



NIEIR

24 October 2007

Mr Andrew Chow
Essential Services Commission
2nd floor
35 Spring Street
MELBOURNE VIC 3000

Dear Andrew,

Re: The Draft Decision and The Demand Forecasts and New Customer Usage assumptions by the Commission

Further to our letter dated 12 September 2007 regarding the Draft Decision, the gas Distribution businesses requested NIEIR to prepare a response to the Draft Decision assumptions regarding average usage for new dwellings over the Access Arrangement period.

A detailed response is attached to this letter regarding new customer usage by 5 star dwellings in Victoria.

The key points raised in the attachment are as follows:

- 1) The Commissions average usage per residential customer appear to be based on a very large house in outer or fringe Melbourne who consumed over 72 GJ per annum pre the 5 star standard. NIEIR reported average actual usage for new customers in its report for each Distribution business at around 55GJ per residential customer (table 5.1, NIEIR reports for each business). The Commission appears to have ignored this data without explanation or stating any reason.
- 2) The Commission makes a number statements on data published by the Australian Bureau of Statistics (ABS) on gas appliance penetration trends. These statements are not supported by the ABS data.

Statistical data reported by the ABS indicates that only 70 per cent of new dwellings completed in Victoria are detached houses. An even smaller proportion would be large houses (using 70 GJ and above), as inner urban new houses and retirement homes and villa's are usually much smaller.

The Commission's average usage assumptions for new residential customers are based on incorrect assumptions, and are inconsistent with historical actuals reported in the NIEIR reports. The usage figure of 71 GJs is some 30 per cent higher than the actual average usage for new pre 5 star dwellings of around 55 GJs per annum. When the Commission applies the 5 star savings to these inflated assumptions, new dwellings use is barely below the actual pre 5 star average new dwelling usage.

The trustee for the
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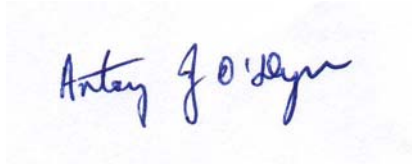
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NIEIR and SP AusNet have been re-examining actual usage by 5 star new dwellings in Victoria using billings database information. This new information will be forwarded to the Commission shortly. The Gas Distribution businesses have requested NIEIR to modify the residential forecasts given improved information on 5 star new dwellings usage and new estimates for 2007, the later which are based substantially on actuals.

Yours sincerely,

A handwritten signature in blue ink that reads "Antony J. O'Dwyer". The signature is written in a cursive style and is centered within a light blue rectangular box.

Antony J. O'Dwyer
Director

Further comments on the Draft Decision: Demand forecasts – new customer usage

**Prepared by the
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While the National Institute endeavours to provide reliable forecasts and believes the material is accurate it will not be liable for any claim by any party acting on such information.

1. Introduction and summary

In relation to some of its arguments, the Commission appears to have misrepresented and misreported some key data and findings from the NIEIR reports and other Government Agencies. This note responds to some of these issues which underlie the Draft Decision on the demand forecasts. It also shows that the Commission's assumptions, used in justifying average new dwellings use of 47 GJ per annum over 2008-2012, is inconsistent with reported actual new customer use.

The Commission has argued that for new customer usage, NIEIR's analysis is based on relatively outdated information and may no longer be relevant. The Commission consistently refer to an April 2007 report by George Wilkenfeld and Energy Efficient Strategies. This report actually supports the Distributor forecasts, and is inconsistent with some of the Commission's findings.

The Commission also points out there have been some shifts in domestic energy usage in recent years, citing an Australian Bureau of Statistics publication, *Environmental Issues: People's Views and Practices*. Some of the findings of the Commission in relation to this data are not supported by the actual reported ABS data.

The Commission's assumptions for new dwellings usage for both 5 star standard and implied pre 5 star standard are examined in Section 4. The Commission's assumptions for pre 5 star average residential usage are inconsistent with **actual** new pre 5 star average usage reported in the NIEIR reports for each business. The Commission's 5 star usage assumptions are therefore also inconsistent with actual data. The Commission does not provide a reason why it did not use the actuals reported for each business for pre 5 Star new dwelling usage, instead of the implied and erroneous figure of 71 GJs for all new dwellings. NIEIR provides a reason and explanation of why the Commission may have been misled. This explanation also reconciles the usage figures back to the reported actuals for Victoria for all new dwellings of around 55 GJs per dwelling pre the 5 Star Standard.

