

Inquiry into the Affordability of Bottled Liquefied Petroleum Gas (LPG) for Household Use: Issues Paper

November 2006

Inquiry Taskforce:

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Overview

The State Government has commissioned an inquiry into the affordability of bottled liquefied petroleum gas (LPG) in Western Australia in response to concerns from consumers, particularly people in regional areas and on fixed incomes who are dependent on bottled LPG as a residential energy source.

Previous investigations into LPG bottle pricing were undertaken in 1999 by the Australian Competition and Consumer Commission (ACCC) and in 2000 by a Western Australian Select Committee of Parliament. The ACCC reported in 2000 and advised that bottled gas prices in Western Australia did not appear excessive relative to other States.

However, the Select Committee on Pricing of Petroleum Products noted that the price of bottled LPG was causing hardship to regional Western Australians on low incomes.

Over the last five years retail prices of bottled LPG have increased significantly. Anecdotal evidence suggests that the retail price for 45kg cylinders doubled between 2001 and 2006. By comparison, unleaded petrol prices increased between 50-60% over the same period.

Bottled LPG is an important energy source for household appliances in regional and outer metropolitan areas of Western Australia that are not supplied by natural gas. It is commonly used for cooking, water heating and/or space heating. In these applications, bottled LPG competes with other energy sources such as from slow combustion wood heating, electric cookers, water heaters and space heaters, solar hot water systems, and more recently, reverse cycle air conditioning.

In July 2006, the Minister for Energy announced a taskforce to conduct an inquiry into the affordability of bottled LPG to be led by Mr Mick Murray MLA and Mr Max Trenorden MLA with support from the Office of Energy.

The terms of reference (Attachment 1) require the taskforce to investigate, and provide advice and recommendations to the Government on:

1. The affordability of bottled LPG for households in Western Australia, having regard to price trends in LPG compared with alternative energy sources, differential impacts on households with various income profiles and in different locations in Western Australia, and the Government's commitment to sustainability principles.
2. The factors influencing prices, particularly the price disparity between metropolitan and regional areas.
3. Opportunities for the introduction of other forms of gas supply, such as reticulated systems using liquefied natural gas (LNG), compressed natural gas (CNG) or an LPG based product that may provide lower cost alternatives to bottled LPG in regional towns.
4. Related matters as appropriate.

In particular, the taskforce will consider:

1. The views of users of bottled LPG about the impact of LPG prices on household budgets.
2. A comparison of the current and historical retail prices of bottled LPG with the retail prices of energy obtained through other energy sources, including reticulated natural gas, reticulated LPG (where applicable), electricity and renewable fuels.
3. The impacts of the potential migration of users of bottled LPG to other energy sources such as electricity or wood, including potential impacts on the existing electricity network and on the environment.
4. The effectiveness and equity of existing Government energy subsidy schemes for consumers dependent on more expensive energy sources.
5. The viability of, and current obstacles to, potential alternative mechanisms to supply gas, such as town-level distribution of natural gas, LNG, CNG or LPG.
6. The social, economic and environmental benefits of increased accessibility to gas for domestic, commercial and industrial users in regional Western Australia, compared with the cost of provision.

The taskforce is to provide a final report to the Minister for Energy in early 2007.

As part of this inquiry, the taskforce is seeking submissions from interested parties on the affordability of bottled LPG to help determine the extent that price increases are impacting on household budgets and potential options to address this, as well as other relevant issues.

This Issues Paper has been prepared to assist interested parties with framing their submissions. A copy of the Issues Paper and Inquiry Terms of Reference may be obtained from:

Website: www.energy.wa.gov.au

Phone: (08) 9420 5600

Email: lpginquiry@energy.wa.gov.au

Written (electronic or hard copy) feedback should be provided by 4pm WST on Wednesday 20 December 2006 to:

By mail:

Office of Energy
Bottled LPG Inquiry
Reply Paid 83418
Perth WA 6000

By hand:

Office of Energy
Bottled LPG Inquiry
Level 9, Governor Stirling Tower
197 St Georges Terrace
Perth WA 6000

By facsimile:

(08) 9420 5700
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Bottled LPG Inquiry

By email:

lpginquiry@energy.wa.gov.au

Submissions sent by email are strongly encouraged.

The Office of Energy may post submissions received on the Office of Energy website at www.energy.wa.gov.au. If any aspects of the submission are considered confidential, those areas should be clearly identified and the reasons for a claim of confidentiality noted in a covering letter.

Questions on any aspects of the inquiry should be directed to:

Nathan Johnston
Senior Analyst, Industry
Office of Energy
Level 9, Governor Stirling Tower
197 St Georges Terrace
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Tel (08) 9420 5637 or email: lpginquiry@energy.wa.gov.au

Glossary

CNG – Compressed Natural Gas – Natural gas pressurised to about 25MPa (about 3,600 psi) for transport and storage in bottles or tanks.

LNG – Liquefied Natural Gas – Natural gas cooled to -163°C at approximately standard atmospheric pressure to convert it to liquid form for transport and storage. LNG takes up about 0.16% of the volume of natural gas at room temperature. The liquefaction process also removes oxygen, carbon dioxide, heavier hydrocarbons, sulphur and water from the natural gas to leave it as almost pure methane.

LPG – Liquefied Petroleum Gas – Mixture of hydrocarbons (mainly propane and butane) extracted from petroleum reservoirs in association with natural gas or produced as a by-product of petroleum refining. It is stored as a liquid in tanks/bottles using pressure alone (about 2.2MPa or 320psi) and takes up about 0.4% of the volume of the gas at room temperature. LPG has a heating value about 2.5 times that of natural gas.

Natural Gas – Gas, primarily methane, extracted from underground reserves and either piped to the point of use or compressed as CNG or cooled as LNG for transport and storage.

Background on the LPG industry

What is LPG?

Liquefied Petroleum Gas or LPG is the generic name for mixtures of hydrocarbons (mainly propane and butane). It is a colourless, odourless gas heavier than air. A chemical called ethyl mercaptan is added to impart a pungent odour to assist leak detection. It is usually transported and stored in a liquid state because it is far more compact as a liquid. Propane is 240 times more compact in liquid than in a gas form and butane is 270 times more compact in liquid form.

LPG is different from natural gas piped into residences. Natural gas consists almost entirely of methane and has a different chemical formula and properties. LPG has a higher energy content than natural gas. For this reason, LPG appliances generally can not be used with natural gas and vice versa without conversion. Propane and butane are much easier and cheaper to compress into a liquid state for storage than methane (natural gas), which requires very low temperatures and significant energy to be turned into liquefied natural gas (LNG).

Where does LPG come from?

LPG is produced from two different sources: naturally occurring LPG and refinery produced LPG. It is produced globally from these sources and traded internationally.

Naturally occurring LPG is extracted from petroleum reservoirs where it occurs in association with natural gas and crude oil or condensate. This extraction produces propane and butane separately.

Refinery produced LPG is produced as a by-product from the process of crude oil refining and produces a propane/butane mixture. Both these processes are used in the production of LPG in Western Australia.

What is LPG used for?

There are three principal uses of LPG:

- It is used as a transport fuel (known as autogas or automotive LPG). Autogas is generally a mixture of propane and butane¹.
- It is used as a fuel for industrial, commercial and domestic use. Propane is used exclusively in this market in Western Australia.
 - In the commercial sector LPG is used for industrial processes, for power generation and in restaurants/bakeries.
 - LPG is used domestically for heating (water and homes) and cooking as well as for barbeques and camping stoves.
- It is also used by refineries and the petrochemical industry as feedstock.

For safety reasons, autogas should not be used for domestic LPG appliances as these are specifically designed to burn pure propane at the correct temperature. Autogas usually also contains butane, which does not fully combust in a propane appliance due to its slightly

¹ A small proportion of automotive LPG delivered to some areas is solely propane.

different chemical characteristics. Incomplete combustion of butane can be highly dangerous as it leads to the production of deadly carbon monoxide gas.

The terms of reference for this inquiry direct the taskforce to focus primarily on energy markets in which LPG is sold for use by residential consumers. This residential use does not include smaller gas bottles (typically 9kg bottles) used for BBQs, camping and other leisure purposes or automotive LPG.

