

A photograph of a rural village with several traditional huts with thatched roofs. The huts are built with natural materials and are situated in a clearing surrounded by lush green trees. A person is visible in the foreground, standing in the dirt path. The background shows more trees and a clear blue sky. The image is overlaid with a white geometric design consisting of lines and circles.

**DEVELOPING RURAL MARKETS
FOR LP GAS
KEY BARRIERS AND
SUCCESS FACTORS**



WORLD LP GAS ASSOCIATION

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World LP Gas Communication SARL
9 rue Anatole de la Forge
75017 Paris – FRANCE
Phone: +33 1 58 05 28 00
Fax: +33 1 58 05 28 01

<http://www.worldlpgas.com/publications>

DEVELOPING RURAL MARKETS FOR LP GAS
KEY BARRIERS AND SUCCESS FACTORS

Executive Summary

Rapid population growth in many of the world's developing countries has far exceeded the rate of increase in modern energy provision. This rampant growth has left many behind, perhaps millions – most of whom are found in rural communities in the developing world.

This astonishing gap has created an immediate opportunity for the supply of LP Gas to vast new markets. In terms of market potential, industry estimates show that between 30 to 60 million tonnes of LP Gas is not being consumed by markets in developing countries that could afford it, representing a potential increase of 15-30 percent for global LP Gas supply.

However, as many commercial ventures into the developing world have demonstrated, the prospects for new market growth are often limited by long-standing market barriers. For the most part, these barriers have little to do with the consumers' demand for LP Gas or with the suppliers' ability or willingness to deliver. Rather, it is often the inherent economic, social and governance characteristics that negate investment decisions and jeopardize business ventures to the point of failure.

Only by fully understanding the wide-ranging market characteristics and barriers, is it possible to begin to devise strategies that build sustainable business models - effectively bridging the gap between latent consumer demand and potential supply.

For these reasons, this report takes a deeper look into current LP Gas distribution practices in selected rural markets around the world, with a view to clearly delineating the key barriers and commercial risks that stand in the way of new market development in the rural areas of the developing world.

Some of the findings reveal barriers that have persisted for decades and that reflect the everyday frustrations experienced by many local LP Gas operators working on the ground to develop these prospective markets. In many cases, however, it is clear that barriers can be overcome if the right mix of policy changes - and what are called Critical Success Factors - are in place. Namely, Critical Success Factors are elements that will enhance the ability and probability of increased LP Gas market penetration in rural areas.

Solutions do exist...

Public-sector assistance will be needed as pure market economics may fail to provide the necessary incentives for market development. New, innovative government assistance may include “smart subsidies” to help with upfront costs, or creative financing mechanisms geared for the poor - such as the development of micro-credit facilities - are a few examples. These measures may very well help stimulate demand, but the larger situation will benefit from a fresh look at legislative, political, monopoly energy supply and regulatory conditions in fast-growing developing countries, such as China and India, who are grappling to match economic development with energy supply.

While improving energy policy and regulatory conditions in the developing world may seem a daunting task, there is a current well-spring of pressure from Intergovernmental Organizations – like the World Bank and the United Nations – that is directed at improving the local conditions necessary to scale up the provision of energy services. This support provides leverage for industry negotiations with local and national governments to establish acceptable conditions and rational energy markets – particularly with regard to under-served poor rural communities.

When industry comes together with government and the community in a project partnership, all parties can draw on their combined strengths and collective action to deliver results more effectively than either party working independently. This collective mobilization of the public and private sectors, in ways that benefit both society and companies, can improve social and economic conditions, as well as create viable new markets for LP Gas products and services.

Overall, the “rural challenge” is to identify new ways to overcome long-standing barriers and to endeavour to ensure that many of the Critical Success Factors described in the report are in place. This will require a concerted effort by industry and government to address all aspects of the rural energy puzzle - from developing local resources, to financing, to building capacity in local energy entrepreneurs, to changing policy and regulations, and to increasing public awareness.

With the right mix of the above, the LP Gas industry has the potential to build upon the impressive track record it has established in meeting the energy needs of millions of people living in rural areas in the prosperous developed regions around the world.

With appropriate government assistance, the industry can deliver the product and its associated productive capacity for stimulating economic development and reducing poverty levels.

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Company	Country Operation
Caltex Ocean Gas & Energy Limited	China
Hindustan Petroleum Corporation Ltd	India
Repsol	Spain
Shell	Sri Lanka
Totalgaz	South Africa
Ultragas	Brazil
Aygaz	Turkey
E1 Corporation	South Korea
Totalgaz	Senegal

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01.

Introduction

1.1 Objectives

This report investigates current LP Gas distribution practices in selected rural markets with the objective of clearly delineating barriers and commercial risks that stand in the way of building new markets in the rural areas of developing countries. The findings aim to provide WLPGA member organisations with a greater understanding of the wide-ranging market parameters that go hand-in-hand with the prospects for expanding the supply of LP Gas into these new rural household markets. Specifically, many serious constraints and barriers exist and must be carefully identified, understood and solved before rural LP Gas market prospects can become a successful reality for both suppliers and users.

Supplying affordable and accessible LP Gas to poor households in rural areas in an acceptable, economical and sustainable way is a very challenging endeavour – fraught with myriad potential barriers, including poor or no road infrastructure, bandits, LP Gas cylinder theft and abuse, limited ability to pay among poor households, vested interests of traditional fuel suppliers, lack of government support for energy policy, inclement seasonal weather and excessive safety-in-use risks that can quickly render a huge new potential market expansion opportunity unattractive.

When a project's risk profile becomes too great and the profit return relative to risk becomes unacceptable, government agencies have a mandate to work together with the private commercial sector to develop markets and deliver the associated social benefits. Soft loans, subsidies and grants directed at responsible projects can be effective with the right mix of private sector involvement. They have yielded a number of public/private partnerships that have been successful in developing new markets profitably, while meeting the modern energy needs of the poor. In reality, therefore, the needs of the poor for modern energy and the need for commercial viability are often interdependent.

The challenge therefore is to understand how to achieve these dual imperatives in order to successfully confront global thermal energy poverty while at the same time opening up massive largely untapped new markets for LP Gas.

Notably, the work behind this report and the presentation of findings reflects three key criteria established by the World Energy Council for achieving sustainable energy delivery.¹ During various sections of the analysis, these criteria will be referenced with respect to barrier and Critical Success Factors for rural LP Gas distribution.

Table 1.1 Energy Requirements for Poor Households

World Energy Council	
The WEC emphasises that successfully supplying modern energy services to the poor and rural communities must meet three critical minimum requirements, namely:	
Affordable	Modern energy services must be affordable in terms understood by the users and in relation to the perceived benefits and the relative costs of alternative and available fuels.
Accessible	Energy must be readily and conveniently accessible and available in appropriate quantities.
Acceptable	Modern energy services must be understood and acceptable to the users in terms of their usage, culture and other specific local needs.

1.2 Research Methodology

1.2.1 Organisational and Country Selection

Much of the study was derived from survey responses from LP Gas organisations and their representatives from around the world. Participating companies included:

Company	Country Operation
Caltex Ocean Gas & Energy Limited	China
Hindustan Petroleum Corporation Ltd	India
Repsol	Spain
Shell	Sri Lanka
Totalgaz	South Africa
Ultragaz	Brazil
Aygaz	Turkey
E1 Corporation	South Korea
Totalgaz	Senegal

In selecting these participants, the aim was to obtain a sample that was as representative as possible of the following realities:

- Global representation.
- Biased towards those regions with the highest levels of rural poor.
- Geographically and culturally diverse.
- Private and public LP Gas distribution.
- High LP Gas market growth predictions/potential
- High per capita LP Gas consumption or rapid market expansion.
- Contestable/competitive and regulated market places.
- Government supported and non-government supported.
- Subsidised and non-subsidised.
- Overall biased towards developing versus 'developed' LP Gas markets.
- Few developed country rural LP Gas distribution respondents for 'control' / comparison purposes.

Against this methodological background, together with the WLPGA, a short list of 24 organisations were invited to participate in the research survey.

1.2.2 Research Component

Engagement of the selected LP Gas suppliers was undertaken under the auspices of the WLPGA. The Association assisted with the identification of specific supply organisations and particularly with the introduction of the study and invitation to potential respondents.

Data Analysis and Validation

The information obtained from LP Gas companies via the questionnaires was a major source of data for the study. The information received was carefully reviewed and analysed for commonalities, trends, successful, unsuccessful and innovative practices. The questionnaires were combed for the defining characteristics of the various LP Gas markets that were described, carefully extracting information of relevance to rural LP Gas supply and distribution. Throughout this meticulous analysis, the focus was on identifying the critical criteria, barriers and critical success factors confronted by each company in the course of their daily operations. This material then formed the basis for forming conclusions on barriers, critical success factors, supply models and case studies.

A variety of other information sources including the authors' own knowledge and experience were also reviewed to yield valuable insights and the results described later in this report. Parallel studies, both academic and market, on successful supply of other services to remote communities were also consulted.

The critical success factors extracted from analysis of questionnaires and other information sources are shown in Section 5. A section on "Universal success factors" that apply to all stakeholders and to all rural supply situations is highlighted. In addition, this study has devised a specific analytical framework to provide a focused tool for use by the LP Gas industry and other stakeholders. It deploys a two-dimensional classification matrix with supply versus demand factors on one axis and affordability, accessibility and acceptability on the other axis.

02.

Characteristics of Rural Energy Markets

This section of the report provides a general description of some of the major characteristics of supply of LP Gas to rural households, especially those to be found in the less developed and more remote regions of the world. The aim here is to provide the reader with an introductory appreciation of rural distribution of LP Gas before specific barriers and critical success factors are described in greater detail in the sections that follow. It is hoped that this will enable an understanding of the factors that influence the complex dynamics of consumer demand, supply and distribution and will allow a better assessment of the prospects, barriers and critical success factors. Many characteristics are considered, from geographic, to profile of households, cultural issues, governmental, political, regulatory and economic.

2.1 Key Characteristics

Location and Density

Probably the first and most obvious characteristics of rural LP Gas distribution are the location of households, the topography of the locations and the density of dwellings per square kilometre. Rural poor households across the world are found in limitless settings, from being clustered in small hamlets to isolated homes perched on mountain sides or scattered across deltas at major river mouths or wetland regions where river-craft provide the primary link to the outside world. Remote or difficult locations challenge the ability to deliver, and low densities preclude economies in investment. Each of these particular local situations will call for their own special local LP Gas supply solutions and in many circumstances these will be an innovative blend of modern and traditional supply arrangements.

Dwelling Type and Occupancy

The types of dwelling present another set of factors for consideration. They may be permanent structures made from brick, wattle or mud or temporary structures often favoured by nomadic cultures. Perhaps they are made of wood and local vegetation adapted for household construction. The storage and use of LP Gas in these different settings will require their own unique household supply and utilisation solutions.

Within dwellings live households. The nature of such households also needs to be understood in terms of the occupants and the number of adults, children, parents, grandparents and extended family members. Household income, literacy levels and livelihoods are also a factor in the ability to adapt to LP Gas utilization. Most important will be a full understanding of the household's thermal energy needs, such as cooking, baking, heating water and space heating, and the frequency of these energy needs so as to match the supply to each household demand and determine cylinder sizes, storage and delivery regimes. Literacy levels and determining the primary LP Gas user in the household are also of vital importance in terms of safety notices on cylinders, efficient use of LP Gas appliances and the physical human capabilities available for cylinder handling and use.

Access

There is another cluster of characteristics around the question of access to households. Is the only way to access the rural householder in situ at the dwelling or do they gather in local community gathering points or visit local villages or commercial centres where central distribution facilities could be established? Is there local radio, a messenger service, postal services, telephones or cell phone services? Managing regular access to the key householders for communications such as promoting the product, receiving LP Gas sales orders, delivering/collecting cylinders and receiving payment are basic necessities. While in developed regions of the world all these things are relatively straightforward, in remote developing locations nothing can be taken for granted.

Storage, Handling and Transport

This vexing issue also faces the rural LP Gas supplier. There is an inherent economic conflict between locating cylinder storage depots as close as possible to the user, versus the potential economies of scale afforded by large centralised bottling and cylinder storage sites. When serving households scattered over many square kilometres, the logistics and economics of the last few steps in the supply chain become critical.

Cultural Factors

Local cultural factors must also be embraced within LP Gas distribution arrangements - in Turkey - the values of local communities, together with local religious interests can often create barriers to new suppliers from outside the community. Gender is another factor that in certain cultures clearly distinguishes certain roles between women and men. Since a primary use of LP Gas is for cooking, the preparation and serving of food will almost always have a variety of associated cultural factors that must be fully understood and respected.

Suppliers' Commercial Viability

In addition to infrastructure, another significant characteristic of rural markets are the economics of supply and whether private companies can operate commercially. Many factors interact to make this a particularly challenging aspect of rural LP Gas distribution. Long supply lines, costly cylinder handling chain, high cylinder supply and maintenance costs all contrive to make the economics especially challenging. Small supply volumes required by individual households will often require aggregation into viable quantities to economically support rural distribution infrastructure investment. High poverty levels that frequently characterise rural households in developing regions present the challenge of affordability and the need to have low comparative LP Gas prices. The disposable income of households and their ability to purchase LP Gas will need to be carefully addressed. Also payment methods or revenue collection procedures will need to be highly innovative to comply with local economic conditions.

Competition

In these communities, competition also exists in many different forms. The most obvious will be the availability of cheaper or zero cost (excluding the value of time and labour) fuel alternatives such as wood, cow dung and agricultural waste. In addition, in many countries coal, paraffin and renewable energy sources also compete for rural household energy expenditure. All of these alternative and competing energy sources will need addressing in the marketing, LP Gas promotion and switching strategies employed locally by LP Gas suppliers. As well as competition between different energies there is also competition from other products and services. The expanding use of cellular phones in rural areas will compete with expenditure on fuel. Soft drink companies that have widespread coverage are another competitor. The fact is that there are a growing number of commercial competitors for the scarce disposable incomes of rural households.

Energy Efficiencies

In the whole matter of comparative energy costs and affordability, one must never lose sight of varying process efficiencies for different thermal applications and fuels. It is always essential to ensure that, like is compared with like, and that fuel efficiency is factored into all fuel cost calculations and comparisons. While this is a highly complex and specialised area of debate, providing the efficiency is also embraced within comparative fuel cost comparisons, then LP Gas will receive a fair hearing and be properly represented.

Switching Strategies

Strategies will need to be developed and deployed to convert rural households to regular LP Gas usage. No fuel is without cost. Wood has to be collected, stored and the ash disposed of; all labour intensive activities. The time that will be saved by using LP Gas is a major benefit to potential users that will need to be carefully explained and demonstrated. There are also less apparent costs such as indoor smoke pollution, dirt, health impacts and slow and inefficient cooking using traditional fuels. User education programmes will be required to win household users to LP Gas and they will need to deploy all the competitive benefits of LP Gas over competing alternative local fuels. Another important element will be the availability and affordability of fit-for-purpose LP Gas cylinders and household appliances. Commonsense and attention to detail in meeting the thermal energy needs as perceived and understood by the users (rather than the supplier) are crucial in devising effective switching strategies¹.