The inconsistencies of the Commission's assumptions regarding new dwelling usage over the Access Arrangement period in respect to:

1. actuals for new dwellings for each business pre the 5 star standard; and
2. inconsistencies with other ABS statistical data such as the composition of new dwelling completions and appliance penetration trends,

implies the Commission's assumptions cannot be regarded as reasonable and therefore not appropriate for use in the Access Arrangement.

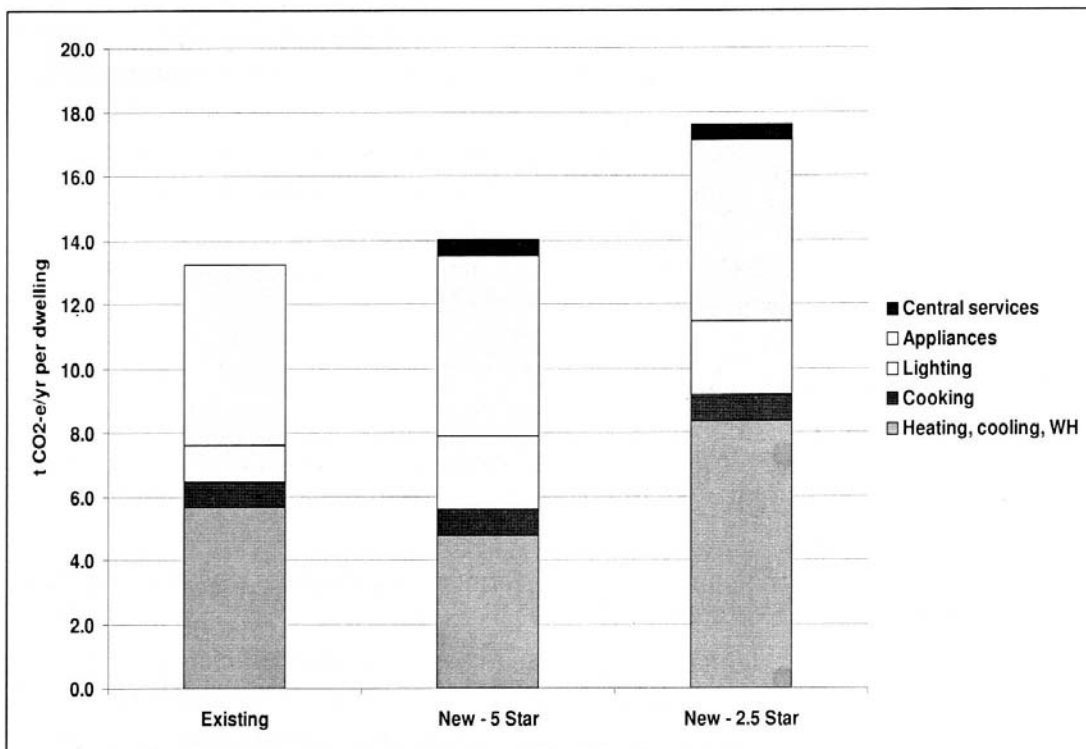
2. The misrepresentation of the Wilkenfeld/Energy Efficient Strategies report

In relation to the argument that the new customer usage is based on outdated information, the Commission itself relies extensively on a report by George Wilkenfeld and Associates with *Energy Efficient Strategies* dated April 2007. This report actually vindicates the NIEIR/distributor assumptions re the impact 5 star regulations on natural gas use in new dwellings.

Part of the Executive Summary from this report is reproduced below.

“It is also relevant to compare new dwellings meeting the 5 Star regulations with what would have happened if the 5 Star measures had not been introduced. The later scenario is called the ‘2.5 Star’ or ‘No-measures business-as-usual (BAU) case’.

Figure S1 Annual emissions per dwelling: Existing, New 5 Star and New 2.5 Star



Without the 5 Star measures, it is estimated that the average thermal performance of new dwellings would have been about 2.5 stars on the AccuRate rating scale, and annual emissions from energy use would have been about 17.6 tCO₂e/yr, or 33% higher than for existing homes (Figure S1). This is because there would have been very little improvement in thermal performance to compensate for the greater size of new dwellings and their greater lighting load.

The 5 Star regulations have largely compensated for the effects of larger dwellings by lowering the requirement for heating, cooling and water heating (but not lighting), so average emissions are only 6% higher than existing dwellings rather than 33% higher. In other words, the 5 Star measures have meant that average emissions from new dwellings are about 20% less than if the measures had not been implemented.

