INVESTIGATION INTO FACTORS CONTRIBUTING TO THE PERFORMANCE OF HOUSEHOLD LIQUEFIED PETROLEUM GAS IN DURBAN

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DECLARATION: This dissertation represents the original work of the author and has not been submitted to this or any other University. Wherever use was made of work of others, it was duly acknowledged in the text.

ABSTRACT

Background

The Liquefied Petroleum Gas (LPG) cylinder market consist of a group of consumers with similar yet differentiated needs, namely commercial customers (small industries, restaurants, wholesalers and nature reserves), low-income customers (such as the rural and township households with a monthly income of R748 - R2288) and high-income customers (such as the urban households with a monthly income above R9743). LPG is mainly used for cooking, lighting, heating, leisure and as a preferred form of energy in the commercial segment. The key issues currently facing the industry are: minimum growth, high capital requirement, rising cost of product and squeezing profitability.

Objectives

The focal point of this study is to identify strategies to overcome barriers of effective Liquefied Petroleum Gas (LPG) pricing and promotion and investigate the possibility of increasing the household use of LPG in Durban. LPG is set to be a future growth sector of the economy. A number of studies have indicated that LPG should be able to grow its share of the overall energy market from the current level of less than 2% to 15-20% over a twenty-year period. The research objective is to investigate the effects that pricing and advertising changes could have on LPG sales to household consumers in Durban.

Methods

A focus group consisting of six people with the researcher as the facilitator was formed to assist with generating primary data that was helpful in structuring appropriate questions for the questionnaire. The researcher completed a pilot study. Selected trained undergraduates completed the fieldwork interviews with individual household users of LPG. A sample size of 200 respondents was interviewed at LPG dealers and distributors in Durban. Cronbach's Alpha tests were conducted to test the reliability of the study and chi-square test was applied to test the hypotheses.

Results

Most respondents preferred LPG to be subsidised and regulated by the government. Respondents also indicated that they expect a competitive price for LPG and are not loyal to a particular brand. It is evident that when the LPG price was acceptable to the household the private sector experienced moderate increase in sales. As the price of LPG is expensive, households have the tendency to purchase less LPG resulting in the private sector experiencing low increase in sales.

Respondents are adamant that advertising of LPG should take place in the newspaper, on the radio and on television. The majority of respondents also strongly agreed on LPG demonstrations. Coca Cola has demonstrated that advertising and promoting their product on an ongoing basis resulted in an increase in sales. Respondents made it clear that the LPG industry lacks advertising, promotions and educational material for their consumers.

Conclusion

It is recommended that government should embark on engaging the private sector in conferences and discuss the possibility of regulating the price of LPG so that both the private sector and households may gain from this idea. Government should also put a team together and explore the possibility of subsidising LPG by either, removing VAT or providing a basic LPG appliance to the LPG household. LPG reduces pollution and therefore government should be the first to ensure that adequate advertising is done so that most of its citizens use an energy source, which is environmentally friendly.

ACKNOWLEDGEMENTS

All praise and appreciation are first and foremost attributed to the Almighty who has made it possible for me to accomplish this academic milestone.

I am especially grateful to my wife Louise, and sons Dane and Lance for their loving support during my studies. I also express my heartfelt thanks to my extended family and friends for their encouragement and continued support through every year of my studies. My appreciation goes to Indirani Naidoo for assisting with the SPSS analysis and Anand Sirkissoon for language usage editing.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This study is based on Liquefied Petroleum Gas, commonly known as LPG in the petroleum industry. The Liquefied Petroleum Gas (LPG) market in South Africa is steadily growing and the country currently uses 400,000 tons of LPG a year (www.shell.co.za). Marketing and sales manager (bulk division), of specialist LPG supplier Easigas, Mr Rob Wykerd says the driving forces behind the growth in the LPG market are its versatility of uses namely clean combustion with few noxious emissions, natural pressure which allows it to move down pipelines without the use of pumps, and its cleanliness, which limits rust and contamination thereby reducing maintenance costs. However, the use of LPG in the household sector in South Africa is still low. A reason cited for this, is that most of the people in rural areas cannot afford to use LPG due to the upfront cost of the appliance and the lack of money to purchase LPG. Limited LPG consumption is often blamed on the population's low-income level. While it is obvious that low-income level limits access to most goods and services, facts show that supply constraints, inadequate institutional framework, pricing and subsidies, and the lack of incentives for marketers, are by far the major reasons for keeping LPG consumption low. Low-income level is not the all inclusive reason for the low use of LPG in most South African households.

As part of its sustainable development targets, South Africa's energy policy places a high priority on improving households' access to safer, cleaner and affordable sources of energy. Increase use of LPG for cooking could reduce greenhouse gas emissions (smoke), compared with using coal-fired electricity. Compared with the fuels most widely used for cooking by poorer households (wood, coal and illuminating paraffin), LPG is more convenient and does not carry such health hazards (sooting, smells and poisoning). However, a minority of households use LPG in South Africa. The prices are high, the distribution networks are limited in different parts of the country, and also other factors (lotto, cellular phones, poverty, etc) impede wider use of LPG.
Therefore, if some of these barriers to LPG usage can be removed, it is believed that wider use of LPG could deliver significant socio-economic and environmental benefits.

1.2 BACKGROUND

The Liquefied Petroleum Gas (LPG) cylinder market consist of a group of consumers with similar yet differentiated needs, namely commercial customers (small industries, restaurants, wholesalers and nature reserves), low-income customers (such as the rural and township households with a monthly income of R748 - R2288) and high-income customers (such as the urban households with a monthly income above R9743). LPG is mainly used for cooking, lighting, heating, leisure and as a preferred form of energy in the commercial segment. The key issues currently facing the industry are: minimum growth, high capital requirement, rising cost of product and squeezing profitability.

The dominant player in the South African LPG cylinder market is Afrox, an aggressive and competent market leader. BP, Easigas, Total and Elf are the other main players.

The LPG market in South Africa has the potential to grow and the demand in the household sector could increase in the future. There is a segment of the population that uses LPG for cooking - this represents 24% of the LPG market. They can be divided in two different classes – high income uses 7% and low-income use 17% (www.lpgas.co.za).

The 1999/2000 survey based on the 1996 census, illustrates that from 9,1 million households, 286,657 (3,15%) consume LPG. The 286,657 households comprise of: 83131 in Free State, 61,631 in Eastern Cape, 61,631 in KwaZulu Natal, 40,132 in Gauteng and 40,132 in Mapumulanga. The 2000/2001 survey based on the 1999 census, illustrated that from 11 million households, 330,000 (3%) consume LPG. There has been a 0,15% reduction in households using LPG as their source of energy.

However, the range of basic needs requiring energy inputs shows that normal life would be impossible without energy. Without fuel for transport, the economy would come to a standstill. Without energy to cook food, a household would starve. This is particularly the case for poorer households that rely on cheap staple foods, which are inedible without being cooked.

Table 1 – Strength and Weakness Analysis of the main LPG suppliers.

	STRENGTHS	WEAKNESSES
Afrox	• Vast distribution network • Key account specialist • Offers a variety of gases in cylinders • Strong marketing • Technical & sale functions • Well - known LPG brand • Global player • Own a few big hospitals - guaranteed LPG business • LPG transport cost sometimes shared with delivering other gases	• Duplication of network • Offers only one type of petroleum product
BP	• Health, Safety and Environment awareness • Product marketing • Key account specialist • Sells LPG through their forecourts • Supplier of all petroleum products • Global player	• LPG brand not yet well known • Offers only one gas type (LPG)
Easigas	• Product marketing • Key account specialist • Well - known brand • Technical Team • Global player	• Offers only one gas type (LPG)
Total	• Supplier of all petroleum products	• Offers only one gas type (LPG) • Few LPG distributors • Weak LPG brand • No LPG marketing
Elf (new entrant)	• Low product price - no major investments yet	• Weak distribution network • Extremely weak LPG brand • Offers only one gas type (LPG) • Insufficient number of the different LPG cylinder sizes • No marketing

1.2.1 Market share

Five companies that dominate the LPG cylinder market share in South Africa are: Afrox, Easigas, BP, Total and Elf. The table below highlights their LPG cylinder market share.

Table 2 - LPG cylinder market share.

Company	Market Share
Afrox (Engen & Caltex)	42%
Easigas (Shell)	22%
BP	22%
Total / Elf	11%
Other	3%

Source: LPGas Association 2002.

1.2.2 The Marketing Mix

The marketing mix of the household LPG cylinder market is typical amongst all the main players in South Africa. LPG is produced and packed to the same standard at all the refineries in South Africa. However, the distribution, price and promotions strategy varies according to the suppliers' priorities. Reference is made to product, place, price and promotion in the LPG cylinder market.

Product

Handigas is the generic term known for Afrox LPG and Easigas is the generic term for Shell LPG. LPG is non toxic, non corrosive, non polluting, odourless (stencher added for gas leak detection), heavier than air, lighter than water, clean burning, safe, portable, flammable, easy to use and environment friendly.

South African Liquefied Petroleum Gas is mainly produced from crude oil and comprises of two gases: 40% butane and 60% propane. Butane boils at 0 degrees Celsius and propane at minus 42 degrees Celsius. The density of LPG is approximately 0,555kg/litre. The fact that LPG vapour is nearly twice as heavier than air is one of the most important factors to bear in mind when considering the safety of LPG. Unlike air that rises into the atmosphere, leaking LPG vapour flows along at ground level and into pits, drains, cellars, boat hulls and the like.

A smelly chemical known as ethyl mercaptan, is added to LPG. The stencher emits a nauseating odour, making LPG easily detectable in the case of a leak.

LPG is stored in a liquid form for both bulk and cylinder uses. Due to the expansion of LPG liquid when the temperature rises, all LPG storage containers are filled to only 80% of capacity. The remaining 20% space allows for the expansion of LPG. Most consumers use LPG vapour for their operations. The change in pressure causes LPG to change from liquid to vapour - this is best explained to that of a car radiator, which gives of vapour once the radiator cap is taken off. This happens because of the change in pressure.

Excessive heat applied to LPG cylinders or tanks could result in an explosion. Liquid LPG is normally put under a pressure of about 600kpa at 20 degrees Celsius in a tank or in a cylinder.

LPG is sold in bulk and in cylinders *(See appendix 1 and 2).* Cylinders with a capacity of 9kg and more belong to the suppliers, whilst the smaller cylinders, less than 6kg belong to private individuals. Only the supplier may fill his cylinders of 9kg mass or more. The cylinders are easily identified with the suppliers name and logo on them.

LPG's substitute products are wood, coal, electricity and illuminating paraffin. LPG suppliers provide the gas-storage facility and ancillary equipment free on loan, so the customer does not have to pay for the installation or upgrade of the energy source, as is the case with alternative energies such as electricity. A further advantage is that there are no penalties associated with the way LPG is used – the customer can use as much of the LPG how and when he wants, without incurring extra costs in the form of demand or load factor penalties, as is the case with electricity. LPG is packaged and stored in a number of ways including a variety of containers and cylinders, mini-bulk and bulk storage facilities. LPG is sold in 48kg, 19kg, 14kg and 9kg cylinder capacity sizes. The 19kg, 14kg and 9kg cylinder capacity sizes are commonly used in both the low and high-income households.

The large quantity of LPG being used is bringing down the cost of LPG and it is competitively priced compared to other energy sources. Wood is mostly used, easily available and free in rural areas and townships. However, this practice poses a major threat to the environment. Africa is the world's largest consumer of biomass energy (firewood, agricultural residues, animal wastes, and charcoal), calculated as a percentage of overall energy consumption. Most of Africa's biomass energy use is in sub-Saharan Africa. Biomass accounts for 5% of North African, 15% of South African, and 86% of sub-Saharan (minus South Africa) consumption. Wood, including charcoal, is the most common and the most environmentally detrimental biomass energy source. Firewood accounts for about 65% of biomass use, and charcoal accounts for about 3%. Deforestation is now one of the most pressing environmental problems faced by most African nations, and one of the primary causes of deforestation is wood utilization for fuel (www.shell.co.za).

The local perception (culture) about LPG is poor. A common perception is that LPG is very dangerous and is fatal when it explodes. Most LPG appliances are regulated by SABS and the code of practice is included in the Occupational Safety and Health Act. Consumers (current and potential) need to be educated concerning the uses and safety of LPG.

Place

LPG is produced at SAPREF (BP/Shell refinery). It is then collected by road tankers from SAPREF and transported to LPG distributors where it is decanted from the road tanker into a bulk LPG tank on the distributors' premises. The product is then decanted from the LPG bulk tank into various LPG cylinder sizes. The LPG distributor sells:

- direct to the end user, such as households, restaurants/hotels, nature reserves or small commercial customers
- to the LPG dealer who is fitted with a LPG storage facility as well as a LPG decanting pump

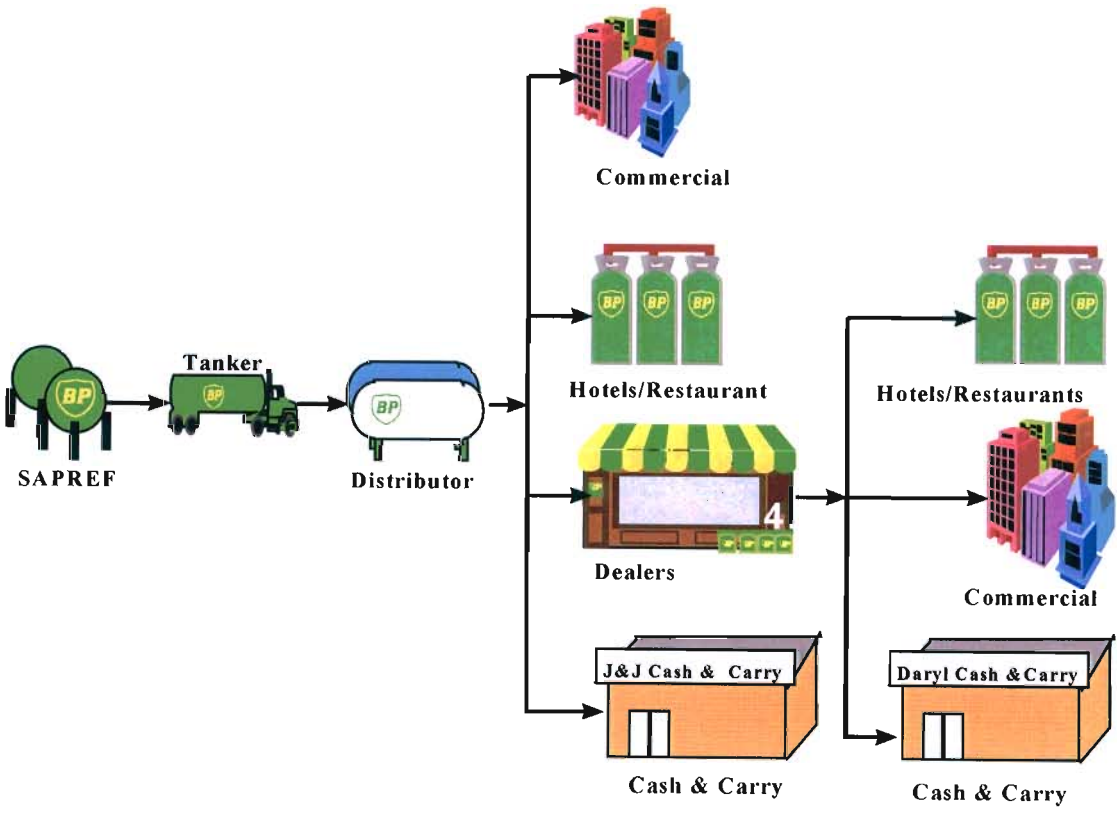
The LPG dealer then sells either to:

- a forecourt who sells to the end user *(See appendix 3)*
- a direct commercial customer

- a restaurant/hotel or nature reserve
- an end user who needs his Cadac cylinder filled

The LPG cylinder market is mainly in the rural and township areas, small industrial areas and on BP forecourts. Therefore, the places ideally suited to sell LPG in cylinders will be the wholesalers in and near rural and township areas, and also LPG dealers near small industrial areas and BP forecourts. However, the value chain is long and cumbersome for households. The household customer travels to the LPG distributor point, collects and pays for the product and transports it home. If one could shorten the value chain, it will make matters more convenient for the consumer. Unfortunately it is not always possible, especially in rural and township areas where homes and small businesses are not always accessible by road.

Afrox's Durban LPG distributors are situated on Maydon Road, Umbilo and in Westmead, Pinetown. Easigas, Total and Elf's Durban LPG distributors are situated in the Queensburgh area. BP's Durban LPG distributor is situated in Prospecton. All these distributors have a 90,000 litre LPG tank installed on their premises. *(see appendix 1)*



LPG VALUE CHAIN

Price

The price of LPG is based on a wholesale list price minus a discount. Each zone has its own wholesale list price i.e. the further you are positioned from the oil refineries, the higher the wholesale list price. The current LPG wholesale list price in zone 01L (Durban) is R5,61/kg and it takes an hour to burn off 1kg of LPG. Consumers also pay a deposit of R85,50 for all supplier LPG cylinders used. This deposit is refunded on return of the LPG cylinder. The average prices for LPG in cylinders are:

- 48kg LPG cylinder with LPG is R228,00 excluding VAT
- 19kg LPG cylinder with LPG is R86,45 excluding VAT
- 14kg LPG cylinder with LPG is R64,96 excluding VAT
- 9kg LPG cylinder with LPG is R43,02 excluding VAT

Until now there has been no mechanism to regulate the price of LPG. Recently, there has been a process at the Department of Mineral and Energy (DME) to consider regulating the price of LPG at the retailing level. The DME, in conjunction with the refinery companies and other stakeholders, are debating the possibility of regulating the LPG market. The only tax currently applicable to LPG is Value Added Tax. The local pricing is not controlled. This is the reason why consumers pay high prices for LPG. The government however, is preparing a policy paper, which will be released in the near future regarding regulating LPG prices to the end user (households).

Promotion

In the past BP has not been effective in the advertising, sponsor and promotion field of LPG. Since the formation of an LPG team in 2000, BP has now become more focused on LPG advertising, sponsorship and promotions. However, BP global has always promoted its brand in many ways, such as the sponsoring of the BP Top Eight Football challenge in South Africa, the clinics in rural/township areas and the advertising of petrol with the slogan " beyond petroleum."

Easigas and Afrox advertise LPG in the local magazines, Cash and Carry pamphlets and on taxis. The current Sasol gas pipeline radio advertising is making the public more aware of gas. Total and Elf are not noted for advertising LPG. LPGas association of South Africa also advertises the safe use of LPG in schools and on

billboards. Along with the LPGas Association of South Africa, all suppliers are aware of the market implications if a LPG cylinder explodes. Explosions cause consumers to discontinue using LPG as an energy source. It is for this reason that all suppliers embark on continuous safety measures to ensure that LPG is handled, stored and used safely.

All LPG distribution points are fully fitted with advertising material such as "LPG sold here", price boards, correct filling procedures and other safety information.

Being corporate companies, the advertising, sponsorship or promotional ideas are forwarded to the marketing department and they construct the finished product in conjunction with the LPG teams based on their corporate mission statement and vision.

The LPG industry is faced with competition from the Lotto and cellular telephone industries. Consumers have shifted to purchasing a cellular telephone and a lotto ticket rather than purchasing LPG with which to cook. The notion is that if they win the lotto they will be in a position to purchase a house that comes fully fitted with electricity.

1.3 MOTIVATION FOR THE STUDY

There is a significant fluctuation in household use of LPG. Finding the reason for this anomaly will assist future decision-making. I am not aware of any such study of research been conducted in the South African petroleum industry and as such the findings of this study could be useful to companies in the South African petroleum industry that:

- Want to ensure a competitive edge
- Want a better corporate policy on pricing and advertising
- Want to ensure sustainable survival

1.4 VALUE OF THE STUDY

The LPG market in Durban lacks consistency in pricing and promotion of the product. Understanding what consumers prefer in terms of pricing and promotion of LPG will assist suppliers and marketers to improve the current situation. It is hoped that the findings of this study will enable all suppliers to favourably bridge the gap between the consumer and their perception of LPG and its pricing.

1.5 LIMITATIONS

1. A more representative sample would be desirable. Time constraints however prevent a bigger sample size.
2. To my knowledge no such study has been conducted in the LPG industry. Much research is required such as the long-term effects of a new pricing and advertising strategy.
3. A significant limitation is the use by household consumers only, because there are many other consumers of LPG.
4. Interviews will be conducted by undergraduates and therefore cannot guarantee error free completion of the questionnaires.

1.6 PROBLEM STATEMENT

This research examines the impact advertising and pricing has on the fluctuating consumption of household LPG.

1.7 OBJECTIVES

The research objective is to:

- Investigate the effects price changes have on LPG sales to household consumers in Durban.
- Investigate the effects advertising changes have on LPG sales to household consumers in Durban.

1.8 HYPOTHESES

First hypothesis – The changes in LPG pricing will have a direct impact on the fluctuations in sales.

Second hypothesis – The changes in LPG advertising will have a direct impact on the fluctuations in sales.

1.9 DELIMITATIONS

- This study will not attempt to predict sales in LPG.
- This research is restricted to household consumers of LPG.
- This study will not attempt to predict the success of marketing strategies.

1.10 STRUCTURE OF DISSERTATION

Chapter 1: Introduction. This chapter includes the background and motivation of the study, the value of the study and the problem statement, objectives and hypotheses as well as the limitations.

Chapter 2: Review of Literature. This chapter discusses the LPG industry reports, related literature and relevant secondary data on pricing and promotion of LPG. A comparison will be made between the secondary data and what is practised by the LPG industry. Examples of the beverage industry pricing and promotion will also be compared to that of the LPG industry.

Chapter 3: Methods. This chapter describes the research sample, research design and methodology, focus groups, questionnaire, pilot study and the procedures used to collect and analyse the data.

Chapter 4: Results. This chapter highlights the research findings. Data collection of LPG pricing and promotion within the Durban area will be presented in this chapter.

Chapter 5: Conclusion. This chapter discusses the research findings. The findings will be presented in conjunction with the hypotheses and objectives of the study.