Issues:

- *While the primary focus of this inquiry is on residential consumption of LPG, are there other uses and users of LPG that are relevant to the terms of reference of this inquiry and should be considered? Why?*
- *While this Inquiry is not directly considering autogas, are there any relevant issues from the autogas market that should be considered?*

LPG supply/demand and market structure

Supply of LPG

The commercial participants in the bottled gas supply chain include:

- **Producers** - who sell LPG at the petroleum refinery or LPG extraction plant gate, or at overseas terminals for transshipment to Australia.
- **Marketers** - who buy LPG in bulk from local producers, or from overseas markets, and sell to other marketers, distributors, retailers and/or to final consumers.
- **Transporters and distributors** - who truck bulk LPG to their regional depots, where it is stored in large pressure vessels, to be supplied to bulk customers by small tanker and to refill LPG cylinders, which are distributed to bottled gas retailers or consumers. The transporters and distributors may be integrated with a marketer, or may operate on contract to a marketer, or may be independent. Sub-contractors may carry out any of the specific functions of distributors such as bulk haulage, depot operation, and/or cylinder filling and distribution. There are also network operators in three towns where bulk LPG is trucked to the depot for supply by reticulation.
- **Retailers** – who sell directly to customers, including the activities of sales and billing, and sometimes appliance retailing. These may be retail branches of a marketer, commission agent of a marketer, or else independent resellers who purchase and resell propane in marketer owned and branded cylinders.

LPG production in Western Australia

LPG is a small but valuable part of State petroleum exports. The majority of LPG produced in the State is for export and the primary destination for Western Australia's LPG is Japan. In 2005, LPG exports represented approximately 4% of total petroleum export sales.² In 2005/06, exports of butane and propane increased by 12% in volume to 871,983 tonnes of LPG, returning a sales value of \$654 million, up 55%, reflecting the increase in international prices³. By comparison, LPG consumption for residential purposes in Western Australia is approximately 18,700 tonnes per annum or around 2% of that produced for export.

LPG is produced at BP's Kwinana refinery as a by-product of the oil refining process. There are currently two major facilities in Western Australia extracting LPG from gas/condensate streams – the North West Shelf Joint Venture (NWSJV) plant on the Burrup Peninsula and the Wesfarmers' plant at Kwinana.

The NWSJV plant was commissioned on the Burrup Peninsula in 1995 to extract LPG from the gas/condensate streams. The plant has a capacity of up to 800,000 tonnes per annum and all of this LPG is exported.

Wesfarmers LPG owns and operates a plant in Kwinana, Western Australia, which extracts propane and butane from the natural gas stream flowing from Western Australia's North-West Shelf gas fields via the Dampier to Bunbury Natural Gas Pipeline (DBNGP). The extraction plant has the capacity to produce 350,000 tonnes of LPG per annum. Wesfarmers LPG supplies much of Western Australia's domestic market, with the balance exported to Japan.

² 2005 Western Australian Oil & Gas Review, Department of Industry & Resources.

³ Overview of the WA Mineral and Petroleum Industry for 2005-06, Department of Industry & Resources.

The Wesfarmers LPG extraction plant commenced operations in 1988 with LPG supplied through the DBNGP under a long term contract with the State Energy Commission. The contract was assigned to AlintaGas following the creation of separate electricity and gas corporations. It is understood that contract conditions made AlintaGas liable to pay compensation if the amount of LPG in the DBNGP was less than a prescribed minimum and also restricted the earliest date that the contract could be terminated to 2005. In line with this commercial reality, the Government enacted regulations requiring a minimum quantity of LPG to remain in the gas transported through the DBNGP until 30 June 2005.

Recommendations from a review of DBNGP gas quality specifications in 1995 recognised the principle that agreements entered into in the past by participants in good faith should continue to be recognised until those contracts expire or are voluntarily renegotiated and that new competitive arrangements should be phased in as quickly as possible, but within existing constraints⁴.

Current rates of extraction of LPG from the pipeline by the Wesfarmers LPG plant are expected to have fallen below previous levels. The planned commissioning of the NWSJV LNG Train 5 in 2008 may impact the Wesfarmers LPG operations further if all LPG is extracted upstream on the Burrup Peninsula for export. Wesfarmers also has a seaboard facility available to import additional LPG for the domestic market as required. It is understood this facility has only been required on a very limited basis to meet peak demand.

The BP refinery at Kwinana produces LPG as a by-product of oil refinery operations, with annual production varying around 40,000 tonnes. As LPG output is related to refinery capacity and processes as well as crude oil throughput, the potential for any large increase in LPG output from the refinery is limited. Most of the LPG produced at the refinery goes to the autogas market.

The production and distribution sectors of the LPG industry are highly concentrated. At the producer level, Wesfarmers LPG and BP account for almost the entire production of LPG for the domestic market in WA. Kleenheat, another subsidiary of Wesfarmers Ltd, plays a central role in the distribution of LPG from producers to wholesalers.

Issues:

- *Do you believe that changes to the quantity of LPG extractable from the DBNGP will impact on the domestic market? To what extent and why?*
- *Do you believe that the level of competition in LPG production impacts on the residential LPG market? If so, why?*
- *What is the potential for competition from imported LPG from other suppliers? Are there any barriers to such competition?*

Distribution of LPG

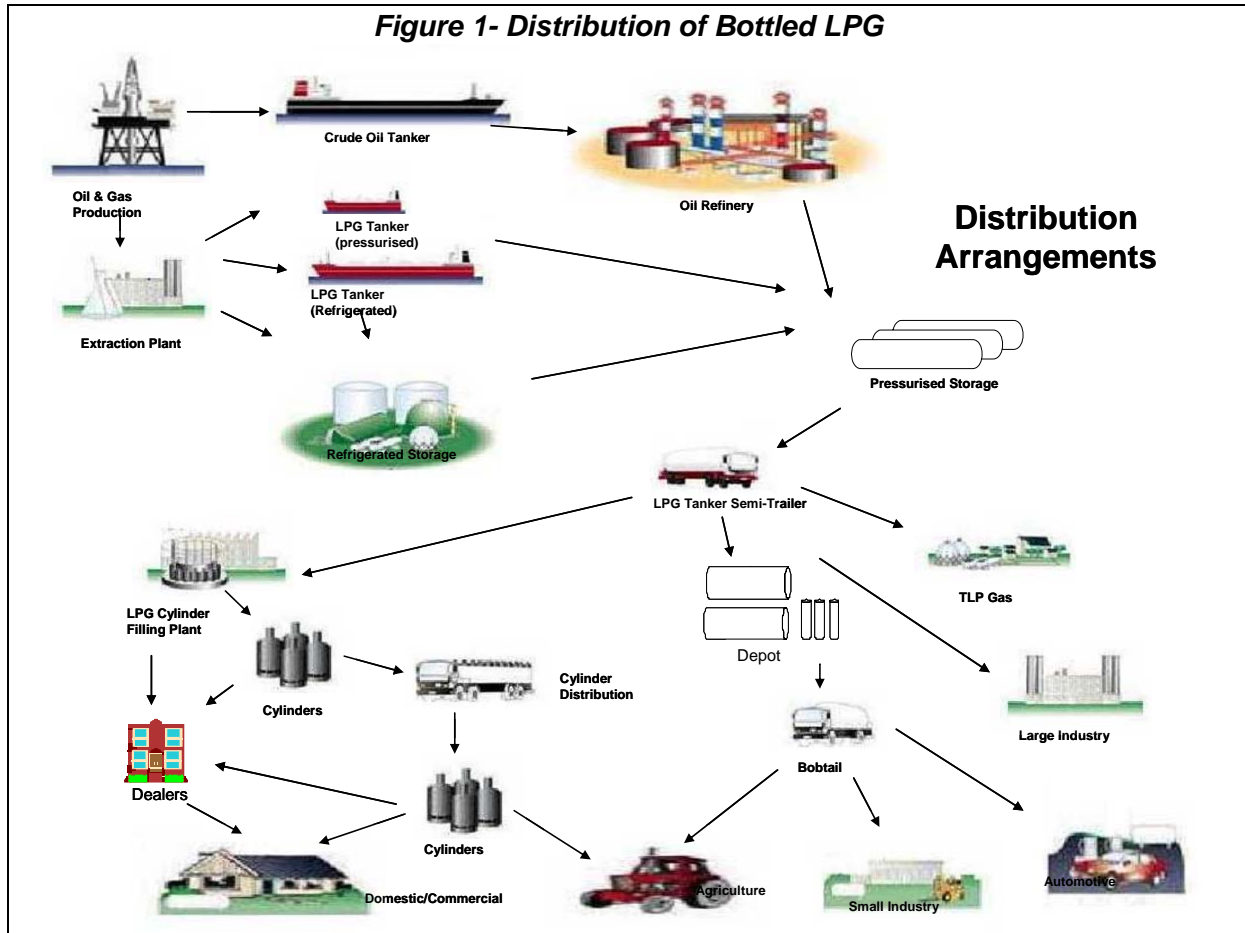
LPG for domestic consumption is typically sold by producers at the primary supply terminal located at or near:

- the petroleum refinery;
- the LPG Extraction Plant (in the case of naturally occurring LPG); or
- the bulk seaboard import terminal.