The difference amounts to about 3.6 tCO₂e/yr per new dwelling: about 3.1 tCO₂e/yr due to the thermal performance impacts and 0.5 tCO₂e/yr due to the water efficiency and solar water heater impacts. Without 5 Star, the annual emissions added by each year's cohort of new dwellings would have been about 136 kt CO₂e/yr higher than it is."

As stated above, the introduction of 5 star has meant that average emissions (electricity and gas usage) are about 20 per cent lower than if the measures had not been implemented.

The savings for 5 Star can be directly interpolated from the Figure above. As indicated in the Figure, denoted Figure S1, the reduction for new 5 star for heating, cooling and water heating (WH) compared to new 2.5 star is from around 8.2 to 4.7, a reduction of nearly 43 per cent (the grey area of the graph). The Report cited by the Commission actually supports the position of the Distribution/NIEIR forecast in their assumptions regarding the impact of 5 star on gas usage in new dwellings. It is the Commission's numbers that are misrepresentative and inconsistent with the assessed impact of George Wilkenfeld and Associates and *Energy Efficient Strategies 2007* report.

3. The ABS Survey results re gas appliance penetrations

The Commission's interpretation of the ABS statistics relating to gas appliance penetrations in Victoria in the Draft Decision is misleading and at times incorrect. Some of the actual ABS data directly conflict with the Commission's findings in the Draft Decision. Table 1 reproduces the ABS data on energy used in space heating and water heating for Victoria over selected years. The data suggest that:

- gas has increased its share in the hot water market and electricity has lost market share;
- electricity has increased its market share in space heating, partly reflecting a more than doubling in reverse cycle and a small increase in slab heating; and
- gas has not increased its market share in space heating since 1994 and its share fell between 2002 and 2005.

Table 1 Percentage of Victorian homes using electricity and gas for space heating and hot water				
	1994	1999	2002	2005
Main source of energy used in space heating (per cent)				
Gas (including LPG)	71.0	71.5	72.7	71.2
Electricity	12.5	11.9	12.9	14.7
Sources of energy used in heating water (per cent)				
Gas	61.0	64.6	66.7	68.0
Electricity	38.0	34.1	34.1	28.5
Heaters in dwellings (per cent)				
Gas ducted	Na	31.5	35.8	40.1
Gas not ducted	Na	40.1	37.7	33.0
Reverse cycle	Na	2.0	2.3	3.7

Source: Environmental Issues: People's Views and Practices, ABS, Cat. 4602.0, November 2005. Tables 3.12, 3.14 and 4.8. Gas includes LPG.

The Commission argues that almost 100 per cent of new homes use gas as the primary source of heating, and the majority of these use ducted heating. The Commission's statement is not correct. Only 70 per cent of all new dwellings in Victoria are detached dwellings (refer ABS Building Activity Statistics), and further a small proportion of these detached dwellings would be too small for central gas space heating to be viable. Nearly all apartments and other multi-unit dwellings use electricity for space heating and not central gas heating. Other dwellings were 30 per cent of total dwelling completions in Victoria in 2005 and 2006 (ABS Building Activity).

The increase in the share of apartments and multi-unit dwellings constructed in Victoria implies electricity is displacing gas for heating purposes. This is supported by the ABS Survey results in Table 1 above, showing reverse cycle has doubled over the last six years to nearly 4.0 per cent.

The Commission quotes George Wilkenfeld and Associates, noting that 22 per cent of Victorian dwellings had a reverse cycle air conditioner. This is not correct, as the ABS actually reports that in March 2005, 36.3 per cent of dwellings had a reverse cycle air conditioner in Victoria (Table 4.12).

The increase in gas central heating, as indicated in Table 1, has largely been at the expense of non-ducted gas heating. The increase in the market share also simply reflects completions of new detached houses over the period most of which (about 70 per cent of new dwellings are detached houses, and 30 per cent other dwellings such as townhouses and apartments), would have gas ducted heating.

Where the Commissions arguments in relation to the ABS data are incorrect, and the Commissions approach relies on these, the Commissions findings cannot be regarded as reasonable.

4. The Commission’s assumptions for new dwellings – inconsistency with actuals

The Commission’s assumptions for new dwellings usage are inconsistent with actual reported data for new dwellings usage drawn directly from the Distributors’ billings databases. These were reported in Table 5.1 of the NIEIR forecast report for each business.

Table 2 reproduces the Commission’s numbers regarding average usage for new dwellings. The Commission’s assumptions were as follows:

- 85 per cent of new dwellings have 3 star ducted gas heating;
- 10 per cent of new dwellings have 4 star non-ducted gas heating;
- 5 per cent of dwelling have no gas heating;
- 75 per cent of new dwellings have gas boosted solar hot water;
- 20 per cent of dwellings have gas hot water;
- 5 per cent have electric hot water; and
- 77 per cent of new dwellings have a gas cook top and 40 per cent have a gas oven.