From the analysis and interpretation of data a framework will be proposed that will aid the development of pricing and promotion strategies in household consumption of LPG.

CHAPTER 2

LITERATURE REVIEW

The greatest danger is not that our aim is too high and we miss it but that our aim is too low and we reach it.

- Michelangelo

Correct pricing and promotion are two elements of the household LPG marketing mix that has proven to have great impact on whether a consumer purchases more LPG or whether a consumer decides to choose LPG as the preferred energy source. It is for this reason that this study is been conducted on price and promotion only. However, there are other factors which have an impact on the fluctuation of LPG sales such as unemployment, poverty, distribution to rural areas, purchasing of Lotto tickets, purchasing of cellular telephones, medical costs and so forth. However, these factors will require a more in-depth study, which could require more than six months to complete.

2.1 PRICING

LPG is manufactured from crude oil and crude oil is sold per barrel in United States Dollar (USD). Therefore, the cost of LPG in South Africa is largely dependent on the Rand / USD exchange rate and the demand and supply of crude oil. In recent times, the Rand has weakened substantially resulting in the LPG price being increased more than once a year during the past few years opposed to the normal annual increase. These twice a year increases forced the low-income households to use cheaper substitute energy such as paraffin, coal or wood.

2.1.1 Analysis of global crude supply and demand

- DEMAND FOR CRUDE OIL

The definition of demand for goods means the quantity per unit of goods or service that one intends to buy at all possible prices, other things being equal.

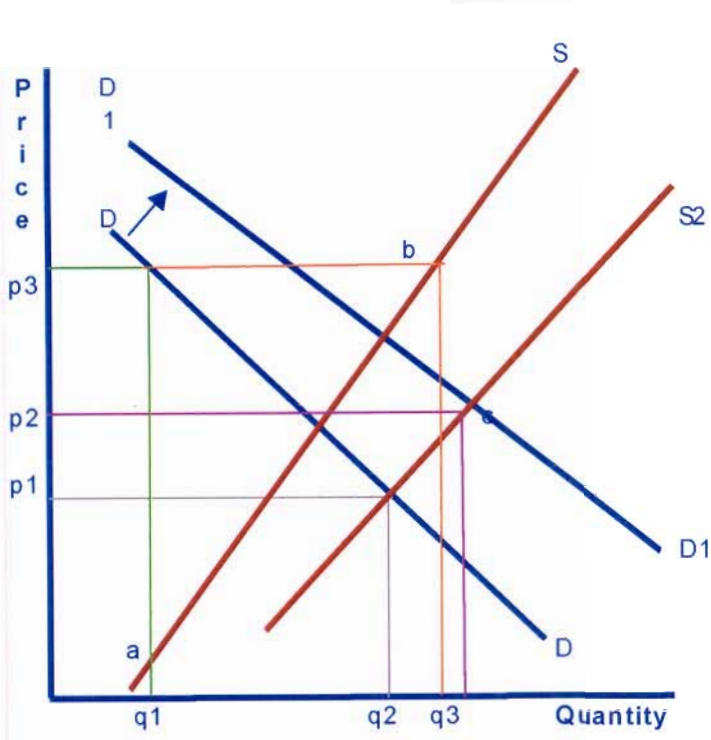


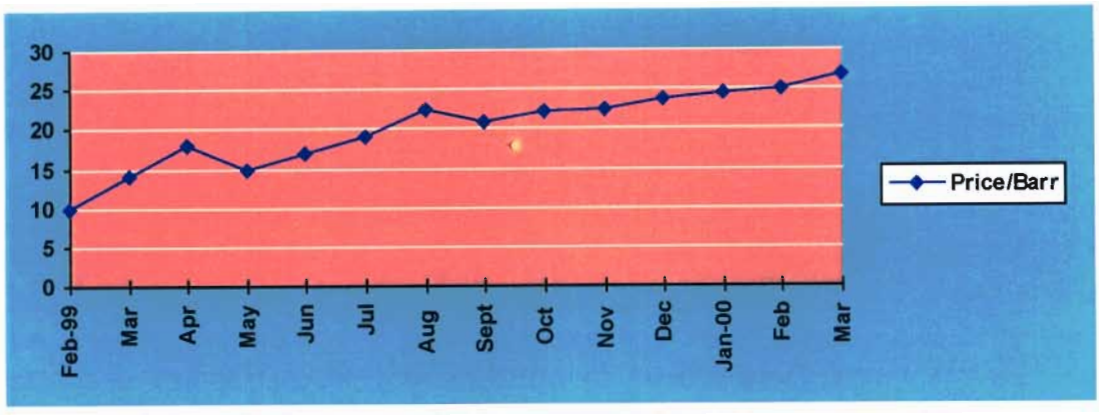
fig. 1 SUPPLY & DEMAND GRAPH

Taking the world demand for crude oil as per figure 1, we notice that the demand for oil at p3 is q1. If the price had to fall to p1 then the quantity demanded will increase to q2. The movement along the demand curve is a result of a change in price. It is not a "change in demand". The term "change in demand" refers to an entire new demand curve, for example, in figure 1 the move from DD to DD1. This occurs when one or more of the variables that were held constant now change. The positive change in demand for crude oil, especially in the western world, enhances the growth of their economies. The energy requirements in the Industrial, Automotive and Domestic markets have risen in the first and developing world.

- SUPPLY OF CRUDE OIL

The supply of goods or services is linked to the price and the availability of the goods or services. Normally if there is a higher price offered for a good or service then it becomes profitable for producers to increase supply or other players enter the market to satisfy the increased demand. However, with the limited amount of crude oil available this does not happen, allowing the oil suppliers a strangle hold on the market. The movement on figure 1 illustrates this, where an increase in price from p1 to p3, move from point a to point b. A change in the supply means a shift in the entire supply curve for example in figure 1, the curve S to S2. Here the price of crude oil drops because there is an increase in the quantity supplied (b to c in figure 1).

2.1.2 Trend of crude oil prices in US$ since February 1999



Source: Internet Business/economy; 22/01/1999

The oil price affects SA in many ways, not least on the balance of payments. At current prices and the exchange rate, crude oil imports are costing an annualised US $1,8bn (about R11bn). This is based on imports of around 440,000 BPD. Local synthetic fuel output - the conversion by Sasol & Mossgas of coal and gas directly into petrol & diesel is equivalent to a further 200,000 BPD. Even at distressed oil prices, crude oil costs SA nearly 10% of total imports (Internet-Business/economy; 22/01/1999).

South Africa's economic growth averaged only 1.8% from 1980-2000, but has picked up in the last three years; real gross domestic product (GDP) grew at 2.5% in 1999, 3.1% in 2000 and 2.3% in 2001. Real GDP is predicted to grow by 2.3% in 2002. In the 1980's, South Africa experienced double-digit inflation, but the government's fiscal policies have helped to reduce inflation significantly. Inflation was 5.3% in 2000, and 6.3% in 2001. Despite these positive trends, foreign direct investment remains below expectations. Fixed investment, which accounted for 27.5% of GDP in 1981, accounted for only 14.9% of GDP in 2000. South Africa's currency, the Rand, lost 6.5% of its value against the dollar during the first eight months of 2001. The falling currency, when combined with higher prices for imported oil, has prompted fears of increased inflation in the country (www.eia.doe.gov). However, the Rand has strengthened, and was trading at R9,13 to the US Dollar, on the 9th December 2002.

LPG can potentially provide an energy source for South Africans, particularly the poor, who do not have adequate access to other forms of energy.

This would be contingent, however, on the affordability of LPG to those with very low incomes. Given the profit-maximising motives of the private sector, they would not be geared towards providing affordable access to LPG for the poor, and this reality goes some way towards explaining the current limited use of LPG by households. Regulation of prices and subsidies by the government will make LPG more attainable by households in terms of its cost.

2.1.3 South African household expenditure on energy

The affordability of modern, efficient end-use appliances and the amount of energy used in the home are both influenced by the disposable income of a household.
Household expenditure is very unevenly distributed in South Africa. The majority of households (approximately eighty percent) spend less than 40 percent of all money available for expenditure. The wealthiest 20 percent of households is responsible for more than 60 percent of the country's purchasing power.

Table 3 shows the average annual household expenditure according to income category. This shows the disproportional spending of the poorest part of the population on household energy, represented in the table by the category fuel & power. This category constitutes spending on electricity, LPG, firewood, charcoal, paraffin, candles, coal, methylated spirits, recharging of batteries, crop waste, dung and other household fuels. The national average spending on fuel and power for the entire population is 0,6 percent of total household expenditure (right-hand column). Four of the five quintiles (representing 80 percent of the population) spend this percentage and more on fuel and power. For the lowest quintile (earning only 2 percent of all income), this category represents its third largest category of expenditure (after food and housing), or more than 8 times the national average.
While the poorest fifth of the population spends 5,1 percent of its annual household expenditure on fuel and power (this figure does not include household resources used for collecting firewood and other non-commercial resources), the most affluent 20 percent of the population spends only about 0,1 percent of its annual household expenditure on energy. These figures illustrate the necessity of energy conservation for poor households (www.ctech.ac.za).

Based on the statistics below it is evident that quintile 1 households are the largest consumers of energy. One would need to direct more attention to this segment in order to achieve a favourable consumer price structure for LPG, which could increase future consumption of LPG.

Table 3 - Average annual household expenditure according to income category, 1995

	Percentage of total expenditure allocated per expenditure item					
Expenditure	**Quintile**					
Item	1 R0- R6 867	2 R6 868- R12 659	3 R12 660- R23 939	4 R23 940- R52 799	5 R52 800 -	Total
Food	50,7	43,1	32,8	23,2	11,6	18,3
Drinks	2,3	2,7	2,6	2,1	1,5	1,8
Tobacco	2,3	2,0	1,8	1,2	0,6	0,9
Clothing & footwear	6,8	8,1	8,1	6,7	3,8	5,1
Housing	13,7	12,7	12,7	14,9	17,2	16,0
Fuel & power	5,1	2,9	1,5	0,6	0,1	0,6
Furniture & equipment	2,4	4,2	5,5	5,8	3,5	4,1
Household operation	3,9	3,6	3,1	2,3	1,2	1,8
Servants	0,2	0,3	0,5	1,0	2,0	1,6
Medical services and requirements	0,6	1,2	2,2	4,5	4,5	4,0
Transport	2,8	4,4	6,3	7,6	12,2	10,2
Communications	0,8	1,3	1,9	2,6	2,5	2,4
Recreation, sports, etc	0,4	0,6	1,0	1,3	2,1	1,7
Reading matter	0,04	0,2	0,3	0,5	0,5	0,5
Education	1,0	1,1	1,4	1,9	2,1	1,9
Personal care	3,1	3,3	3,3	3,1	2,0	2,5
Restaurants, bars, etc	0,2	0,3	0,4	0,6	1,0	0,8
Holidays	0,3	0,2	0,3	0,2	0,3	0,3
Income tax	0,4	3,6	8,5	12,0	17,6	14,6
Other	2,6	3,9	5,9	8,0	13,5	11,0
TOTAL (Rand)	4 891	8 943	16 178	33 294	104 275	35 688

Source: Roux, A.: "Where does Income go? Expenditure of Households in South Africa" Strategy Insights, Economic Issues, Vol. 5, No. 10, Nov 1997.

2.1.4 Energy purchasing pattern of low-income households

Despite the importance of energy services for low-income households, such services have not been adequately supplied in the past, the priority of government having being the development of a modern industrial urban society. As a consequence there is a general service backlog, with the majority of people still not enjoying the benefits of electricity, and a significant proportion of electrified households at a stage where they are only using electricity for lighting and entertainment.

Furthermore, the considerable inequalities in wealth have meant that many people cannot afford to use electricity optimally, even if they have access to it. Such households have to rely on less convenient and often, unhealthy fuels, such as paraffin, candles, coal, LPG, batteries and fuel wood.

An important factor associated with the continued use of non-electric fuels is unemployment and poverty. Households facing low or unpredictable incomes tend to purchase fuels as and when cash resources are available. Whilst small amounts of paraffin are convenient for such users, the benefits of bulk purchasing are foregone. Such unstable energy use patterns, characterised by the use of several fuels for different end-uses, clearly mitigates against the efficient and rational use of energy. Low-income households tend to purchase cheap and unsafe appliances, thus increasing the risk to health.

Household energy services can be provided by numerous appliance and fuel combinations. For example, cooking can be done with a coal stove/coal, hot-plate/electricity, gas-stove/gas, paraffin-stove/paraffin, solar cooker/sun, or low-smoke fuel stove/low-smoke fuel combinations. The costs of these combinations vary widely. For poor households the multi-functionality of appliances and fuels is often important. LPG, paraffin and coal stoves can be used to cook food while heating a room at the same time, whereas two electrical appliances would be required to perform these tasks, at greater expense.

Research has shown that electrified low-income households continue to use a range of fuels because electricity is found to be less cost effective, and is less socially desirable

than the alternatives. It is becoming apparent that, contrary to initial expectations, grid electrification may not satisfy all the energy needs of low-income households (or at least not in the short to medium-term electrification process). The high cost of electrical appliances, their lack of multi-functionality and the relatively high costs for thermal end uses like cooking and space heating are some obvious constraints to the greater application of electricity (www.polity.org.za).

2.1.5 Energy purchasing pattern of high-income households

Higher income households are almost entirely dependent upon electricity to meet their energy needs. Despite the high-energy consumption of such users, little emphasis has been placed on encouraging energy conservation. LPG is mainly purchased for leisure use and high-income consumers are willing to pay a premium price. These consumers normally source their LPG requirements from garage stations. However, there are a small percentage of consumers that purchase LPG for cooking and heating water. These consumers have proper expensive LPG manifold installation installed with all the necessary manifold, piping, regulators and valves. Such installations have 48kg LPG cylinders connected to the LPG manifold.

2.1.6 LPG pricing issues: Are Subsidies an option?

LPG to South African household consumers is neither subsidised nor regulated. LPG prices are controlled by the private sector. Unlike illuminating paraffin (IP), which is both subsidised and regulated, IP prices change every first Wednesday of the month. Depending on the cost of crude oil at the time, IP prices either increase or decrease. Consumers do not pay VAT on IP.

IP has gained wide acceptance in the informal market. This is due to IP being: -

- Easily accessible
- Easy to store – one litre of Coke bottle
- Easy to transport
- Relatively cheap fuel – regulation
- Relatively cheap appliances – stoves, fridges, lamps, etc.
- Cheap containers for storage

However, IP does have problems associated with its use and storage such as: -

- Sooting
- Smells
- IP poisoning of children

The IP market in terms of tons sold is five to six times the size of the LPG market in South Africa.

As IP is a petroleum product, its pricing is very similar to LPG i.e. use is made of Magisterial District listings which are grouped into Magisterial pricing zones. Hence, if you require the price of IP in a certain town you would have to establish which magisterial area the town falls into. As with LPG, IP is discounted against the zone price by the oil companies by offering discounts.

IP is sold in bulk, in 210 litre drums and in 20 litre drums. Dealers then dispense IP into customers' own containers (for example Coke bottles).

Bulk LPG prices (ex-refinery or import prices) are often designed to protect the refineries, not the consumer. As a consequence, they distort end-user prices. They generally consist of high ex-refinery prices, based on Mediterranean prices for small spot cargoes, coupled with expensive freight established on the basis of small ships. They typically range from USD170 to up to USD800/ton. While such pricing formulae are appropriate from an economic standpoint, in a scarce supply environment where the alternative to local supply is to import LPG from Europe or the Gulf, they are definitely out of line.

Because of its high socio-political content and limited supply, LPG pricing is generally established and controlled by governments. While prices do have to be regulated as long as suppressed demand and structural dysfunctions remain, operating margins must be attractive enough to allow operators to invest and develop their activities. Once supply is no longer constrained and the organisation of the industry is sound, price regulation is no longer required.

Over the long term, end-user prices must reflect the actual economic cost of the product. Subsidies may have helped develop the market initially (example Senegal) but wherever they might be required to help develop the LPG industry in a first time, they must remain temporary, explicit and transparent. Studies shows that:

- In many countries, LPG consumption has remained idle in spite of subsidies, because of supply constraints and not weak demand.
- Where subsidisation policy was successful, subsidies created a heavy burden on the State's budget, which increased as LPG demand developed
- In turn, the government may try to recover part of the subsidies through reducing operators' margins, thus hampering industry development and creating shortage situations
- Without reducing bulk import cost through improved infrastructure and pricing structure, removing subsidies often present a certain political risk
- Although they are intended to help the poor, subsidies often miss the assigned target and do not help allocation of public money efficiently
- Subsidies encourage smuggling, which may actually benefit consumers in neighbouring countries rather than domestic consumers
- They are counter-productive, as they tend to create scarcity, which in turn translates into black market, smuggling, and thus higher actual prices (www.ifc.org).

2.1.7 The LPG Industry – pricing system

Due to the foreign exchange implications and the strategic nature of petroleum based products to the country, all petroleum product prices are currently based on the "offshore" cost of crude oil. The oil industry, of which the LPG industry forms part, therefore structures prices on a basis that will recover the costs of (i) production and (ii) the distribution of product from the coastal refineries at Durban, Cape Town and Mossel Bay to the rest of the country. Although a large proportion of LPG is supplied by Sasol at Secunda and Sasolburg to the inland provinces, this product includes what is called "Sasol Differential" which effectively makes the cost of product, plus railage, the same as if supplied from the coastal refineries.

The costs that need to be recovered include:

(i) Costs that are generally incurred at all points of supply: -

- Cylinder and plant investment
- Bulk and cylinder filling
- Plant and cylinder maintenance and repair
- Marketing, office and management overheads
- Management overheads

(ii) Distribution costs that vary as the distance from point of supply increases: -

- Distribution of product in bulk by rail
- Distribution of product in cylinders, either by rail or road

Since the cost of distribution is variable and is a major component of the final cost, LPG prices will therefore increase in relation to the distribution required to supply from the coastal refineries to the market place.

2.1.8 The LPG industry – Magisterial district/zone code pricing system

A magisterial district/zone code pricing system is used by the LPG industry to allocate distribution costs and recommended selling prices for each and every town/place in the country. As each town/place falls within the boundaries of particular Magisterial Districts, this demarcation of areas is used to group each Magisterial District into particular "pricing zones" depending on its location and therefore on the product transportation costs incurred to distribute LPG to each particular Magisterial District.

As mentioned above, cost of distribution is broken into two categories:

(a) Cost of bulk LPG supplied from the refineries by rail or road to certain designated "bulk depots".

(b) From the "bulk depots", all distribution is costed as product supplied from that depot in cylinders delivered by road to all the other places.

For most customers LPG is supplied in cylinders and the "Wholesale List Price" is used to determine a price relative to the customer's delivery location and expected/actual volume of LPG used.

However, should the customer require on-site LPG storage and reticulation system, then the cost of such an installation must be recovered in the LPG price or by way of a monthly equipment rental charge. A cylinder manifold and pipeline reticulation system is a typical high-income household type of LPG installation. In this case, there are additional costs that are unique to each customer's particular requirements and application. These additional costs are normally recovered in the LPG price that the customer pays.

Therefore, the unique requirements and costs of each particular customer are established in order that a target price can be calculated as a guideline to the customer when establishing a price structure.

2.1.9 Price elasticity of demand

A basic question for any business, regardless of size or type, is: can more money be made with a change in price? While the normal tendency is to think in terms of lowering price to sell more and make more money, the responsiveness, or the lack of it, to price change might be such that an increase in price results in lost profitability. When the percentage of demand is greater than the percentage change in price, demand is said to be elastic. If the percentage demand increases less than the percentage of change in price, demand is said to be inelastic (Hanna and Dodge 1995, p. 33).

Moreover, different consumers or groups of consumers (example low-income and high-income households) may respond differently to price changes. In the case of the LPG market, the availability of substitutes (IP, wood and coal) is undoubtedly the most important determinant of consumer's reaction to a price change. This large number and availability of substitutes somehow tend to have an elastic demand. For example, if the price of LPG with its close substitutes increases, consumers will tend to switch to the substitutes, which become relatively cheaper. The switch to substitutes, is however relatively low because of the inherent health implications. The

LPG industry's annual price normally increases about 2 percent and the annual growth is about 8 percent.

However, LPG is sometimes used as a complimentary product and the price elasticity of demand tends to be low. Electricity is expensive and households compliment it with LPG for cooking and heating.

LPG volumes could improve by converting electricity consumers to use LPG as their sole energy requirement. One can also target the current electricity consumers with a view to marketing LPG as a complimentary energy source.

2.1.10 Going – Rate Pricing

The LPG industry is based on a going-rate price where suppliers and dealers base their price largely on competitors' prices, especially to low-income households. The supplier/dealer normally charge the same, more or less than major competitors. BP, Easigas, Total and Elf follow Afrox (the leader) - changing their prices when the market leader's prices change rather than when their own demand or costs change. It is thought to reflect the industry's collective wisdom as to the price that will yield a fair return and not jeopardise industrial harmony. However, that is not always the case, as suppliers/dealers tend to enjoy good margins where households have LPG equipment on loan from them. High-income households also pay a premium price for the leisure LPG consumption *(See appendix 4 and 5).*

2.2 PROMOTION

Advertising is generally considered a "pull" strategy; that is, a direct appeal to the customer to stimulate demand, which will hopefully encourage the channels to support the product. "Push" strategies, in contrast, emphasise marketing tactics that stimulate more aggressive vendor activity (sales force effort, trade discounts, high retail margins and exclusive distributorships). Clearly, one major objective of advertising is to directly stimulate product purchase; however, advertising may serve many other functions as well. Other goals may include gaining the target audience's attention, communicating a specific message, persuading the target audience, or encouraging actions other than consumer purchase (Ring et. al 1989, p. 433).

Because LPG is perceived as an extremely dangerous product, the type of advertising that marketers need to pursue is: communicating a safety message of the product, persuading the target audience that LPG is cheaper than electricity and not a health hazard as their substitute products and gaining the target audience's attention by highlighting the benefits associated with LPG such as it being portable, reliable and effective.