⁴ *Review of the Gas Quality Specification for the DBNGP WA*, Office of Energy, 1995

The primary supply terminal normally has bulk storage facilities and truck loading terminals. Alternatively, some storage facilities and truck loading terminals may be located closer to markets, and supplied by pipeline from the extraction plant.

LPG is trucked by bulk road transports, capable of carrying 16-33 tonnes, from the primary supply terminals to the distribution depots where it is stored in above ground tanks of between 10 and 70 tonnes. It is then put into cylinders or a small tank truck for distribution to customers or distributed via a reticulated system.



Reticulated LPG systems

There are three reticulated LPG systems providing LPG to residential consumers in Western Australia: Margaret River, Leinster and Albany⁵. Kleenheat supplies Leinster⁶ and Margaret River, whereas Alinta supplies Albany. LPG is transported by truck to a bulk cylinder, which feeds these systems. Reticulated systems account for only a very small percentage of the residential LPG market.

Use of LPG cylinders

Domestic consumers normally purchase LPG in cylinders, which account for the vast majority of the residential LPG market. A typical household will be connected to two 45kg cylinders, but some larger residential consumers and small to medium businesses may use 90kg cylinders or larger 190kg cylinders. Permanent occupants of caravans, holiday use caravans and motor homes typically use smaller cylinders.

⁵ There is also a reticulated LPG system on Rottneest Island primarily connected to cottages used for holiday purposes.

⁶ BHP Billiton is the sole customer of Kleenheat and then provides LPG to its employees.

Cylinders are supplied by distributors, either by cylinder replacement, where empty cylinders are swapped for full cylinders and the empties are returned to the depot for refilling, or otherwise in-situ refill for larger tanks using small tank trucks with pumping facilities.

Cylinders are expensive and generally remain the property of the supplier, who will charge a rental fee, and the cylinders can only be filled by the supplier that owns them. There is usually also an annual maintenance or service fee.

Issues:

- *Aside from pricing issues, what are the pros and cons associated with the use of cylinder LPG that need to be taken into account in this inquiry? If so what are they? And why are they important?*
- *While the primary focus of this inquiry is on residential consumption of LPG from cylinders, are there issues associated with reticulated LPG consumption that need to be considered? If so what are they? And why are they important?*
- *Are there issues or alternatives associated with distribution or delivery of LPG that the taskforce should consider?*

Retailers

The Western Australian retail market for domestic LPG is about 18,000 to 19,000 tonnes per annum. The market appears to be mature, with annual demand decreasing at about 2% per annum and strong competition from alternate energy sources with more stable prices.

While the actual level of competition varies from region to region, there are a number of competitors in the Western Australian LPG retail market. These range from the large companies such as Kleenheat and Origin to independent small retailers serving a specific area.

Table 1 – LPG Retailers in Western Australia

	Kleenheat	BP Shell Caltex etc	Origin	Elgas	BOC	Gas Cylinders Australia	Others
Bottled LPG	✓		✓	✓	✓	✓	✓
Automotive	✓	✓					
Small industry	✓		✓	✓	✓		
Large industry	✓		✓	✓	✓		

The retail bottled LPG market is dominated by Kleenheat which is vertically integrated (i.e. operates in the production, distribution and retail markets) and is estimated to have between 60% and 70% share of the market. Kleenheat operates 14 company owned branches and has agency arrangements with many other retailers particularly in regional areas. Another vertically integrated company, Origin Energy is estimated to have more than 10% of the market.

As shown in table 1, the remainder of the market is shared between BOC, Elgas, Gas Cylinders Australia, Hills Gas and some other small independent retailers.

Of the retailers only Kleenheat, through a related Wesfarmers company, is a significant local producer of LPG. BP at its refinery at Kwinana also produces LPG locally but most of its supply goes to the autogas/motor spirit market. Of the bottled LPG retailers, only Wesfarmers/Kleenheat and Origin have facilities to store significant amounts of LPG.

Market barriers

There may be a range of possible barriers to entry in the LPG market:

- In order to enter a new market, a retailer must be confident that it can secure competitive supply and sufficient customers for a period to make an investment in storage, transport, depots and marketing justified.
- Markets that are undergoing contraction are not as attractive to potential entrants.
- Competition and security of supply for potential entrants may be compromised as the largest retailers are vertically integrated and are sole local suppliers of wholesale LPG.
- Infrastructure to store LPG, fill and distribute LPG bottles is expensive, particularly in order to obtain the economies of scale to compete across the market. This includes the need to build a network of depots and a fleet of trucks although smaller scale entry may be possible within a single location.
- LPG retail agents may be contractually bound to a particular supplier such as Kleenheat or Origin.
- Customers may not wish to change retailers as they may perceive a high transactional cost (too much effort and dislocation for too little reward).

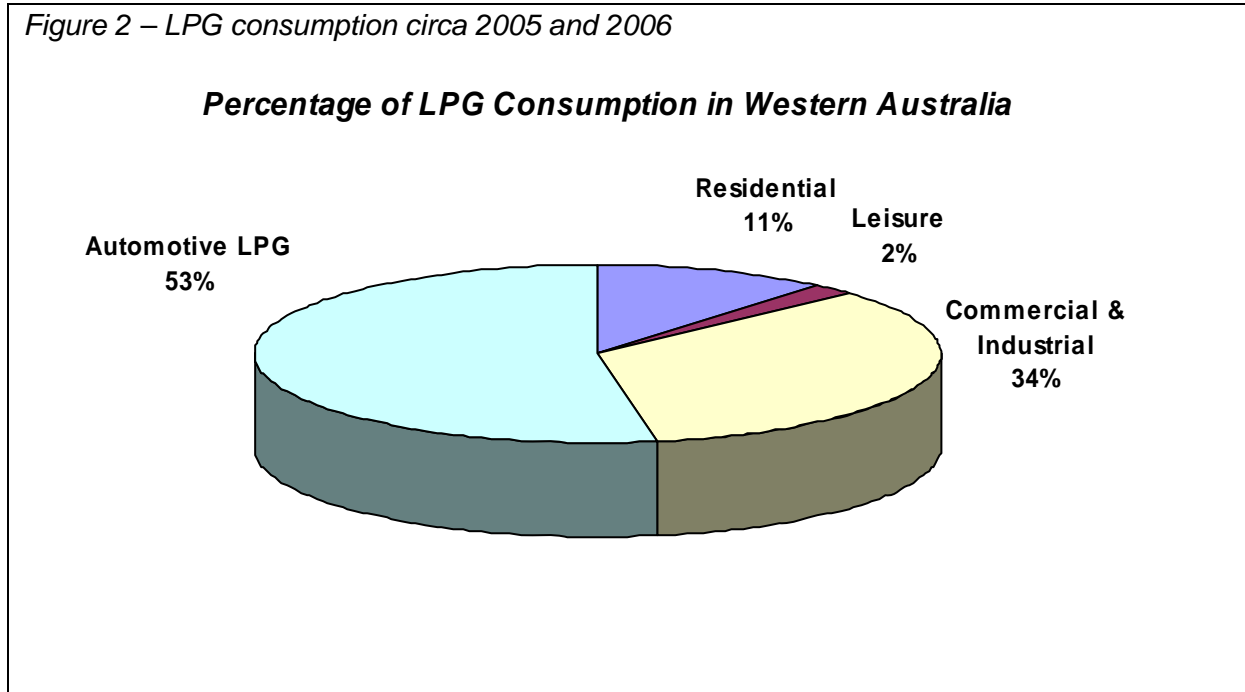
Issues:

- *Are there any issues the taskforce should consider regarding the level of retail competition in a given area?*
- *Do you believe that the level of competition or concentration in the residential LPG market impacts on retail prices? If so, to what extent and why?*
- *If you believe that one or more companies are able to influence the residential LPG market, to what extent? In what sections of the LPG supply chain does this apply?*
- *The taskforce seeks comment on any barriers to entry in the Western Australian bottled LPG market. How do they impact on competition in the State's energy market?*
- *Has there been much evidence of new entrants to the market at the marketing, distributor or retailer level? In regards to barriers to entry, what is the experience of new or prospective entrants to the market at the marketing, distributor or retailer level?*
- *How might barriers to entry be addressed to promote competition in the market?*

Demand for LPG

LPG is consumed in Western Australia for automotive, residential, leisure (BBQs, camping), forklifts, commercial and industrial purposes as well as for petrochemical feedstock.