The Commission incorporates the new 5 star building shell impact by assuming that a 3 star efficiency rated heater will use 35 per cent less energy. Table 2 replicates the Commission’s assumptions for new dwellings and indicates average usage for new dwellings of 46 GJs per anum. An examination of ducted appliances on the market (e.g. Brivis) suggests the Commission’s assumption that the average of 3 star is too conservative. The Brivis models start at 2.8 star and extend to 5.5 star. Henley homes offer 5 star ducted heating in their standard package. Gas boosted solar hot water is also standard. The 4 star usage figures would probably be more representative since there is no doubt 5 star ducted heaters are being installed.

Table 2 ESC assumption – new dwelling usage					
Appliance	Usage GJ	5 star efficiency factor	5 star usage	Weighting/ Penetration	Usage GJ
3 star ducted heater	56.00	0.35	36.40	0.85	30.94
4 star non-ducted heater	29.00	0.35	18.85	0.10	1.89
Solar hot water	8.00	0.00	8.00	0.75	6.00
Gas hot water	19.00	0.00	19.00	0.20	3.80
Stove/Cooker	3.00	0.00	3.00	0.77	2.31
Oven	3.00	0.00	3.00	0.40	1.20
Total					46.14

The usage figure in Table 2 at 46.14 GJs per dwelling is slightly below the 47 GJs reported by the ESC in its Draft Decision. NIEIR believes this reflects the fact that the ESC did not apply 5 star building shell savings to the 4 star non-ducted heaters in Table 2 above.

Pre- 5 star usage new dwelling gas usage can be easily calculated by removing the 35 per cent saving on heating and changing the shares of solar hot water to 5 per cent solar gas and 70 per cent have gas hot water. Pre 5 star new home usage implied by the Commission’s assumptions and the modified assumptions is shown in Table 3. The Commission’s assumptions imply pre 5 star new customer usage was nearly 71 GJs.

Table 3 Pre 5 star implied usage for new customers					
Appliance	Usage GJ	House 5 star efficiency factor	5 star usage	Weighting/ Penetration	Usage GJ
3 star ducted heater	56.00	0.00	56.00	0.85	47.60
4 star non-ducted heater	29.00	0.00	29.00	0.10	2.90
Solar hot water	8.00	0.00	8.00	0.05	0.40
Gas hot water	19.00	0.00	19.00	0.85	16.15
Stove/Cooker	3.00	0.00	3.00	0.77	2.31
Oven	3.00	0.00	3.00	0.40	1.20
Total					70.56

The Commission’s new customer pre 5 Star usage of 71 GJs is inconsistent with, and significantly above actual reported new customer usage. NIEIR reported new customer usage for Victoria on a weather normalised basis of 56.4 GJ for 2003 meters and 52.3 GJ for 2004 meters (refer Table 5.1 in the NIEIR report for each business). These figures were based on all new customers in 2003 and 2004 respectively and therefore pre-date the introduction of the 5 star Standard. The analysis was based on the actual billings databases of each distribution business.

Averaging the two gives 54.4 GJ per new dwelling pre the 5 star standard. It is unreasonable for the Commission to effectively ignore the actual reported data as they were a fundamental component of the VENCORP and Distribution Businesses (NIEIR) forecast methodologies..

NIEIR believes that the explanation for the inconsistency in the Commission’s findings lies in the composition of the new dwelling completions in Victoria and the assumed star rating for new gas ducted heaters.

The problems with the Commission’s assumptions appear to lie in two areas:

1. the star rating of gas ducted heaters is too low for new dwellings as mentioned above; and
2. the Commission does not recognise that detached houses only represent 70 per cent of new dwelling completions in Victoria.

The remainder of dwellings completed in Victoria include multiple story flats, townhouses, and apartments (together denoted as other dwellings). Reverse cycle air conditioning is much more prevalent in these dwelling types and gas space heating is often not permitted due to fluing constraints. Gas would be used for cooking and possibly water heating, depending on the dwelling type (multiple storey). Small Townhouses built for older persons could include gas hot water, room heating, gas cook top and of course space cooling, which would inevitably be reverse cycle(Cooling only air conditioners are virtually no longer available).

If we accept Table 3 as representative of new detached houses (subject to the 3 star assumption being changed to 4 star for ducted heating), then another table of assumptions needs to be made for other dwellings so that we can reconcile with actual average actual new customer usage. Table 4 presents assumptions regarding gas usage in other dwellings for Victoria.