¹ For greater understanding on the health implications please consult the WLPGA document entitled "Household Fuels and Ill-Health in Developing Countries; what improvements can be brought by LP Gas.

Crime

Theft, corruption and abuse of LP Gas cylinders, is another cluster of rural supply circumstances facing LP Gas suppliers. The level and breadth of these problems varies significantly across different cultures and regions of the world. In many regions in the Far East there are high ethical standards and cultural norms of honesty whereas in certain parts of Africa, corruption and theft is endemic. There are several components to these problems ranging from organised crime syndicates to mere petty crime. Abuse of cylinders occurs due to lack of user education and can usually be addressed with appropriate local communication programmes and effective control processes. Where there is corruption among customers and staff, this is a more challenging issue to deal with and requires special focus and dedication by LP Gas suppliers.

National / Local Government and Utilities

Then there are the activities of government, relevant local authorities and energy monopolies. These may include local fire, health and safety, road transport or just general regulations that are either too stringent or not sufficiently stringent for the proper and safe handling, transport and supply of LP Gas. Central governments may also impose excessive excise or resale price taxation, making LP Gas uncompetitive and therefore unaffordable to poor rural households. There may, on the other hand, be local vested interests in retaining an existing fuel supply situation such as the supply of kerosene at favourable terms (e.g. subsidies and zero value added tax) under government patronage. In other situations, the monopoly power of energy suppliers, particularly electricity utilities, may present challenging competitive scenarios.

Subsidies

The issue of subsidies is complex and diverse. Some countries operate free or heavily subsidised basic electricity and energy schemes for indigent households. Any plan to expand the supply of LP Gas to such rural households will need to be carefully integrated with these other/existing energy provisions to ensure success. In many countries there are clear protectionist policies operating for certain energy sectors often related to diversity and security of national energy supply. Local regulatory bodies will be key stakeholders in these matters. Generally speaking these are macro circumstances that have to be handled at a national or provincial level. Finding equitable solutions may be an essential first prerequisite before embarking on a major rural household LP Gas supply initiative.

There are clearly a wide and varied range of different circumstances that face LP Gas suppliers wishing to successfully supply rural households, especially in poor developing regions of the world. In all cases there will be a group of critical factors that will need to be addressed in an integrated manner.

03.

Key Barriers to Rural Household Distribution

A barrier to LP Gas supply to rural households is a circumstance that inhibits the successful market transaction between product suppliers and consumers. From a *supply side* perspective, a barrier may be insufficient LP Gas to supply a large new market. Another barrier might be a lack of sufficient profit margin or insufficient return on asset investments for LP Gas supply companies and distributors. From a *government* perspective, a possible barrier may be failure to implement local energy policy or inability to secure necessary resale taxes. Critical *demand side* barriers might include user concerns such as unaffordable LP Gas prices and non-availability of low cost appliances. In terms of *community* factors, a barrier may be the loss of livelihoods in traditional fuel supply or the lack of patronage from local leaders or elders.

The following discussion reviews the types of barriers from a number of different standpoints in an attempt to gain a greater appreciation of the type and nature of barriers to sustainable LP Gas supply to rural households. Following the presentation of a list of barriers, they are then presented in a barrier framework within dimensions of affordability, accessibility and acceptability each from a supply and demand perspective. The section also provides a number of direct quotations from the various respondent questionnaires that directly support the list of identified barriers.

FEEDBACK - BARRIERS

Part of the primary research undertaken with existing suppliers to the rural market around the world was the identification of barriers experienced. Throughout the following section, a selection of their feedback is incorporated in ‘feedback blocks’ such as this.

‘High price of LP Gas is the main barrier to entering the rural market. This case favours other alternative fuels like coal, wood and electric. Second, rural households are much more connected to their traditions so local companies or familiar dealers are preferred . In some rural areas, LP Gas consumption is not big enough to generate sufficient profit. Thus, we are not giving dealerships in these areas. Since rural households have some economic problems, they can not accept standard payment and prefer to pay by long-term instalment. This is also a barrier for entering rural markets. Alternative fuels especially natural gas will be the biggest threat for LP Gas market’

Turkey:

3.1 Barriers to Successful Rural LP Gas Distribution

3.1.1 Economic Barriers

Uneconomic business cases are perhaps the most fundamental barrier to rural delivery. Here the high costs of rural distribution, low revenue, poor profit margins and unattractive investment have kept back the growth of the rural LP Gas market. The crucial question must be, can a commercial LP Gas supply company make a suitable profit, and thereby a competitive financial return on investment, when supplying rural households? Unless this barrier can be overcome successfully, all the remaining barriers in this section are irrelevant. So what must we understand about the nature of this economic barrier? There are three crucial elements, namely:

- **High costs of rural LP Gas distribution.** Common factors that generate excessive operating costs to rural households include attenuated supply chains, long distances and high transport costs, poor road networks, dispersed and inaccessible customer base, high revenue collection costs; need for massive investment in smaller cylinders; and higher cylinder maintenance costs.
- **Low revenue.** Rural households typically consume small quantities of LP Gas in comparison with industrial and commercial users. Such households are also typically dispersed over large areas. In addition many rural households are poor with limited disposable income. All these factors conspire to reduce revenue levels.
- **Poor profit margins and unattractive investment.** Rural distribution of LP Gas to dispersed households traditionally generates low or comparatively poor profit margins when compared with other LP Gas market sectors. This negatively impacts the attractiveness of rural LP Gas distribution as an investment destination for commercial funds.

‘Rural residential market looks unattractive to our company now because of the small percentage and also because it is not easy to penetrate into rural areas at today’s high record selling price’

China

3.1.2 Demand Side and Community Related Barriers

This section reflects customer and community barriers.

Cheaper Fuel Alternatives and Affordability of LP Gas

Many poor rural households use wood or waste biomass that have a low or negative cost to the users. In addition other thermal fuels such as coal and paraffin are often cheaper than LP Gas. There is little or no financial incentive therefore for such users to switch to LP Gas.

In many countries the full market or economic cost of LP Gas is higher than alternative thermal fuels. This negatively impacts both the incentive for poor households to switch to LP Gas and the ability to pay for a more expensive thermal fuel from limited disposable income of the poor.

High cost of appliances

In comparison to a cheap paraffin stove or a simple iron grid to stand pots on for wood or a coal open fire, the comparable LP Gas cooking equipment is both more sophisticated and therefore more expensive. Poor rural households by definition have very limited disposable income. Without the money to afford LP Gas appliances they will remain enslaved to their traditional cooking methods and implements that incur no additional direct costs or burden on their limited finances. Without the necessary fuel appliances that enable LP Gas to be transformed into useful energy for cooking, water heating, space heating and lighting there will be no demand for LP Gas.

High customer switching costs from other fuels

Because it costs more to purchase the necessary LP Gas appliances than many of the appliances and equipment necessary for other fuels, rural households will be hesitant to 'lavish' scarce money on LP Gas appliances. They have also already paid for their existing appliances. Rural householders also need to be persuaded and educated in the use of LP Gas. There are therefore a number of 'switching' costs involved in winning first time users to LP Gas and these costs that may need to include appliance subsidies, special pricing incentives, customer education and marketing expenses all contribute to high customer switching costs from other fuels.

The main barrier and challenges are high household switching cost from other fuels and cheaper fuel alternatives. The challenge facing our organisation is to run it in a manner that will be both profitable and sustainable.

South Africa

Lack of Awareness

Traditional households, especially those in remote rural areas in most cultures, often cling to tradition and are the slowest to adopt new technologies and modern living practices. Certainly in Africa there is in many countries a low awareness among households about alternative modern fuels, including LP Gas. This lack of awareness also exists with Government officials, entrepreneurs, women's groups and others who influence switching rural households to LP Gas. Awareness must precede any desire to switch to LP Gas. Without awareness of LP Gas, practical knowledge of the product and especially an appreciation of the comparative benefits, it will be impossible to sell LP Gas to rural householders.

Rural Traditional Cooking Methods

Very often, in traditional rural areas, such as India and Africa, the open fire using wood or coal for cooking has cultural, gender and lifestyle values. Certain staple foods such as maize, yams, pulses require slow cooking, well suited to traditional open fires. In Africa, the collection of wood by women is viewed as a gender value and a pile of wood outside a kraal or hut signifies a diligent mother caring for her family. In terms of lifestyle, the open fire serves several purposes apart from just cooking such as space heating and clothes drying in winter months. For reasons such as these there is usually a significant loyalty to traditional cooking methods and therefore the fuels used.

Low Literacy Levels among Rural Householders

Unlike many urban households there is often a low literacy level among rural householders. This is certainly the case in India and Africa. Low literacy presents a range of constraints on introducing and sustaining the safe and efficient use by householders of a new thermal fuel such as LP Gas.

Limited Media and Reach

In many rural developing regions of the world there is an absence of modern media such as newspapers and TV coverage. This is a particular problem in India and parts of Africa. With limited media and that media that does exist having a limited reach to the target rural household market creates a barrier for supply companies wishing to market and promote their product.

Diversity of Local Languages and Cultures

This is nowhere better exemplified than in South Africa where there are 11 official languages. Alongside different languages there are different cultures and traditions. Since the home is the crucible of tradition, local language and culture and it is in this precise environment where LP Gas is to be used, the diversity of language and culture can readily become a barrier to marketing and fuel usage switching.

Low Disposable Income of Rural Households and Ability To Pay

By definition this project focuses on rural households and these are more generally poor households with very limited and scarce disposable income. Not only is income very scarce it is also often sporadic, linked to crop cycles and seasonal work. Thus, serious constraints exist on many rural households' ability to pay, both in actual prices required for appliances, but also the regularity of payments necessary for a reliable supply of cylinder refills. There may be certain times in the year or month when such households simply do not have money to pay for cylinder refills.

3.1.3 Supply side and macro stakeholder barriers

This section reflects the barriers that the supply industry and other macro stakeholders face upon delivery.

Fraud, Cylinder Theft, Misuse and Under-filling

LP Gas supply arrangements, especially to remote rural regions, must include robust provisions for managing and controlling fraud, cylinder theft and under filling by third parties. Much depends on cultural mores regarding ethics. In Africa, where there are serious levels of poverty, fraud, corruption and theft is endemic. Fraud will impact every aspect of the supply operation from theft of revenue, the odd missing consignment of refilled bottles, to the free supply of LP Gas to local 'friends'. Cylinder theft is well known in the supply industry, however it can become particularly acute in remote areas. In Brazil, which has many borders with adjoining countries, cross border cylinder theft is a serious matter that requires careful control, for example. Misuse of cylinders by rural householders is generally a matter of user education. However if this matter is not dealt with it can lead to damage to cylinders and safety risks. Under-filling of company branded cylinders by unscrupulous third party independent LP Gas suppliers will also damage customers' trust in the brand and lose revenue for the legitimate LP Gas supply company. All these matters represent serious barriers that have to be overcome in order to run a trustworthy, legitimate, cost conscious and therefore profitable supply operation.

'Income of rural people, high switching from other fuel and low margin for company due to high transportation cost'

Hong Kong

Safety

The safe supply and utilization of LP Gas has always been non negotiable for all members of the global supply industry. Corporate reputations that have taken decades to nurture and maintain can be put at serious risk unless the whole matter of safety is properly and fully addressed. In some countries where safety may be seriously jeopardised in supplying LP Gas to remote rural users, the potential commercial liabilities may be just too great for suppliers to enter rural supply.

Limited Convenient Access and 'In Time' Cylinder Refills

LP Gas is often simply not available in close and regular proximity to rural households. Without a local and trusted point of sale outlet that can be conveniently accessed by rural households, the product will not be purchased and used. Without a proper local network of sales outlets that provide convenient access by customers to the product, it will be impossible to build LP Gas market penetration in the household sector.

Having a point of sale readily accessible to the rural householders is not sufficient. The brand names of LP Gas suppliers frequently adorn agent's premises in rural areas. However these have to be supported by a regular supply of properly filled cylinders. Without timely availability of filled cylinders, the product will not be relied on by rural householders for daily household activities such as cooking. Once the reliability of supply is broken, households will readily revert to traditional fuels.

'Barriers in rural India include 700 million population in 600,000 villages, wide geographical spread, low per outlet sale in villages, difficult and expensive rural distribution, low product exposure and experience, low penetration, low consumption, low reach of all forms of media, low literacy levels, high cost of initial connection (deposit and stove), high recurring cost of refill, availability of other options for cooking at low/zero cost, low levels of awareness and availability'

India

Unfriendly Energy Regulation

Energy regulations present a large and complex cluster of potential barriers that may impact right across the whole LP Gas supply operation. Regulations as diverse as excessively stringent road haulage regulations can inhibit the physical handling of cylinders. On the other hand, it may be a preferential treatment of an alternative energy source such as electricity to the disadvantage of LP Gas. It may also be the exclusion of LP Gas from government household energy supply policies where patronage and public awareness campaigns funded by government exclude LP Gas. Perhaps it is excessive import duties or levies on imported LP Gas to protect local refineries, thus keeping the resale LP Gas price high and uncompetitive.

Taxes and Levies

The imposition of resale price taxes can inflate the cost of LP Gas and contribute to making it uncompetitive to alternative thermal fuels. Frequently, poor developing countries are eager to gain the short term benefit of tax revenue from what ever source to bolster the government exchequer. LP Gas is an easy target, despite it impacting on longer term socio economic development. In terms of levies, perhaps there are excessive import levies, possibly to protect high cost local refineries, thus keeping the resale price of LP Gas high and uncompetitive.

‘The main obstacle related to rural distribution of LP Gas is economic, in the actual market scenario it is not profitable to distribute LP Gas to rural residential users. The bottled and canalized LP Gas are regulated and its price is a maximum price, bulk LP Gas distribution is profitable since it has larger margins’.

Spain

Price Regulation

Price regulation can be a blunt and negative instrument when used. The ideal model that is increasingly proving itself globally is the liberalisation of supply markets with free competition. Lower prices should preferably be the result of competition rather than artificial price fixing. However, having said this, a universal principle found in most energy markets is the regulation of energy prices, either by the government, international supply cartels such as OPEC with crude oil prices; or, national electricity utilities with carefully regulated tariffs. In the case of LP Gas either the lack of or the imposition of price regulation can act as a barrier to market development. Lack of price regulation may retain excessively high LP Gas prices making it unaffordable for the rural poor. Too stringent price regulation at too low a level may act as a barrier to commercial LP Gas supply companies wishing to supply rural households.