Figure 2 – LPG consumption circa 2005 and 2006



In Western Australia, residential consumption of LPG represents 11% of the total consumption of LPG for all uses. By comparison, automotive LPG is 53% of the total consumption of LPG in Western Australia and commercial and industrial (including forklifts and petrochemical feedstock) is 34%⁷.

Demand for autogas is considerably greater than for residential purposes, and this can be expected to increase as a result of State and Federal Government policies offering substantial subsidies to convert cars from petrol to autogas and recent volatility in petrol prices. In Western Australia, the combined State and federal subsidies cover the total cost of conversion.

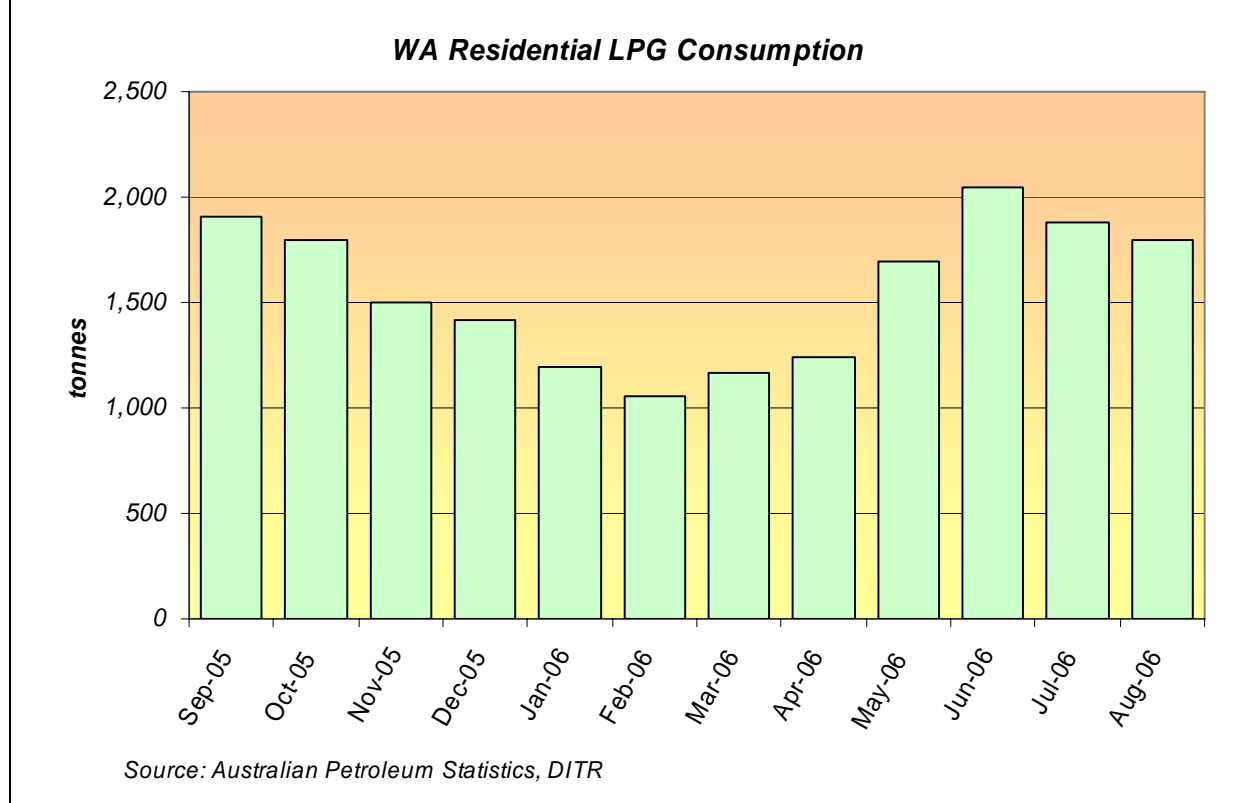
Total Australian residential consumption of LPG over a one year period (September 2005 to August 2006) was 160,900 tonnes. Total Western Australian residential consumption of LPG for the same period was 18,700 tonnes, representing an average proportion of 11.6% of the Australian residential market⁸. Western Australia is therefore consuming approximately its population share of the residential LPG market. This contrasts with Victoria, which has the largest residential LPG market, and consumes around 37% of the total.

Demand in Western Australia for bottled LPG in the residential market can fluctuate from approximately 1,000 tonnes to over 2,100 tonnes per month (averaging around 1,500 tonnes per month). The main influence driving higher LPG demand in the winter months is most likely from increased demand for space and water heating during colder weather.

⁷ *Australian Petroleum Statistics*, Department of Industry, Tourism and Resources data for WA taken over a one year period (September 2005 to August 2006).

⁸ *Australian Petroleum Statistics*, Department of Industry, Tourism and Resources.

Figure 3 – Residential LPG consumption



In Figure 3, LPG consumption peaked in June then declined during the winter months of July and August. Influencing factors may have been a change in consumer behaviour in response to sustained high prices or related to warmer weather requiring less demand for LPG.

Reliable statistics for the total number of households consuming LPG in Western Australia are not readily available. Some consumers may have LPG installed but no longer use it. Other LPG connected residences are used as holiday homes and only use LPG infrequently. In 2002, of the 708,400 households in Western Australia approximately 119,000 (17%) live in areas not connected to natural gas reticulation⁹. As a guide, based on an average annual consumption of LPG per household of somewhere between 4 to 5.5 bottles (45kg each), this would equate to roughly 85,000 households using LPG in Western Australia.¹⁰ However, the true figure may either be somewhat lower or higher.

Anecdotal evidence suggest that the amount of residential LPG used per household has generally declined since 2000. Householders may be changing consumption behaviour in response to higher prices or are increasing their use of appliances that run on other energy sources, such as reverse cycle air conditioners for heating. The volume of LPG used by the residential market is likely to stay static or continue to decline if retail prices remain at higher levels. LPG is also likely to lose some market share to future expansions of natural gas reticulation networks and if LPG users switch appliances to use other energy sources.

⁹ ABS 2002

¹⁰ A survey carried out in Victoria by the Essential Services Commission in 2002 estimated that average domestic consumption of 45kg cylinders is approximately 5.5 cylinders per year. Western Australia is likely to have a slightly lower average consumption due to a warmer climate reducing LPG heating demand.

Issues:

- *Do you believe that the amount of residential LPG used per household is expected to increase or decrease? To what extent?*
- *Do you believe that the number of households using LPG will increase or decrease? To what extent?*
- *What factors are driving these changes in demand?*
- *How might these factors be addressed?*

Pricing environment

Regulation and surveillance of LPG bottled gas prices

The State Government does not currently monitor or regulate the price of bottled LPG for non-transport use. However, there are provisions in the *Petroleum Products Pricing Act 1983* which allow it to do so.

This legislation specifically includes LPG as a petroleum product whether it is used as a motor fuel or for other purposes such as residential use.

In 2002, the Victorian Essential Services Commission (ESC) conducted an extensive inquiry into the supply of bottled LPG in Victoria. The ESC's final report considered a number of reform options for the bottled LPG industry and concluded that price regulation or surveillance of bottled LPG prices in Victoria was not warranted on the basis that costs were likely to exceed any benefits.