Advertising of LPG is conducted on an individual supplier basis as well as on an industry basis by the LPGas association. Suppliers have their LPG advertising boards placed at their dealers' sites and sometimes advertise in the local magazines. The LPGas association advertise LPG on billboards throughout the country. Sasol's recent pipeline gas project has made many people aware of gas. Sasol is advertising gas through the radio, on billboards and in the newspapers. However, the Department of Mineral and Energy (DME) has not advertised LPG aggressively as expected by COSATU and World LP Gas Association (WLPGA).

2.2.1 LPG ready to deliver energy solutions

COSATU is of the view that the state should assume a leading role in the promotion of the LPG industry. The main motivation for this proposal is the promotion of an infant industry.

Internationally, LPG industries have been developed either as fully or majority state-owned, and in many countries that situation persists. Within South Africa, other sectors of the energy industry have developed under state ownership. Whatever the policy choice may be once the industry has matured – and COSATU would tend to favour ongoing state involvement - it would be exceedingly difficult for it to develop fast and fully if in private hands. This stems, in part, for the need of a huge capital outlay without the expectation of short-term returns; as well as from the need to operate within an environment dominated (both domestically and internationally) by big players (www.cosatu.org.za).

In an effort to provide greater clarity to world policy-makers preparing to gather in Johannesburg for the World Summit on Sustainable Development, U.N. Secretary General Koffi Annan recently outlined five key areas to improve the lives of all

human beings while protecting the global environment. Water and sanitation, Energy, Health, Agriculture, and Biodiversity, which have come to be recognised as the "WEHAB" issues are the five key areas where concrete results "can and must be obtained," Annan said.

With respect to the Energy challenge, governments are investigating the development of energy supplies that are both cleaner and facilitate delivery to the poor. LPG meets these criteria — both as a stand-alone, clean, portable energy supply and as a complement to renewable energy systems in rural or decentralised locations.

In a newly released report, "The Role of LP Gas in Meeting Sustainable Development," the WLPGA and the World Bank have undertaken a careful examination of the role for LPG—with the aim to investigate how it can improve the quality of life today and whether LPG can play a role in advancing a sustainable path for the future.

The report found that LPG contributes to strengthening all three pillars of sustainable development: the economy by boosting productivity; social welfare by improving living standards, and enhancing safety and the environment by reducing indoor and outdoor pollution.

Switching to LPG from traditional fuels, such as wood, coal and kerosene delivers important health and environmental benefits. Indoor pollution, which mainly affects women and children, is greatly reduced. Urban air pollution and emissions of climate-destabilising greenhouse gases are lower for LPG than most other fossil fuels and traditional fuels used in an unsustainable way.

Moreover, the report found that LPG could play an important - if not essential - role in the overall transition to a truly sustainable global energy system. LPG's comparative advantages over most other fuels mean that it can make energy development more sustainable until such time as affordable and environmentally acceptable renewable energy technologies become available.

Emmanuel Chantelot, Managing Director of WLPGA pointed to sections of the report, explaining, "there is a good case for government support to the LPG sector in developing countries based on the positive contribution the fuel can make to more sustainable energy use. Government policies and measures can strongly influence LPG market development and active government support can catalyse LPG market take-off and establish a virtuous circle of growing market potential, increased investment and expanded availability."

Demonstrating a consistency in U.N. messages on sustainable energy, Susan McDade, Manager of the UNDP Sustainable Energy Programme used the 3rd planning meeting in the run-up to Johannesburg to question "why so many of the world's poor still cook on dung and wood in a world where we have LPG?" McDade delineated her vision for an 'LPG Challenge,' aimed at expanding accessibility, availability and affordability of LPG; using LPG as an important transition to renewable energy; and providing targeted subsidies for LPG canisters and cookers.

"The timing of our joint report with the World Bank could not be better," explained Chantelot. "Right now, governments are looking for sustainable energy solutions and LPG is ready to deliver. In short, investment in LPG systems delivers modern energy to those without, thereby generating economic growth, improving health and quality of life, particularly for women. LPG is a safe, clean option delivering both local and global air quality benefits, and it serves as a vital partner to developing renewable technologies over the long run" (www.worldlpgas.com).

2.2.2 SA environmental challenge

Most consumers of wood and charcoal are not aware that these substitute fuels are the most common and the most environmentally detrimental biomass energy source. The use of these fuels, also result in deforestation. Effective awareness and advertising is required from both the DME as well as the private business sector.

Deforestation is now one of the most pressing environmental problems faced by most African nations, and one of the primary causes of deforestation is wood utilisation for fuel.

- Deforestation has negative implications for the local environment (increased erosion) and the global environment (acceleration of climate change, threatened biodiversity).
- Many African nations have had over three quarters of their forest cover depleted.
- Of the 159 signatories to the Convention to Combat Desertification, 52 are African. Of those 52, nearly all have ratified the Convention, which entered into force in 1997.

Women and children suffer disproportionately from negative health effect due to the smoke generated in the use of fuel wood for cooking (smoke is a carcinogen and causes respiratory problems). About 75% of wood harvested in sub-Saharan Africa is used for household cooking.

Production of traditional fuels is often insufficient to satisfy rising demand. Fuel available to the poorest communities is expected to decline, which will intensify environmental degradation in those communities. End-use efficiency for most traditional fuels is low. A high concentration of fuels is needed to produce a low level of energy, and a significant share is wasted.

South Africa is unique in sub-Saharan Africa; biomass accounts for only 15% of energy consumption. There is a range of energy options available in South Africa: biomass, kerosene, coal, liquefied petroleum gas (LPG), electricity, and solar power. This range of choices reflects the country's high level of economic development, relative to other African countries (www.worldlpgas.com).

2.2.3 LPG safety

Explosion and fire related incidents are the main reasons for LPG consumers avoiding the use of LPG as an energy source. These incidents are due to customer negligence and lack of product knowledge. Problems that the LPG industry face are that most of

the LPG literature is in English. Many customers are illiterate and speak other languages such as Zulu, Xhosa, etc. Literature in pictorial form is more desirable.

Overfilling of cylinders and lack of ventilation are the most common causes of explosions and fire related accidents. Both the suppliers and LPGas Association have websites, which highlight the safe use and handling of LPG. However, most customers do not have this facility, making that information inaccessible. Hence, the need for more aggressive product awareness campaigns for LPG customers in their respective language.

On Wednesday, 14 August 2002, the Mercury published a recent accident in Nyoni, Zululand. The article stated that four members of a North Coast Family, including an eight-month pregnant mother, burned to death after a gas explosion inside their thatched hut at Wangu reserve, Nyoni, on Monday night. Police said Ms Duduzile Cele Zikhali, 34, her husband, Bonginkosi, 41, and their two children, Bongekile, 4, and Siyanda, 3, and his mother-in-law, Ms Belinah Cele, 70, were burnt when the hut caught fire. Duduzile escaped the Blaze.

The LPGas Association is currently conducting an investigation into the accident and suspect that the cylinder used at the time was overfilled. They suspect that LPG was leaking from the top of the cooker whilst the cooker flame was burning, resulting in a big flame, which set alight the thatch.

LPGas is CLEAN and SAFE, provided one follows some SIMPLE RULES:

- Light the match or igniter before turning on the gas.
- Check by looking to see that the pilot burner or main burner has ignited - especially inside ovens where it is not always easy to see the flame.
- If the gas will not ignite easily turn off the gas and check that there is LPG in the supply cylinders. If in doubt call a LPG dealer.
- Remember that LPG vapour is heavier than air and even a small leak will result in gas accumulating on the floor and forming a flammable mixture with the surrounding air.

- LPG vapour is invisible - but you can quickly detect its presence by its strong smell. Extinguish all flames and do not smoke. Ventilate the area by opening doors and windows until the smell has gone.
- Gas leaks are caused by accidentally leaving open a gas valve or by a faulty connection to a pipe or valve. To find the leak, splash suspect part of pipe or valve with soapy water. The leak will cause bubbles.
- Cylinders must always stand upright.
- Do not use a cylinder that is damaged eg. badly rusted or dented, cut, bulging, etc. - have it checked by your LPG Dealer.
- Use only proper LPG hose to connect your stove or other LPG appliances. Ordinary rubber or garden hose must never be used as these are not designed for LPG and will soon deteriorate and leak.
- Keep flexible piping away from heat.
- Flexible pipe should be inspected annually for leaks.
- Flexible piping should be clamped to correctly designed metal connectors.
- A good supply of oxygen (air) is essential for efficient combustion - therefore a room in which LPG is burnt must have adequate ventilation openings - at low level to let fresh air in and at high level for products of combustion to exit.

THIS IS PARTICULARLY NECESSARY FOR SMALL ROOMS SUCH AS BATHROOMS.

It is important to note that inadequate ventilation may result in the formation of poisonous carbon monoxide.

Most gas connections utilise synthetic rubber joints or O-rings. These should be inspected (whenever the joint is made or broken) for cracks, perishing or other damage (eg. brittleness due to ageing) and replaced if necessary.

EMERGENCY DRILL FOR FIRE AT CYLINDER/S

Don't panic - Flames from joints near cylinder are not dangerous in themselves.

If possible, close the cylinder valve using a wet cloth to protect your hand.

Spray cold water onto cylinders exposed to the fire in order to keep them cool. Use a hosepipe. Keep people away from the area.

NOTE: IF IN DOUBT ABOUT ANY OF THE ABOVE, CONTACT YOUR LPG DEALER.

ALWAYS ENSURE THERE IS GOOD VENTILATION.

Men, women and children breathe air as a natural function, which enables them to live. There is normally 21% oxygen in the air we breathe. If this oxygen content drops to 14-16% it results in rapid breathing and an increased pulse rate. Loss of muscular co-ordination occurs at around the 12% level. Abnormal fatigue and laboured breathing sets in at round 10%. Between the 6 and 10% level nausea, vomiting and an inability to move freely occurs and eventually, the probability of loss of consciousness.

If we just seal ourselves in a room we will be using up the oxygen with our normal breathing. A person at rest will use approximately 4.5 cubic metre/h. Therefore they could experience difficulties if locked in a 2m cubed or 8m cubed room (e.g. a bathroom) for just 2 hours without the entry of any fresh air.

All forms of combustion require/use oxygen and LPG is no exception. An LPG appliance will therefore also use up available oxygen in the air, at approximately the same rate as a person - depending upon its size. Ventilation is the free entry and circulation of air in a confined space such as a room.

A vent is an opening through which air is able to pass. Ventilation is required if flames burning are using up the air in a room and/or people breathing. If ventilation is

not provided then the existing oxygen in the air will be used up, the flames will start to smoke and eventually go out and the people will lapse into unconsciousness and, eventually suffocate.

Most fatal accidents involving LPG in South Africa are usually suffocations and/or carbon monoxide poisonings, caused by a lack of ventilation. Once the problem is understood it is not difficult to make the necessary provision - bearing in mind however, that two vents must be provided; a lower ground level one through which fresh air will enter and, a higher or ceiling level one through which the warmer, stale air can leave the room.

It is not enough to assume that a flue, if fitted, will take out the stale air. A separate high-level vent is essential - particularly if people are likely to be in the room. Good building practice requires ventilation bricks/panels to be built in the walls. These are usually in the form of 15cm x 15cm vent or louvered panels. Preferably, two near the ceiling and two near the floor.

In winter, in an attempt to keep warm, people tend to try and seal any gaps in order to prevent drafts (i.e. fresh air coming in). As can be seen from the above this can be very dangerous - especially in small rooms. Always ensure that there is adequate ventilation (www.lpgas.co.za).

2.2.4 Sales Promotion

Sales promotion involve the use of media and non-media marketing pressure applied for a pre-determined, limited period of time at the level of consumer, retailer or wholesaler in order to stimulate trial, increase consumer demand, or improve product availability. (Dunne et al 2002, p. 405) The most popular sales promotion tools used in the LPG industry are safety information collars, coupons, contests and product demonstrations. However, not all suppliers adhere to these sale promotion activities.

Information collars

Safety information collars comprise of safety information both in writing and picture regarding the safe use and handling of LPG. These collars are placed on every LPG cylinder that is sold to a customer. The objective is for the customer to read the

information on the collar and understand the safety use and handling of the product before using it.

Coupons

Customers are given coupons that entitle them to a free fill of their cylinder after the fifth time. After every fill the dealer will stamp the customer's coupon with his trading name on it and the sixth fill is free. This type of promotion is normally carried out during off peak periods, which is during March, August and October.

Contests

Lucky draw contests take place during the BP Top Eight football competition. Customers receive footballs, BP Top Eight jackets, pencils, rulers, rubbers and school bags as prizes. Each customer that fills his/her cylinder receives a number from the dealer and the lucky number is drawn on a weekly basis during the Top Eight competition period. Pencils, rulers, rubbers and school bags are normally given to the children that are present at the draw.

Product demonstration

Product demonstrations are conducted at trade shows. A fully assembled LPG manifold system is displayed as well as Cadac cylinders with cooker tops, lights and braai attachments. Customers are able to view how the systems operate. They are also given personal demonstrations on request. A competent person who is fully knowledgeable about LPG is always present at the LPG stand. Unfortunately, the low-income households do not attend these shows in great numbers.

2.2.5 Pricing and promotion strategies of various companies

The South African LPG industry needs to learn from the experiences of other industries, on how they overcome challenges of pricing and promotion. Even though the industries are different, pricing and promotion challenges are generally similar. The following examples highlight various pricing and promotion challenges.

(i) Starbucks

Coffee's greater cachet has had a big effect on the bottom line. Ten years ago, only 3 per cent of all coffee sold in the United States was priced at a premium – at least 25 per cent higher than value brands. Today, 40 per cent of coffee is sold at premium

prices. Over the past decade, we have tracked the cachet of 39 categories of fast-moving consumer goods measured as the percentage of the product category sold at a premium over value brands. We've found plenty of evidence of the Starbucks effect. When individual companies increase the perceived "premiumness" of a product through innovations in the product itself or the way it's delivered, the entire category can reap higher prices and profits (Harvard Business Review, Mar/Apr2000, Vol. 78 Issue2, p17, 1/2p, 1graph, 1bw.).

(ii) Danone

By the 1980s, yoghurt had lost its status as an exotic, healthful product. But between 1991 and 1994, Danone introduced a spree of innovations, including crunch-top packaging and pop-out spoons, raising both its market share and its average price. General Mills followed with Trix yoghurt, Yoplait Adventure Pack, and Go-Gurt yoghurt in a tube, aimed at creating a new kids' yoghurt niche. Danone has recently tested a drinkable yoghurt. This burst of creativity, plus a big investment in complementary advertising, has begun to push up the sales of premium brands throughout the category. Danone, for example, has increased its profit margin by five percentage points between 1990 and 1997 (Harvard Business Review, Mar/Apr2000, Vol. 78 Issue2, p17, 1/2p, 1graph, 1bw.).

(iii) Nike

Subsequent sports sponsorship deals included the golf star Tiger Woods and, for a previously unheard of sum, the whole Brazilian football team. By signing a ten-year deal in 1996 worth between US$200 and US$400 million, Nike broke new ground in football sponsorship. It bought the television rights for five friendly games each year involving the Brazilian national team. Also, Nike's "swoosh" logo appeared around the world in many televised golf tournaments, and in the televised final of the 1998 Football World Cup and in the year 2000 Sydney Olympics with Brazilian footballers.

During the 1990s, the levels of Nike research activity, its marketing support, its clarity in its targeting to teenagers and the breadth of Nike's coverage were all totally new in sports shoe activity. Nike's market share in the USA continued to climb. It reached 43 per cent in 1996, compared with Reebok's 16 per cent. Moreover, Nike had succeeded in growing the US market with sales alone exceeding US$3 billion (compared to

US$597 million in 1987). However, Nike was criticised for its use of cheap labour in some countries and was forced to take steps to deal with this. (Lynch 2000, p. 477)

(iv) Absolut Vodka

For more than fifteen years, advertising for Absolut Vodka has been based on the same fundamental concept, with focus placed on the product. The very first advertisement, "Absolut Perfection" was created in 1981 and today stands as one of the most often used. Since Andy Warhol, patron saint of pop art, created his first Absolut painting in 1985, artists around the world have been asked to render their interpretation of the bottle.

In the advertisement "Absolut Essence", magazine readers were able to fold back the cover and smell the scent of Absolut Kurant. Distinctive advertising campaigns like "Absolut London" in which the door of 10 Downing Street resembles an Absolut bottle, has made the vodka brand nearly as famous as Coca-Cola or Nike. Most countries maintain strict rules concerning alcohol advertisements to consumers. But Absolut's PR machine has milked the free publicity that it's advertising generates. (Hollensen 2001, p. 557)

CHAPTER 3

METHODOLOGY

We talk a lot about making the best first impressions. Now let's run ahead and think about making the best last impression. The last impression people have of us will stay with them until we have a chance to change it – if we ever have another chance!

- Ron Willingham

3.1 INTRODUCTION

The focal point of this study is to identify strategies to overcome barriers of effective LPG pricing and promotion and investigate the possibility of increasing the household use of LPG in Durban. LPG is set to be a future growth sector of the economy. A number of studies have indicated that LPG should be able to grow its share of the overall energy market from the current level of less than 2% to 15-20% over a twenty-year period. South Africa presently has extremely high coal content energy mix by international standards, which holds various disadvantages including environmental damage. Increased LPG utilisation would hold various environmental benefits. International trends also indicate an increasing consumer preference for LPG (www.cosatu.org.za).

3.2 RELIABILITY OF THE STUDY

Cooper and Schindler (2001, p. 215) noted that: "A measure is reliable to the degree that it supplies consistent results". A Likert type questionnaire will be used to ensure that consistency is achieved. Also, a set of comparable households will be used in a focus group to discuss and make the necessary changes to the questionnaire before conducting the proper interviews. Trained undergraduates will be used to conduct the interviews. Cronbach's Alpha internal testing will be used to ensure that the instrument items are homogeneous and reflect the same underlying construct.

3.3 VALIDITY OF THE STUDY

Validity is concerned with the idea that the research design fully addresses the research questions and objectives one is trying to answer and achieve (White 2000, p. 25). In this study external validity will be measured merely because it refers to the extent to which the causal relationships measured in an experiment can be generalised

to outside persons, settings, and times. SPSS analytical software will be used to analyse the data.

3.4 RESEARCH DESIGN

This is a descriptive correlational study that examines the relationships between the variables. Qualitative and quantitative data will be collected to better understand the issues around pricing and promotions of LPG to households in Durban.

A focus group will be formed to assist with generating primary data that will be helpful in structuring appropriate questions for the questionnaire. The size of the group will be six people. The researcher will be the facilitator.

For the purpose of this study, a structured 5-point Likert type questionnaire will be used. Nominal, ordinal and interval data will be collected. Every effort would be made to avoid errors that are common with these rating scales. Errors such as leniency, central tendency and the halo effect.

The purpose of a structured questionnaire is that it allows one to standardise the questioning to such an extent that a more numerate, statistically based analysis is possible, and permits one to test out hypotheses more explicitly (Jankowicz 1995, p. 222).

Once the questionnaire is designed, the researcher will test the questionnaire by carrying out a pilot study with a small sample of respondents. Pilot interviews will be carried out to test:

- Whether all questions can be answered and that respondents are likely to be willing to answer them
- That all questions can be answered by a single respondent
- That the questionnaire flows logically and is ordered in a way which respondents find easy to follow
- That precoded questions include all major options
- That the questionnaire is not too long (West 1999, p. 89).

After the pilot study is satisfactorily completed, the researcher and selected undergraduates will complete the fieldwork interviews with individual household users of LPG.

Nonparametric tests such as the chi-square test would be applied to analyse and interpret information.

3.5 SAMPLING DESIGN

A probability sampling method will be conducted using a stratified sampling approach of low, medium and high-income households.

The reason for taking a stratified sample is to obtain a more efficient sample than would be possible with simple random sampling. If urban and rural groups have widely different attitudes towards energy conservation, but members within each group hold very similar attitudes, then random sampling error will be reduced, because the groups are internally homogenous, but comparatively different between groups. More technically, a smaller standard error may result from this stratified sample because the groups will be adequately represented when strata are combined (Zikmund1994, p. 459).

The LPG household population is made up of 61631 in KwaZulu Natal, a sample size of 200 respondents will be interviewed at LPG dealers and distributors in Durban.

3.6 ETHICS

Churchhill's study states that an ethical study must adhere to moral principles and values that govern the way an individual or group conducts its activities (Churchhill 1995, p. 124). A few ethical issues that will be addressed in this study are:

- Consent of respondents will be obtained before the interview
- Treating of all groups alike, with consideration and respect
- Explaining to all concerned what the research is about

3.7 BIAS

If respondents cooperate and give truthful answers, the survey will likely accomplish its goal. However, if these conditions are not met, response bias may cause a sample bias (Zikmund 1994, p. 213).

The researcher will monitor research bias by ensuring that the following are adhered:

- Interviewers must avoid selection bias and conduct interviews with low and high-income LPG household users
- Interviewers must not influence respondents in unperceived ways
- Interviewers must ensure good control of the process and produce quality data
- Interviewers to avoid biased wording – obviously such words or phrases as politically correct or fundamentalist must be used with great care
- Interviewers must ensure that the respondents avoid response bias such as falsified and misrepresented answers

CHAPTER 4

ANALYSIS OF SURVEY

A focus group with a panel of six respondents met on Saturday, 5th October 2002, for two hours *[see appendix 6]* and discussed the questionnaire with a view of gathering additional ideas and assessing the questionnaire. The researcher was the facilitator. The results obtained from the focus group were incorporated in the questionnaire prior to the pilot testing. The researcher conducted a pilot test in Durban, comprising of personal interviews with nineteen respondents to detect for weaknesses in the design and instrumentation. The pilot testing was a success with all respondents from different areas and income levels. The respondents understood the wording and revealed no errors in the design and instrumentation *[see appendix 7]*.

Seven undergraduates assisted with personal interviews in Durban and completed two hundred questionnaires in rural, township and urban areas ensuring that the low, medium and high-income respondents were targeted. All two hundred questionnaires were completed within three weeks.

4.1 DEMOGRAPHIC DETAILS

This part of the questionnaire comprised of the respondent's personal details such as name, area, race, gender and income per month.