Hostile Activities of Energy Supply Monopolies such as Electricity Utilities

The energy supply industry worldwide is characterised by a few large dominant energy supply entities in most countries. Indeed the deregulation of the energy supply sector and the introduction of competition of supply is an economic phenomena that has emerged only in the later part of the 20th century and is still in progress around the world with many public energy utilities. It is particularly notable in the electricity and natural gas industries. By their very nature, such bodies have been monopolies and the sole supplier in defined markets and geographical territories. To protect such supply industries, they have often built up all manner of preferential trading conditions. The cross subsidy of one market sector for another is a prime example, particularly in electricity supply. This has resulted in household electricity tariffs being artificially low, despite being uneconomic, and this has in turn created hostile and unfair competitive conditions for LP Gas suppliers. Publicly owned national electricity supply utilities have a huge influence in household energy usage. They are widely known, respected and have major communications impact. Without their support and should they have reasons to resist LP Gas household use, they can exert a range of barriers.

Lack of Government Integrated Household Energy Policies

In seriously challenging household thermal energy poverty, those countries who have often been most successful, such as Brazil, have had some form of integrated energy policy. Such policy aims among other things to carefully deploy different energies for those applications they are best suited to. Thus LP Gas for thermal household energy needs and electricity for those unique applications suited to electricity. Without such an integrated energy policy and Government direction and facilitation, even of competitive markets, then imbalances and conflicting activities can arise, that in themselves can become significant barriers to creating and sustaining new rural markets. For the complex needs of broader socio economic development, household energy policy also often needs to be further integrated with country wide health, education, environmental and economic policies. Nowhere have such integrated policies, both the good and bad, been more in evidence than in the USA and Europe during the last century.

‘Cheaper fuel alternatives and poor demand due to escalating cost of LP Gas. Uneconomic for the distributors to travel to Point of Sales located in remote areas since the sales volume is low’.

Sri Lanka

Interference and Lack of Local Consultation by Foreign Development Agencies

Many of the developing regions of the world have been subjected over the last fifty years to a wide range of external influences from global development agencies such as the UN, World Bank and International Monetary Fund. There is also the plethora of unilateral aid agencies with many developed countries operating development programmes in poor regions. Quite often such programmes have been underpinned by the implicit assumption that 'we know best'. Some of this history has created serious long term problems and barriers to local initiatives in solving the best way to serve household needs. Aid funding has distorted and even in some instances corrupted indigenous supply capacity and created artificially low cost energy alternatives to LP Gas. The election of prescribed technologies such as certain renewable energies, notably photo voltaics for essential electricity and the promotion of hi tech western technology, at huge cost, on poor communities, has led to market distortions, short run supply initiatives that prove unsustainable in the longer term and the inefficient allocation of scarce global resources to weird and wonderful schemes that have had more to do with meeting the donors agenda than the real needs of the client country. Thankfully there is an increasing awareness among global development agencies of the need to carefully listen to local stakeholders rather than to tell and prescribe, although such arrogant behaviour, backed up through funding and money, still persists in places around the world.

The main barriers to rural distribution we came across were; high costs of distribution, poor profit margins, cheaper fuel alternatives, and poor demand.

Senegal

Differing Interests of Various Stakeholders

The supply of LP Gas to rural households is a multi faceted undertaking. It impacts many areas of national and local life, both directly and indirectly. There are therefore many stakeholders involved, as well as the immediate LP Gas supply company, their local agents and the rural household user. Every step in the LP Gas supply chain impacts on various stakeholders from land owners, transport companies and environmental groups for example.

The production of LP Gas impacts on oil companies and importers. The usage of LP Gas displaces other fuels such as wood and paraffin. The majority of these stakeholders will have their own unique interests and agenda. Very often, some of these vested interests, if threatened by the supply of LP Gas will reappear as barriers and constraints.

Conflict and Divergent Interests

Where there are differing vested interests that are unresolved, then conflict shortly follows. It can be logically argued that every new market development is a potential conflict situation. Every human intervention in an existing environment throws up potential conflicts of some type or other. Some conflicts can be readily solved by a simple exchange of information and understanding. Others, such as the serious competitive threat to paraffin suppliers, that LP Gas will pose, will require dedicated effort to resolve.

Failure to Adopt the Right Implementation and Management Approach

This represents a broad cluster of barriers to do with the need to have the right skills, leadership and managerial processes in place within LP Gas supply companies, to develop the rural household market. It is a market very different from the bulk industrial or the commercial market. It will require dedicated and specialist staff to develop it. There are a range of organisational, market development process and business model barriers therefore that unless properly addressed will ultimately lead to a company's failure to penetrate and sustain growth in the rural household market. Unless robust and well quantified business plans are developed, that provide for the special needs of this market, then failure will be a strong possibility.

Uneconomic, high costs of distribution, poor profit margins, cheaper fuel alternatives (firewood)

Brazil

3.2 Rural Distribution Barrier Framework

The international survey of LP Gas suppliers revealed a number of barriers that are frequently confronted in the delivery of LP Gas to rural households. In order to more clearly understand the barriers confronted in both supply and demand relative to the three conditions for sustainability established by the WEC, the following matrix has been created. The result is six major clusters of potential barriers, where for example, limited access to LP Gas for a rural household customer is one dimension of a barrier that also exists for a supplier attempting to reach a customer or customers spread across large areas with poor road infrastructure. This duality of barriers for both suppliers and rural household customers is more fully described below:

The main barriers have been overcome through LP Gas being environmentally friendly, price competitiveness and accessibility attributes

South Korea

Table 3.1 A Framework for Barriers

	Demand Side	Supply Side
Accessibility	Rural Household Access to LP Gas	LP Gas Supplier Access to Rural Households
	Local LP Gas supply to households	Dispersed customers
	Smaller cylinders	Long supply chains
	Full local sales and service	Lack of rural supply infrastructure
	Fast and convenient refills	Need for local agents and sub agents
	Plenty of cylinders frequently refilled	Higher investment, risk and maintenance costs
Affordability	Low LP Gas and Appliance Prices	Higher Margins to Support Higher Rural Supply Costs
	Ability to pay	Low LP Gas prices
	Need for credit	Small margins
	Small quantities	Economic viability
	Low cost of appliances to switch to LP Gas	Need for subsidies for market entry appliances
	Access to credit	Need to reduce overheads
	Below poverty line households	Special third party financial support
Acceptability	Rural Household View of LP Gas	Attractiveness of Rural Market to Suppliers
	Low or zero cost fuel alternatives such as wood	Added cost of competitive marketing
	Higher fuel costs	Low margins
	Safety and proper usage	Costly user education
	Cooking major usage	Small volumes of LP Gas
	Govt friendly household energy policy	Govt., energy policy favouring other fuels such as paraffin/natural gas
	Zero rated taxes	VAT on LP Gas sales
	Many competing suppliers	Exclusive supply territories

The framework provides a comprehensive listing of many of the barriers that were identified across the world. By nature, a matrix of barriers presents a negative reflection of the rural household market opportunity. However, substantial evidence was also shown in respondent's questionnaires of the widespread interest and intent by LP Gas suppliers to overcome these barriers in order to grow and realise the sales potential of rural markets.

04.

Lessons from other Industry Sectors

Understanding rural distribution practices in other industries can often lead to useful “benchmarks” for the LP Gas industry. After a careful review of rural household expenditure patterns on other products and services a number of important learning points identified.

Products and services used by rural households, that showed the greatest similarity with the supply of LP Gas were found to be returnable bottled drinks, both alcoholic and non-alcoholic; and, a service industry - cellular telephones.

4.1 Bottled Beverage Industry

The fact that even in the remotest rural areas soft drinks - such as Coca-Cola and very often, also alcoholic drinks, are widely-available is significant and offers an opportunity for greater understanding. While these products are supplied increasingly in disposable containers, provision of drinks in “returnable bottles”, a practice that is still widely-utilised in rural areas, represents a relevant base for comparison.

Similarities and notable differences with LP Gas sales and distribution include:

- The need to contain a volume of liquid product, under pressure (although at a lower pressure and non flammable) in dedicated reusable containers.
- Both are commodities used/consumed by household members.
- The consumption points however are not always the same – for example beer and cool drinks are consumed in local drinking venues as well as being taken home.
- Interestingly, competition from externally delivered commercial beers with local community brewed beers is very similar to LP Gas competing with locally gathered fuels.
- Unless the container is disposable and scraped after use (typically tin or plastic) the ownership of container always resides with the supplier, a deposit system is operated and no usage of the suppliers' asset is allowed by any other persons.
- Costs are higher for a refill in the case of the LP Gas than for a beverage.

4.1.1 Lessons Learned

Transportation of the goods is undertaken by the bottling company only up to the depot point - thereafter additional delivery fees are payable or the trader needs to collect at the depot or large wholesaler. Many dealers have their own transport which is often a barrier to market entry.

Learning: LP Gas cylinders can be added to traders' product mix and the traders own transport utilised for the movement into the community.

Extensive use is made of community level traders/resellers to stock and sell the goods within the community. Harnessing the entrepreneurial strengths of these local traders helps to ensure that LP Gas is well-promoted and supplied with the correct levels of service.

Learning: LP Gas can be stocked and sold by community members thereby increasing its accessibility to rural households and can help to ensure correct servicing.

Sub-levels of distribution in rural communities are evident, with one or two of the larger traders becoming effective micro-wholesalers for supply companies through wholesaling to smaller outlets. Once micro-wholesalers are established and volumes are sufficient, the bottled beverages are delivered directly by the supplier into the community. Setup of micro-wholesalers is not just left to chance, rather active marketing takes place by the supplier through the identification of a suitable trader in a community. Agreements and terms are put into place and the wholesaler is carefully managed and supported by the supply companies

Learning: Micro-wholesalers should be actively sought, set up and actively-managed by LP Gas suppliers.

The local taxi industry and bus operators are currently used as a means of transportation by the poor to transport goods purchased in local towns back to the rural communities. Rural households simply embrace this cost to purchased goods in town and compare the price with available goods in the community with the belief that it is cheaper in town. For the bottled drinks industry, the availability of refrigerated beverages locally is often the deciding factor whether it is purchased in town and then transported to the rural village - or purchased locally.

Learning: A value proposition needs to be developed that communicates the advantages of local purchase.

Unless a national published price is enforced, prices for the goods are always higher in rural areas than in cities. This is a direct function of the higher transport costs and multiple steps in the supply chain each with their incremental mark up.

Learning: The lesson is to cut out as many “middlemen” in the value chain as possible ensuring a direct supplier-to-community distribution line.

4.2 Cellular Phone Industry

Cellular phones have also warranted investigation due to the rapid growth of this modern means of communication, even into remote rural areas. Similarities and notable difference with LP Gas sales and distribution include:

- Distribution of the service takes place electronically through the radio network, both for the delivery of the purchased service (increased airtime after purchase and entering of a recharge code) and the actual usage (communication) from any point.
- The commonality with LP Gas therefore lies in the area of switching to a new modern service, re-allocation of funds from limited rural household budgets, region by region roll out of the new product and the need for the usage appliance (the phone in this case being directly analogous to the LP Gas cooker).

4.2.1 Lessons learned

Cellular phones are a clear status symbol. Many poor households in the developing world have been able to successfully re-direct some of their household budgets to the payment for cellular handsets and operating costs, which demonstrates that rural consumers with limited incomes can and will pay for a new product or service if it is sufficiently desired. The drive for modern appliances/communications and ingenuity of users is evident from how rural users purchase cellular handsets despite having no access to electricity for charging. Users have to take or send the units to town for charging purposes. It was noted, interestingly, that in South Africa and Nigeria, the liquor industry has actually experienced a reduction in sales as people re-directed disposable income to cell phone costs.

Learning: Marketing LP Gas as the preferred modern thermal household fuel – or the most sought-after product for the rural household - is a marketing “must”. Re-allocation of budgets towards LP Gas purchase is possible, given that the product attractiveness and status is sufficiently high when compared to other goods. Active local promotion and positioning of LP Gas as a “modern” desirable product through innovative product design and marketing campaigns will positively affect the rural user’s willingness to pay.

Cell phone networks are constantly growing, always covering the areas of highest call density first, such as up motor ways and most dense housing areas.

Learning: Development of distribution networks follows a more- to less- dense geographical area trend.

Cellular handsets are often purchased with financial help including innovation credit assistance. “Specials” on the handsets are constantly used by the cellular companies to lock in customers and create the switch to their networks.

Learning: From an LP Gas perspective, the appliance financing – or switching cost assistance - is critical to unlocking the market. Innovative financing methods should be explored with government and local micro-financing institutions.

Prepayment or cash on purchase is the norm for these goods and services. No credit is allowed for the consumables by the suppliers. In local communities, it is found that the resellers mostly operate on a credit system.

Learning: LP Gas suppliers should preferably operate using a cash system and allow the local resellers to manage consumer credit systems.

05.

Critical Success Factors

Critical Success Factors are the key factors which need to be in place to maximise the probability that LP Gas rural supply initiatives will succeed. In this context, success is defined as sustainable and replicable expansion into a suitable rural household market. By definition the CSFs are not methods for overcoming a single barrier, rather they are activities, approaches or foundations that greatly enhance possible success while impacting on a range of barriers.

The CSFs were obtained from three sources, firstly the completed questionnaires, secondly various other reference documents and from the authors' own commercial experience in managing rural energy supply projects. In terms of the questionnaire data, the process involved a thorough review of the information kindly submitted by the respondents. Following this the CSFs were classified between those that should be regarded as universal and those that had a specific bearing on a range of dimensions such as supply and demand side and affordability, accessibility and acceptability.

In describing the various CSFs it is apparent that there is often overlap between individual CSFs. In view of this, when examining specific CSFs in relation to specific countries, market conditions and local circumstances, there will always be some element of judgement required for proper interpretation and application.

For ease of reference the major barriers that are confronted by each of the CSFs are show in the inset boxes adjacent to each CSF description.

5.1 Universal Success Factors

5.1.1 Sustainable Economics

There is an almost universal dynamic to be found in LP Gas supply to rural households. Rural and often poor households require low cost thermal fuels in comparatively small quantities, and they have limited ability to pay for it. Thus there is a demand side pressure for low LP Gas prices. From a supply perspective, the rural household market is relatively costly and difficult to supply in comparison with other market sectors such as bulk industrial and commercial users. It will be essential to ultimately achieve acceptable economic returns to ensure sustainable supply to such markets. The economics of LP Gas rural household supply programmes, particularly in terms of projects being able to show a positive return on investment over a defined time period is of course, fundamental. In achieving this, critical mass and breaking even, are crucial. Supplying LP Gas to rural households is, by its very economic nature, a matter of building a sizeable customer base that requires a regular and consistent volume of the product that in turn, will provide the necessary revenue streams for viability and profit. To set the breakeven point too soon or the penetration level too low will often lead to market failure. Equally, highly sophisticated and costly supply operations may well create unsustainable overhead cost burdens. Commercial business models must therefore be attuned to those business criteria geared to serving mass consumer markets where high market penetration, large volumes, aggregation of demand, streamlined supply methods, small margins and competitive marketing are paramount. The distribution methods, benefits and ethos enjoyed by LP Gas suppliers for bulk supply to industrial consumers, for example, simply do not apply to the rural household market opportunity, and very different business ethos and practices must be adopted.