Similarly, based on the comparatively smaller market size for bottled LPG in Western Australia, the Department of Consumer and Employment Protection (DoCEP) has noted that the benefits of regulation or price surveillance are also likely to be outweighed by the associated costs.

Issues:

- *Are there specific issues associated with regulation and surveillance of the bottled LPG industry and prices that need to be taken into account in this inquiry?*
- *Do you believe that bottled LPG prices should be regulated in Western Australia? Why?*

Retail price structure

The retail price of bottled LPG is made up of the benchmark wholesale price and movements in exchange rates, plus marketing, distribution (including transportation) and storage costs, wholesale and retail margins, franchise fees, overheads, bulk breaking cost, labour costs, maintenance and regulatory compliance costs, GST and other costs. The cost of the gas in the cylinder represents approximately 30% of the retail price of bottled LPG in rural areas. Other major price components are cylinder handling/filling costs and retail and delivery costs.

However, direct price comparison is often difficult as retailers differ in the way prices are presented. Variations in prices between suppliers can reflect the competitive market and differing levels of service. Many LPG retailers also charge delivery and cylinder rental fees.

Some retailers charge a delivery fee to customers each time a cylinder is replaced. However, suppliers that charge a delivery fee may charge a lower cylinder price, whereas those who do not charge for delivery may to some extent bundle the cost into the retail price. It may be difficult for customers to pick up cylinders from a distributor and avoid delivery fees because cylinders must always be kept upright for safety reasons, especially during transportation when they must be well secured.

Cylinder rental covers maintenance and service costs. Cylinder maintenance is a critical safety issue and must be carried out by personnel accredited to the relevant safety standard.

Price evidence of cylinder rentals varies in the market place but suggests an average annual cost between \$40 and \$50. Cylinder rentals may, to some extent, lock in consumers to a particular supplier, as customers may lose the balance of rental paid or lose the balance of propane remaining in the tank if they switch.

Comparison with interstate LPG prices

The ACCC's investigation into bottled gas prices in Western Australia in 2000 reported that bottled LPG prices in Western Australia do not seem excessive relative to prices in other States.¹¹

Issues:

- *How easy is it for consumers to compare total retail prices between retailers? If you believe that this impacts on competition, how could the situation be improved?*
- *Do you believe that cylinder rental fees limit switching between different retailers? To what extent and why?*

International price influences

Worldwide, propane is produced at a relatively steady rate year-round by refineries and gas processing plants. As a result, there is no ready source of incremental production when supplies run low. Propane wholesalers and retailers are forced to pay higher prices as propane markets are bid higher due to dwindling supply. Consequently, higher propane prices are simply passed on to consumers. Imports do not offer much cushion for unexpected demand increases or supply shortages due to the long travel time. On the other hand, when propane prices do spike, the petrochemical sector may cut back on its use, thus freeing up supplies for other uses.

Recent higher wholesale prices appear largely driven by increases in global demand for LPG including:

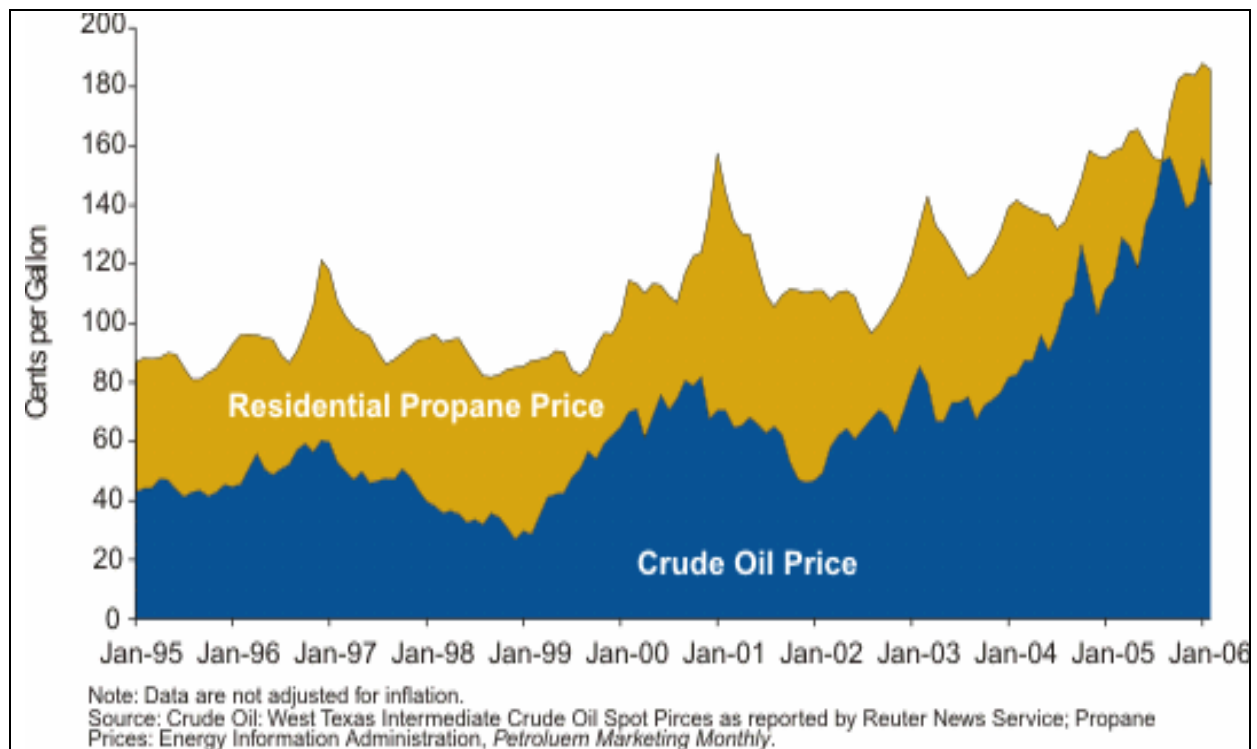
- strong seasonal demand associated with stockpiling for the northern hemisphere winter where LPG is primarily used as a heating fuel for commercial and domestic purposes;
- this seasonal demand usually creates peak prices for LPG in Western Australia during November to March each year; and
- steady demand from Asian markets, especially China, tightening global market supply.

Oil price trends

Although propane is produced from both crude oil refining and natural gas processing, its price is influenced mainly by the cost of crude oil. This is because propane competes mostly with crude oil-based fuels.

¹¹ Australian Competition and Consumer Commission, "Review into prices of liquid petroleum gas (LPG) in Western Australia", 2000.

Figure 4 - US Residential Propane Prices Follow Crude Oil Price Trends



Recent high international oil prices are likely to be compounding consumer LPG price increases as well as causing them through:

- substitution effects creating higher global demand for alternative petroleum products, including LPG; and
- higher petrol prices increasing transportation costs for bottled LPG, particularly in some country areas.

Import Parity Pricing

LPG is an internationally traded commodity and its price is set in global markets.

Prior to 1974, LPG prices in Australia were determined solely by commercial negotiation. From May 1974, maximum wholesale prices for LPG were fixed by the Commonwealth Prices Justification Tribunal, which from 1978 set these at the price the Bass Strait producers received for their exports (export parity pricing). At the same time, export controls meant that only LPG surplus to domestic requirements would be granted export permits. The Prices Surveillance Authority assumed responsibility for determining maximum wholesale prices for refinery produced LPG from 1984 and for naturally occurring LPG from 1989. From July 1989, the Prices Surveillance Authority used a notional import parity price for LPG to stimulate investment in LPG infrastructure, including import facilities for future requirements, and to provide incentives to explore and develop local resources.

Import parity pricing uses an international benchmark trading price as a base, and adds a component equivalent to freight and insurance to come up with a price that an LPG supplier would be required to pay if it imported LPG. That figure is then used to derive the wholesale price of locally produced LPG.

Part of the logic behind import parity pricing is that if the local market is unwilling to pay world prices, then producers would have little incentive to supply the domestic market with LPG as they could export the product overseas and achieve higher returns.

Following a review by the Prices Surveillance Authority, The Australian Government deregulated the wholesale price of LPG in January 1991. Today, LPG producers and importers in Australia generally determine an Australian landed price based on the Saudi contract price plus a freight allowance (from Saudi Arabia), insurance and loss, storage and handling. The freight, terminal and other costs can vary depending on location.