Area:	Rural (eg. Ndwedwe)		Township (eg. Umlazi)		Urban (eg. Umhlanga)	

Respondents were asked to select whether they reside in the rural, township or urban area. Forty-one respondents resided in the rural, ninety in the township and sixty-nine in the urban area *[see graph 1, appendix 8]*. These statistics confirm that most LPG cylinder users reside in the rural and township areas.

Race:	White		Black		Asian		Coloured	

Respondents were also requested which racial group they belong to. Thirty-one respondents were White, one hundred and twenty-three Black, forty-four Asian and two Coloured *[see graph 2, appendix 9]*. Graph 2 illustrates that the highest number of respondents came from the Black population group.

Gender:	Male		Female	

Respondents were asked to select which gender they belong to. One hundred and thirty-eight respondents were male, sixty-one were female and one respondent did not answer this question *[see graph 3, appendix 10]*. Market intelligence reveals that most rural and township women control the household spending and therefore it was pleasing to see the number of female respondents.

Income per month:	Low Income R748 - R2288 (LSM 1 - 3)		Medium Income R2289 - R9742 (LSM 4 - 7)		High Income R9743 and above (LSM 8 - 10)	

Respondents were also requested to select a low, medium or high-income category. One hundred and fifteen respondents were low income, seventy-six were medium income and nine were high-income households *[see graph 2, appendix 9]*. These statistics confirm the point highlighted in the literature review, which mentioned that the low-income households are the main users of LPG sold in cylinders.

4.2 PRICING, ADVERTISING/PROMOTION AND SAFETY

This part of the questionnaire comprised of a few open-ended questions that attempts to understand the attitude and perception of the respondents. These open-ended questions were followed by closed-ended pricing, advertising and safety statements whereby the respondents were requested to select one of five options: strongly agree, agree, neither agree nor disagree, disagree or strongly disagree.

4.2.1 Attitude and perception questions

Question 1 - What do you use gas for?

Respondents were requested to list the use of gas in their households and could select more than one option. Thirty-eight respondents use gas for heating, one hundred and seventy-seven use gas for cooking, fourteen for camping, sixteen for lighting, twenty-two for braais, two for leisure, one for testing gas equipment and twenty-six for their refridgerator *[see table 7, appendix 11]*. The table highlights that the most common use of gas in the household was for cooking.

Question 2 – What are the benefits when using gas?

This question asked respondents to list benefits they receive when using gas. Thirty-two respondents noted that it is clean burning, eighty-four indicated that it is fast cooking, seventy-nine indicated that it is easy to use, forty-seven indicated that it is cheap, forty-eight indicated that it is convenient (portable), eighteen indicated that it is safe, thirty-nine indicated that it is efficient (instant heat), twenty-four indicated that there is no pollution (no smoke) when using gas, six indicated that there is no noise when using gas and one indicated that it is good to use gas when there is a power failure *[see table 8, appendix 12]*. It is impressive to see that consumers were aware and understood most of the benefits when using gas.

Question 3 – How far is the nearest gas dealer from your home?

Respondents were asked to select from three options on how far their homes are from the nearest gas dealer. One hundred and eighteen respondents selected between 1 to 5,99 km; forty-nine selected 6 to10,99 km; thirty-two selected 11 km plus and one respondent did not answer this question *[see graph 4, appendix 13]*. The average distance calculated was over 7 km. Considering that most of the rural and township households walk to purchase their goods, the 7 km average is rather far.

Question 4 – Do you feel safe when using gas?

Respondents were requested to select yes or no. One hundred and seventy-seven respondents selected "yes" they do feel safe when using gas and twenty-three selected "no" they do not feel safe when using gas *[see graph 5, appendix 14]*. It is reassuring

that most current gas consumers feel safe when using gas. However, it is the twenty-three that feel unsafe when using gas that gives cause for concern.

4.2.2 Pricing statements

Statement	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
5. Gas is cheaper than electricity but more expensive than paraffin, wood and coal.					

Respondents were required to select one of five options: strongly agree, agree, neither agree nor disagree, disagree or strongly disagree. Eighty-five households strongly agreed with this statement, eighty-eight agreed, seventeen neither agreed nor disagreed, five disagreed and five strongly disagreed *[see graph 6, appendix 15]*. Eighty-seven percent of the respondents agreed with this statement, however eight percent (nine low and eight medium income households) were neutral and five percent (three low, five medium and two high income households) felt that electricity is cheaper than gas. The results of this statement highlights that consumers will continue to use gas as the preferred energy source because it is cheap and convenient.

Statement number 6 – If government subsidises gas, by removing VAT, I will afford to use more gas.

Respondents were required to select one of five options. One hundred and sixteen respondents strongly agreed with this statement, sixty-eight agreed, twelve neither agreed nor disagreed, four disagreed and none strongly disagreed *[see graph 7, appendix 16]*. Ninety-two percent of the respondents agreed with this statement, however six percent (six low, four medium and two high income households) were neutral and two percent (medium income households) felt that the removal of VAT would not make gas more affordable for them to use more gas. These results could be attributed to the shift in consumers purchasing the smaller size cylinders (9kg) and stretching it to last the month.

Statement number 7 – If government subsidises gas by paying for the cylinder deposit, I will afford to use more gas.

Respondents were required to select one of five options. One hundred and twenty-one households strongly agreed with this statement, sixty-four agreed, eight neither agreed nor disagreed, six disagreed and one strongly disagreed *[see graph 8, appendix 17]*. Ninety-three percent of the respondents agreed with this statement, however four percent (one low, five medium and two high income households) were neutral and three percent (one low and six medium income households) felt that if the government subsidises by paying for the cylinder deposit, their gas consumption would remain the same. These results show that most consumers require government to subsidise LPG so that they could use more gas.

Statement number 8 – If government subsidises by paying for a basic gas appliance, I will afford to purchase more gas.

Respondents were required to select one of five options. One hundred and fourteen households strongly agreed with this statement, sixty-two agreed, thirteen neither agreed nor disagreed, eleven disagreed and none strongly disagreed *[see graph 9, appendix 18]*. Eighty-eight percent of the respondents agreed with this statement, however six percent (ten low and three medium income households) were neutral and six percent (five low and six medium income households) felt that if the government subsidises by paying for a basic gas appliance, their gas consumption would remain the same. These results corroborate previous research that when government subsidises gas equipment, a sudden increase in the country's LPG demand is realised.

Statement number 9 - The gas price should be regulated the same as paraffin so that all distributors/dealers prices can be controlled encouraging users to use more gas.

Respondents were required to select one of five options. One hundred and twenty-three households strongly agreed with this statement, fifty-two agreed, thirteen neither agreed nor disagreed, seven disagreed and five strongly disagreed *[see graph 10, appendix 19]*. Eighty-eight percent of the respondents agreed with this statement, however six percent (eight low, four medium and one high income household) were

neutral and six percent (five low and seven medium income households) felt that if the government regulates gas prices they would not use more gas. It is evident that consumers prefer a regulated gas price.

Statement number 10 – I am willing to pay a premium price for gas if I have supplier loan equipment.

Respondents were required to select one of five options. Fifty-four households strongly agreed with this statement, fifty-seven agreed, fifty neither agreed nor disagreed, thirty-two disagreed and seven strongly disagreed *[see graph 11, appendix 20]*. Fifty-six percent of the respondents agreed with this statement, however twenty-five percent (thirty-five low, eleven medium and four high income households) were neutral and nineteen percent (sixteen low, twenty-one medium and two high income households) felt that even though they use supplier equipment, they expect to pay a competitive price for gas. The high percentage of neutral respondents, are those who are not fully aware of household LPG installations, as it is not a common practice with households. Most consumers do not have the initial cash to pay for an LPG installation and therefore accept paying a premium price for LPG, if they have supplier loan equipment.

Statement number 11 – I am not price sensitive because I use gas for leisure (braais) purposes only.

Respondents were required to select one of five options. Fifteen households strongly agreed with this statement, thirty-one agreed, fourteen neither agreed nor disagreed, fifty-eight disagreed and eighty-two strongly disagreed *[see graph 12, appendix 21]*. Seventy percent of the respondents disagreed with this statement, however seven percent (nine low and five medium income households) were neutral and twenty-three percent (fifteen low, twenty-five medium and six high income households) felt that they are not price sensitive. The majority of consumers expect to pay a competitive price for LPG at all times.

Statement number 12 – I purchase gas from the cheapest distributor/dealer.

Respondents were required to select one of five options. One hundred and two households strongly agreed with this statement, sixty agreed, fifteen neither agreed

nor disagreed, nineteen disagreed and four strongly disagreed *[see graph 13, appendix 22]*. Eighty-one percent of the respondents agreed with this statement, however seven percent (twelve medium and three high income households) were neutral and twelve percent (three low, seventeen medium and three high income households) felt that they do not necessarily purchase gas from the cheapest distributor/dealer. These results show that most consumers purchase gas from the cheapest distributor.

Statement number 13 – Gas is expensive and therefore only use gas for cooking – substitutes (wood, paraffin and charcoal) are used to complete my total energy consumption.

Respondents were required to select one of five options. Thirty-six households strongly agreed with this statement, sixty-nine agreed, eighteen neither agreed nor disagreed, fifty-six disagreed, nineteen strongly disagreed and two respondents did not respond *[see graph 14, appendix 23]*. Fifty-three percent of the respondents agreed with this statement, however nine percent (four low, thirteen medium and one high income household) were neutral and thirty-eight percent (thirty-four low, thirty-seven medium and four high income households) do not use wood, paraffin and charcoal to compliment their energy consumption. These results show that a high percentage of consumers do compliment LPG with other energy sources. However, more than a third of the consumers only use LPG as their energy source.

Statement number 14 – Gas is expensive because I pay a taxi driver an extra amount for transporting my cylinder.

Respondents were required to select one of five options. Forty-six households strongly agreed with this statement, forty-seven agreed, forty-three neither agreed nor disagreed, fifty disagreed, ten strongly disagreed and four respondents did not respond *[see graph 15, appendix 24]*. Forty-seven percent of the respondents agreed with this statement, however twenty-three percent (twenty-three low, seventeen medium and three high income households) were neutral and thirty percent (twenty-six low, thirty-one medium and three high income households) do not use a taxi to transport their cylinder. These results show that a high percentage of consumers use a taxi to transport their cylinders, some consumers use a wheelbarrow to transport their cylinders and others use their own vehicles.

4.2.3 Advertising/Promotions statements

Statement number 15 – Promotional coupons issued when purchasing gas will promote users to purchase more gas.

Respondents were required to select one of five options. Eighty-nine households strongly agreed with this statement, eighty-six agreed, seventeen neither agreed nor disagreed, eight disagreed and none strongly disagreed *[see graph 16, appendix 25]*. Eighty-eight percent of the respondents agreed with this statement, however nine percent (eleven low, four medium and two high income households) were neutral and four percent (two low and six medium income households) felt that promotional coupons would not promote users to purchase more gas. Most of the households agreed that the promotional coupons would promote consumers to purchase more gas.

Statement number 16 – Lucky draw promotions will encourage users to purchase more gas during the contest period.

Respondents were required to select one of five options. Ninety-two households strongly agreed with this statement, eighty-one agreed, nineteen neither agreed nor disagreed, four disagreed and four strongly disagreed *[see graph 17, appendix 26]*. Eighty-seven percent of the respondents agreed with this statement, however ten percent (eleven low, six medium and two high income households) were neutral and four percent (three low and five medium income households) felt that lucky draw promotions would not encourage users to purchase more gas during the contest period. Most of the households agreed that this type of promotion would encourage consumers to purchase more LPG.

Statement number 17 – Regular gas demonstrations will encourage users to continue using gas.

Respondents were required to select one of five options. One hundred and twenty-four households strongly agreed with this statement, fifty-nine agreed, twelve neither agreed nor disagreed, three disagreed and two strongly disagreed *[see graph 18, appendix 27]*. Ninety-two percent of the respondents agreed with this statement, however six percent (eight low and four medium income households) were neutral and two percent (two low and three medium income households) felt that regular gas

demonstrations would not encourage users to continue using gas. These results emphasise that regular LPG demonstration would promote further use of LPG.

Statement number 18 – Periodic advertising of gas in local newspapers and radios will encourage users to purchase gas.

Respondents were required to select one of five options. Eighty-eight households strongly agreed with this statement, eighty-two agreed, twenty-seven neither agreed nor disagreed, two disagreed and one strongly disagreed *[see graph 19, appendix 28]*. Eighty-five percent of the respondents agreed with this statement, however fourteen percent (seventeen low and ten medium income households) were neutral and one percent (three medium income households) felt that periodic advertising in local newspapers and radios would not encourage users to purchase gas. Advertising has always proven to increase sales and awareness of a product. These results, depict just that.

Statement number 19 – I tend to purchase more gas when the BP top 8 football gas promotion is on.

Respondents were required to select one of five options. Forty-seven households strongly agreed with this statement, eighteen agreed, sixty neither agreed nor disagreed, sixty-four disagreed, nine strongly disagreed and two respondents did not respond *[see graph 20, appendix 29]*. Thirty-three percent of the respondents agreed with this statement, however thirty percent (twenty-nine low, twenty-five medium and six high income households) were neutral and thirty-seven percent (forty-five low, twenty-seven medium and seven high income households) do not purchase more gas when the BP top 8 gas promotions is live. BP has stopped this gas advertising this year.

Statement number 20 – Gas advertised on taxis and buses encourages users to continue using this type of energy.

Respondents were required to select one of five options. Seventy-three households strongly agreed with this statement, seventy-five agreed, forty-four neither agreed nor disagreed, six disagreed and two strongly disagreed *[see graph 21, appendix 30]*. Seventy-four percent of the respondents agreed with this statement, however twenty-

two percent (twenty-four low, eighteen medium and two high income households) were neutral and four percent (two low and six medium income households) felt that gas advertised on taxis and buses would not encourage users to continue using this type of energy. These results emphasise the need for continued advertising of gas on taxis and buses.

4.2.4 Safety and the environment statements

Statement number 21 – Indoor pollution, which mainly affects women and children, is greatly reduced when using gas.

Respondents were required to select one of five options. Ninety households strongly agreed with this statement, seventy-nine agreed, eighteen neither agreed nor disagreed, eight disagreed and five strongly disagreed *[see graph 22, appendix 31]*. Eighty-five percent of the respondents agreed with this statement, however nine percent (three low, thirteen medium and two high income households) were neutral and six percent (five low and eight medium income households) felt that indoor pollution is not greatly reduced when using gas. These results show that consumers are concerned with pollution and would rather use an energy that reduces pollution.

Statement number 22 – The use of wood and charcoal, results in reducing forests (deforestation).

Respondents were required to select one of five options. One hundred and twenty-eight households strongly agreed with this statement, sixty-three agreed, five neither agreed nor disagreed, none disagreed and three strongly disagreed and one respondent did answer this question *[see graph 23, appendix 32]*. Ninety-six percent of the respondents agreed with this statement, however two percent (two low, two medium and one high income households) were neutral and two percent (three medium income households) felt that the use of wood & charcoal, would not result in reducing forests. Consumers concern about their environment is shown in these results.

Statement number 23 – Most LPG related deaths are caused by lack of ventilation (carbon monoxide poisoning or suffocation), and not by gas.

Respondents were required to select one of five options. One hundred and twelve

households strongly agreed with this statement, fifty-four agreed, twenty-nine neither agreed nor disagreed, three disagreed and two strongly disagreed *[see graph 24, appendix 33]*. Eighty-three percent of the respondents agreed with this statement, however fifteen percent (sixteen low, twelve medium and one high income households) were neutral and two percent (one low and four medium income households) felt that most LPG related deaths are not caused by lack of ventilation but by the gas. These results reflect that most households are aware of the importance of good ventilations, however almost one fifth of households need to be educated about this issue (good ventilation).

Statement number 24 – Gas is not dangerous if used and handled safely.

Respondents were required to select one of five options. One hundred and twenty-two households strongly agreed with this statement, seventy-six agreed, one neither agreed nor disagreed, none disagreed and one strongly disagreed *[see graph 25, appendix 34]*. Ninety nine percent of the respondents agreed with this statement, however point one percent (one medium income households) was neutral and point one percent (one low-income household) felt that gas is dangerous even when used and handled safely. Almost all households agreed with this statement.

4.3 OTHER BARRIERS PREVENTING THE USE OF GAS

This part of the questionnaire comprised of an open-ended question that attempts to identify any other barriers that consumers might experience when using cylinder gas.

Question 1 – Are there other barriers that prevent consumers using gas as an energy source?

Respondents were requested to list other barriers that prevent consumers using gas as an energy source in their households. One respondent highlighted that the insurance premium goes up, one spoke of the cost of gas storage licence, two mentioned finding a suitable place to store the gas, twenty-six said the perception that gas is unsafe, thirty said the lack of education, twenty-seven said the lack of promotion, thirty-nine said transportation costs, twenty-two said the expensive equipment and three said that electricity is readily available *[see table 9, appendix 35]*. The table highlights that the respondents are concerned about: the price of the product and its associated costs; the

perception of safety; lack of education and promotion; and the ready availability of substitute products.

4.4 Cronbach's Alpha testing

RELIABILITY ANALYSIS - SCALE (ALPHA)

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	825.4435	192	4.2992		
Within People	4107.4000	3667	1.1201		
Between Measures	1392.5637	19	73.2928	98.4856	0.0000
Residual	2714.8363	3648	0.7442		
Total	4932.8435	3859	1.2783		
Grand Mean	37.9513				

Reliability Coefficients

N of Cases = 193.0 N of Items = 20

Alpha = 0.8269

Source: SPSS analysis

The reliability analysis is significant (Prob = 0.000 < 0.05). The high Cronbach's Alpha value (Alpha = 0.8269) indicates a high degree of internal consistency and reliability amongst the items (Lickert scale items). This shows that the data is reliable.

4.5 One-way ANOVA income level test

Table 4 – One-way ANOVA income level

Descriptives

		N	Mean	Std. Deviation
Pricing	Low income (R748 -R2288)	115	38.5843	.33155
	Medium income (R2289 - R9742)	73	38.7452	.44192
	High income (R9743 and above)	7	38.3857	.18645
	Total	195	38.6374	.38272
Advertisng or Promotions	Low income (R748 -R2288)	115	38.3536	.44816
	Medium income (R2289 - R9742)	74	38.4324	.55306
	High income (R9743 and above)	9	38.0741	.38289
	Total	198	38.3704	.49107
Safety & Environment	Low income (R748 -R2288)	114	38.4079	.39670
	Medium income (R2289 - R9742)	76	38.2632	.48972
	High income (R9743 and above)	9	38.2222	.31732
	Total	199	38.3442	.43618

ANOVA

		Sum of Squares	df	Mean Square	F	p
Pricing	Between Groups	1.615	2	.808	5.787	.004
Advertisng or Promotions	Between Groups	1.107	2	.554	2.327	.100
Safety & Environment	Between Groups	1.096	2	.548	2.935	.055

Source: SPSS analysis

There is a significant difference in pricing. The level of agreement regarding pricing is highest amongst the medium-income households, followed by low-income and then high-income. Price is not an issue for the high-income households. The p-value for safety is approaching significance. The means indicate that safety is of more concern with the medium to high households than the low-income households.

4.6 Overall perceptions – Tendency to agree

Table 5 – Overall perception

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pricing	195	37.70	39.90	38.6374	.38272
Advertisng or Promotions	198	37.33	40.17	38.3704	.49107
Safety & Environment	199	37.50	40.25	38.3442	.43618
Valid N (listwise)	193				

Source: SPSS analysis

The respective statements relating to Pricing, Advertising and Safety where analysed together to provide the overall perception. The mean for Pricing is 38,64, Advertising is 38,37 and Safety is 38,34, which indicates a greater degree of agreement than disagreement for the statements within Pricing, Advertising and Safety. This is confirmed by the minimum and maximum values that range from agreement to slight disagreement. The low standard deviation indicates that the majority of respondents had similar perceptions.

4.6 Hypotheses testing

Table 6 – Chi-Square tests for statements 7, 8 and 19.

Test Statistics

	If government subsidises gas by paying for the cylinder deposit, I will afford to use more gas	If government subsidises by paying for a basic gas appliance, I will afford to purchase more gas	I tend to purchase more gas when the BP Top 8 football gas promotion is on
Chi-Square[a,]	270.950	142.600	62.354
df	4	3	4
Asymp. Sig.	.000	.000	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 40.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 50.0.

c. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 39.6.

Source: SPSS analysis

The purpose of the Chi-Square (Non parametric) tests was to test whether there was a significant difference in the responses within the categories for statements 7 and 8 of Pricing and statement 19 of Advertising.

The p-values (Asymp Sig) in the table labelled Test Statistics indicate a significant difference. More of the respondents agreed or strongly agreed to statements 7 and 8. For statement 19, more of the respondents disagreed or were neutral. Hence the hypotheses are proven true.

CHAPTER 5

RESEARCH CONCLUSION

5.1 ACHIEVEMENT OF RESEARCH OBJECTIVES

The research objective was to investigate the effect pricing and advertising changes have on LPG sales to household consumers in Durban.

5.1.1 LPG pricing effects

Most respondents preferred LPG to be subsidised by the government and that LPG be regulated. Respondents also indicated that they expect a competitive price for LPG and are not loyal to a particular brand. It is evident that when the LPG price was acceptable to the household the private sector experienced a moderate increase in sales. Because the price of LPG is expensive, households have the tendency to purchase less LPG resulting in the private sector experiencing a low increase in sales.

It is clear that all South African households require access to a basic level of energy services. Achieving a sustainable level of energy security for low- income households can play a central role in the reduction of poverty, the fostering of households' livelihoods and an improved quality of life. It is essential that government endeavour to provide energy to all its citizens, particularly disadvantaged households, at a reasonable cost. Electricity is expensive and, at times, not accessible to certain households. Paraffin, wood and charcoal are health hazards, which makes LPG the preferred energy choice.

LPG can potentially provide an energy source for South Africans, particularly the poor, who do not have adequate access to other forms of energy. This would be contingent, however, on the affordability of LPG to those with very low incomes. Given the profit-maximising motives of the private sector, they would not be geared towards providing affordable access to LPG for the poor, and this reality goes some way towards explaining the current limited use of LPG by households. Regulating the LPG price would be ideal to ensure affordable access to LPG for poor households, in

line with the government's programme of accelerated delivery and the meeting of basic needs. The provision of low-cost LPG, even "artificially" low-cost, would also facilitate the rapid penetration of the energy market by LPG such that economies of scale could be realised and production costs thus reduced. Regulating the LPG price should also entail implementing a differential tariff structure whereby large-scale commercial users cross-subsidise household users.