BARRIERS CONFRONTED
<i>Uneconomic business cases</i>
<i>High cost of appliances</i>
<i>High switching costs</i>

5.1.2 Complies with Medium Term Strategies

BARRIERS CONFRONTED

Uneconomic business cases
Unfriendly energy regulation
Taxes & levies
Price regulation
Lack of Government integrated household energy policies
Failure to adopt the right implementation and management approach

All LP Gas supply programmes need to fit into a medium-term commercial strategic framework with suitable milestones on the way to a defined end-point. Such a point will usually be in terms of market penetration, aggregation of volumes, breakeven and getting to a point of critical mass when overhead costs are readily spread over substantial numbers of rural household customers. Growth, consolidation, regular revenue streams and profits will be the ultimate goals on the path to long term economic sustainability.

5.1.3 Establish and Know the Market

BARRIERS CONFRONTED

Cheaper fuel alternatives & affordability of LP Gas
High customer switching costs from other fuels
Lack of awareness
Rural traditional cooking methods
Low literacy levels
Limited media & reach
Diversity of local languages & cultures
Low disposable income & ability to pay
Unfriendly energy regulation
Hostile activities of energy supply monopolies such as electricity utilities
Differing interests of various stakeholders

The assumption that an LP Gas market exists for rural households does not mean that it actually exists – it must be proven and quantified to exist. The precise thermal energy needs of the target rural households must be established and fully understood both in qualitative and quantitative terms. The total potential of the market together with realistic penetration levels must guide the business case and phased market growth strategies and tactics.

5.1.4 Market Related Prices

BARRIERS CONFRONTED

Cheaper fuel alternatives & affordability of LP Gas
High cost of appliances
Low disposable income & ability to pay
Taxes & levies
Price regulation
Failure to adopt the right implementation and management approach

In most countries, rural households have access to low cost or zero direct cost alternative thermal fuels such as wood, peat, cow dung or various combustible waste materials. Despite the hidden costs of gathering, labour intensive cooking procedures and dirt, potential customers will need to be weaned off these inferior fuels. There may also be paraffin, charcoal and coal available for household thermal use at low prices. In view of these various competitive circumstances it is essential to have market related prices for LP Gas closely linked to the comparative efficiency, convenience, cleanliness and other benefits of LP Gas. These features and benefits need to be carefully and persistently explained to customers to build market share and customer loyalty. Payment methods must also be carefully attuned to local economic circumstances and the way that goods and services are bought and sold.

5.1.5 Deploy Reliable and Proven Technology

It is essential that trustworthy and proven cylinder and appliance technology be used that is 'fit-for-purpose' in terms of the household usage needs, volumes, local distribution environment and climatic conditions. Costly mistakes can be avoided by thoroughly testing all supply packages in diverse and varied conditions before embarking on a major market expansion programme. In the absence of broad experience of specialised supply technology of cylinders and appliances in a particular country or territory, the golden rule must be to test, test and then test again in all the various settings to be experienced in the full supply programme. The provision of clearly understood guarantees will often assist in building confidence of new technology with customers. The assurance, both of safety and that cylinders are properly filled are especially important aspects in the more traditional communities in rural areas.

BARRIERS CONFRONTED

Uneconomic business cases
Low availability & convenient access
Fraud, cylinder theft, misuse & under filling
Safety

5.1.6 Ensure an Efficient Market Chain is Created to Handle and Control the Product

This is of special importance for rural household supply where customers are often remote and scattered over large areas. Each step in the supply chain must be fully necessary and streamlined to reduce overhead costs. On the other hand however, there is a need for a wide network of local suppliers, either retail agents or other local supply arrangements that ensure timely and consistent availability of filled cylinders. Empty cylinders must also be handled with extreme efficiency for checking, maintenance and proper refilling. This cycle must operate under close supervision to avoid wastage, theft or misuse of cylinders.

BARRIERS CONFRONTED

Low availability & convenient access
Fraud, cylinder theft, misuse & under filling
Safety
Lack of awareness

Generally in most countries with an LP Gas supply industry, the supply chain from the import terminal or refinery through to cylinder refilling plants is highly refined and efficient. Beyond these supply chain stages however, rural LP Gas supply becomes more problematical. The location and proximity of refilling plants is a critical matter and careful logistical planning is always necessary to ensure optimum deployment of resources. The onward distribution of cylinders to local dealers and sub-dealers is often where disproportionate operation costs are incurred and losses occur. The local market supply chain must be created systematically to achieve least-cost cylinder refilling, storage, handling, maintenance, control and fast and efficient supply to end users.

A fast and reliable filled cylinder supply is an obvious critical success factor. But so too is the need to supply the appropriate size of cylinder that economically and conveniently meets the household thermal energy needs whilst also being readily transportable. Smaller cylinders such as the 2, 4.5 and 6 kg cylinders that are easily carried have greatly assisted in the expansion of rural household markets. Larger cylinders requiring special handling will naturally restrict accessibility.

5.1.7 Trained and Competent Market Support Personnel

Without properly trained, deployed, motivated, managed and rewarded LP Gas distribution, sales, accounts and service personnel, any rural household supply programme will be in serious jeopardy. This applies with equal force to both direct and indirect employees, such as the staff of independent retailers, local agents, technical support operations, drivers and cylinder handlers.

BARRIERS CONFRONTED

Uneconomic business cases
Low availability & convenient access
Fraud, cylinder theft, misuse & under filling
Safety
Lack of awareness
Limited media & reach

5.1.8 Suitable Appliance Financing

BARRIERS CONFRONTED

Uneconomic business cases
High cost of appliances
High customer switching costs from other fuels
Lack of awareness
Low disposable income & ability to pay

In developing regions of the world where there are still billions of poor rural households without access to modern thermal energy, the most critical success factor is to address these poor households' inability to pay for LP Gas appliances. The relatively high cost, to the poor households at least, of an LP Gas cooking appliance, often stops them from being able to switch to LP Gas. The provision of suitable appliance purchase credit, special appliance financing or a single appliance grant to cover or heavily subsidise the appliance cost, has been shown across the world to be an important CSF.

5.1.9 Never Forget Local or Provincial Specific Factors

BARRIERS CONFRONTED

Lack of awareness
Rural traditional cooking methods
Diversity of local languages & cultures
Differing interests of various stakeholders

Although most successful rural household LP Gas supply programmes replicate carefully refined generic supply models across countries or provinces, it is absolutely essential not to overlook local cultural, economic, religious or socio political factors. The old adage applies here, 'act globally but think and behave locally'. It is essential to demonstrate that the unique challenges and opportunities that arise in local settings, even at the local village level have been fully addressed. It is here that regional and local distributors and retail agents have a crucial role to play and this must be understood and made explicit to all parties in supply arrangements and agreements.

5.1.10 Legislative, Political, Monopoly Energy Supply and Regulatory Conditions

BARRIERS CONFRONTED

Unfriendly energy regulation
Taxes & levies
Price regulation
Hostile activities of energy supply monopolies such as electricity utilities
Lack of Government integrated household energy policies

Probably the single most important set of macro factors that affect an LP Gas supply programme to rural households is the framework of the above elements within which it is expected to operate. It is important therefore to identify national or provincial government household energy policy, legislation, relative political influences, the activities of monopoly alternative energy suppliers such as electricity utilities; and, regulatory bodies. Are the local health and safety laws conducive to low cost and profitable LP Gas supply to rural households? Are electricity or other competing fuels heavily subsidised? Are there special financial and fiscal schemes for subsidised energy provision to poor households? Hence, it is important to identify all these various factors and ascertain whether they are essentially friendly or hostile to the type of LP Gas supply investment being considered. The aim must always be to ensure that any LP Gas supply programme is carefully integrated with these other framework factors in a complimentary manner.

5.1.11 Dissemination of Programme and Results

BARRIERS CONFRONTED

Low availability & convenient access
High cost of appliances
Lack of awareness
Low disposable income & ability to pay
Differing interests of various stakeholders.
Conflict and divergent interests

The benefit of creating a desire among rural household to use LP Gas must never be underestimated. Such 'market pull' can provide LP Gas suppliers with a host of benefits that quickly show on the company's profit and loss statements. Nothing breeds success more than success, and nothing breeds customer loyalty more than the widespread dissemination of the success, desirability and usage of LP Gas by a growing number of other rural householders. Imitation is a powerful influence in winning the acceptability of traditional communities. So, one of the best ways of establishing future demand for LP Gas, is by dissemination of success stories. In addition to building demand, such publicity may also positively influence other stakeholders such as financiers, politicians and community leaders.

5.1.12 Keep Subsidies to a Minimum (if at all)

If the medium and long term objective is to create a new economically sustainable LP Gas market among rural households, then subsidies should ideally be kept to a minimum. Once subsidies become an established factor in any energy supply situation they are extremely difficult to remove at a later stage. They also distort supply arrangements and lead to the inappropriate allocation of scarce resources. All LP Gas supply programmes must place primary value on the commodity being supplied, the comparative features and benefits of LP Gas as a preferred household thermal fuel. The provision of subsidies only devalue the true value of the product and create widespread expectations of artificially and uneconomic resale prices. Clearly, such situations can never be sustained over the long term and so should therefore be avoided.

Despite the over-riding principle above, subsidies are a varied and complex matter. Where competing household thermal fuels benefit from subsidies, efforts should be made to have these removed so that a level playing field can be restored in the market place. There may also be special classes of rural household, such as the very poor, where it is justifiable for some fuel subsidy relief to be given. Many countries operate free basic energy schemes in these circumstances. However, such subsidies need to be clearly understood and the true price/cost of the product still needs to be widely communicated to users.

Single one-off subsidies, such as for low cost starter LP Gas appliances, are more justifiable to get poor rural households onto the first level of LP Gas usage. These are once-off subsidies geared to very specific needs and are therefore more easily targeted, controlled, quantified and are discontinued once the specific fuel switching objectives have been achieved.

5.1.13 Monitoring Results and Review

There must be proper monitoring of results, and the use of critical performance indicators for all the operational and marketing activities involved in a rural household LP Gas supply programme. Although this is an obvious need, it is surprising how often this important CSF is overlooked or badly handled. The need for proper records, project review and feedback is necessary at several levels. The basic reason for these things is to practice and demonstrate effective and thereby successful project management at every level in the LP Gas supply programme. However, in addition to the need to control and successfully drive the overall supply programme, such monitoring processes and records enable a wide range of other valuable activities. These include: early identification of problems; swift problem solving and implementation of remedial measures. Such records can also be used to demonstrate reliable supply model design, acceptable economics, proper establishment of supply networks and efficient agents, how local factors have affected outcomes, satisfaction levels among rural households and provide the basis of dissemination activities.

BARRIERS CONFRONTED

Uneconomic business cases
Cheaper fuel alternatives & affordability of LP Gas
High customer switching costs from other fuels
Price regulation
Hostile activities of energy supply monopolies such as electricity utilities.
Lack of Government integrated household energy policies
Interference and lack of local consultation by foreign development agencies

BARRIERS CONFRONTED

Lack of awareness
Differing interests of various stakeholders.
Conflict and divergent interests
Failure to adopt the right implementation and management approach

5.1.14 Cater for Changes (especially at first)

BARRIERS CONFRONTED

Lack of Government integrated household energy policies.
Differing interests of various stakeholders.
Conflict and divergent interests
Failure to adopt the right implementation and management approach

It is important to always be prepared for changes, especially in the early stages of an LP Gas rural household programme. The proper monitoring and review of results mentioned earlier will assist in quickly identifying where changes may be necessary. It is essential to keep focused on the objectives, whilst also remaining flexible. Something that should be considered at the outset is the matter of growth-in-demand from other household and non-household rural thermal energy applications. While cooking in households will be the first application to be switched to LP Gas it may well be quickly followed for a demand for LP Gas lighting, space heating, bulk water heating and refrigeration. Within local communities LP Gas may be required for other activities such as cooking and heating in schools and other public buildings. Local trades may wish to use LP Gas for various applications such as generators and lighting, as well as other local agricultural enterprise. The main issue here is to be prepared to take swift advantage of these opportunities. The supply of basic energy services to rural communities has shown worldwide that demand for modern energy will always grow.

5.1.15 The Right Project Development, Management and Implementation Approach

BARRIERS CONFRONTED

Uneconomic business cases
Low availability & convenient access
High cost of appliances
High customer switching costs from other fuels
Fraud, cylinder theft, misuse & under filling
Safety
Lack of awareness
Differing interests of various stakeholders
Conflict and divergent interests
Failure to adopt the right implementation and management approach

It is essential to deploy the right project management development and implementation approach to achieve success with medium and long term rural household market expansion programmes. A unifying vision bringing together the interests of the various stakeholder groups, the development of thoroughly tested supply models and then the diligent implementation with appropriate remedial action as the programme unfolds, will all be essential. Often dedicated manpower and specialist skills within LP Gas supply companies, are essential to ensure success.

5.1.16 Conflict Management

BARRIERS CONFRONTED

Differing interests of various stakeholders
Conflict and divergent interests
Failure to adopt the right implementation and management approach

Frequently, failure to identify and then manage conflicts arising as a result of an LP Gas supply programme can create all manner of resistance and even sabotage of programmes by third parties. The displacement of traditional fuels is an obvious area for attention but there are several others that may exist where vested interests are being threatened.

5.1.17 Public Private Collaboration

With many LP Gas supply programmes for poor rural households needing government support, either with subsidies, special provisions for the poor or friendly market regulation, barriers often exist in the harmonising of government and commercial interests. Unless commercial supply programmes are fully harmonised with broader government energy policy, taxation rules and socio-economic provisions for the poor for example, they will in all likelihood flounder, despite any good intentions on the part of the supply bodies or the government.

The whole matter of public private partnerships is a complex issue. It is such a critical aspect of rural energy planning and the expansion of LP Gas markets that it warrants a separate report and does not fall within the terms of reference of this document. It is however, one of the critical success factors that warrants detailed review and understanding and then a multifaceted strategy to ensure it is managed effectively. Suffice to say, numerous public private partnerships, either formal or informal, have floundered due to insufficient understanding, poor communications, differing (and concealed) agendas, conflicting motivations of the various parties concerned and lack of the essential leadership, managerial, conflict resolution, entrepreneurial and bureaucratic skills required. Nowhere has this been more evident than with many rural energy development projects.

BARRIERS CONFRONTED

Hostile activities of energy supply monopolies such as electricity utilities.

Lack of Government integrated household energy policies.

Interference and lack of local consultation by foreign development agencies.

Differing interests of various stakeholders.

Failure to adopt the right implementation and management approach

5.2 Affordability – Supply and Demand Perspectives

In line with the framework of barriers, specific CSFs are related to the **affordability** of using LP Gas as a thermal fuel in rural households. Without considerable effort, matching the prices of the “product offer” with the customer’s economic means, market growth will be impacted. This leads to a natural tension that will always exist between low LP Gas and appliance prices versus the higher expected margins required by suppliers to support higher rural supply costs.