The benchmark used by local LPG producers to set their prices is known as the "Saudi Aramco Contract Price". This price, set by the world's largest producer, Saudi Arabia, is used as a basis internationally for sales of LPG. This price is set on a monthly basis.

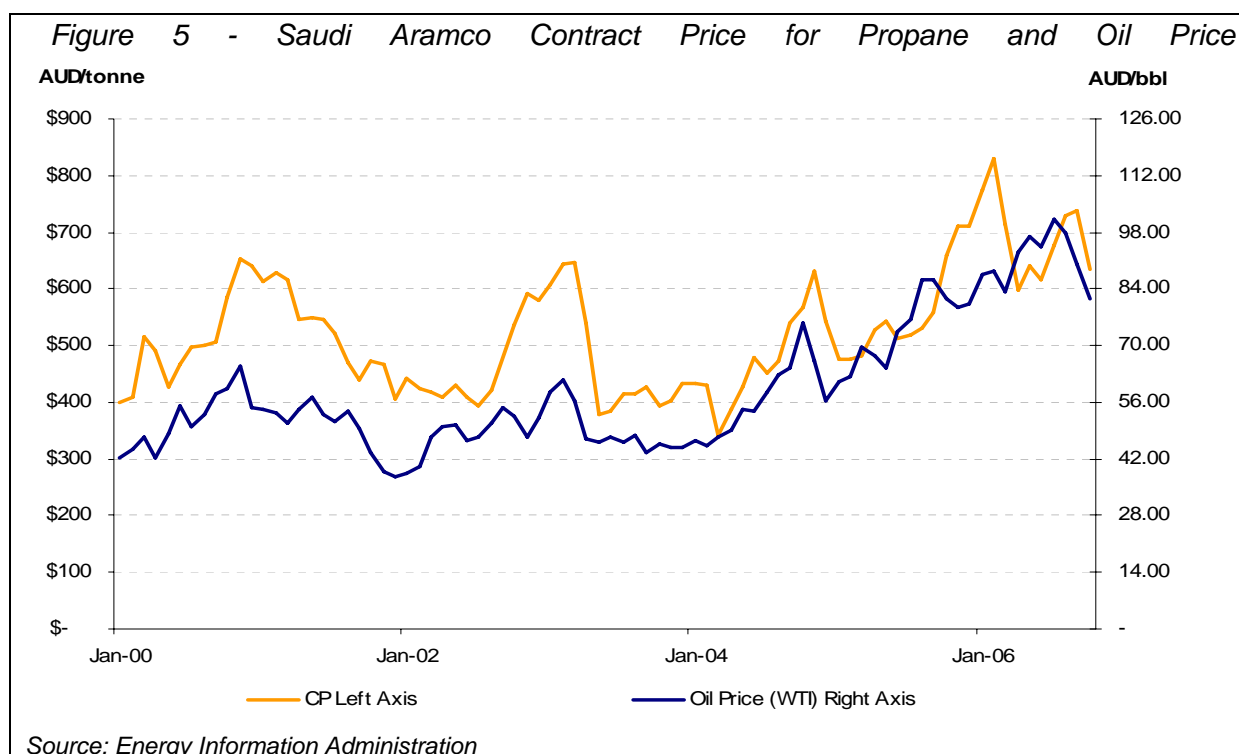
In the past the Saudis based their price largely on oil price parity. However, in October 1994, the Saudis abandoned the direct crude oil linkage and adopted an approach to pricing that reflects the LPG market itself. As previously noted, crude oil still has a significant influence on LPG prices.

During 2005, crude oil prices increased approximately 50%. This combined with tight LPG supplies in the US market winter period resulted in the LPG benchmark increasing from AU\$477 in February 2005 to a record peak in February 2006 of AU\$830 per metric tonne of propane (increase of 74%). LPG benchmark prices then receded to AU\$600 per metric tonne of propane by April 2006 as LPG demand from the US winter eased.

However, during the latter part of June and then July 2006 crude oil prices reached record highs, which in turn affected other international liquid fuel prices. This resulted in upward movements of the July, August and September 2006 LPG benchmarks.

During September and October 2006 crude oil prices reduced significantly and these reductions have had a corresponding impact on international liquid fuel prices.

As a result the November 2006 LPG benchmark dropped to \$AU600 per metric tonne of propane, which is a decrease of around 19% since the September benchmark¹².



¹² Data source: Energy Information Administration

International benchmark price influence on retail prices in WA

Between 2003 and 2006, there has been an underlying increase in the international benchmark price of propane of around 20% per year. It is estimated that this increase would have accounted for a 6% per year increase in the retail price of propane, or around 20% over the full 3 year period¹³.

Issues:

- *To what extent do you believe that the residential retail price of LPG is determined by international factors? Why?*
- *Do you believe that movements in the international benchmark price are accurately reflected in movements of the retail price? If not, why?*
- *To what extent can residential LPG prices be shielded from international fluctuations and how?*
- *Do you believe that import parity pricing provides an effective mechanism to determine wholesale LPG prices? What alternative mechanisms should the taskforce consider?*

Price differences between autogas, reticulated LPG and bottled LPG

Storage and dispensing methods are more expensive for bottled gas than for reticulated (piped) gas or autogas and this is reflected in the per unit price. Reticulated gas and autogas are delivered in bulk quantities that achieve economies of scale while the delivery of bottled LPG has much higher transport costs (lower volumes, increased weight). There are also higher administrative costs of order taking, billing and customer service in retailing bottled LPG.

The autogas market price mainly reflects the producer price and bulk haulage costs as handling costs are much lower due to the self service nature of most petrol outlets, and competition tending to keep retail margins low.

Autogas consumers also do not face ongoing servicing or delivery fees for the installed tank as they own it outright.

Issues:

- *Do you believe that the factors contributing to prices of autogas and residential LPG accurately account for the difference in prices? If not, why?*
- *As approximately 20% of delivered autogas is propane (not mixed with butane), are there any opportunities to reduce costs of residential LPG through combined bulk delivery in relevant areas?*

¹³ Data source: *Energy Information Administration*

Price differences between outer metropolitan and rural areas

Prices for a 45kg bottle of LPG vary between different areas. At the end of October 2006, for example, cash and carry prices at 11 different locations revealed that most prices were close to the average retail price of \$91, with the lowest surveyed price of \$72 in the outer metro area and the highest \$98. Delivery fees and annual servicing fees increase costs further.

There are a number of factors that contribute towards higher country LPG prices including lack of price support and discounting, lower sales volumes and drop sizes, higher freight costs, lower levels of non-fuel revenue, higher maintenance costs, higher per unit operating costs and lower levels of competition.

Due to its unique chemical properties LPG must be stored in a highly compressed form. This results in the need for special tanks and storage equipment, as well as pressurised tankers to transport it. This form of transportation is more expensive than for regular fuel types and therefore the cost of transport (relative to petrol for example) increases the further it is from the metropolitan area.

Supply in the cylinder market requires investment in a distribution network. In more remote areas there may be insufficient market demand to support a large number of retailers reducing competition.

The LPG market in regional areas is relatively smaller than areas closer to the metropolitan area with little to no competition in some areas. Sales volumes of LPG may also be decreasing over time in some regional areas due to shrinking or ageing populations. The lower volumes result in higher per unit costs so retailers have to make bigger margins on each unit sold. A small business in the country may face higher overheads and will have much lower sales volumes than a comparable business located close to the Perth metropolitan area. It has been argued that a higher margin is needed for businesses located in more remote areas to offset this. The lower volumes may also mean that price reductions are not passed on as quickly as they are in the metropolitan area due the lower number of deliveries replacing stocks¹⁴.

Irrespective of variations in costs, the lack of effective competition in many regional areas means that some wholesalers and retailers may be making higher margins than would be achievable in a more competitive environment.