The assumptions for new other dwellings include:

- 5 per cent of other dwellings have four star ducted gas heating;
- 25 per cent have 4 star non ducted heating;
- 10 per cent have gas solar hot water;
- 30 per cent have gas hot water;
- 50 per cent have gas cook tops; and
- 10 per cent have gas ovens.

Table 4 Gas usage in other dwellings						
Appliance	Usage GJ	5 star efficiency factor	5 star usage	Weighting/ Penetration	Usage GJ	
4 star ducted heater	50.00	0.00	50.00	0.05	2.50	
4 star non-ducted heater	29.00	0.00	29.00	0.25	7.25	
Solar hot water	8.00	0.00	8.00	0.10	0.80	
Gas hot water	19.00	0.00	19.00	0.30	5.70	
Stove/Cooker	3.00	0.00	3.00	0.50	1.50	
Oven	3.00	0.00	3.00	0.10	0.30	
Total					18.05	

Average usage for other dwellings pre 5 star implied by Table 4 is 18 GJ per annum. Weighting the house and other dwellings usage in Tables 3 and 4 (70 per cent houses and 30 per cent other dwellings) gives new dwelling usage of around 55 GJs for pre 5 star dwellings. This now reconciles reasonably closely with the actual new customer usage reported in NIEIR's reports for each business (Table 5.1).

After correcting for the composition of the growth in the dwelling stock and reconciling to actual new dwelling usage, the Commission's assumptions re 5 star can now be included back into the house and other dwelling usage tables for new customers. Tables 5 and 6 show new customer usage implied by 5 star. New customer usage for houses is around 43 GJs, while other dwelling usage is around 15 GJs. This gives a weighted average usage of around 34 GJs, including all dwelling types and not just large detached houses. Table 7 shows the weighted average results including both houses and other dwellings.

Table 5 Implied usage for new customers – houses including the Commissions 5 star assumptions						
Appliance	Usage GJ	5 star efficiency factor	5 star usage	Weighting/ Penetration	Usage GJ	
4 star ducted heater	50.00	0.35	32.50	0.85	27.63	
4 star non-ducted heater	29.00	0.35	18.85	0.10	1.89	
Solar hot water	8.00	0.00	8.00	0.75	6.00	
Gas hot water	19.00	0.00	19.00	0.20	3.80	
Stove/Cooker	3.00	0.00	3.00	0.77	2.31	
Oven	3.00	0.00	3.00	0.40	1.20	
Total					42.82	

Table 6 Gas usage in other dwellings including the Commissions 5 star assumptions						
Appliance	Usage GJ	5 star efficiency factor	5 star usage	Weighting/ Penetration	Usage GJ	
4 star ducted heater	50.00	0.35	32.50	0.05	1.63	
4 star non-ducted heater	29.00	0.35	18.85	0.25	4.71	
Solar hot water	8.00	0.00	8.00	0.10	0.80	
Gas hot water	19.00	0.00	19.00	0.30	5.70	
Stove/Cooker	3.00	0.00	3.00	0.50	1.50	
Oven	3.00	0.00	3.00	0.10	0.30	
Total					14.64	

Table 7 Gas usage in houses and other dwellings including the Commission's 5 star assumptions – weighted average						
Appliance	Usage GJ	5 star efficiency factor	5 star usage	Weighting/ Penetration	Usage GJ	
3 star ducted heater	50.00	0.35	32.50	0.61	19.83	
4 star non-ducted heater	29.00	0.35	18.85	0.15	2.73	
Solar hot water	8.00	0.00	8.00	0.56	4.44	
Gas hot water	19.00	0.00	19.00	0.23	4.37	
Stove/Cooker	3.00	0.00	3.00	0.69	2.07	
Oven	3.00	0.00	3.00	0.31	0.93	
Total					34.37	

As stated above, the Commission's average usage for new residential customers are based on incorrect assumptions, and are inconsistent with historical actuals in the NIEIR reports. The usage figure of 71 GJs is some 30 per cent higher than the actual average usage for new pre 5 star dwellings of around 55 GJs per anum. When the Commission applies the 5 star savings to these inflated assumptions, new dwellings use is barely below the actual pre 5 star average new dwelling usage.

Behavioural impacts associated with the water and energy conservation have not been taken into account in this analysis above of new customer gas usage patterns. These behavioural impacts have the potential significantly reduce new residential gas usage further as they are promoted widely by Government, and can be implemented and realise further cost savings by households.