5.2.1 Demand-side Affordability CSFs

BARRIERS CONFRONTED

Uneconomic business case
Cheaper fuel alternatives & affordability of LP Gas
High cost of appliances
High customer switching costs from other fuels
Low disposable income & ability to pay

Ability to Pay

Within poor rural communities the ability to pay will be a problem. However, there is often an economic stratification within the communities that leads to differing thresholds of possible expenditure. Simplistic single product options would mean that the richer segments’ needs would not be met nor those of the poorest of the poor. A second factor is the current energy expenditure. Even traditional fuels such as paraffin and candles cost money. The movement of this money to modern energy services such as those supplied by LP Gas is the first contribution. Next, the reallocation of funds from other areas of expenditure to fuel purchase will need to make up the difference on the expected spend. The significant switch to cell phones in many poor and rural areas of the world is perhaps the greatest demonstration of how money can be switched from one activity to another within a household budget.

Success will clearly depend on the supplier’s ability to **match product offers to the levels of disposable income of different segments of the communities**. Plus, showing the relative improvements in lifestyle through the adoption of a modern energy services, will be worth any additional expenditure.

Seasonality of Income and Varying Levels

Subsistence farmers often make use of surplus crop and livestock sales as their main income stream. With so much of the rural economy linked to subsistence farming there is a tendency for income to be seasonal and at times variable, due to drought, floods etc. Inclusion of flexibility and possibly loan accounts, will help the households to manage the seasonality of their income when it comes to purchasing LP Gas.

Matching the organisational design to the seasonality of income, where applicable, will be key to its success.

Small Quantities

Purchasing power is limited, with typically a “hand-to-mouth” approach to financial management within the poor rural households. Thus, often the household will have to regress back to traditional fuels if the LP Gas cylinder is empty and there is no money for a refill. The larger the cylinder size, the greater the accumulated or allocated amount of cash needed for this refill. What can assist here, is support through the provision of small quantities. This would need to take the form of smaller sized cylinders and even possibly part filling.

As an example, in South Africa, regular purchases of paraffin/kerosene in 350ml tins are made. **Success will be found when customers can purchase regularly in quantities that will fit into the household budgets**. Training on household budgeting or saving for essential needs, such as energy, will assist.

Low Cost of Appliances to Switch to LP Gas

Generally LP Gas appliances are more expensive than the appliances associated with traditional fuels. This, coupled with the limited earning potential and general low capital base of the households, means that switching/converting is both difficult and may take significant time for saving. Lowering of the appliance access cost will assist households to make the switch and more importantly, greater numbers within one community will help the supplier break even. Here, a suitably funded switching grant subsidy may prove to be the critical lever to open the market.

Success will be directly related to how low the LP Gas appliance can be priced.

Access and Need for Credit

Continuing with the need to assist the customers making the switch, actual payment for the appliance (as apposed to being fully subsidised) is extremely important. This will ensure responsibility and ownership of the appliance. However, even small amounts of cash are difficult for persons living on as little US\$1 or 2 per day to obtain, or rather to set aside out of such tight budgets. This raises the need for access to credit to help with the initial appliance switching purchase.

Apart from a credit based purchase there is also the approach of a “lay bye” where a customer makes down-payments until the full amount is saved.

Below Poverty Line Households

A special case is the poorest of the poor, where the income levels and subsistence is so low that not even the monthly volumes of LP Gas for cooking and water heating could be afforded at any price close to commercial viability. Special solutions would be required. Straight financial subsidies of the LP Gas would then become the only way for households to afford to cook with LP Gas. The fuel subsidy approach will open the situation up to many complexities: setting the levels of subsidy; who receives and who does not receive (effectively means testing); and the problems of subsidised product moving into other markets for financial “kick backs”. Whilst other cheaper, yet less convenient fuels are an option, such as biogas, in line with the overall approach of upliftment through the supply of LP Gas, alterative models are required.

Novel schemes such as communal cooking areas for these households are a way of giving access to LP Gas stoves, and the inconvenience factor of central cooking will ensure that only those genuinely not able to afford, will make the effort. **Success in the below the poverty line market sector will need to be through obtaining the necessary subsidy**, and the management of who is eligible to receive, plus ring fencing subsidy within the correct market.

5.2.2 Supply-side Affordability CSFs

BARRIERS CONFRONTED

Uneconomic business case
Cheaper fuel alternatives & affordability of LP Gas
Low disposable income & ability to pay
Taxes & levies
Price regulation
Lack of Government integrated household energy policies

Low LP Gas prices

Critical success throughout the rural market will be the need to offer a low LP Gas price. The aspect requiring the greatest attention with a view to minimising price is the structuring of the supply chain. The rural supply of LP Gas requires a completely new operation and may mean deviating from current operational norms, especially the number of steps in the supply chain and the role of wholesalers and distributors. A vertically integrated operation from the refinery gate/import terminal, through to the end user, will be advantageous, with each step of the moving, storing, filling, handling process designed for the lowest costs.

Success will stem from understanding what the customer will be able to pay and then designing a rural operation that will have the greatest cost savings and thereby the lowest price.

Small Margins

Despite the extent of this market, conservatively estimated at (2 billion households all using at least 5 kg/month) 360 million tons/annum, the need to supply at the lowest possible price will result in small margins and pressure on financial returns. However, the growth in disposable income in poor households throughout many parts of the world and particularly South East Asia is significant. For those suppliers with the vision and long term commitment, there is a significant opportunity to build market share now for future “cash cow” type returns.

Success from a margin and financial return perspective needs to be linked with a long-term view on the mass-market opportunity through increasing penetration and aggregation of sales.

Economic Viability

The core words related to economic viability need to be the *scale* of operation and the *household density* of the communities. In response to the expected low margins, suppliers need to structure their operations in a way that scale can come into play. The best view of scale is perhaps to talk of a full scale “roll out”. This is not something that can be proven in the supply of a few thousand households. It is only in the millions that it can become viable.

Lessons from the electricity energy sector, show that asset bases and operational staff need to have best returns from the denser areas. Here again the denser rural areas need to be targeted first as a means for setting up the supply infrastructure on an economically viable basis, with a slow spill-over growth into less dense areas, inevitably located between the areas of higher density. The argument can even be taken further, with the roll out even starting in peri-urban areas to cover the significant costs of infrastructure and then delivery to the rural areas on a marginal cost basis.

A critical success factor is clearly a decision to roll out fast, supported by switching subsidies to get households onto LP Gas as fast as possible within an area, overlaid with a higher to lower density delivery footprint growth.

Raising Subsidies for Market Entry Appliances

The need for a subsidised appliance as part of a swift switch to LP Gas has been dealt with above, but how can such a subsidy be raised. Given that LP Gas leads to the delivery of modern energy services for rural households with the associated life-style improvements (lower local air pollution, reduced drudgery etc.), the raising of subsidies need not be such a major obstacle. All potential funding bodies, be they philanthropic of nature or perhaps even commercial, have a number of common needs that can be perfectly met by the appliance subsidy opportunity.

The actual subsidy needed is likely to be in the region of \$20 to \$30 to radically reduce the capital appliance access cost to a household. This is at least 1/25 of the cost of a similar electricity connection and can be classified as small on a household basis. In addition, a once-off capital subsidy has the benefit of bringing immediate impact with none of the concerns related to an ongoing fuel subsidy (which could cease or be incorrectly applied). Lastly, the implementing agency, in the case of the subsidy, credible commercial organisations, who are effectively using their organisational capacity to deliver the subsidy in the form of an appliance to the customer. In addition, the delivering agency (supplier) has no interests other than to deliver it as their LP Gas sales will increase.

Hence, capital access subsidies are a real possibility and need to be included in project development and design especially for poor rural households.

Higher Investment, Risk and Maintenance Costs

Investment in new rural distribution operations will be relatively higher, given the increased distances to move the LP Gas and the investment in most cases in an entirely new set of cylinders for the market. This again, links to the need for a long term rather than short term goal. Plus the matter of cylinder turn (average number of times a cylinder is filled per year) is another important consideration.

Lower Financial Hurdle Rates and Social Investment

Potential suppliers to the rural households are often global companies that on the one hand have substantial investment resources, but these would be linked to stringent investment criteria and hurdle rates. One way for these low initial margin/higher risk projects to meet corporate agendas is to go beyond the standard financial returns and look at the value from a corporate social responsibility perspective. Given the growing social pressure on oil companies in particular to be investing in socially responsive projects there can be a direct value link between a zero financial return project and the associated community upliftment. What better way to build social responsibility value, than through the delivery of their own products? Plus this investment would lead to future market value as the customers grow in income and affluence.

A significant success factor is for projects to quantify and align the corporate social investment benefits with corporate responsibility objectives.

Zero Rated Taxes

From a government policy perspective a level playing field needs to be requested whereby LP Gas for rural households is exempted from taxes and duties or at least placed on comparable basis to any traditional fuels such as candles and paraffin.

5.3 Accessibility – Supply and Demand Perspectives

From an **accessibility** perspective, success lies in balancing the need for rural households to easily access LP Gas and the challenge for rural LP Gas suppliers to access the market.

5.3.1 Demand-side Accessibility CSFs

BARRIERS CONFRONTED

Low availability & convenient access
High cost of appliances
High customer switching costs from other fuels
Low literacy levels
Limited media & reach
Diversity of local languages & cultures

Local LP Gas Supply to Households

Whilst LP Gas cylinders are portable and can be carried in buses, on bicycles or even wheel barrows, the availability of cylinders locally to the customer is an essential ingredient to a successful product offer. The question really becomes what is local? Or if not house delivery, how far is the customer expected to transport the cylinders?

The answer to this question lies in the correct engagement of the target audience. Simply developing a product offer in isolation without careful and stringent market research is not going to work. Despite being deemed rural, with often low levels of literacy, rural customers all have perceptions and aspirations even on accessibility.

Hence, for success, **suppliers need to include the needs and reasonable requirements of the rural household when the final decisions are made on the supply chain.** Critically the supply chain in this context needs to be how the cylinder gets all the way to the household, even if they are part of the final delivery stage. If so what is an acceptable distance and what means do they have to traverse the distance with refilled cylinders?

Plenty of Cylinders Frequently Refilled

Non-availability of a product is perhaps one of the most negative and damaging experiences a customer can have of a product. Availability of cylinders is simply a matter of logistics, investment and management of the supply line.

Effective feedback systems are required to ensure that at every point in the delivery chain the flow of cylinders can be ensured.

Cylinders Size

Cylinder size is a constant area of debate by suppliers involved in the residential market, especially in rural areas. From the survey the range of cylinders varied from 12 kg down to 2 kg. Factors that influence this decision can be localised on the one hand (e.g. small if they need to be carried by hand) and global on the other (e.g. corporate purchasing contracts by a global supplier). Factors that will impact on the final decision include:

- Customer usage volumes
- Corporate policy.
- Dynamics of the delivery chain – number of steps, types of transport, geographic terrain and extent of actual human carrying
- Customer affordability and the largest refill affordability, with associated economic levels.
- Cooker stability, whether it is able to support the cooking appliance and pots.
- Distance travelled, from the perspective of how often does the customer get to the purchase point.
- Customer inputs on what would be preferred.

Many factors will contribute to the important decision of what size the cylinder will be for the rural market in a given area.

Cylinder Ownership

Ownership of the cylinder is a study in its own right, yet for the purposes of this report the following factors are raised on cylinder ownership, with ownership by the supplier being the recommended option. A number of examples around the world (Brazil, Vietnam) have shown that when “white” household owned or government supplied cylinders are in the market, the regular usage coupled with an absence of maintenance responsibility leads to safety problems and accidents.

Most of the feedback from the survey indicated company owned cylinders.

Full Local Appliance Sales and Service

What is supplied to a potential rural household needs to be an entire “product package”, that includes the usage appliances. While analysis and decisions related to the LP Gas are extensive, often it is the matter of service and appliance sales that suffers or is left out. Suppliers needing to commit to the long road on this market must ensure the customer is serviced from aspects such as on going education, up grades and additional cylinders, appliance repairs, appliance sales and query handling.

With the use of local agents being a common practice, who sell and serve on behalf of a principle supplier, the challenge is to get the agents to continually deliver acceptable levels of service.

Fast, Correct and Convenient Refills

In the majority of models surveyed, the modus operandi is based on company owned filling depots that fill in a strictly controlled environment, giving the necessary health and safety compliance with corporate standards. Whilst these are fast and effective, the longer supply chain for the cylinders to travel needs to be managed to ensure availability.

In the cases where local filling is part of the delivery model, then the service provided by the filling operators is paramount. Should the operators have other business interests such as goods stores, then there is always the problem of poor service, waiting for refills and under filling.

First Time Purchase

Access issues from a demand side perspective are at their highest during initial sales and roll out in an area. Additional sales resources may need to be available during this phase together with special ad hoc marketing support by the principle LP Gas supplier.

5.3.2 Supplside Accessibility CSFs

BARRIERS CONFRONTED

Low availability & convenient access
High cost of appliances
High customer switching costs from other fuels
Fraud, cylinder theft, misuse & under filling
Low literacy levels
Limited media & reach
Diversity of local languages & cultures

Dispersed Customers

Household density is perhaps the greatest challenge apart from affordability for the supplier. Critical to success is therefore a detailed knowledge of the target areas and the development of roll out plans that ideally target the higher household density areas first. However, information may not be readily available on the household density. Alternate methods for obtaining the information may be to work with local knowledgeable persons who would have an understanding of the social structures as a basis for determining the density patterns. Alternatively aerial photographs could be used.

Long Supply Chains

Long supply chains cost money and so need to be designed carefully. Part of this design is the positioning of the cylinder filling point. The costs and difficulty associated with moving cylinders (half the weight is steel) needs to be offset against the difficulty of setting up and operating a cylinder filling plant more and more distant from urban areas. Different schools of thought are evident from the suppliers on where the refilling should take place, however **the core issues in all cases are what are the costs, associated risks, company policy on filling and size efficiencies.**

Lack of Rural Supply Infrastructure

Lack of rural supply infrastructure is an impact in many ways and needs to be taken into account during the supply programme design phase. The following facts are highlighted:

- Local roads, upgrade plans, road maintenance, surfaces and condition, related to actually moving the LP Gas and cylinders in and out of the area.
- Weather, are there times of extreme weather, such as monsoons, that will impact on deliveries, stock piling of cylinders by customers and patterns of cyclical usage – used for space heating in cold winters.
- Security, is there possibility of hijackings and robbery during the transportation of cylinders
- Are barges or water craft necessary to deliver cylinders?
- To what extent can customers be relied on to transport cylinders themselves by hand, donkey carts and so forth?

Need for Local Agents and Sub-agents

The positive social impact as well as logistical and cost saving advantages from the use of local agents to stock, refill, service, sell appliances and deal with the “customer” is clearly evident. By actually living in the area, the local entrepreneurial forces are harnessed and livelihoods are created in the communities, keeping economic value in the area. Further, the low levels of income needed by these agents will help the overall economics of supply.

Community involvement in the delivery cannot be over stated, but particularly through the establishment of local agents, additional positive synergies can be created.