Issues:

- *Do you believe that prices vary significantly by region? To what extent and why? Do you believe that, on average, prices in regional areas are higher than outer metropolitan areas?*
- *To what extent do higher retail prices of bottled LPG in some country areas reflect the higher operating costs and/or low sales volumes of business in those areas?*
- *To what extent do higher retail prices of bottled LPG in some country areas reflect lack of competition from other retailers? Is lack of competition inevitable in some localities due to low volumes of sales or other factors?*
- *To what extent are demographic changes in rural populations impacting LPG prices?*
- *Are there any other factors influencing retail prices? What are they and how do they influence prices?*

¹⁴ FuelWatch website FAQ, Department of Consumer and Employment Protection

Competition with alternative energy supplies

In cooking, water heating and/or space heating applications, bottled LPG competes with other energy sources such as from slow combustion wood heating, electric cookers, water heaters and space heaters, solar hot water systems, and more recently, reverse cycle air conditioning.

Cost comparison

Until recently, bottled LPG as an energy source was a cost effective alternative to electricity in regions that do not have reticulated natural gas. However due to the increasing market price for LPG, and the fall in the real price of electricity (tariffs have not been increased for more than ten years), the price to consumers of electricity and LPG per energy equivalent unit are now very similar.

When the price of a 45kg LPG bottle is compared against the price of electricity on an equivalent energy basis, data indicates that LPG becomes comparatively more expensive above a price of \$106 (including GST, delivery and annual service fees). This LPG price level has certainly been exceeded in some areas during 2006. It is expected that the upwards price trend for LPG is likely to continue over time.

Table 2 – Energy cost comparison

Energy Source	Cost per Unit (c/kWh)	Price equivalent
LPG (45kg bottle)	16.67	\$106 ^a
Electricity	13.94	\$105 ^b
Reticulated Natural Gas	5.011	\$32 ^c

^a based on average LPG price of \$106 (including GST, delivery and annual service fees)

^b includes daily supply charge of 25.57c

^c based on an average reticulated price

For example, water heating accounts for approximately one third of energy consumption in the average home¹⁵. Consistent with table 2 & 3, LPG is comparatively more expensive than other fuels for water heating.

Table 3 – Water heater annual running costs comparison¹⁶

Type of hot water system	Running cost (\$/yr)	Retail purchase cost (\$) excluding installation	Approximate take up of <u>new</u> water heaters in houses
Gas boosted solar	100	4,400 (2,900)	7%
LPG boosted solar	210	4,400 (2,700)	1%
Electric boosted solar	160	3,200 (2,400)	7%
Natural gas*	435	1,200	70%
LPG*	1,070	1,200	5%
Electric heat pump	220	4,000	<1%
Electric *	605	600	9%

* Average of storage and instantaneous options

Figures in brackets are after Renewable energy Certificates (RECs) of typically \$800 and, for gas and LPG boosted solar, after a scheme rebate of \$500 or \$700 respectively.

¹⁵ Sustainable Energy Development Office

¹⁶ Sustainable Energy Development Office

As can be seen in Table 3, the cost to purchase a LPG water heater is the same as for natural gas, however, both are more expensive than for electricity. However, LPG water heaters are cheaper to purchase than solar water heaters (including LPG boosted solar), which offer the lowest running costs.

Appliance installation costs will also have an effect on the total costs. LPG cylinder installation and connection cost is around \$200. Connection to natural gas can cost consumers nothing under current licence conditions, if the house can be connected to the distribution outlet point with 20 metres or less of service pipe and total costs are less than \$650¹⁷.

Consumers when purchasing an appliance will often put upfront purchasing and installation costs ahead of ongoing running costs in their decision making, and this may be particularly so for lower income households. This has implications for energy affordability impacting on weekly budgets due to higher running costs resulting from either choice of fuel, and/or efficiency of the appliance.

Energy price volatility

As shown in table 2 above, electricity and LPG appear reasonably cost competitive, while natural gas is significantly cheaper. However, such direct cost comparisons ignore the issue of price volatility.

As previously noted, LPG is subject to international price trends which fluctuate on a monthly basis, but overall have been trending upwards.

This contrasts with both electricity and reticulated natural gas, both of which are regulated. Consumers can thus be confident that these prices will remain stable and increase, if at all, in a predictable and modest way.

Pluses and minuses of alternative fuels

In addition to the lower costs of alternative fuels, there are also a range of other pluses and minuses arising from fuel consumption decisions. These include:

- Differing Greenhouse gas emissions. LPG and natural gas typically have lower greenhouse gas emissions than other fuels. Electricity, which must be generated from a primary fuel, has a greater net emissions impact. Wood heating use has an even higher impact.
- Inefficient wood heaters can produce excessive smoke and particulates, creating pollution and potential health risks. There may also be health issues associated with burns from wood fires and increased household fire risk. There is anecdotal evidence of increasing illegal collection and cutting of firewood from National Parks and nature reserves driven by higher prices for LPG and wood.
- More widespread use of reverse cycle air conditioning may put an extra load on rural electricity systems generally and, in particular, exacerbate summer peaks, requiring expensive additional capacity or network augmentation to meet this demand. However, as reverse air cycle air conditioning is more efficient at space heating than gas for larger areas and electricity tariffs are regulated, there is a benefit to the individual consumer.
- The increased availability and reduced price of reverse cycle air conditioners enables a household to use a single appliance for both heating and cooling the home.

¹⁷ Alinta connection policy – for full conditions for residential connection to natural gas, see the Alinta website.

Barriers to use of alternative fuels

While alternative fuels may have cost and other advantages over LPG, there are a range of barriers to their use. These include:

- The extent of the reticulated gas network. Installation of gas reticulation involves significant costs and may not be economically feasible in some areas. While it has been possible to reticulate LPG in a few locations, domestic natural gas reticulation requires close proximity to existing gas systems. In either case, the costs of reticulation are likely to be required to be met upfront by users and these costs can be significant.
- Natural gas and LPG appliances are not directly substitutable, requiring conversion. This cost can be substantial and act as a barrier to uptake, even when alternative supplies are available.
- The cost of appliances is often a significant portion of household budgets and, once purchased, households may not switch to another technology until the useful life of the appliance is exhausted.

Issues:

- *To what extent do other energy sources compete with bottled LPG in the residential market? To what extent does this competition impact on the price of bottled LPG?*
- *To what extent is substitution away from LPG to other sources of energy such as electricity, wood, solar or other fuels occurring and to which fuels or appliances?*
- *To what extent will substitution away from LPG to other sources of energy such as electricity, wood or other fuels have economic or environmental impacts?*
- *What will the impact of increased use of reverse cycle air conditioning be for rural electricity systems? How should this be managed?*
- *To what extent do higher retail purchase and installation costs for competing fuel appliances prevent consumers from purchasing appliances that have lower ongoing running costs as an alternative to LPG?*
- *Is the greater volatility of LPG prices a significant issue? What impact does it have on residential customers?*
- *Are there environmental or health issues associated with the use of LPG or substitute fuels that need to be taken into account? If so, what are they and why are they important?*
- *What are the most significant barriers to uptake of alternative fuels? How can these be lowered?*
- *To what extent will the expansion of the natural gas network impact on the growth of demand for LPG?*
- *What is the potential for expansion of the natural gas network to rural areas?*

Alternative means of supplying gas to regional areas

While the current physical delivery options for gas are likely to remain similar to those that already exist – i.e. residential cylinder delivery, bulk cylinders for large users or reticulation – alternative market operations may have the potential to improve outcomes.

For instance, aggregation of demand by a number of large users in a regional area such as hospitals may be able to improve economies of scale and hence contract terms.

As previously noted, most LPG in Western Australia is used in autogas and significant increases in this use are expected. Where autogas is delivered as propane only to some areas, the increased overall LPG demand may allow similar bulk efficiencies and reduced prices.

Compressed natural gas (CNG) and LNG (both of which are natural gas rather than LPG) are increasing being used as transport fuels and delivered to remote mine sites for power generation, which may create the ability to have natural gas delivered to towns without the need for connecting gas transmission pipelines.

Issues:

- *Are there alternative means of supplying gas (either LPG or natural gas) to regional areas?*
- *How feasible are they?*
- *Is there enough aggregate demand for gas in some regional areas/towns to support other forms of gas distribution apart from bottled LPG?*

LPG and equity issues

Because LPG is not cost competitive with reticulated natural gas, it is only used as a residential fuel in regional and outer metropolitan areas where reticulated natural gas is unavailable. To the extent that some of these areas have a lower socio-economic profile, issues associated with LPG prices may raise equity issues.

