for gas marketing from 2009-10 onwards. NIEIR has identified three broad market-related areas which will have significant impacts on gas consumption in NSW over the next regulatory period; namely:

- trends in NSW gas consumption
- the link between future gas prices and the Carbon Pollution Reduction Scheme **(CPRS)**
- NSW and Commonwealth Government policies relating to gas (and electricity) consumption in NSW.

Where indicated, JGN has made some observations on the NIEIR analysis.

2 Trends in NSW gas consumption

Every three years since 1994, the Australian Bureau of Statistics (**ABS**) has produced information relating to domestic energy use by conducting a monthly Labour Force Survey (**LFS**) supplemented by an Energy Use and Conservation Survey (**EUCS)** (the latest is March 2008).

The EUCS covers a range of issues including energy sources, appliances and energy saving measures used in households. Despite possible sampling and other errors, it provides a useful overall picture of gas usage by households in NSW. NIEIR has analysed the EUCS data as shown in the following sections.

2.1 Summary of total residential energy market

Table 2-1: Appliance penetration in NSW households – (Table 4.4 NIEIR)

Table 4.4	Appliance penetration in gas end-uses – New South Wales – 2008 (per cent)						
	Electricity	Mains gas	Electricity and gas combined	LP bottle gas	Solar	Wood	Other
Main source of energy used							
Ovens	80.3	15.8	n.a.	3.6	n.p.	0.3	-
Cook tops	65.2	27.9	0.3	6.2	n.p.	n.p.	n.a.
Space heating	43.1	17.2	n.a.	4.0	n.a.	10.3	1.6
Water heating	58.1	23.9	n.a.	1.6	5.0	0.3	12.1

Notes: 'Other': Includes didn't know and oil.
n.a. Not applicable.
n.p. Not available for publication but included in the totals.
Source: ABS, Tables 3.6, 3.7, 3.8, 3.10, Catalogue 4602.0.55.001.

Table 2-1 shows that natural gas is used for 15.8 per cent of ovens, 27.9 per cent of cook tops, 17.2 per cent of space heating appliances and 23 per cent of water heaters.

2.2 Space heating

Table 2-2: Main source of space heating in NSW – (Table 4.6 NIEIR)

Table 4.6 Main source of energy used in space heating – New South Wales (per cent)							
	Electricity	Mains gas	LPG	Total gas	Wood	Oil	No heater
1999	42.2	n.a	n.a	21.9	14.7	2.7	17.8
2002	44.4	n.a	n.a	23.7	11.8	1.6	18.2
2005	44.3	16.1	5.1	21.2	10.9	0.8	22.5
2008	43.1	17.2	4.0	21.2	10.3	0.3	23.9

Note: n.a. = Not applicable.
Source: ABS, Table 3.9, Catalogue 4602.0.55.001.

Table 2-2 indicates that:

- the natural gas share of the main energy source decreased slightly from 21.9 per cent in 1999 to 21.2 per cent in 2008. Wood heating is also on the decline, having fallen more than 4 percentage points to 10.3 per cent in 2008

- the electricity share of space heating has been fairly steady since 1999, having risen by 0.9 per cent to a share of 43.1 per cent over the last nine years

- a notable trend is the increasing proportion of households with no heater, rising from 17.8 per cent in 1999 to 23.9 per cent in 2008. This trend could potentially reflect the increased use of air conditioners for room heating (see next section).

2.3 Effect of residential cooling

The number of dwellings in NSW with a cooler/air-conditioner has been increasing, rising from 30.8 per cent of dwellings in 1994 to 58.3 per cent in 2008, according to the EUCS.

This trend can be further supported by the NSW reverse cycle air conditioner sales data, which shows that sales have been on a steady increase since 1994 at an average growth of 14 per cent annually[1].

2.4 Dwelling insulation

The EUCS shows that 978,000 dwellings in NSW have no insulation, or 36 per cent of the total. The Australian average is 29 per cent of dwellings with no insulation. The Commonwealth stimulus package announced in March 2009 aims to have insulation installed insulation into 2.7 million Australian homes[2].

[1] JGN notes that this could explain the increasing proportion of dwellings without a dedicated room space heater.

[2] JGN NOTE: There appears to be considerable potential for increased uptake of insulation in NSW, with resulting effects on energy consumption. The effect of the stimulus package and other greenhouse gas initiatives will be to drive the increased uptake of insulation in existing dwellings, contributing to further reductions in gas consumption of existing dwellings.