5.1.2 LPG advertising effects

Most of the respondents are adamant that advertising of LPG should take place in the newspaper, on the radio and on television. The majority of respondents also strongly agreed on LPG demonstrations. Coca Cola has demonstrated that advertising and promoting their product on an ongoing basis resulted in an increase in sales. Respondents made it clear that the LPG industry lacks advertising, promotions and educational material for their consumers.

BPSA has recorded increased sales in LPG during their BP top 8 advertising campaigns. During this advertising campaign BP advertises a few of their products such as petrol, lubricants and LPG.

The results and experiences have shown that an industry, which advertises and promotes its product on an ongoing basis, will definitely experience sustainable increase in sales.

5.1.3 LPG safety and environmental effects

A high percentage of respondents understood what safety entails in the LPG industry. One could assume that the high percentage of people that perceive LPG to be unsafe and dangerous are those who do not use LPG or have experienced an LPG explosion or fire. LPG is an environmentally friendly product and is clearly seen and experienced in households.

Environmental advantages of increased LPG utilisation include the following:

- Reduced CO2 emissions relative to equivalent energy from other fossil fuels
- Low particulate emissions
- High-energy efficiency in combined-cycle applications

- Negligible sulphur content in regional gas deposits; and
- Gas-fired generation plants that require less space than conventional coal-fired plants of the same capacity

5.2 LIMITATIONS OF THE STUDY

This study was conducted over a short period and reflects a single "snapshot" in time of household experiences and expectations. Due to constant changes of consumer needs and wants, this research would have to be repeated on a regular basis to keep abreast with the consumer trends. The sample size was relatively small and only concentrated in Durban, which prevented a greater in-depth insight into the study.

The short-term rather than long-term effects of pricing and advertising on consumption are measured.

Limited large-scale studies have been conducted in the LPG industry and if conducted would normally be done by the private sector which is not available to the public.

5.3 RECOMMENDATIONS

The following recommendations are made based on this study:

- Government should aggressively embark on engaging the private sector in conferences and discuss the possibility of regulating the price of LPG so that both the private sector and household may gain from this partnership. One does not want a scenario where government dictates to the private sector as this could have a detrimental effect on the future of LPG. We must bear in mind that big oil refineries are controlled and managed by foreign companies.

- Government should put a team together and explore the possibility of subsidising LPG by either, removing VAT or providing a basic LPG

appliance to the LPG household. Both these subsidy suggestions would be for the short term. Once the LPG demand reaches an acceptable percentage level, government could perhaps gradually stop the subsidies. Government could pursue conducting this exercise with the private sector, especially the possibility of providing a gas appliance.

- LPG reduces pollution and therefore government should ensure that adequate advertising is done so that most of its citizens use an energy source that is environmentally friendly. This advertising campaign would also ensure that its citizens live longer and are therefore in a position to be productive for perhaps a longer working period than at present.

- Both the private sector and government should embark on regular safety campaigns either in the form of LPG demonstrations or LPG safety booklets that are designed to attract all race groups. These safety campaigns should be conducted in various languages (English, Zulu, etc.). There is a high percentage of people who perceive LPG to be a dangerous and unsafe product to use. Educating the public that LPG is not as dangerous and unsafe as they perceive it to be could inject an instant high percentage of non-users to become LPG consumers.

5.4 AREAS FOR FURTHER RESEARCH

In order to have a better command of the LPG industry, more research would be required. One would need to explore other barriers such as transportation, safety, price and suppliers selling directly to the consumer.

- This study has indicated that consumers travel a long distance to purchase LPG. Further research would be necessary, to establish how to transport LPG to the rural and township households effectively. This could be an opportunity for a local entrepreneur to embrace the challenge and bridge the gap.

- Further research in understanding why people perceive LPG to be a dangerous and unsafe product would be paramount. The results of this research could assist in ascertaining leads that could encourage an instant increase in demand for LPG.

- In order to regulate the price of LPG, a study would be necessary to identify what the recommended price for LPG should be. It is important to ensure that the regulated price is acceptable to the producers and affordable for the consumer.

- Pricing seems to be one of the major contributing factors whether a consumer purchases LPG or not. A research to determine the possibility of producers selling LPG directly to the public would be an interesting study. If middlemen in the value chain were eliminated, LPG would become more affordable for the household.

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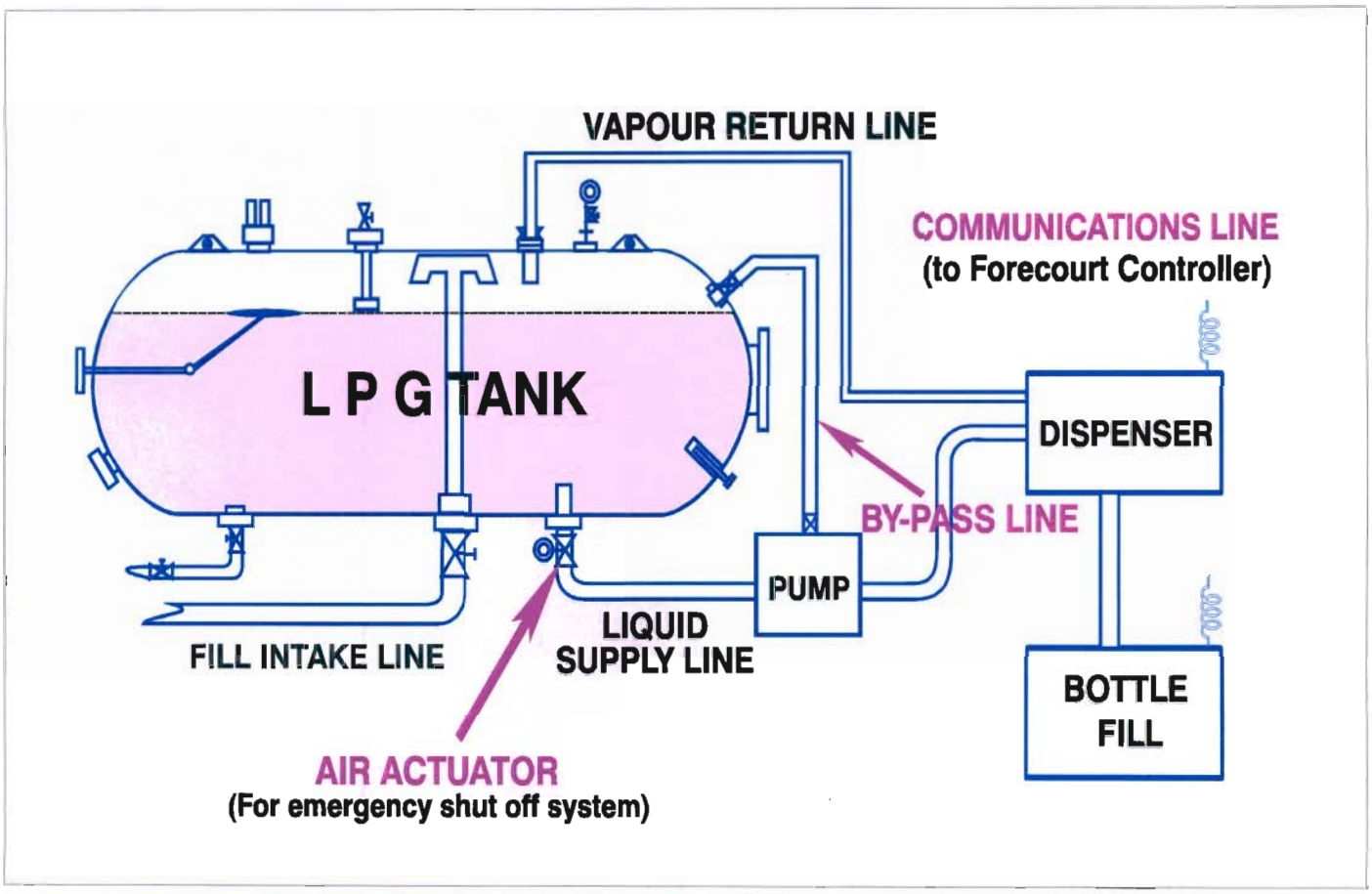
APPENDIX 1

A TYPICAL LPG STORAGE TANK INSTALLED AT A LPG DISTRIBUTOR SITE.

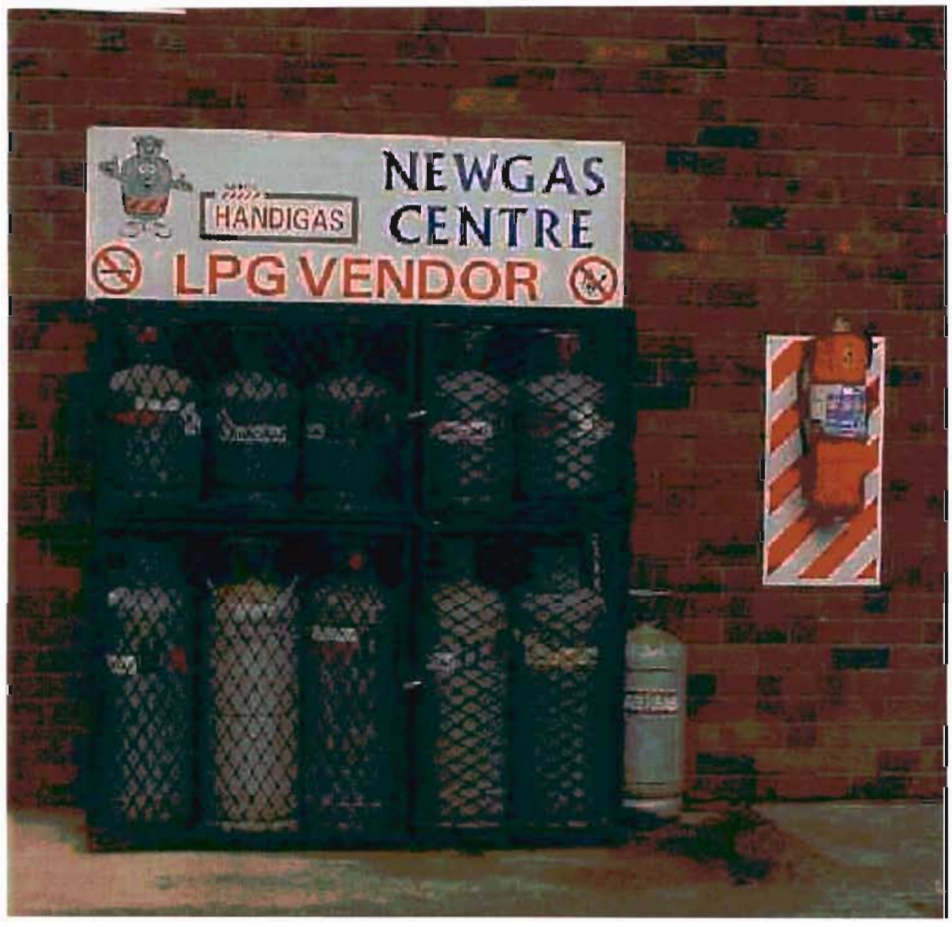


APPENDIX 2

A TYPICAL SUPPLIER LPG CYLINDER

APPENDIX 3

A TYPICAL RETAIL LPG STORAGE CAGE ON A FORECOURT



APPENDIX 4

AFROX ADVERTISING IN THE LOCAL CASH & CARRY

APPENDIX 5

EASIGAS ADVERTISING IN THE LOCAL CASH & CARRY

APPENDIX 6

FOCUS GROUP ATTENDANCE REGISTER

UNIVERSITY OF NATAL

MBA PROGRAMME - DISSERTATION

Venue: BP Centre, 214 West Street, Durban. Date: 05 October 2002

Time: 09H00 – 11H00

Name	Identity Document	Telephone
1. F. Ebrahim	7006155068083	0722183615
2. R. Nzama	5501016196083	0837713548
3. R. Cele	6611235397088	0836366547
4. A. Reinders	4204165066105	0721788923
5. O. Reinders	7505315138082	0724161240
6. D. Beselaar	6605155154801	031- 4640456

APPENDIX 7

QUESTIONNAIRE

SURVEY ON HOUSEHOLD CYLINDER GAS (LPG) - PRICING AND ADVERTISING/PROMOTION

PART A. DEMOGRAPHIC DETAILS:

1. Interviewer name: _____
2. Date of Interview: _____
3. Respondent name: _____
4. Respondent address: _____

_____

Please insert an X in the appropriate box.

5. Area:

Rural (eg. Ndwedwe)		Township (eg. Umlazi)		Urban (eg.	

6. Race:

White		Black		Asian		Coloured	

7. Gender:

Male		Female	

8. Income per month:

Low Income R748 – R2288 (LSM 1-3)		Medium Income R2289 – R9742 (LSM 4 – 7)		High Income R9743 and above (LSM 8– 10)	

(LSM – Living Standard Measure)

PART B. PRICING, ADVERTISING/PROMOTION AND SAFETY:

1. What do you use gas (LPG) for?

_____

_____

_____

2. What are the benefits when using gas (LPG)?

_____

_____

_____

3. How far is the nearest gas (LPG) dealer from your home?

_____

_____

_____

4. Do you feel safe when using gas (LPG)? Yes ☐ No ☐

Please insert an X in the appropriate box.

Statement	Strongly agree	Agree	Neither agree nor disagree	Strongly disagree	Disagree
Pricing:					
5. Gas is cheaper than electricity but more expensive than paraffin, wood and coal.					
6. If government subsidises gas by removing VAT, I will afford to use more gas.					
7. If government subsidises gas by paying for the cylinder deposit, I will afford to use more gas.					
8. If government subsidises by paying for a basic gas appliance, I will afford to purchase more gas.					
9. The gas price should be regulated the same as paraffin so that all distributors/dealers prices can be controlled encouraging users to use more gas.					
10. I am willing to pay a premium price for gas if I have supplier loan equipment.					
11. I am not price sensitive because I use gas for leisure (braais) purposes only.					

Statement	Strongly agree	Agree	Neither agree nor disagree	Strongly disagree	Disagree
12. I purchase gas from the cheapest distributor/ dealer.					
13. Gas is expensive and therefore only use for cooking - substitutes (wood, paraffin & charcoal) are used to complete my total energy consumption.					
14. Gas is expensive because I pay the taxi driver an extra amount for transporting my cylinder.					
Advertising/Promotions: 15. Promotional coupons issued when purchasing gas will promote users to purchase more gas.					
16. Lucky draw promotions will encourage users to purchase more gas during the contest period.					
17. Regular gas demonstrations will encourage users to continue using gas.					
18. Periodic advertising of gas in local newspapers and radios will encourage users to purchase gas.					
19. I tend to purchase more gas when the BP Top 8 football gas promotion is on.					
20. Gas advertised on taxis and buses encourages users to continue using that type of energy.					
Safety and the environment: 21. Indoor pollution, which mainly affects women and children, is greatly reduced when using gas.					

Statement	Strongly agree	Agree	Neither agree nor disagree	Strongly disagree	Disagree
22. The use of wood and charcoal results in reducing forests (deforestation).					
23. Most LPG related deaths are caused by lack of ventilation (carbon monoxide poisoning or suffocation), and not by gas.					
24. Gas is not dangerous if used and handled safely.					

PART C. OTHER BARRIERS PREVENTING THE USE OF GAS:

1. Are there other barriers that prevent consumers using gas as an energy source? If your answer is yes, please comment.

APPENDIX 8

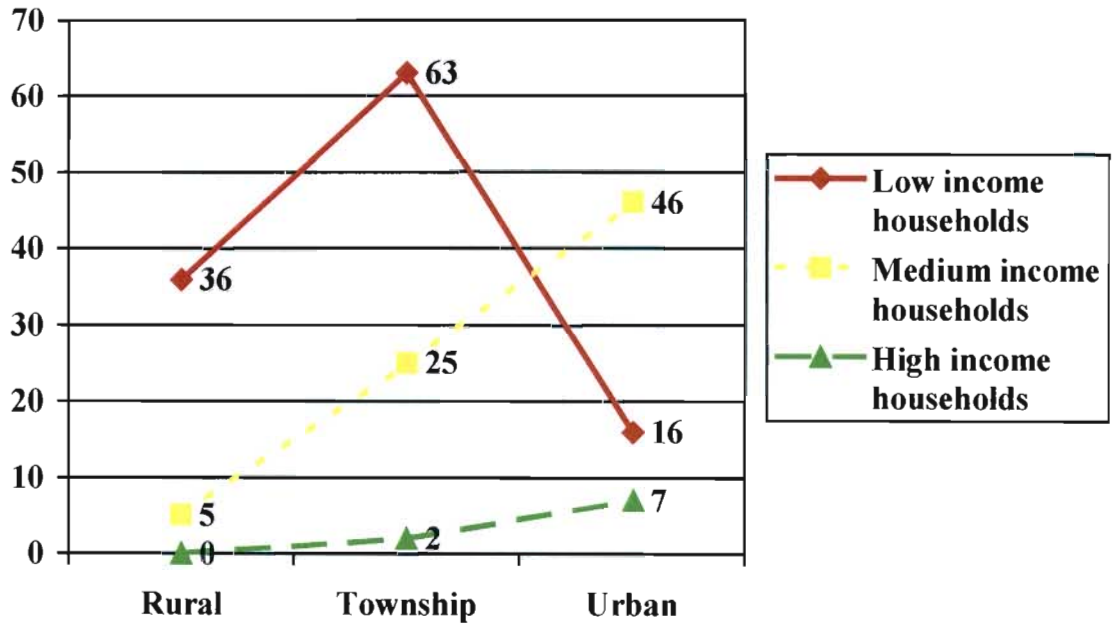
GRAPH 1

Area of respondents

AREA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 Rural	41	20.5	20.5	20.5
	3 Township	90	45.0	45.0	65.5
	4 Urban	69	34.5	34.5	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis



APPENDIX 9

GRAPH 2

Race and income level of respondents.

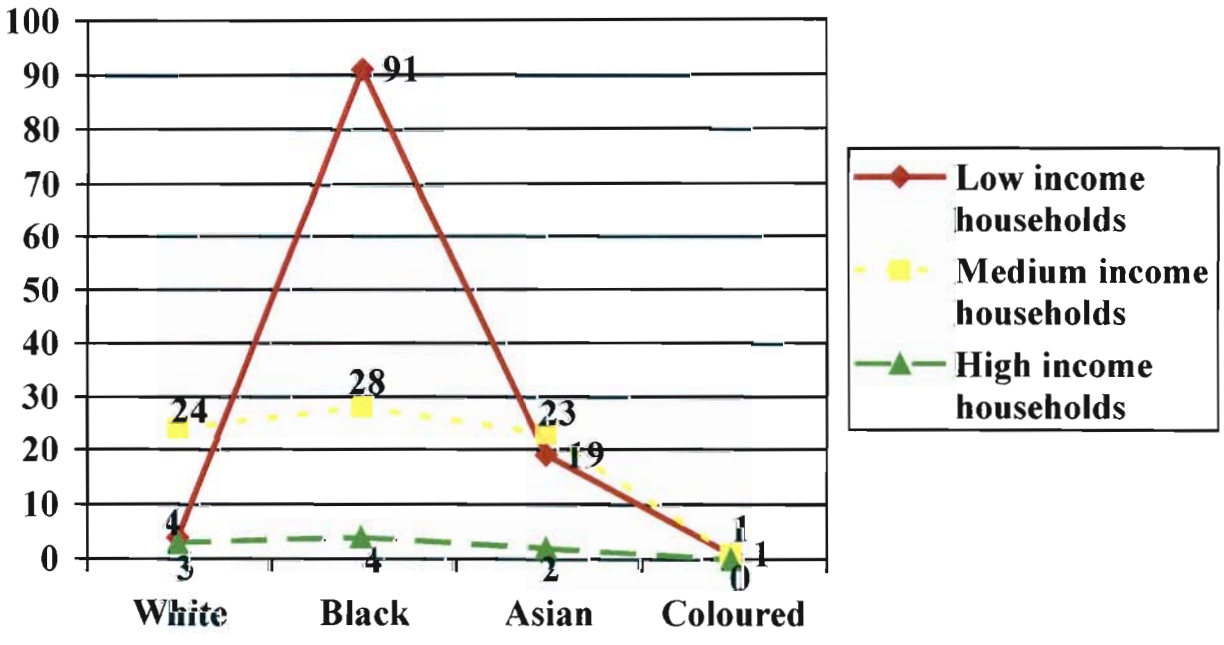
RACE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5 White	31	15.5	15.5	15.5
	6 Black	123	61.5	61.5	77.0
	7 Asian	44	22.0	22.0	99.0
	8 Coloured	2	1.0	1.0	100.0
	Total	200	100.0	100.0	

INCOME

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	11 Low income (R748 -R2288)	115	57.5	57.5	57.5
	12 Medium income (R2289 - R9742)	76	38.0	38.0	95.5
	13 High income (R9743 and above)	9	4.5	4.5	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis



APPENDIX 10

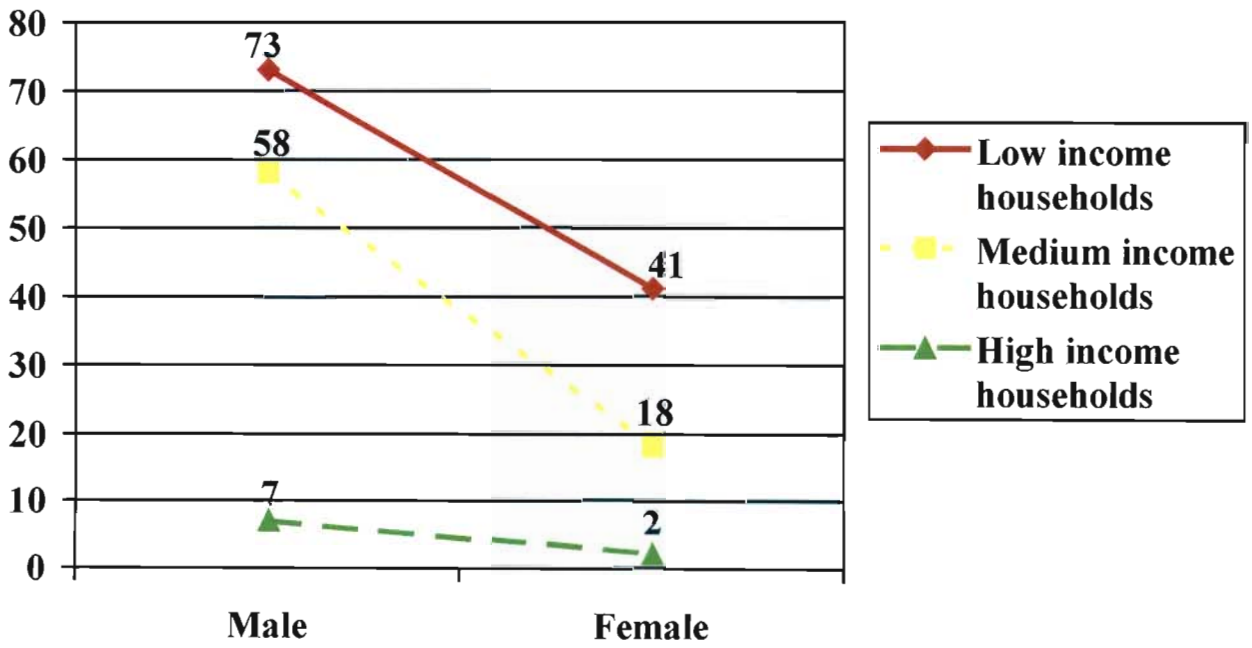
GRAPH 3

Gender of respondents.