Sales Agent Selection and Training

Given the fact that a sales agent in, or close to a community, will be making money on the LP Gas sales, this may mean possible community level conflict. This could come from any other energy sellers that could experience market loss or simply from a jealousy factor associated with their relative economic prosperity. Hence, community involvement as well as the supplier's selection criteria (typically educational level, integrity and personality/job match) should be followed as part of the selection process.

Substantial training programmes are essential, with the selected sales, service agents and refillers all needing accredited and standardised training and accreditation. This also ensures a safe, ethical and professional operation.

5.4 Acceptability – Supply and Demand Perspectives

Lastly, for **acceptability** the needs, perceptions and views of the households need to be carefully considered against the attractiveness of the rural market for the supplier.

5.4.1 Demand-side Acceptability CSFs

Low or Zero Cost Fuel Alternatives such as Wood, Dung, Agricultural Wastes

Apart from lack of availability and high prices for LP Gas currently available to rural households and communities, a major reason for not switching on a larger scale to LP Gas is the entrenched experience of traditional fuels. Until one tries or tastes something better it becomes very hard to persuade the person as to the benefits. While much of the traditional fuel used is collected and obtained for little and mostly zero cost, the associated costs are not thought of or even perceived.

Communication and education on the negative health, lifestyle and convenience impacts of the traditional fuels is likely to be even more important than communication on the LP Gas benefits. **Here, an overall value proposition needs to be made to the potential households that are both a combination of price (LP Gas costs) and the “performance” of the modern energy service. This message needs to be communicated in a way that the households can grasp and work through.** Failure to present in this way will lower success, as the households will not wish to make the shifts in budget and practice.

Equipment Quality

A danger to the supplier is that a product package will be prepared for the market that will compromise on product quality in an attempt to reduce costs to lower price. Noting the need for long term customer loyalty to provide for returns in the future, it is paramount that suitable appliances are specified and supplied.

BARRIERS CONFRONTED

Uneconomic business case

Cheaper fuel alternatives & affordability of LP Gas

Safety

Lack of awareness

Rural traditional cooking methods

Low literacy levels

Limited media & reach

Diversity of local languages & cultures

Higher Fuel Costs

Ultimately the targeted households will need to make a decision to switch or not to switch to LP Gas from their current traditional fuel mix. This will mean the reallocation of budget and funds, but should result in improved lifestyles from the modern energy services (healthier environment, convenient quick cooking and water heating, etc.). What is critical here for the supplier is to communicate the correct messages with the households in the correct way.

Energy days, that demonstrate LP Gas in action, and the Indian example of a “propaganda bus” are important marketing techniques that enable households actually to touch, feel and taste the benefits that LP Gas can bring. These type of activities need to play a key part in raising awareness and educating the household on why a switch to LP Gas will be beneficial.

Safety and Proper Usage

Safety problems and the associated perceptions of fire and explosion can be a significant barrier that needs to be dealt with. Only projects that include measures to counteract negative perceptions will be successful. Correct media, correct message and repetitive impact will ensure these perceptions are overcome. The inclusion of leading personalities in the educational and training campaigns greatly helps to win the confidence of new customers. *Education on the safe usage in the home should continue after the initial switch to ensure long term adherence.* In areas of low literacy it has been found that via the children and younger adults the safety messages can be introduced as part of their schooling.

Cooking and Water Heating versus Essential Electricity

LP Gas will be primarily used for cooking and water heating services within the household. One barrier that needs to be overcome is the great desire for electricity or improved electricity services in many cases. Here success will be linked to a collaborative approach by the LP Gas supplier with the electricity suppliers. Note the essential electricity (lights and communication) can come from many sources, such as; grid, limited grid, stand alone mini grid (mini hydro, wind, diesel generator), PV panels and battery charging services.

Combined delivery of essential electricity and LP Gas will be the ideal approach, where a combination electricity/LP Gas product package will meet all the household energy needs simultaneously. As this is not always possible, at least when any LP Gas offers are going to be made to the target community, knowledge on the status of electricity delivery is essential, as the community will ask questions. At times it will take the intervention of political and local government or utility personnel to deal satisfactorily with the community's questions/demands. **Failure to deal with the electricity demands satisfactorily may result in rejection of the LP Gas offer.**

Involvement of Local/traditional Leadership

Within rural communities, the role of traditional or local leadership cannot be underestimated. Perhaps the best way to understand the role of local/traditional leadership is to talk about obtaining “legitimacy”, or the correct permission to engage the community, to offer a new product and to perhaps identify energy agents to supply LP Gas in the community. **Without legitimacy, resistance at any level is possible**, e.g. rejection of the particular product offer or selection of an inappropriate sales agent.

Supply Acceptability

Another major reason for using local agents is the acceptability of the supplier by the community. Delivery by utilities in developing countries is often plagued with non payment and vandalism problems. This stems effectively from a “them” versus “us” paradigm that leads to lack of responsibility. However, *through the establishment of a local agent the community will identify with the supplier*, the local agent in this case and thereby overcome resistance.

5.4.2 Supply-side Acceptability CSFs

Community Involvement in Decision Making and Choice

Approaching a community on a simplistic take-it-or-leave-it basis effectively marginalises the community even further. However, if they are included through local research, group meetings with their opinions solicited on perhaps 2 or 3 different product combinations by the supplier, an overriding sense of inclusion can be attained.

From a large scale roll out perspective, covering many communities, success can be found by designing the product packages and associated delivery operations on the basis of initial market research. This research will need to cover the entire target area on a sample basis and with the associated segmentation (perhaps area related and economic levels). A finite set of product combinations can then be prepared together with implementation plans/kits. Village or community level implementation would then involve engagement of the village, basic local research (sufficient to short list a set of products for the community) and a joint final decision making meeting with the community and its leaders.

The engagement of the community cannot be overstated and it would be a natural go/no go decision point if a minimum level/percentage of “deposits” can be agreed upon.

Exclusive Supply Territories

Another area of debate is the notation of exclusive territories. Here, the granting of licences by a “regulating” body such as a government department would result in the creation of a monopoly and guaranteed sales rights to an area for a defined period. This is seen as a way to induce prospective suppliers to invest in an area. However, this also results in a lack of competition that protects inefficiencies and may lead to lack of accountability on the terms and quality of delivery.

Success factors here relate to **the setting up of a regulatory board with sufficient independence, technical monitoring ability and ‘power to act’ to manage the exclusive territories successfully.** Alternatively, a straight commercial approach should see the increase of efficiencies if no natural area sharing takes place.

Government-friendly Household Energy Policy

For all suppliers wanting to embark on delivery to rural areas, one of the major needs is a conducive and stable policy environment. This is perhaps the most important role of government, the establishment of a market enabling framework that induces suppliers (subsidies, long term stability in policy, appropriate taxes) on the one hand, while adequately monitoring delivery performance on the other (houses switched, price, customer satisfaction).

From a supplier perspective success will only be found if government can be engaged in a way that such policy can be framed.

BARRIERS CONFRONTED

Uneconomic business case

Taxes & levies

Price regulation.

Lack of Government integrated household energy policies.

Differing interests of various stakeholders.

Conflict

Appliance Matches Needs

From a supply side perspective, the development of the 'product offers' needs to include a clear understanding of what the stoves will be used for, including the size of the pots, the type of food to be cooked, the household sizes and cultural characteristics. This will all help to ensure acceptability of the product.

Another important factor is **the structuring of upgradeable appliance and cylinder packages**, especially where a basic capital grant has been made available. For example a single plate stove can be upgraded to a two or three plate one if the customer pays extra.

Organisational Support

The last supply side success factor is the overall commitment of the organisation to rural delivery. Commitment at the highest level of large national and global companies, particularly the oil companies is needed if LP Gas is going to be the thermal fuel for uplifting the rural poor.

As rural delivery is not for the faint-hearted or without significant risk, **overall organisational support needs to be viewed as paramount for any project**. Ideally there should be a senior company executive appointed to 'Champion' the successful commercial development of this profound emerging market.

06.

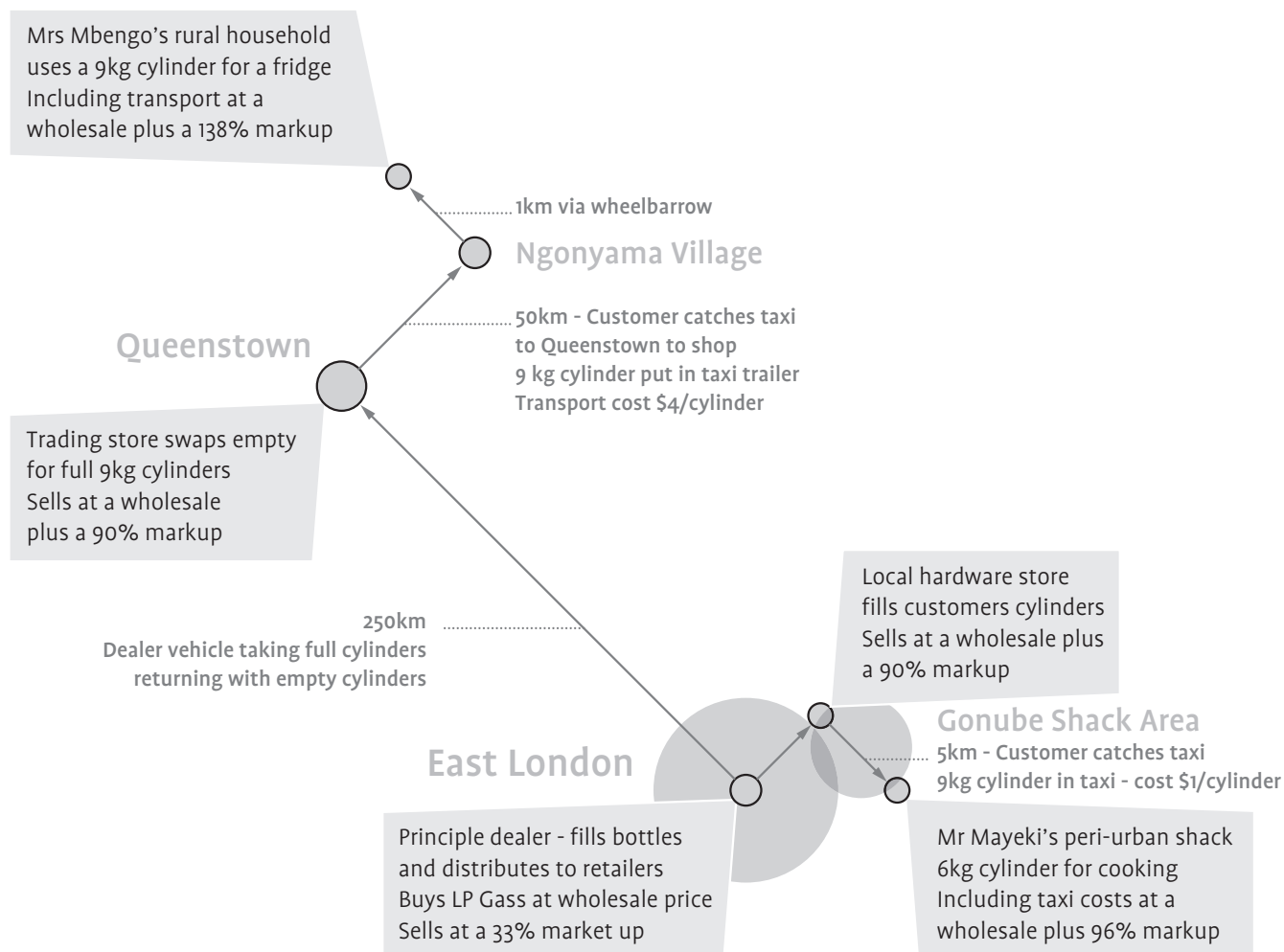
LP Gas Rural Distribution Models

6.1 Existing models

Existing distribution models, except in areas where specific new delivery models have been introduced, have developed from a customer demand rather than a supply side initiative. The simple need for LP Gas by persons living in the rural areas, has translated into a demand that in turn meant that a distribution chain has “evolved”. This has led to very complex and multiple stage delivery chains. These chains are inefficient, costly and inevitably require the customer to transport the final distances.

An example from South Africa shows the complexities and price build up from such an evolved distribution chain:

Figure 6.1 Current “Evolved Distribution Model



6.1.2 Rural Specific Models

Three different generic models have been identified from the survey for rural specific delivery. These are shown diagrammatically below:

Figure 6.2 Direct Depot to Customer Controlled Model

The first model is based on the LP Gas supplier undertaking and being involved in the complete delivery to the customer.

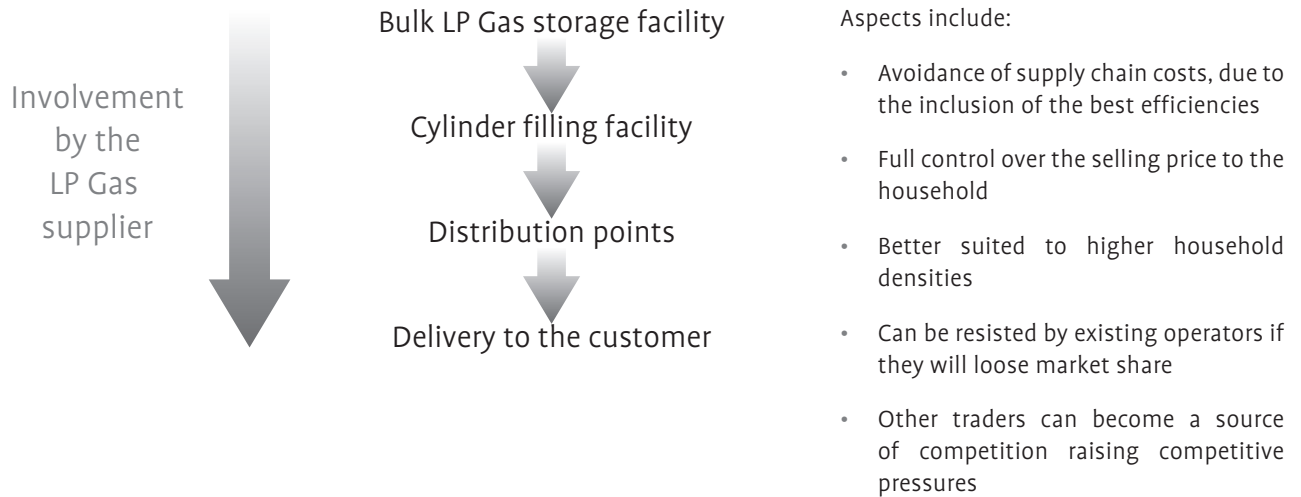


Figure 6.3 Depot to Customer via Independent Intermediary Model

The second model is based on the development of a new independent sub-distributor network for the rural areas.