2.5 Water heating

Table 2-3: Main source of space heating in NSW – (Table 4.8 NIEIR)

Table 4.8	Main source of energy used in water heating – New South Wales (per cent)						
	Electricity	**Mains gas**	**LPG**	**Total gas**	**Wood**	**Solar**	**Other**
1999	75.9	n.a.	n.a.	20.8	0.7	2.7	1.0
2002	79.0	n.a.	n.a.	23.4	0.5	2.4	2.4
2005	63.8	23.9	1.3	25.2	0.6	2.5	8.6
2008	58.0	23.9	1.6	25.5	0.3	5.0	12.1

Notes: n.a. = Not applicable.
'Other': Includes didn't know and oil.
Source: ABS, Table 3.11, Catalogue 4602.0.55.001

Table 2-3 indicates that:

- the natural gas share of the main energy source in water heating increased from 20.8 per cent in 1999 to 25.5 per cent in 2008
- the electricity share has been steadily declining having lost at least 17 per cent of its share as households have shifted towards solar and gas
- the use of solar energy as a source for heating water has been increasing slowly, but is still only 5 per cent of the total
- the significant increase in 'other' could reflect increased heat pump installations (which are really electric appliances).

2.6 Solar water heating

Table 2-4: Solar hot water in NSW – (Table 4.5 NIEIR)

Table 4.5	Solar hot water – type of booster – New South Wales (per cent)				
	Electric	Mains gas	LPG gas	Total gas	Other
1999	90.2	n.a.	n.a.	1.0	8.8
2002	95.1	n.a.	n.a.	3.7	1.2
2005	93.9	n.a.	n.a.	n.a.	6.1
2008	77.0	6.7	n.p.	6.7	13.5

Note: 'Other': Includes not boosted, 'did not know' and wood.

JGN NOTE: Table 2-4 indicates that the majority of solar hot water heating in NSW is solar-electric (77%). The significant growth of the other category can be attributed to the growth in heat pump systems, which are essentially an electric hot water system.

3 Link between future gas prices and the CPRS

At the time that NIEIR was preparing its projections (December 2008), a number of federal and state government policies had significant potential to affect gas prices[3].

On the 15 December 2008, the Commonwealth Government released its white paper on the CPRS. This paper confirmed an emission trading scheme is to be introduced by 2010-11[4]. The White Paper outlines the final design of the CPRS, and a target range for reducing carbon pollution. NIEIR's assessment of the White Paper and the implications for carbon permit prices and gas prices are provided in section 4.7 of the NIEIR report attached.

3.1 Government policies relating to gas (and electricity) consumption in NSW

There are a number of Commonwealth and NSW government policies and initiatives (besides the CPRS) that will have an effect on energy use and gas consumption. These policies cover construction of homes, alterations and extensions, and purchasing/replacement of household appliances and home insulation. All of these affect future gas consumption in NSW.

[3] JGN notes that electricity prices would also be affected.

[4] As noted, now delayed by one year to 2011-12.

NIEIR has considered these policies and their potential effects on gas usage, as described in section 4.8 of its report. The remainder of this section summarises NIEIR's assessment of the effects of these measures on forecast gas usage.

3.1.1 Building Sustainability Index

Building Sustainability Index (**BASIX**) requires all new homes in New South Wales to use up to 40 per cent less potable water and produce up to 40 per cent fewer greenhouse gas emissions than the average home. BASIX will also apply to alterations and additions to existing homes worth $50,000 or more.

Average gas consumption as a result of BASIX in new homes is expected to drop with the new standards in place[5]. Programs such as GGAS and the Commonwealth stimulus package look at improving existing dwellings energy efficiency, whilst BASIX aims to regulate the development of new dwellings to reduce greenhouse gases, which at the same time reduces the average energy use of new dwellings. Average gas usage in new dwellings for heating is around 6.6 GJ, some 9 per cent less than for existing dwellings.

3.1.2 Mandatory Energy Performance Standards

In November 2002, a joint government-industry working group was set up to enhance the effectiveness of the gas appliance efficiency scheme.

The resulting proposed initiative of the Mandatory Energy Performance Standards (**MEPS**) for gas water heating requires the phasing out of all appliances below a 4.5 star rating. This will have a great impact on the overall consumption in NSW, as consumption for a 5 star hot water heater is at least 15 per cent less than for a 3 star appliance.