GENDER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	9 Male	138	69.0	69.3	69.3
	10 Female	61	30.5	30.7	100.0
	Total	199	99.5	100.0	
Missing	99	1	.5		
Total		200	100.0		

Source: SPSS analysis



APPENDIX 11

Question 1 – What do you use gas for?

Category label	Code	Count	Pct of Responses	Pct of Cases
Heating	14	38	12.4	19.2
Cooking	15	177	57.8	89.4
Camping	16	14	4.6	7.1
Lighting	17	16	5.2	8.1
Braai	18	22	7.2	11.1
Leisure	19	2	.7	1.0
Testing gas equipment	20	1	.3	.5
Fridge	21	36	11.8	18.2
Total responses		306	100.0	154.5

2 missing cases; 198 valid cases

Source: SPSS analysis

	Uses							
Income level	Heating	Cooking	Camping	Lighting	Braai	Leisure	Testing gas equipment	Refridgerator
Low	23	107	6	10	6	0	0	19
Medium	14	65	7	4	13	1	1	17
High	1	5	1	2	3	1	0	0

Table 7 – Attitude and perception of respondents

APPENDIX 12

Question 2 – What are the benefits when using gas?

Category label	Code	Count	Pct of Responses	Pct of Cases
Clean burning	22	32	8.4	16.2
Fast cooking	23	84	22.2	42.4
Easy to use	24	79	20.8	39.9
Cheap	25	47	12.4	23.7
Convenient (portable)	26	48	12.7	24.2
Safe	27	18	4.7	9.1
Efficient (instant heat)	28	39	10.3	19.7
No smoke	29	24	6.3	12.1
No noise	30	6	1.6	3.0
Power failure	31	1	.3	.5
	32	1	.3	.5
Total responses		379	100.0	191.4

2 missing cases; 198 valid cases

Source: SPSS analysis

	Benefits									
Income level	Clean	Fast	Easy	Cheaper	Convenient	Safe	Efficient	No Pollution	No Noise	Power Failure
Low	18	54	50	29	22	6	24	11	1	1
Medium	12	27	27	15	24	11	14	12	4	0
High	2	3	2	3	2	1	1	1	1	0

Table 8 – Attitude and perception of respondents

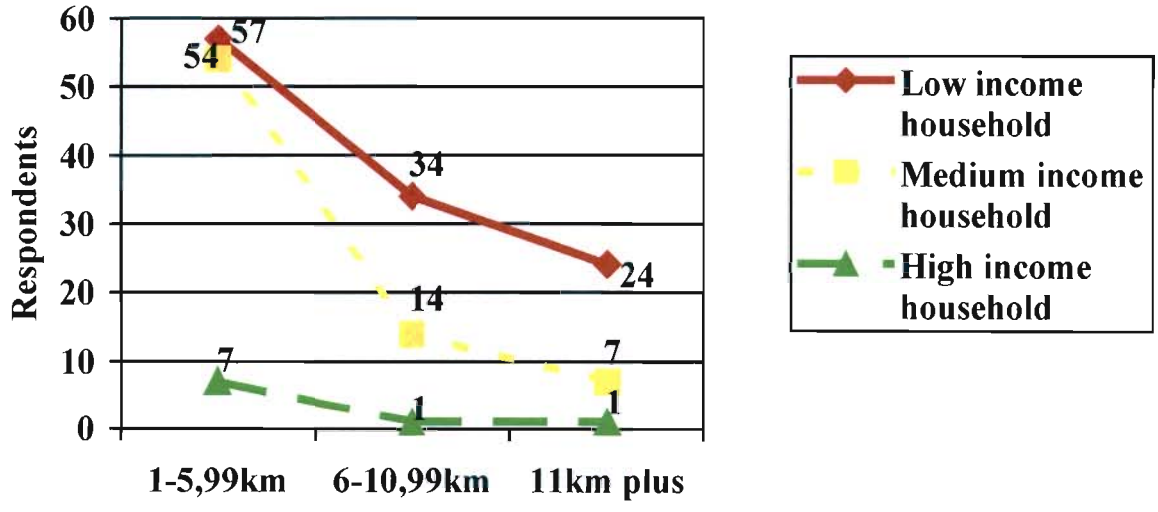
APPENDIX 13

GRAPH 4

B3 How far is the nearest gas dealer from your home?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 - 5,99km	118	59.0	59.3	59.3
	6 - 10,99km	49	24.5	24.6	83.9
	11km +	32	16.0	16.1	100.0
	Total	199	99.5	100.0	
Missing	99	1	.5		
Total		200	100.0		

Source: SPSS analysis



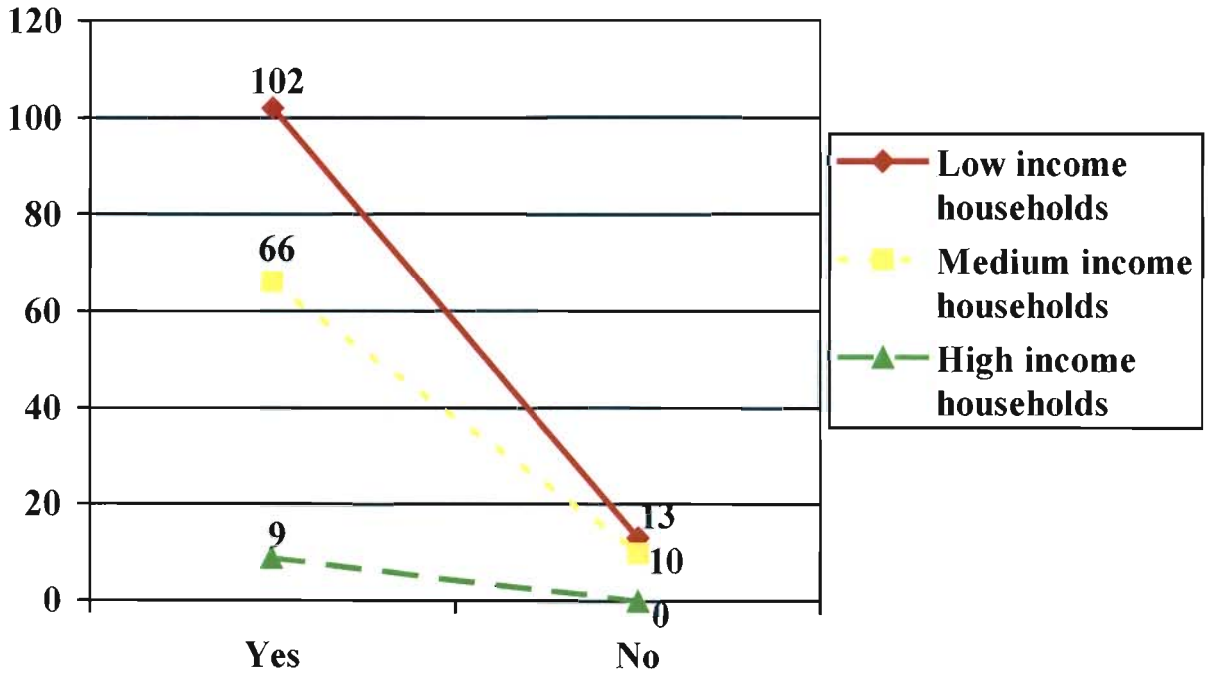
APPENDIX 14

GRAPH 5

B4 Do you feel safe when using gas?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	177	88.5	88.5	88.5
	No	23	11.5	11.5	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis



APPENDIX 15

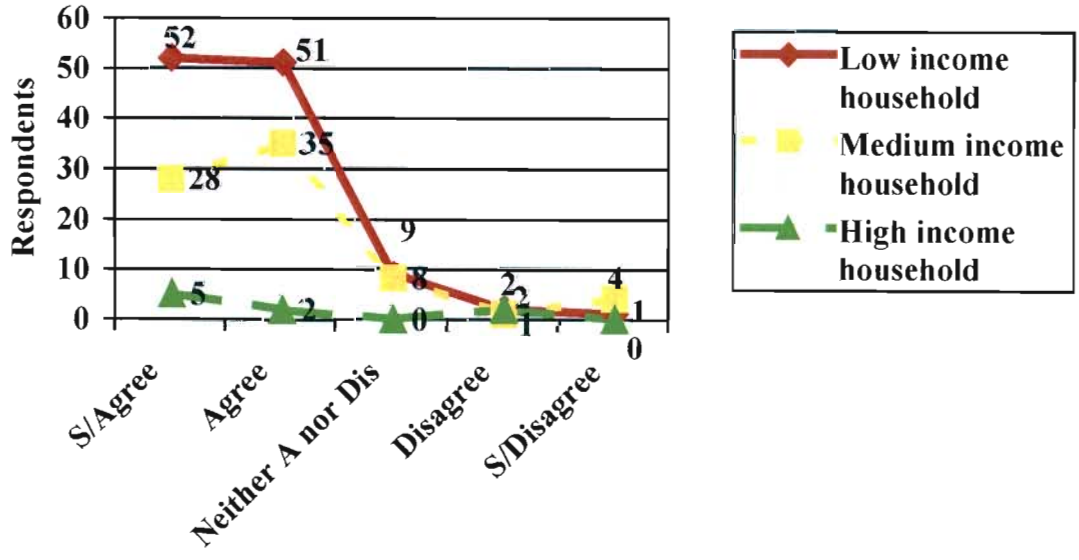
GRAPH 6

B5 Gas is cheaper than electricity but more expensive than paraffin, wood and coal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	85	42.5	42.5	42.5
	Agree	88	44.0	44.0	86.5
	Neither agree nor disagree	17	8.5	8.5	95.0
	Disagree	5	2.5	2.5	97.5
	Strongly disagree	5	2.5	2.5	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 16

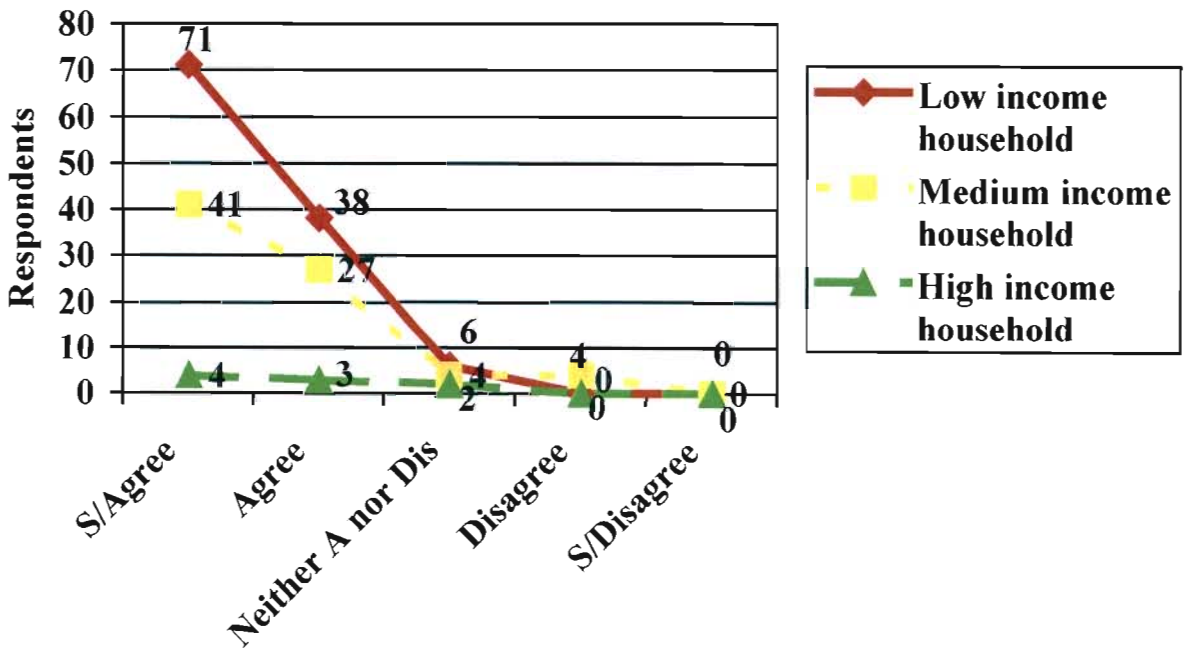
GRAPH 7

B6 If government subsidises gas by removing VAT, I will afford to use more gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	116	58.0	58.0	58.0
	Agree	68	34.0	34.0	92.0
	Neither agree nor disagree	12	6.0	6.0	98.0
	Disagree	4	2.0	2.0	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 17

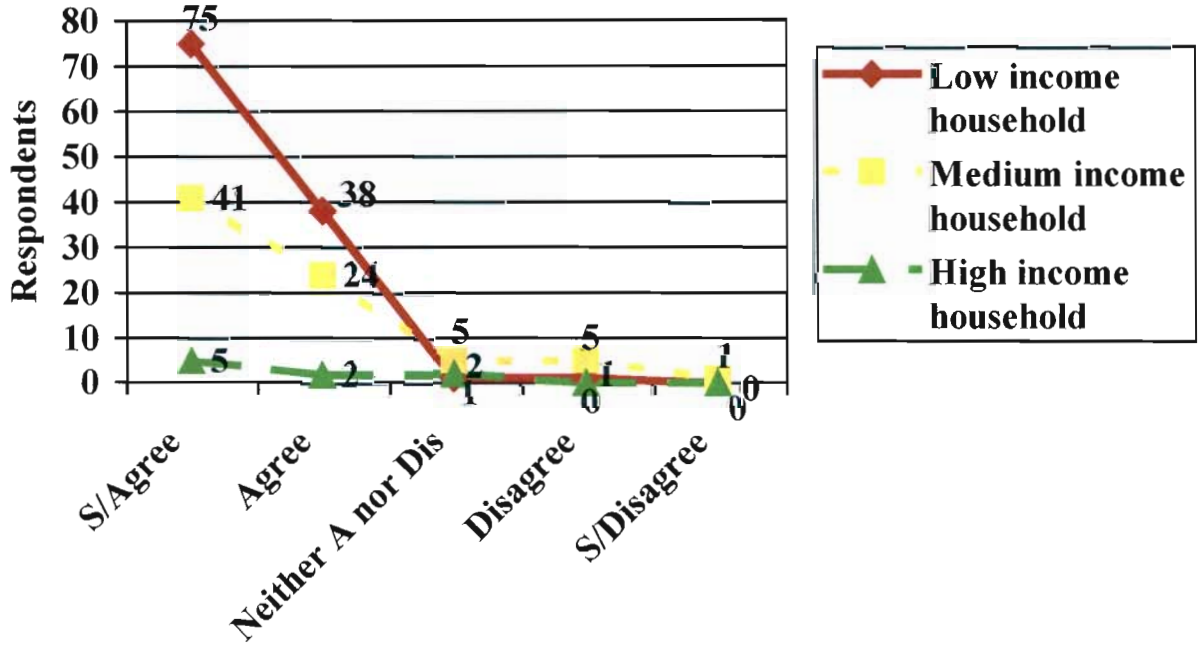
GRAPH 8

B7 If government subsidises gas by paying for the cylinder deposit, I will afford to use more gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	121	60.5	60.5	60.5
	Agree	64	32.0	32.0	92.5
	Neither agree nor disagree	8	4.0	4.0	96.5
	Disagree	6	3.0	3.0	99.5
	Strongly disagree	1	.5	.5	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 18

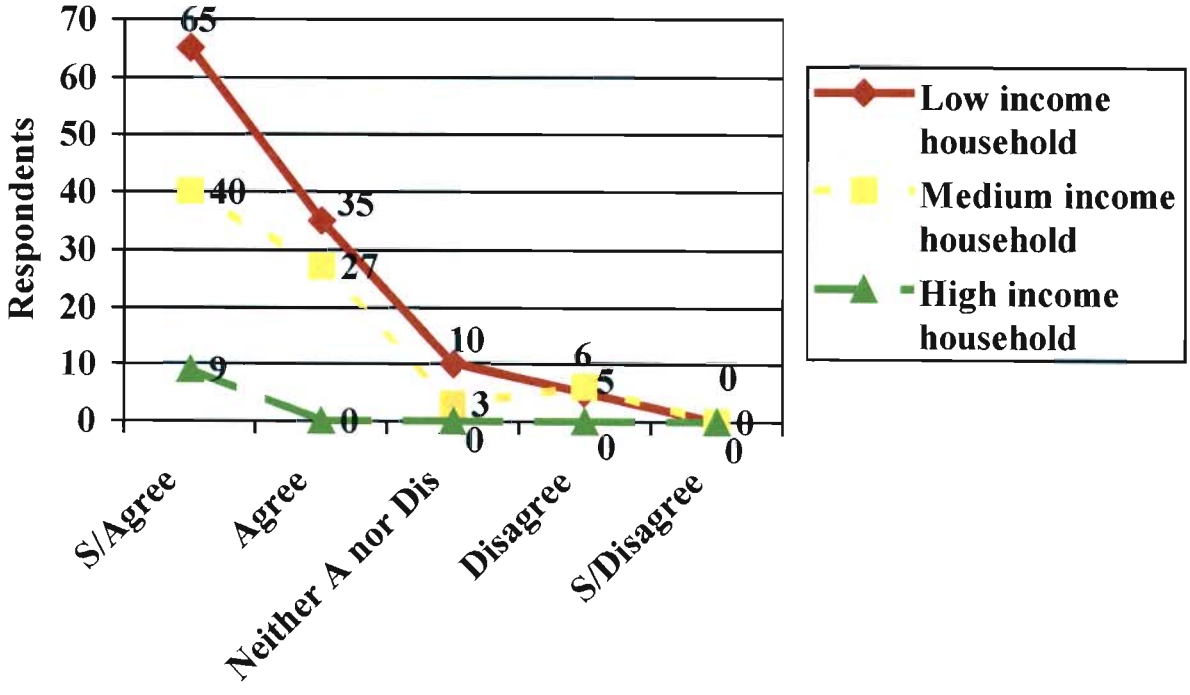
GRAPH 9

B8 If government subsidises by paying for a basic gas appliance, I will afford to purchase more gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	114	57.0	57.0	57.0
	Agree	62	31.0	31.0	88.0
	Neither agree nor disagree	13	6.5	6.5	94.5
	Disagree	11	5.5	5.5	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 19

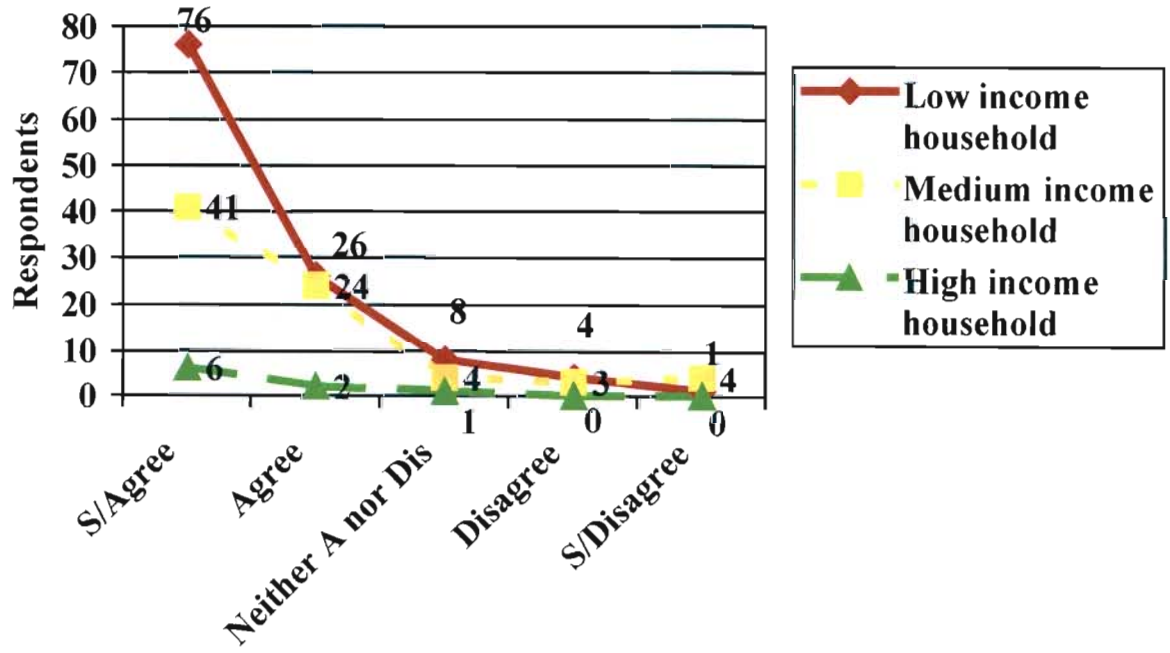
GRAPH 10

B9 The gas price should be regulated the same as paraffin so that all distributors or dealers prices can be controlled encouraging users to use more gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	123	61.5	61.5	61.5
	Agree	52	26.0	26.0	87.5
	Neither agree nor disagree	13	6.5	6.5	94.0
	Disagree	7	3.5	3.5	97.5
	Strongly disagree	5	2.5	2.5	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 20