Anecdotal evidence suggests that the retail price of 45kg LPG cylinders has doubled between 2001 and 2006. Some of the factors driving the price increases reflect increases in cost of transport, labour and handling and increases in the international LPG benchmark price. By comparison, weekly incomes of pensioners have been more stable, increasing by approximately 28% from 2001 to 2006, in line with inflation. Wages growth of other low income groups could be expected to be similar. This would result in LPG becoming less affordable to these income groups.

This conclusion is supported by the incidence of low income households writing to Government and social service organisations regarding higher LPG prices and difficulty purchasing adequate quantities for basic needs.

Other anecdotal evidence suggests that some householders are significantly reducing consumption of bottled LPG and having to modify their behaviour as a result (e.g. not using the heater and going to bed earlier to keep warm) due to the cost of LPG.

Initial results from research commissioned by the Office of Energy suggest that energy costs are a relatively low percentage of average disposable income (<3%) although this varies with household size because changes in disposable income do not always match changes in household size. Households on lower incomes, however, will have a higher exposure to energy costs and energy affordability is generally regarded as a significant social issue.

The research also suggests that there are pockets of rural areas outside of larger country towns with greater numbers of low income families where a greater percentage of the household budget is required for energy consumption. The impacts of bottled LPG price rises would be more significant and may push these householders into financial hardship.

Some householders may have difficulty making the full payment for the purchase of bottled LPG at the time of delivery if a retailer does not provide options to pay in instalments. For example, a pensioner or other low income household with a relatively fixed weekly income of \$300 may face difficulties paying \$100 for an LPG bottle as a single lump payment every 3 months amongst other living expenses.

Upfront costs of more efficient appliances with lower running costs are also often prohibitive for lower income households.

Issues:

- *The taskforce seeks comment on the profile of consumers who use LPG, particularly lower income households.*
- *LPG is mainly used for water heating, space heating and or cooking. What proportion of total use do those uses constitute? Are there regional differences? Are there social/socio-economic differences?*
- *To what extent do you believe that rising LPG costs are impacting on low income households? What evidence is available that higher LPG prices have contributed to financial hardship in a significant number of low income households?*

- *To what extent are consumers reducing their demand for LPG in response to higher prices? Are consumers switching away from LPG for heating or other uses to other fuel sources?*
- *Are there issues concerning up-front versus payment instalment options or other financial arrangements for LPG purchase that the Inquiry should consider? What are the issues? How might they be addressed effectively?*
- *Are there other means of providing access to finances for lower income households to address energy inequity issues?*

Government energy subsidy schemes

The Western Australian Government provides an electricity rebate of \$1.79 per week to assist pensioners with energy costs (total about \$93 per year). This is paid as a rebate on the power bill, but is intended to assist with all energy costs, including use of LPG. The same level of subsidy is thus paid to all recipients regardless of the relative proportions of electricity and gas that they choose to purchase to meet their energy needs.

The State also offers rebates to householders who install environmentally friendly, gas-boosted solar water heaters. Gas-boosted solar water heaters have the lowest greenhouse gas emissions and running costs of all common, residential hot water systems. A rebate of \$700 is available for bottled LPG-boosted solar water heaters used in areas without reticulated gas. The scheme is administered by the Sustainable Energy Development Office.

The Commonwealth Government makes a biannual utilities payment to elderly people on income support to assist with meeting the costs of gas, electricity and water. The utilities allowance is a non-taxable bi-annual payment of \$26.30 per member of a couple and \$52.60 for single people.

The South Australian Government established an Energy Efficiency Program for Low Income Households in June 2003. The primary aim of the program is to reduce financial hardship faced by low-income households as a result of rising energy costs.

The results of a program evaluation suggest that the program helped to reduce defaults on bill payments, lowering levels of disconnections and lowering levels of presentation to welfare and health sector organisations for assistance. Other information indicates that the program reduced energy use, resulting in significant annual and lifetime savings and significant reduction in greenhouse gas emissions¹⁸.

The Victorian Government administers the non-mains winter energy concession for eligible low income households, which is a \$19 rebate available for purchases of LPG from \$80–\$119, a \$95 rebate for purchases from \$120–\$595 and a rebate of \$141 for purchases greater than \$595 (2006 amounts). The Victorian Government also administers a non-mains utility relief grant scheme, which provides once-off assistance to eligible low income customers who use bottled LPG for domestic purposes and are unable to purchase LPG due to a short-term financial crisis (within last 12 months)¹⁹.

¹⁸ An Evaluation of the Energy Efficiency Program for Low Income Households, Australian Institute for Social Research, February 2006.

¹⁹ State Government of Victoria, Department of Human Services website 2006: www.dhs.vic.gov.au/concessions

Issues:

- *Are the current energy assistance schemes available to residential LPG consumers in Western Australia adequate?*
- *What other options are available to Government to provide effective support to low income households in financial hardship using LPG?*

Other issues

Comment is invited on whether there are any other issues that need to be considered by the inquiry, in particular any issues that have not been canvassed above.

Issue:

- *Are there any other issues that need to be considered by the taskforce?*

Attachment 1: Terms of reference

TASKFORCE TO INVESTIGATE THE AFFORDABILITY OF BOTTLED LPG FOR HOUSEHOLD USE IN WESTERN AUSTRALIA, AND POTENTIAL GAS SUPPLY ALTERNATIVES.

BACKGROUND

Many households in Western Australia choose to use gas instead of electricity for cooking, water heating and/or space heating. In areas where reticulated natural gas is unavailable, these households use bottled liquid petroleum gas (LPG). LPG tends to be significantly more expensive than reticulated natural gas, even when the higher calorific value of LPG is considered. Price increases in recent years have also eroded its previous price advantage over electricity in energy value terms. In most country areas, LPG is now more expensive than electricity for the same amount of energy used. Bottled LPG for household use is also more expensive than LPG sold for automotive use. Considerable concern has been expressed in recent months from Western Australians concerned about the rising cost of LPG for domestic use.

PURPOSE AND SCOPE

The State Government has set up a taskforce to inquire into the affordability of bottled LPG in Western Australia.

The taskforce will inquire into, and provide advice and recommendations to the Government on:

1. the affordability of bottled LPG for households in Western Australia, having regard to price trends in LPG compared with alternative energy sources, differential impacts on households with various income profiles and in different locations in Western Australia, and the Government's commitment to sustainability principles.
2. the factors influencing prices, particularly the price disparity between metropolitan and regional areas.
3. opportunities for the introduction of other forms of gas supply, such as reticulated systems using liquefied natural gas (LNG), compressed natural gas (CNG) or an LPG based product, that may provide lower cost alternatives to bottled LPG in regional towns.
4. related matters as appropriate.

In particular, the taskforce will consider:

1. the views of users of bottled LPG about the impact of LPG prices on household budgets.
2. a comparison of the current and historical retail prices of bottled LPG with the retail prices of energy obtained through other energy sources, including reticulated natural gas, reticulated LPG (selected towns), electricity and renewable fuels.
3. the impacts of the potential migration of users of bottled LPG to other energy sources such as electricity or wood, including potential impacts on the existing electricity network and on the environment.
4. the effectiveness and equity of existing Government energy subsidy schemes for consumers dependent on more expensive energy sources.
5. the viability of, and current obstacles to, potential alternative mechanisms to supply gas, such as town-level distribution of natural gas, LNG, CNG or LPG.
6. the social, economic and environmental benefits of increased accessibility to gas for domestic, commercial and industrial users in regional Western Australia, compared with the cost of provision.

CONSULTATION

The investigators will consult with selected industry stakeholders and the public.

Consultation will include:

- Distribution of an issues paper.
- Invitations for public submissions on the issues paper by email and free post.
- A basic survey of selected near metropolitan areas and regions (20 LPG consumers from each of 10 towns) to identify typical bottled LPG use (heating, cooking, water heating) and delivery price.
- Public meetings in selected regional towns.
- Meetings with key industry stakeholders.

FINAL REPORT TO MINISTER FOR ENERGY

The Investigators will provide a progress report to the Minister for Energy no later than 30 November 2006, and a final report, including recommendations if appropriate, in early 2007.

Any recommendations should clearly explain the outcomes that any proposed changes would deliver, having regard to regulatory frameworks, budgetary implications, social equity and environmental impacts, and consider the costs and benefits to government.