To estimate this saving, NIEIR developed a hot water model which looks at changing trends in replacing failed or scrapped units in existing dwellings and household preferences for purchasing hot water services (**HWS**) in new dwellings.

As a result of this analysis, average gas usage for hot water in new dwellings is assumed to be 10.5 GJ per annum, recognising a significant uptake of solar boosted gas systems.

For existing gas dwellings, a forecast net increase in gas usage in hot water is due to:

- a net decrease due to pre-existing storage and instantaneous gas hot water users replacing their HWS with a more efficient gas; and

[5] JGN Note: this analysis accepts that any switch to gas from the targets to reduce greenhouse emissions is outweighed by the other effects of BASIX.

- an increase due to previously electric HWS users switching to storage gas and instantaneous gas hot water.

For E to G dwellings (new gas connections by dwellings using electricity or other fuels) NIEIR assumed that 60 per cent switched to storage or instantaneous gas hot water in year 1. For the remainder of E to G dwellings (mainly still with resistance electric hot water systems) NIEIR assumed a failure or scrappage rate of electric appliances similar to existing dwellings.

3.1.3 Energy efficient showerheads

There are various companies accredited under the NSW greenhouse gas reduction scheme (**GGAS**) who offer or install water efficient showerheads. The Australian Government, in collaboration with state and territory governments, has introduced a Water Efficiency Labelling and Standards (**WELS**) Scheme.

The WELS scheme requires certain types of household water-using products to carry rating labels to reflect their relative water-use efficiency

GGAS and WELS have an indirect impact on gas consumption in New South Wales, via a reduction in water consumption. Those dwellings with gas hot water heaters will see a reduction in their gas consumption, depending on the energy efficiency of the water heater.

Gas savings will vary between dwellings, but a saving due to energy efficient shower heads is expected.

NIEIR's model assumed that the penetration of low flow showerheads will rise by around 3 per cent per annum, consistent with historic trends. This leads to a very small reduction in gas hot water usage by existing dwellings. On an annual basis, this will be around 0.1 GJ per annum.

3.1.4 Insulation and heating

There is very comprehensive range of Commonwealth and state incentives for insulation.

The Department of Environment and Climate Change NSW, is providing up to three hundred dollars in rebates for home owners in New South Wales, plus the Commonwealth Government is giving up to $1,600 rebates for home owners across the country to insulate their homes. From 1 July 2009, the Commonwealth will also install free ceiling insulation in around 2.7 million Australian homes, as a part of Energy Efficient Homes (**EEH**) initiative.

Around 36 per cent of NSW homes are uninsulated.

Assuming 50 per cent of those homes take up the energy efficient homes initiative, and apportioning the 25 per cent savings from insulation, NIEIR estimates that average heating gas usage for heating existing dwellings could fall by around 0.4 GJ per annum over the life of the policy initiative

3.1.5 Conversion from gas to electricity

The NIEIR projections also allow for the substitution towards electricity for existing gas customers. The projections assume that as gas space heaters break down, 25 per cent of existing customers replace the gas appliance with reverse cycle air conditioning. This leads to a small reduction in total gas heating usage in existing dwellings of 0.1 GJ per annum.

3.1.6 Renewable Energy Target

The Australian Government is committed to ensuring 20 per cent of Australia's electricity supply comes from renewable energy by 2020.

It is important to note that certificates under Renewable Energy Target (**RET**) apply both to new and existing dwelling replacements of hot water systems.

3.1.7 New South Wales Energy Efficiency Target

The NSW Government is setting a new target to increase energy efficiency activity under the NSW GGAS. Retailers will be required to pursue additional energy efficiency measures in households and businesses from July 2009.

A new class of tradeable certificate will be established to support the enhanced energy efficiency target, which will be designed to achieve an optimal level of energy efficiency in New South Wales. The remainder of GGAS will continue as it has in the past until it is replaced by the national emissions trading scheme. The existing targets in GGAS will continue.

Under the revised New South Wales Energy Efficiency Target (**NEET**) scheme substitution of electricity with gas for existing energy consumers does not generate new certificates and hence JGN expects that there will be a likely reduction to the current level of electric to gas fuel substitution and with a consequent reduction in gas consumption by existing consumers.