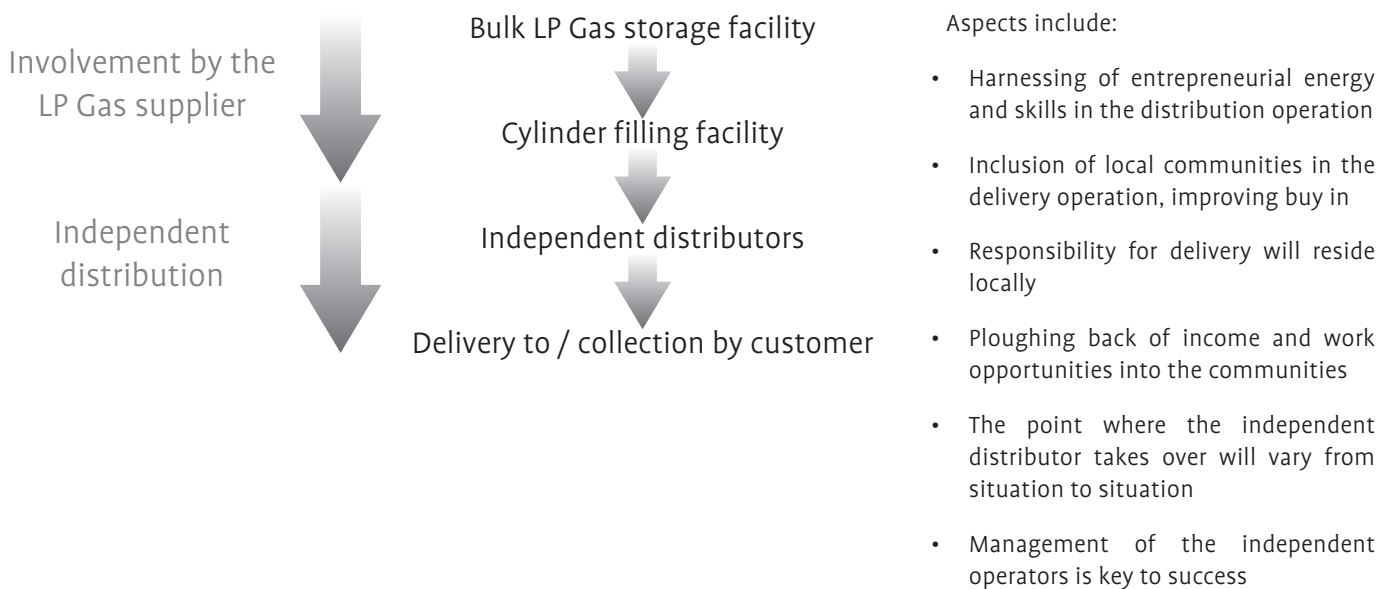
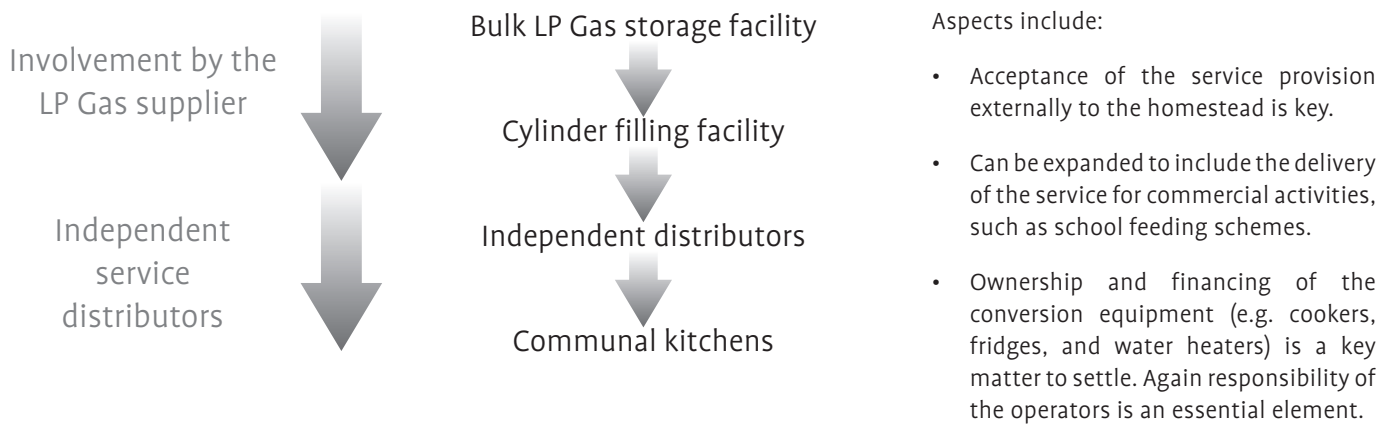


Figure 6.4 Customer Service Sales Model

The third model is fundamentally different in that an energy service such as the cooking of food or heating of water is what is sold, rather than LP Gas.



07.

Findings and Conclusions

This report has investigated current LP Gas distribution practices in selected rural markets with the objective to clearly delineate barriers and summarize risks that stand in the way of building new, commercially-sustainable markets in the rural areas of developing countries. The findings aim to provide WLPGA member organisations with a greater understanding of the wide-ranging market parameters that often go hand-in-hand with the prospects for expanding the supply of LP Gas into these new rural household markets.

There exists a current opportunity to significantly expand the supply of LP Gas to vast markets in rural regions of many developing countries around the world.

Since 1950, world population has grown explosively from about 2 billion people in 1950 to 6 billion people today, rapidly exceeding the rate of increase in modern energy provision. According to widely available surveys on population and energy, this situation has left more than two billion people dependent on traditional energy sources (e.g. dung, crop residues, wood fuel) and urgently in need of clean, modern fuels with which to improve quality of life and generate productive services and economic development.

Beyond the cases of serving the extreme poor, an evaluation of potential demand in markets where income is equal to or more than US\$5 per day indicates that some 30 million tonnes of LP Gas – up to as much as 60 million tonnes – is currently not being consumed by markets in developing countries that could afford it.² This represents a potential increase of 15 to 30 percent for global LP Gas supply.

There are a number of barriers that limit market expansion and the overall ability and viability of reaching these prospective markets.

The portable and scalable characteristics of LP Gas cylinders resolve a number of traditional barriers to rural energy distribution – which for decades have enabled rural communities (in both developed and developing countries) to have access to modern conveniences when and where costly, grid-based energy services are unavailable.

Despite these attributes, LP Gas distribution is not immune to the barriers faced by rural market dynamics in the developing world. For the most part, these barriers are not due to a shortage in demand for modern energy - or the capacity to supply it, but rather exist due to myriad economic, social and geo-political elements such as inadequate rule of law, faulty regulations and tax policies, and end-user awareness and affordability.

Rural consumer demand in developing countries exhibits an inherent set of characteristics that serve as barriers to investment in LP Gas supply.

Practically-speaking, a number of barriers exist within households that derive from both cultural factors and limited economic means in rural areas. To begin with, many of the households especially those in remote rural areas are simply unaware of LP Gas and its attributes. This failing can be due to a variety of factors that go far beyond geographic isolation, including low literacy levels, diversity of language and limited education or access to media. Even those who may be aware, may not be inclined to use LP Gas, preferring traditional cooking methods based on open fires using wood or cow dung that often have cultural, gender and lifestyle values.

Once a consumer becomes familiar with and accepts the comparative benefits of LP Gas as a household fuel, financial barriers may nonetheless prohibit his ability to acquire it. Underdeveloped local economies linked to crop cycles and seasonal work, often generate low disposable income insufficient to purchase LP Gas. Moreover, even relatively inexpensive LP Gas appliances are significantly more costly than a cheap paraffin stove or a simple iron grid for a wood or coal open fire. These barriers tend to keep the rural poor tied to cheaper fuels such as wood or waste biomass -- and as such, render the switching over to LP Gas more difficult.

² Namely, prospects include rural regions throughout China, India, Indonesia, Russia, South Africa, Brazil, Pakistan, Philippines, Argentina and Ukraine.

Assuming sufficient consumer demand can be established, a number of topographic and spatial barriers can prohibit the physical delivery or weaken the financial viability of the LP Gas distribution.

Rural poor households across the world are found in limitless settings, from being clustered in small hamlets to isolated homes perched on mountainsides or scattered across deltas where river-craft provide the primary link to the outside world. These remote, difficult-to-reach locations, marked by long distances and poor or non-existent road networks challenge the ability to deliver goods and may require excessive capacity in the supply chain.

When households are scattered over many square kilometres, low population density becomes a critical barrier to achieving economies of scale that are so critical to lowering unit distribution costs and to reaching commercial sustainability. This situation is compounded by general low monthly consumption and by the requirements for regular fuel delivery and collection.

The lack of good governance and rational energy policy can dramatically interfere with market mechanisms and severely inhibit prospects for LP Gas supply and demand.

Poorly designed energy regulations present a complex barrier that can have negative impacts across the range of LP Gas supply operations. Excessive import duties or levies to protect local refineries can, for example, keep the resale LP Gas price high and uncompetitive. On the other hand, artificial price controls can perpetuate inefficiencies and prevent the growth of a viable marketplace. Patronage and corruption can bias consumer views in favour of competing fuels. Even road haulage regulations can block the practical handling of cylinders and - it should be noted - that cylinder theft and misuse and habitual under-filling erode profitability, customer confidence and undermine further investment.

New innovative approaches must be adopted to attack these barriers.

Ensuring that projects incorporate relevant Critical Success Factors (CSF) can significantly reduce risk and improve the probability that an initiative will succeed. In many cases, a set of CSFs will apply across all aspects of a project. For instance, matching prices with ability to pay (understood both in qualitative and quantitative terms) and closely calibrating the thermal energy needs of the target rural households are CSFs that impact in many areas. The total potential of the market, together with realistic penetration levels, must guide the business case and phased market growth strategies and tactics.

New distribution methods need to replace the current evolved market chains bringing efficiency to the handling and control of the product in rural areas. It may be necessary to establish a wide network of local suppliers – either retail agents or other local supply arrangements – to ensure timely and consistent availability of filled cylinders. Innovations can even include the selling of an energy service such as LP Gas cooking facilities versus the LP Gas in cylinders.

Suitable appliance financing is critical to assist poor households' ability to pay for the relatively high costs of LP Gas appliances. The provision of suitable appliance purchase credit, special appliance financing or a single appliance grant can be crucial for switching the rural user to LP Gas regular usage.

Each prospective LP Gas distribution project should gear solutions towards Affordability, Accessibility and Acceptability to minimize risk and improve the probability of success.

Affordability necessitates product offers that match the levels of disposable income, creative pricing of LP Gas appliances and new financing and subsidy schemes - which could include providing front-end subsidies to accelerate switching. From the supply side it also means designing a rural operation with minimal costs and concentrating on higher to lower areas of housing density.

Overcoming Accessibility barriers can require stock systems to ensure capacity at every point in the delivery chain, gauging cylinder size to market needs and use, and establishing reliable local sales agents. Investments in transiting rugged terrain will be required, but community involvement in the delivery chain can cut costs dramatically also and create positive local synergies that can sustain the market.

From the perspective of Acceptability, the overall value proposition of LP Gas needs to be clearly communicated to rural households, the local communities and the national governments to ensure that consumers “buy into” the LP Gas option and concurrently dedicate resources towards securing its supply. By the same token, education on the safe usage in the home should continue after the initial switch to ensure long term adherence. If legitimacy is not established, resistance can be high at any level. Lessons on innovative marketing and distribution techniques can be drawn from other market sectors where, for example, certain beverage manufacturers have succeeded in penetrating rural markets in many developing countries.

Government “partnership” is often needed.

Legislative, political, monopoly energy supply and regulatory conditions can obviously dramatically impact LP Gas supply to rural households. It is therefore important to identify, and if necessary to correct, national or provincial government household energy policy, legislation, relative political influences. The challenge is to identify interventions that can break the energy poverty-poverty cycle. This requires a concerted effort – by industry and government – to address all aspects of the rural energy puzzle - from developing local resources, to financing, to building capacity in local energy entrepreneurs, to joint marketing campaigns to increasing public awareness often with the right mix of policy changes, dissolution of market barriers and responsible investment, the LP Gas industry has the potential to build upon the impressive track record it established in meeting the energy needs of millions of people living in rural areas in the prosperous developed regions around the world. With appropriate government assistance, the industry can deliver the product and its associated productive capacity for stimulating economic development and improving poverty levels.

The framework of support from inter-governmental organizations has highlighted the need for governments of developing countries to take measures in support of industry efforts to support the poor.

Following the 2002 World Summit on Sustainable Development, the spectrum of inter-governmental organizations have called upon governments of developing countries to put in place policy and regulatory regimes to facilitate investment in modern energy supply to the poor. The Global Forum for Sustainable Energy has stressed that energy is a crucial ingredient of sustainable development and achievement of the internationally agreed development goals on poverty alleviation, education, and health. The Forum also called for progress on providing access to modern energy services to those currently without it. The United Nations and the International Energy Agency position that more must be done to scale up energy services provide additional leverage for industry negotiations with local and national governments to establish rational energy markets.

Partnerships are a critical ingredient to building strong, effective projects at the local level.

When industry comes together with governments and the community in a project partnership, all parties can draw on their combined strengths and collective action to deliver results more effectively than either party working independently. This collective mobilisation of the public and private sectors can improve social and economic conditions, as well as create viable new markets for LP Gas products and services.

For example, the LP Gas Rural Energy Challenge³ attempts to integrate private sector contributions in supply and marketing with government intervention to create a fair playing field and to affect overall affordability. When the partnership succeeds, communities benefit through improved access to LP Gas and modern energy services; governments respond to social and economic development objectives; and private enterprise expands business opportunities.

It is recommended that further focused work be undertaken to build the body of knowledge on how best to exploit these market opportunities in a viable and sustainable manner, for dissemination to member organisations.

³ A Public-Private Partnership between the United Nations Development Programme and the World LP Gas Association to promote sustainable consumption and delivery of LP Gas to reduce poverty in rural and peri-urban environments. The partnership has been in operation for three years now in over 6 countries.

An assessment of the information gathered and the results for this project strongly suggests the following matters that require further study on behalf of WLPGA members. These include:

- Household switching strategies to LP Gas from alternative fuels
- LP Gas pricing for rural households and the application of subsidies
- Government rural household energy policy
- Public-private supply ventures – formation and role clarity - managing the additional complexity
- Role of independent mediators in the formation and execution of joint government and supply industry rural household programmes
- Collaboration across energy supply sectors to share resources
- Quantification of global rural household potential market
- Promotion of LP Gas as the preferred thermal household fuel with development, government and investment agencies
- Innovative supply solutions for the very poor

Appendix 01.

Global Case Studies

A1.1 Dealer and Sub Dealer Networks, Reducing Local Supply Overheads in Turkey

Aygaz is a leading private Turkish company providing LP Gas sourcing, storage, filling, distribution and after-sales service to residential, commercial and industrial markets. Complementary to its main business operations, Aygaz also produces LP Gas cylinders, storage tanks, valves, regulators and appliances. In 2004, the company had a market share of 35% with annual LP Gas sales of over 630,000 tones in cylinders alone.