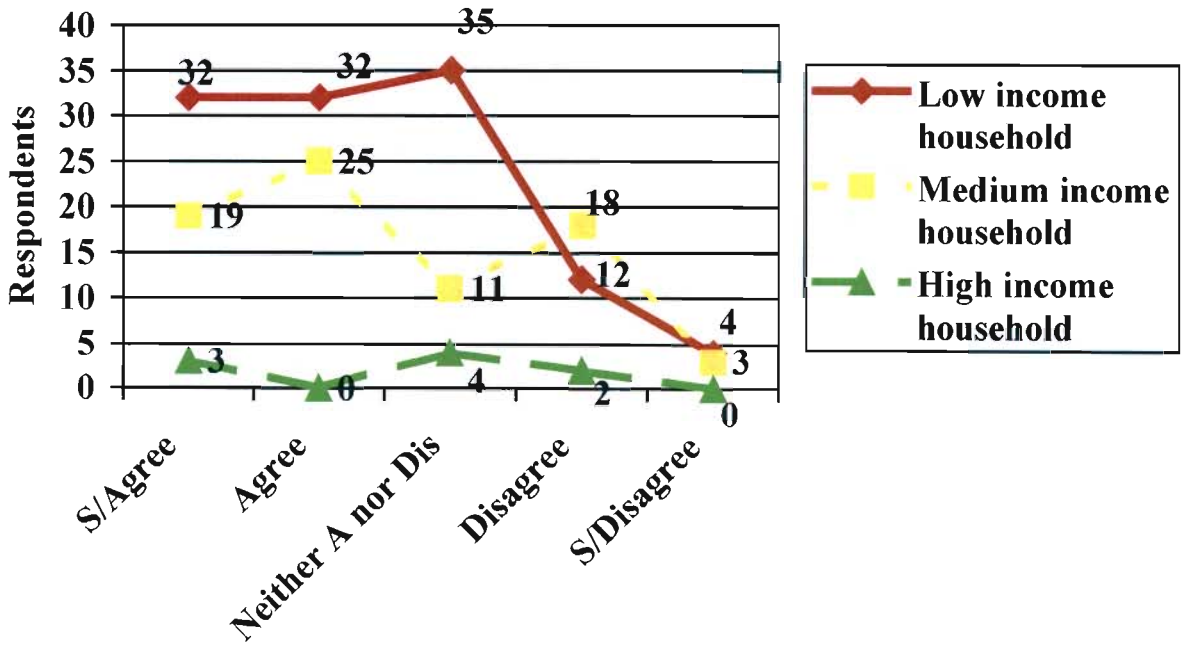
GRAPH 11

B10 I am willing to pay a premium price for gas if I have supplier loan equipment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	54	27.0	27.0	27.0
	Agree	57	28.5	28.5	55.5
	Neither agree nor disagree	50	25.0	25.0	80.5
	Disagree	32	16.0	16.0	96.5
	Strongly disagree	7	3.5	3.5	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 21

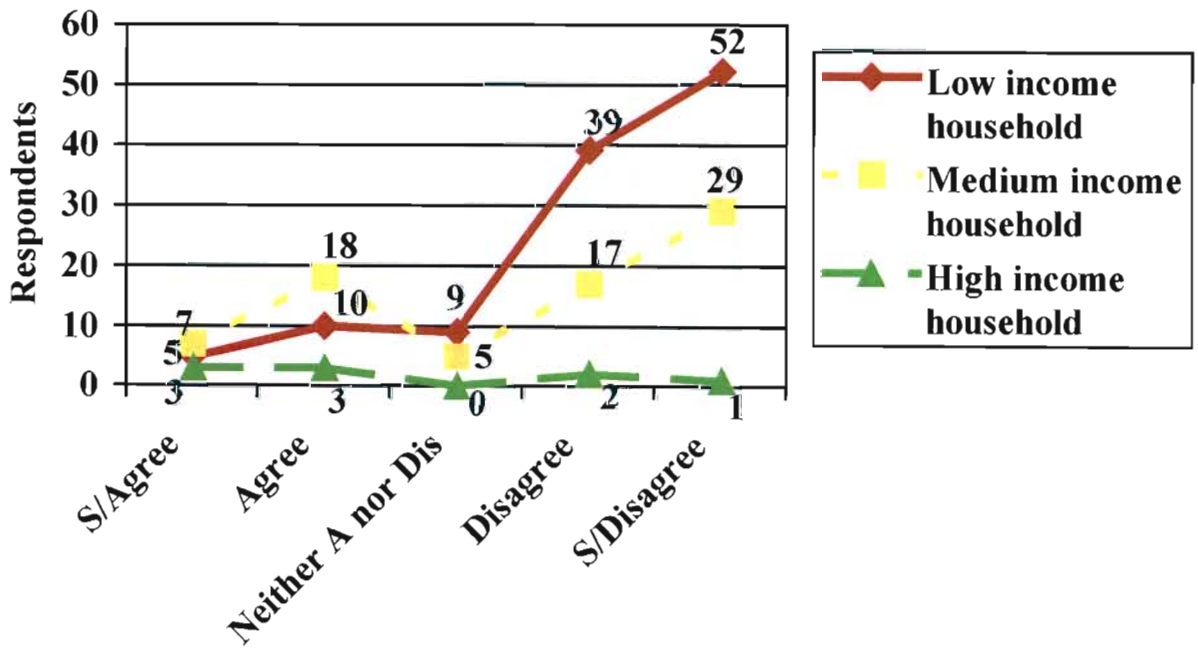
GRAPH 12

B11 I am not price sensitive because I use gas for leisure (braais) purposes only

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	15	7.5	7.5	7.5
	Agree	31	15.5	15.5	23.0
	Neither agree nor disagree	14	7.0	7.0	30.0
	Disagree	58	29.0	29.0	59.0
	Strongly disagree	82	41.0	41.0	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 22

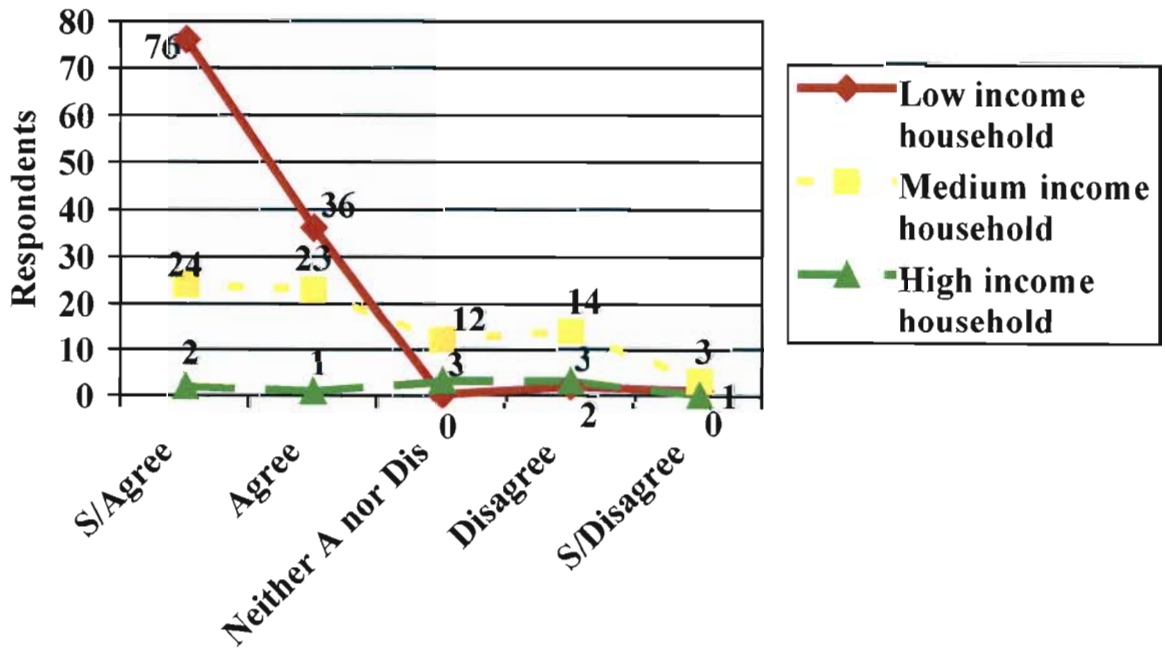
GRAPH 13

B12 I purchase gas from the cheapest distributor or dealer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	102	51.0	51.0	51.0
	Agree	60	30.0	30.0	81.0
	Neither agree nor disagree	15	7.5	7.5	88.5
	Disagree	19	9.5	9.5	98.0
	Strongly disagree	4	2.0	2.0	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 23

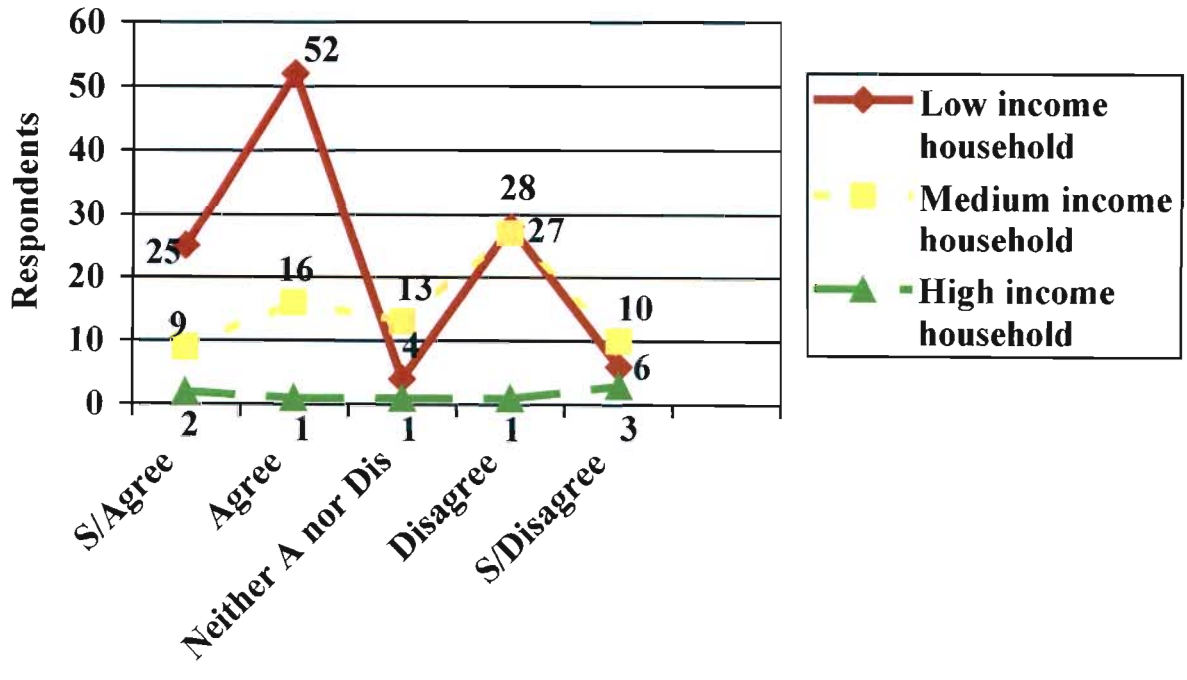
GRAPH 14

B13 Gas is expensive and therefore only use for cooking - substitutes (wood, paraffin & charcoal) are used to complete my total energy consumption

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30	1	.5	.5	.5
	Strongly agree	36	18.0	18.2	18.7
	Agree	69	34.5	34.8	53.5
	Neither agree nor disagree	18	9.0	9.1	62.6
	Disagree	55	27.5	27.8	90.4
	Strongly disagree	19	9.5	9.6	100.0
	Total	198	99.0	100.0	
Missing	99	2	1.0		
Total		200	100.0		

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 24

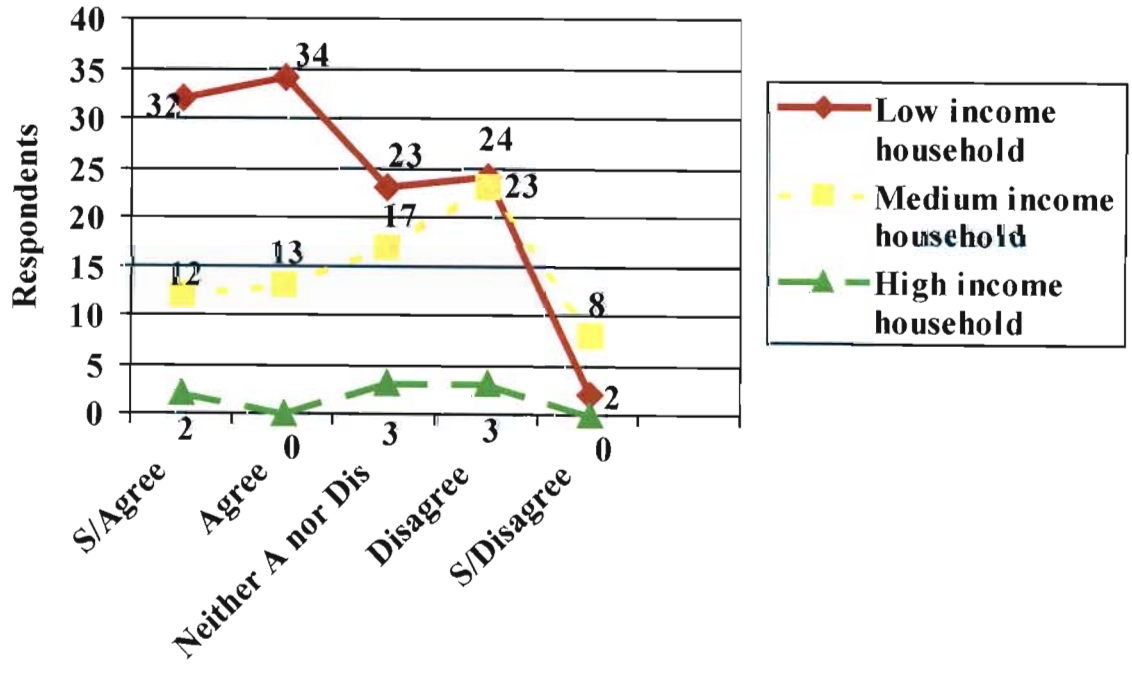
GRAPH 15

B14 Gas is expensive because I pay the taxi driver an extra amount for transporting my cylinder

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	46	23.0	23.5	23.5
	Agree	47	23.5	24.0	47.4
	Neither agree nor disagree	43	21.5	21.9	69.4
	Disagree	50	25.0	25.5	94.9
	Strongly disagree	10	5.0	5.1	100.0
	Total	196	98.0	100.0	
Missing	99	4	2.0		
Total		200	100.0		

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 25

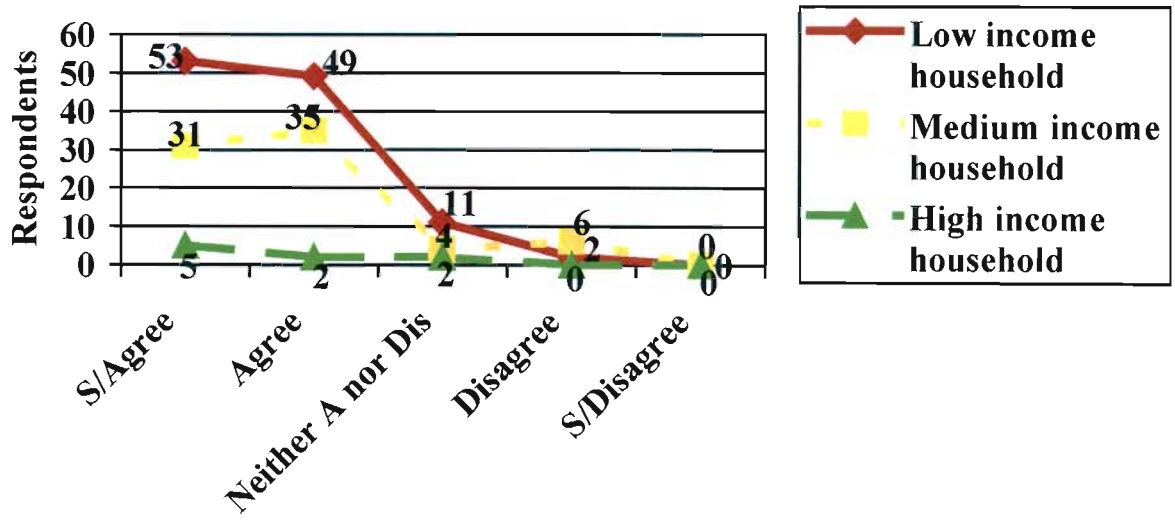
GRAPH 16

B15 Promotional coupons issued when purchasing gas will promote users to purchase more gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	89	44.5	44.5	44.5
	Agree	86	43.0	43.0	87.5
	Neither agree nor disagree	17	8.5	8.5	96.0
	Disagree	8	4.0	4.0	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 26

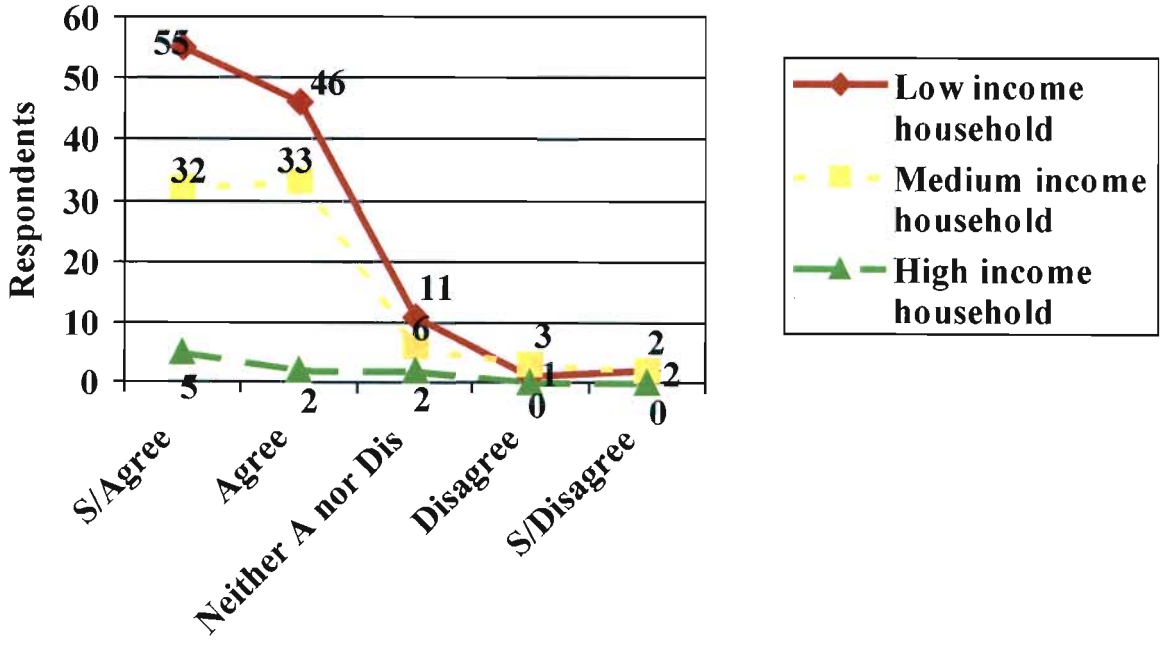
GRAPH 17

B16 Lucky draw promotions will encourage users to purchase more gas during the contest period

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	92	46.0	46.0	46.0
	Agree	81	40.5	40.5	86.5
	Neither agree nor disagree	19	9.5	9.5	96.0
	Disagree	4	2.0	2.0	98.0
	Strongly disagree	4	2.0	2.0	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 27

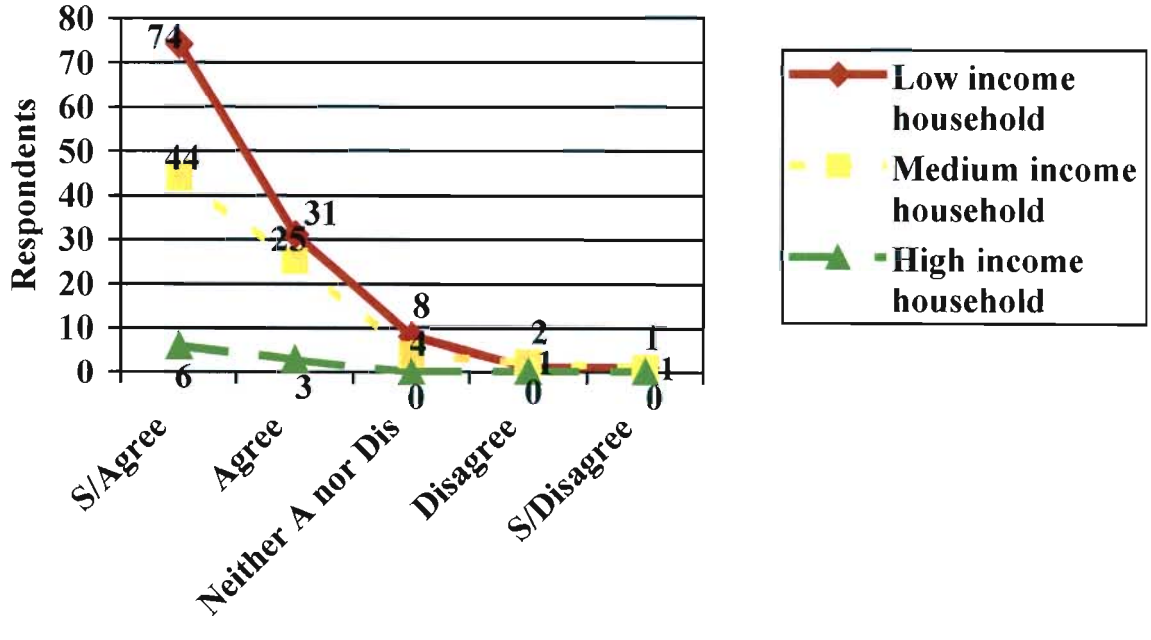
GRAPH 18

B17 Regular gas demonstrations will encourage users to continue using gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	124	62.0	62.0	62.0
	Agree	59	29.5	29.5	91.5
	Neither agree nor disagree	12	6.0	6.0	97.5
	Disagree	3	1.5	1.5	99.0
	Strongly disagree	2	1.0	1.0	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 28

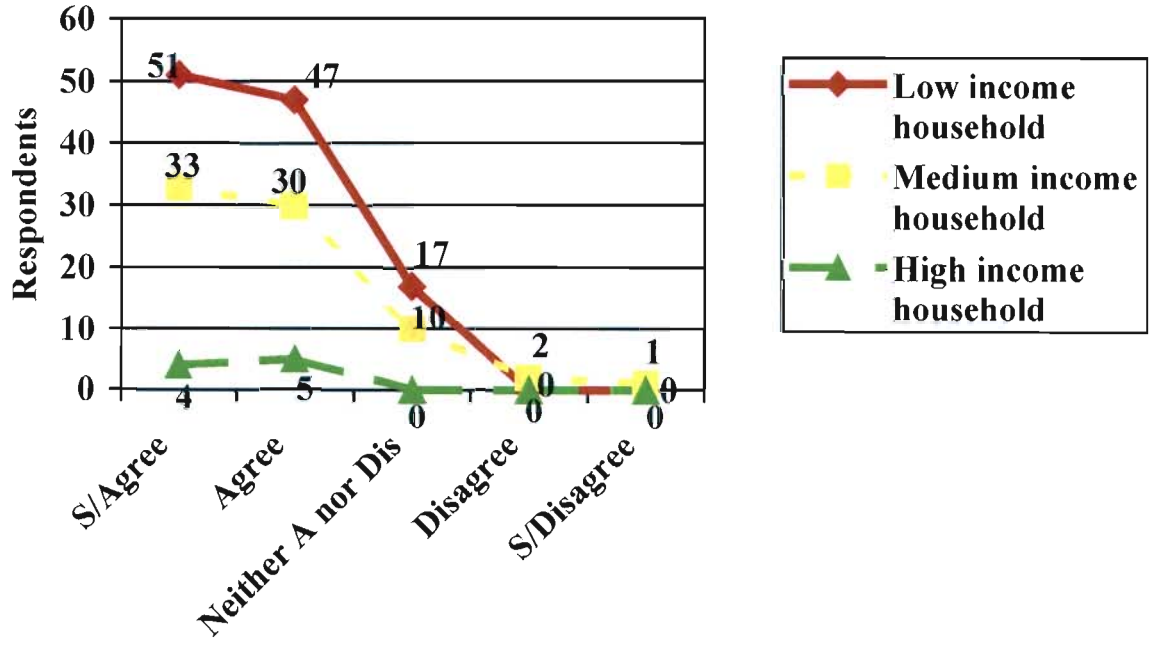
GRAPH 19

B18 Periodic advertising of gas in local newspapers and radios will encourage users to purchase gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	88	44.0	44.0	44.0
	Agree	82	41.0	41.0	85.0
	Neither agree nor disagree	27	13.5	13.5	98.5
	Disagree	2	1.0	1.0	99.5
	Strongly disagree	1	.5	.5	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 29

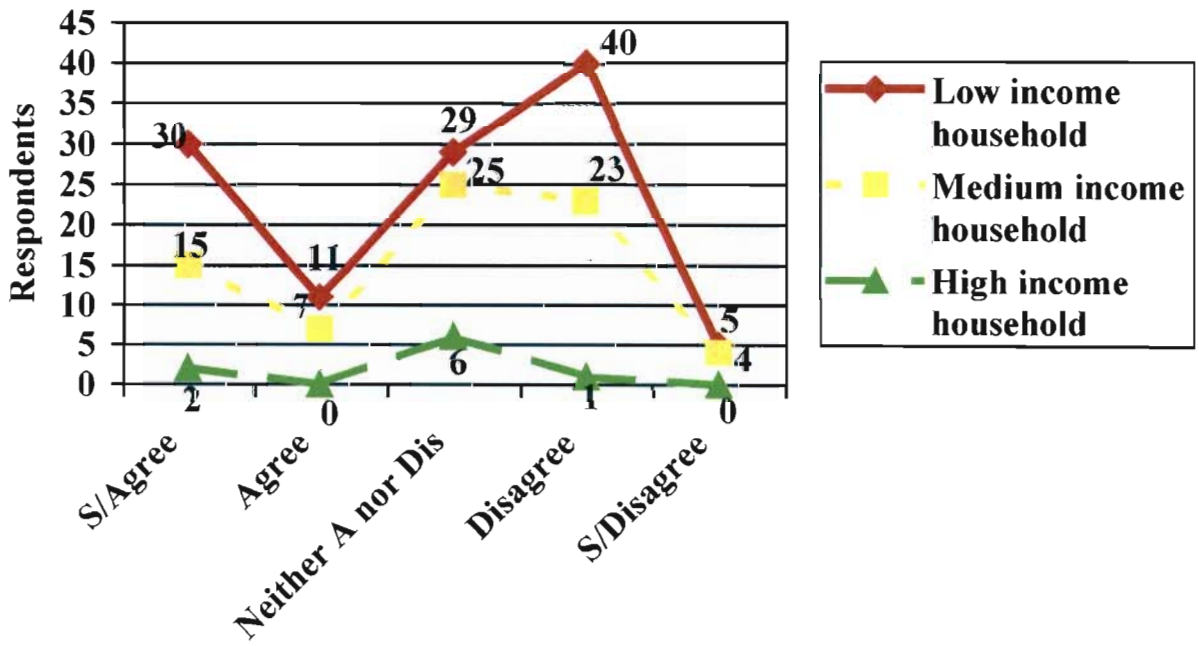
GRAPH 20

B19 I tend to purchase more gas when the BP Top 8 football gas promotion is on

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	47	23.5	23.7	23.7
	Agree	18	9.0	9.1	32.8
	Neither agree nor disagree	60	30.0	30.3	63.1
	Disagree	64	32.0	32.3	95.5
	Strongly disagree	9	4.5	4.5	100.0
	Total	198	99.0	100.0	
Missing	99	2	1.0		
Total		200	100.0		

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 30

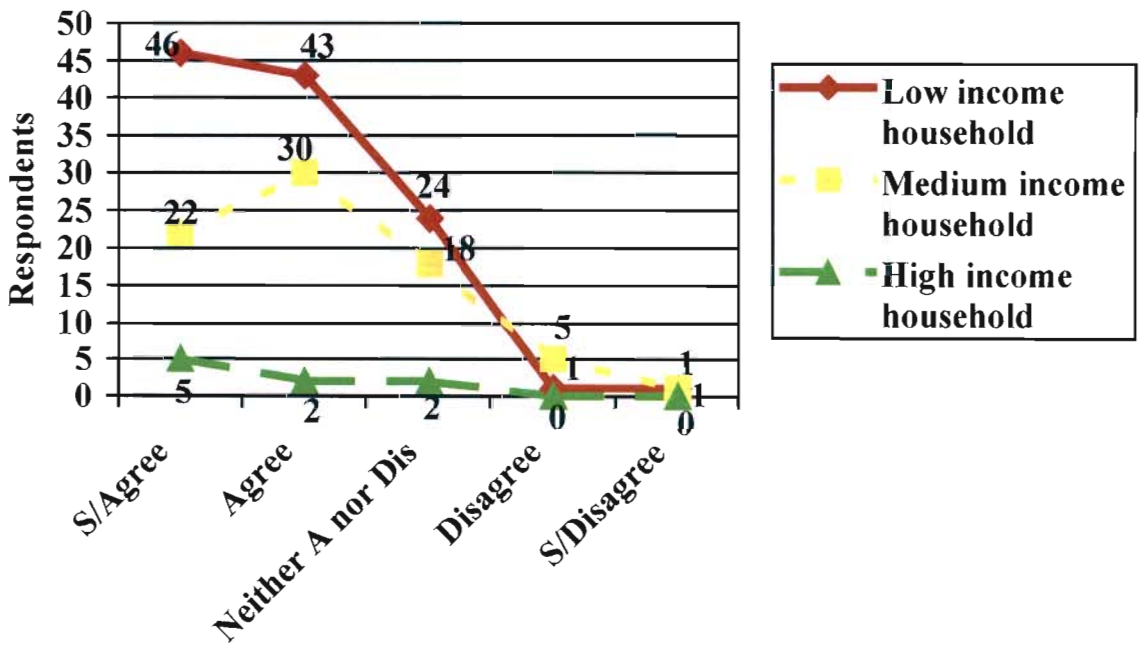
GRAPH 21

B20 Gas advertised on taxis and buses encourages users to continue using that type of energy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	73	36.5	36.5	36.5
	Agree	75	37.5	37.5	74.0
	Neither agree nor disagree	44	22.0	22.0	96.0
	Disagree	6	3.0	3.0	99.0
	Strongly disagree	2	1.0	1.0	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 31

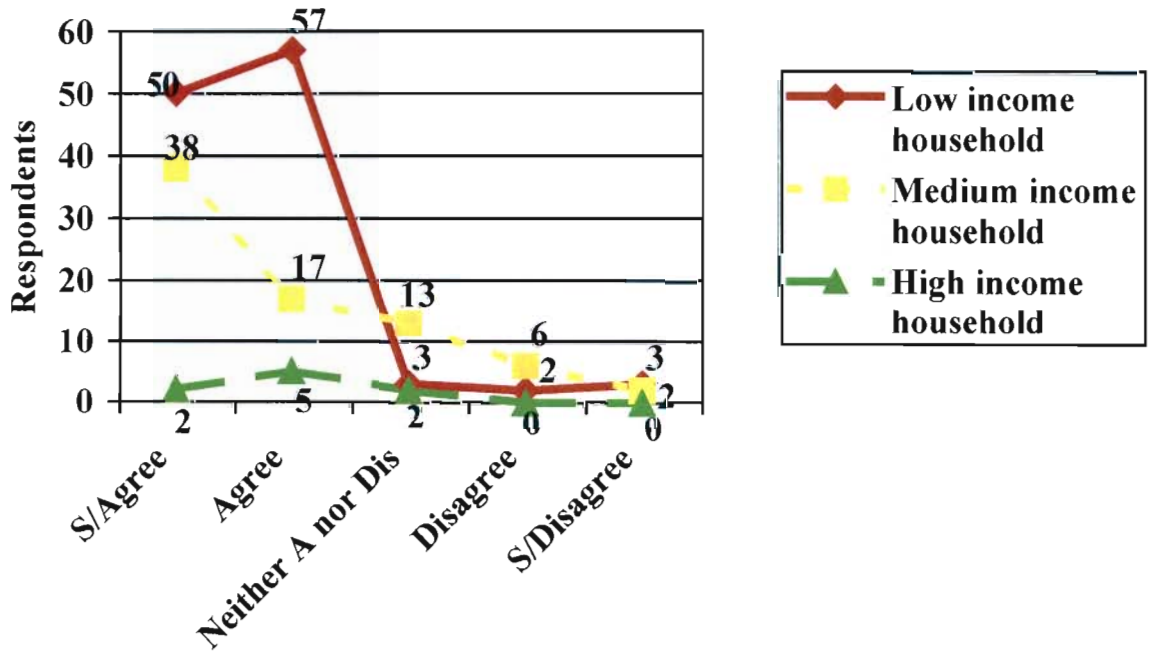
GRAPH 22

B21 Indoor pollution, which mainly affects women and children, is greatly reduced when using gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	90	45.0	45.0	45.0
	Agree	79	39.5	39.5	84.5
	Neither agree nor disagree	18	9.0	9.0	93.5
	Disagree	8	4.0	4.0	97.5
	Strongly disagree	5	2.5	2.5	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 32

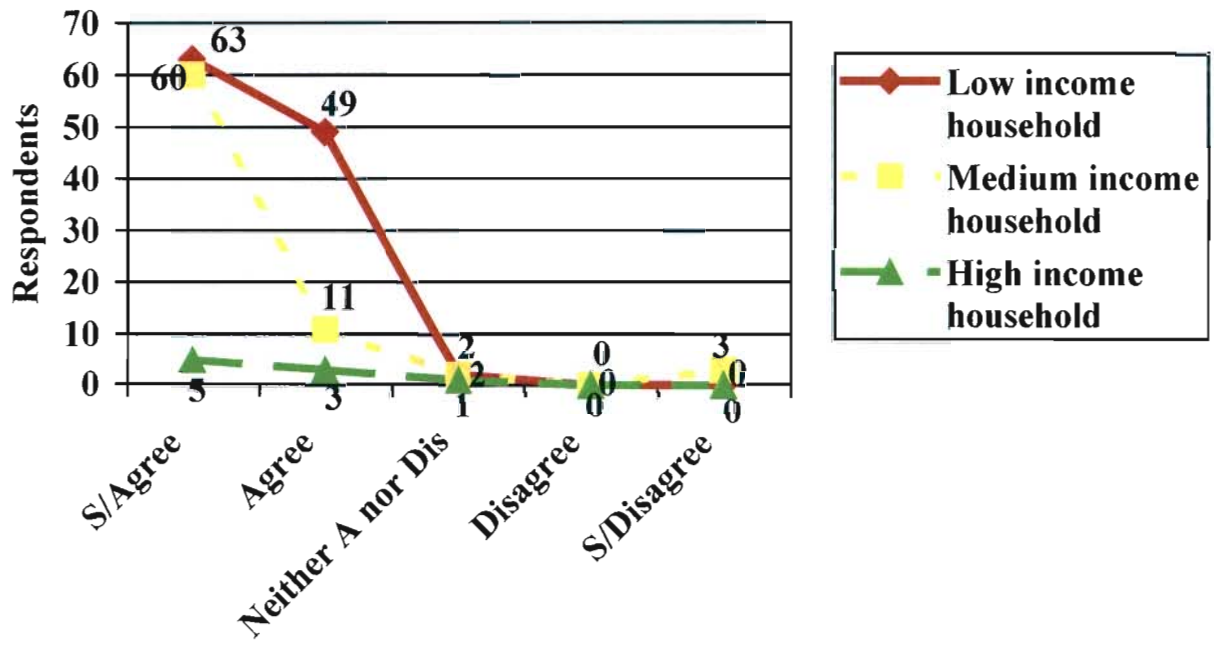
GRAPH 23

B22 The use of wood and charcoalresults in reducing forests(deforestation).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	128	64.0	64.3	64.3
	Agree	63	31.5	31.7	96.0
	Neither agree nor disagree	5	2.5	2.5	98.5
	Strongly disagree	3	1.5	1.5	100.0
	Total	199	99.5	100.0	
Missing	99	1	.5		
Total		200	100.0		

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 33

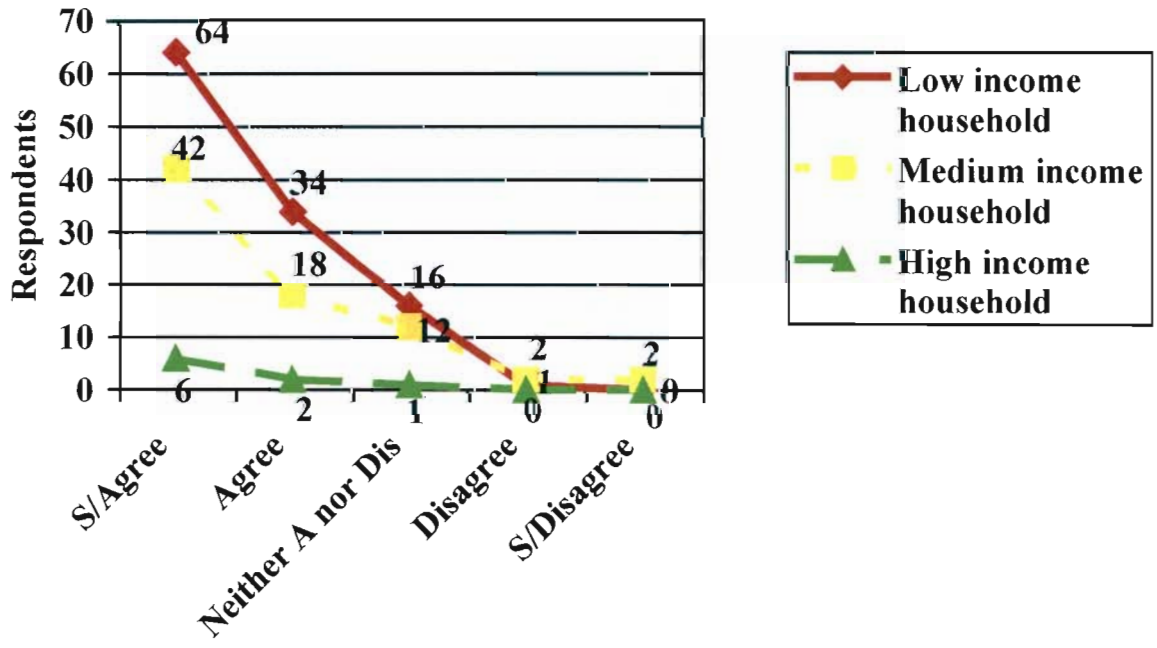
GRAPH 24

B23 Most LPG related deaths are caused by lack of ventilation (carbon monoxide poisoning or suffocation), and not by gas.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	112	56.0	56.0	56.0
	Agree	54	27.0	27.0	83.0
	Neither agree nor disagree	29	14.5	14.5	97.5
	Disagree	3	1.5	1.5	99.0
	Strongly disagree	2	1.0	1.0	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 34

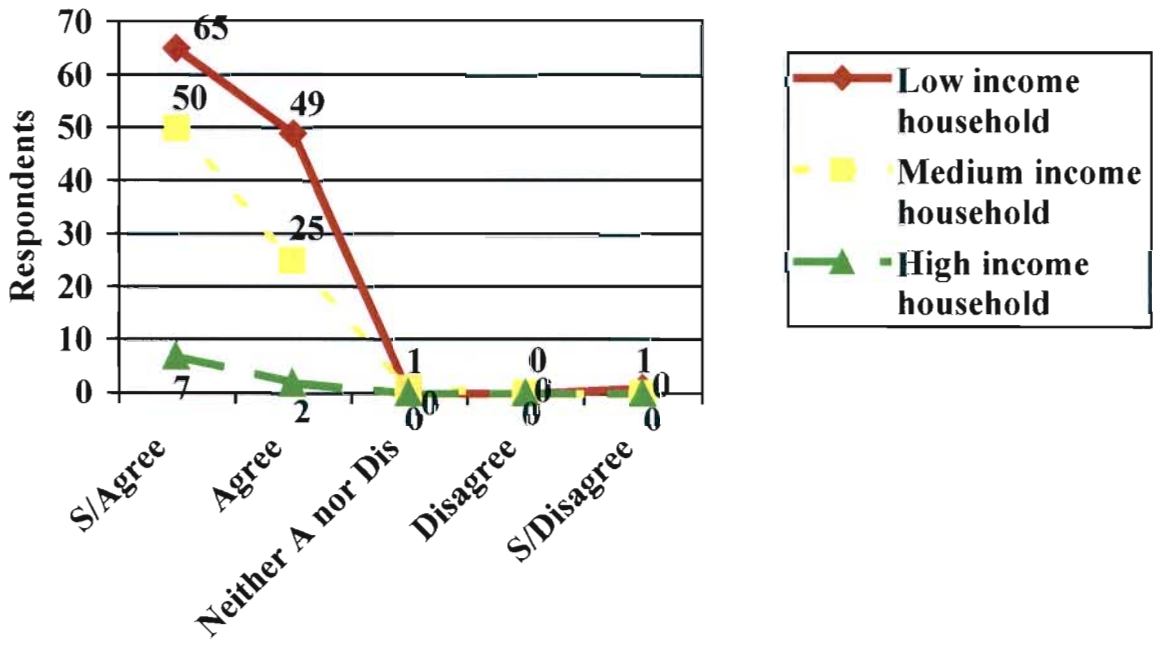
GRAPH 25

B24 Gas is not dangerous if used and handled safely.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	122	61.0	61.0	61.0
	Agree	76	38.0	38.0	99.0
	Neither agree nor disagree	1	.5	.5	99.5
	Strongly disagree	1	.5	.5	100.0
	Total	200	100.0	100.0	

Source: SPSS analysis

Key: S/Agree = Strongly Agree
Neither A nor Dis = Neither Agree nor Disagree
S/Disagree = Strongly Disagree



APPENDIX 35

Question 1 – Are there others barriers that prevent consumers using gas as an energy source? If your answer is yes, please comment.

Category label	Code	Count	Pct of Responses	Pct of Cases
	35	79	23.9	44.1
	36	100	30.2	55.9
	38	1	.3	.6
Insurance premium goes up	42	1	.3	.6
Cost of gas licence	43	1	.3	.6
Finding suitable storage place	44	2	.6	1.1
Perception that gas is unsafe	45	26	7.9	14.5
Lack of education	46	30	9.1	16.8
Lack of promotion	47	27	8.2	15.1
Transportation costs	48	39	11.8	21.8
Expensive gas equipment	49	22	6.6	12.3
Electricity readily available	50	3	.9	1.7
Total responses		331	100.0	184.9

21 missing cases; 179 valid cases

Source: SPSS analysis

			Barriers								
Income Level	(35) Yes	(36) No	Insurance premium goes up	Cost for gas licence	Finding a suitable place to store gas	Perception that gas is unsafe	Lack of education	Lack of promotion	Transportation costs	Expensive gas equipment	Electricity readily available
Low	42	57	0	0	0	13	12	13	27	11	0
Medium	33	39	1	1	2	9	14	10	12	11	2
High	4	4	0	0	0	4	4	4	0	0	1

Table 9 – Other barriers preventing the use of gas.