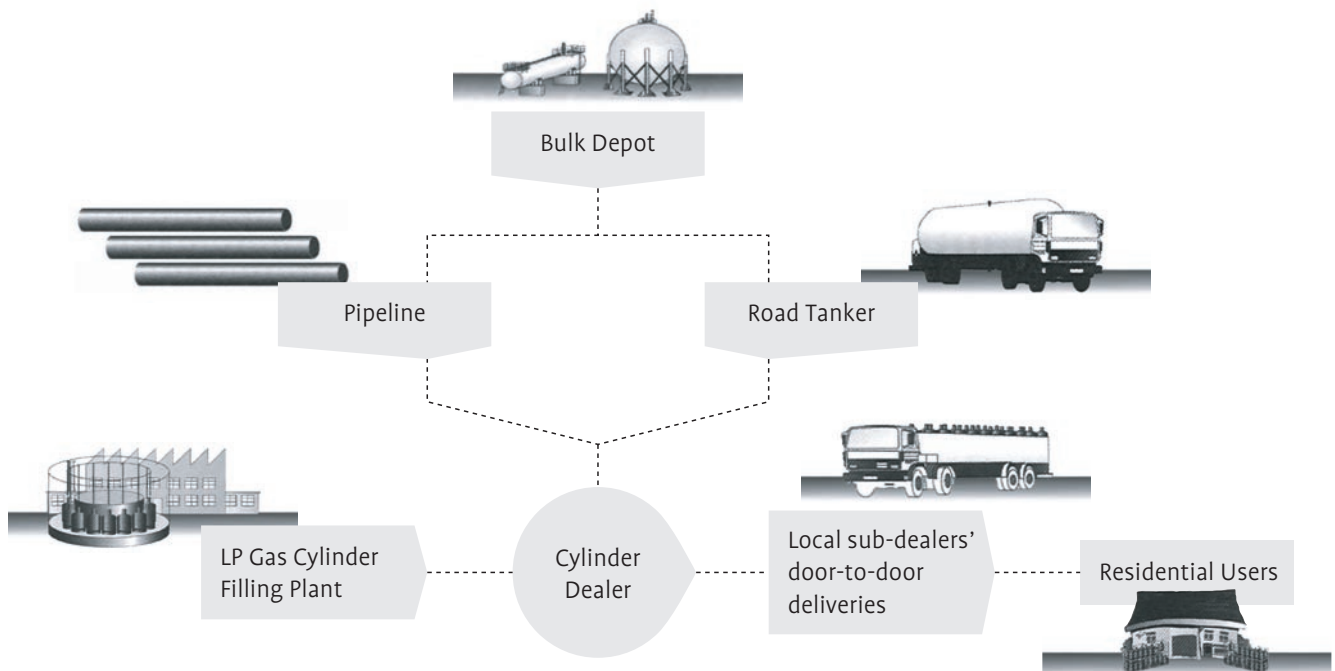
Turkey has an area of 769,604 sq km and 81 provinces in seven geographical regions. The population is over 70 million with 16 million households and 35% of the population still live in rural areas in small towns and villages. The rural population live in more than 37,000 villages. Aygaz supplies nearly 6 million households and 2 million are rural. The company also supplies LP Gas to government institutions in rural areas such as schools, hospitals, army and administrative buildings. Aygaz have over 1300 dealers operating all over Turkey with 600 in cities and 700 dealers in towns. All Aygaz LP Gas sales are via the dealer network. In Turkey, LP Gas dealers have to make door-to-door delivery of all types of cylinders except the 2 kg camping cylinders. Rural householders can buy and return cylinders in front of their doors and do not have to carry them to retail outlets.

In January 2005, the Turkish Government announced LP Gas price deregulation. The rural household LP Gas market in Turkey is highly competitive. There is no special taxation incentive for LP Gas distribution to rural households but there is a transportation cost in price index which is determined according to the distance between distribution point and the filling station. There is severe competition from natural gas in the cities and coal and firewood in rural areas. When we compare the price of natural gas against cylinder LP Gas on a calorific basis, natural gas is four times cheaper than cylinder LP Gas and electricity is 15% less. In addition, the recent changes in the tax system have seen LP Gas become liable for a 43% tax whereas natural gas is only 25%. Correspondingly the growth in natural gas consumption has averaged above 19% over the past five years.

The primary use of LP Gas in the rural household sector is for cooking. In the mountain pastures in the summer, camping cylinders are used extensively since they are portable for cooking in mountain pastures. Rural women also use the 2 kg cylinders extensively for cooking breads, jams and traditional food. In rural areas most people heat their homes with wood and coal supplemented by LP Gas space heaters particularly infrared heaters. Today, electricity is distributed to each rural household.

To meet Aygaz company commercial objectives of expanding rural household usage of LP Gas, measures are being implemented to increase the reach of their local dealer network while reducing operating overheads. After completion of cylinder filling operations in strategically located refilling plants, cylinders are transferred to local cylinder dealers by truck. In rural distribution operations, an additional step has been introduced. Aygaz uses a sub-dealer strategy in order to reach small villages. Sub-dealers are usually small scale highly locally-orientated retailers such as general stores and grocery outlets. In this model, dealers share the profit margin with sub-dealers. All cylinders are branded by the company and to manage them, Aygaz operates a deposit system.

Figure A.1 Aygaz Rural Distribution Schematic



As well as substantially increasing the accessibility by local householders to LP Gas dealers, this strategy has a number of other important benefits. The sub-dealer strategy ensures that cylinders are always available since speed and reliability of availability are key competitive factors, especially in the winter months, with snow across rural areas. It has also enabled Aygaz to embrace highly influential local traders who otherwise may have been resistant to Aygaz LP Gas and appliances. Local culture, traditions and religion are important factors in ensuring local legitimacy. Sub-dealers also manage credit with rural users and provide sales and service support.

A1.2 Leveraging Economies with Combined Rural Energy Solutions in South Africa

Throughout the world, modern rural energy provision is not complete without the supply of electricity, especially in the view of government, development agencies and local rural householders. Huge resources have been deployed in many developing countries providing either grid or non-grid electricity connections to rural households. Renewable energy systems such as photovoltaic (PV) systems have also been widely deployed in rural areas to provide a limited 'essential' electricity service to households. While limited grid and essential PV household systems are relatively expensive, they only provide a limited electricity supply of generally a few watts for limited time periods. Rarely do rural electrification schemes cater for the thermal needs of households.



Figure A.2 Pole Mounted PV Panel and Wood Pile

With the relative costs of providing an essential electricity supply being in the order of ten times more costly than the provision of an LP Gas cylinder and cooker top for a rural household, an opportunity often exists to provide rural households with a combined energy package that provides both essential electricity for lighting, communications, TV and radio and LP Gas for cooking, water and space heating and refrigeration. By combining these services into one package for the rural household user, the overall cost is lowered, making essential electricity more affordable to households. It is also possible for different energy supply bodies such as electricity utilities and the LP Gas supply industry to collaborate, share marketing and other costs, and thereby drastically reduce overall operating overheads, thereby making their combined product offerings more affordable to low income rural households.

With this background, a novel energization project was undertaken in South Africa by Eskom, the national electricity utility, and Totalgaz, in Kwa Zulu Natal, whereby an integrated energy package was offered and supplied to rural householders. An energy agent was established in the village who sold and maintained both the PV systems and the storage and refilling of 4.5 kg cylinders. The start-up products offered, consisted of 2 of 4.5 kg LP Gas cylinders that were filled. A 2-plate gas stove with connections. A 49 W PV panel either roof or pole mounted, a battery with regulator, 2 lights of 9W (later increased to 3 lights), outlets for a black and white television and radio. After the provision of a modest subsidy, the capital to purchase the system was payable either in cash or financed over a period. Each monthly repayment instalment also included one cylinder refill of LP Gas. For the monthly repayment, customers could therefore plan their energy expenditure and meet a large proportion of their household energy needs. It also moved households away from multiple fuel usage of wood, candles, batteries, and paraffin, often reducing their monthly expenditure on energy.



Figure A.3 LP Gas in action for cooking

Customer satisfaction research reported a high level of customer satisfaction. Things of note include comments such as: 'the lighting was bright', 'cooking was quicker and easier', 'the house was clean from soot', and 'it was affordable'. When establishing the payment criteria for the households, it was acknowledged that income in the village was extremely sporadic and seasonal. Flexibility in payment dates and arrears had to be inherent in the process. The leeway on non-payment was thus extended to 6 months, after which the equipment would be repossessed. In the event, payment levels were excellent, no repossessions took place and several households settled their capital repayments in advance. Furthermore, the fact that the energy systems were owned by the householders ensured that the equipment was properly used and cared for and theft was negligible.

As well as the inherent benefits and robustness of the combined energy supply model design, this collaborative approach between different sectors of the energy supply industry also enabled the leveraging of resources, spreading of overheads and gaining economies to provide affordable combined energy solutions well within the affordability of low-income rural households.

A1.3 Community Kitchens: Selling Cooking to Poor Families in India

The Hindustan Petroleum Corporation (HPCL) is a public sector undertaking of the government, which hold 51% of the equity. It is the second largest company in India and operates refineries and the whole liquid fuel supply chain involving petroleum products, lubricants and LP Gas. The supply and distribution infrastructure of the company consists of over 6000 retail outlets, 1647 lubricants dealerships and 2200 LP Gas dealerships spread across the country, being monitored by 185 regional offices and a total workforce of 11,132 employees. HPCL operate 40 strategically located LP Gas bottling plants. The LP Gas Business Unit is the second largest LPH marketing company in the country with sales of over 2.5 million tonnes a year and a market share of over 25%.

In 1998 the LP Gas market in India was opened to competition, although in practice this is now mainly in the industrial and commercial sectors. LP Gas supplied for domestic use in both urban and rural areas is subsidised. In 2002, HPCL started a more focused and structured approach towards rural marketing to households. Out of the total 2.5 million tons supplied annually, almost 0.5 million tonnes is being marketed in the rural areas translating to approximately 20%. The rural population constitutes 70% of the total population of India, which translates to around 700 million population and 138 million households. Currently LP Gas penetration in rural areas is estimated at 15% compared with 75% in urban areas. Most of the urban areas have been nearly saturated and due to relatively high inertia to brand switching, sustainable growth in future in the domestic segment is expected to come largely from rural markets where penetration levels are low. Rural households are therefore a key focus area for HPCL. Despite the challenges of rural LP Gas distribution, HPCL are confident that given the vast potential, once critical mass is achieved, adequate returns will come.



Figure A.4 Communal Kitchen in India

In rural households, LP Gas is mainly used for cooking, although in a few cases, it is also used for lighting. The average family LP Gas usage is 7.8 kg per month and 1.3 kg per capita per month. More than 90% of rural villages are electrified although only 44% of rural homes have a connection. Supply is normally from the electricity grid, although supplies are limited due to electricity shortages.

Despite a range of new and highly innovative supply measures for rural households, HPCL found that they were still unable to penetrate a large cross section of rural households that could not afford their own cylinders, appliances and regular LP Gas refills. They therefore pioneered an innovative scheme called the 'HPGAS Rasoi Ghar', or community kitchens. This provides a common cooking platform for one village where users have to only pay for the time they use in cooking food. It is usually based on a standard hourly charge. This eliminates both the barriers of one time high deposit and appliance costs as well as the recurring cost of refills. HPCL now operates over 1400 community kitchens across India benefiting more than 18,000 families.

Community kitchens are geared toward serving the below-the-poverty-line (BPL) families with ready-to-use cooking facilities in a common place. The space for the kitchen is provided free of charge by the village panchyat or villagers. HPCL renovates the area and provides the stoves, utensils and cylinders. Normally 10 to 12 families in a village use the community kitchen for cooking their daily meals. For taking forward this Rasoi Ghar concept, HPCL has tied up with various ground level organizations such as NGO's, various self help groups, village panchyats, who all work alongside HPCL and carry out the preliminary survey for identifying locations and for setting up the kitchens based on local conditions. HPCL then subsequently open the community kitchens along with assistance from these various local bodies.

A1.4 Transporting Cylinders by Trucks, Jeeps, Motorcycles and Boats in Brazil

Ultragas is a privately owned company and exclusively handles LPG. It is the largest LPG marketer in Brazil and has a market share of over 24%, supplying around 1.542 million tons of LPG every year to the industrial, commercial, agricultural and residential markets across the country. The only area that it does not supply is the Amazon region. Ultragas is involved in the whole supply chain from bulk distribution, cylinder refilling and local distribution.

The Brazilian market for LPG was liberalised some years ago and is today highly competitive. There is no control of prices or subsidies. Ultragas supply some 80,000 tonnes a year to the rural residential market representing just over 5% of total sales. In Brazil, around 81% of the population is urban with 19% being rural dwellers. Firewood remains the dominant traditional household fuel in Brazil and wood represents some 38% of total household fuel usage across the country. In rural areas wood usage rises to some 50% of all fuel used by rural households. The total number of rural households is around 7.5 million with about 2.4 million households, mainly rural, still without electrical energy. Cooking is the main use of LPG in rural households although space heating and lighting are also used in certain regions but on a fairly limited scale. There is also an agricultural use for poultry rearing and crop drying.

LPG reaches almost 100% of the national territory and is a very well known fuel. Typical cylinder sizes, that are branded, are 2, 5, 13, and 45 kg. In Brazil there are 21 marketing supply companies, 25,000 distributors and 270,000 retailers or points of sale for end users including rural householders. Generally there is no differentiation between urban and rural supply arrangements. Around 200,000 of the point of sale retailers are informal. The raw material distribution chain consists of 4 companies, that produce LPG at 35 sites in Brazil in natural gas processing plants, oil refineries and petrochemical plants, and 1 importer company.

In a huge country such as Brazil that covers 8,456,510 sq km's to achieve almost 100% coverage and accessibility to LPG has entailed an extensive supply infrastructure. In Brazil virtually every type of topography is to be found ranging from mountainous regions to great planes. The number of Brazilian cylinders is about 99 million. Ultragas fills about 20 million cylinders at 16 filling sites and deliver them to distributors, retailers and final customers. They have bulk road carriers and many conventional LPG transport down to the local level distributors and to final customer. Sales in bulk can be made directly to customers with a variety of trucks. In transporting cylinders, Ultragas use a wide variety of transport, each geared to local conditions in order to ensure cylinder supply to distributors, points of sale/retailers and end users. Alternatively retailers collect filled cylinders from the distributors.

The customers can take LPG away directly from the points of sale/retailers or they can buy it from their vehicles on the street like small trucks, cars or pickups. They use barges in part of the Amazonian area with sand banks in the dry season, creating special distribution challenges. With many poor roads and mountainous terrain, they use jeeps. Motorcycles are also used to convey small quantities of cylinders in more local settings.

They use a variety of transport to return empty cylinders from clients and collect filled cylinders from the many point of sales/agents including farm vehicles and other kind of vehicles. There is a very porous and ubiquitous local supply infrastructure. This leads to challenges that Ultragas have to manage especially in the borders with Bolivia, Paraguay, Colombia and Venezuela with cross border sale of their cylinders.

A1.5 Rural Distribution of all Sized Cylinders and a New Small Combined Cylinder and Cooker Top, “The Shesha Package”, in South Africa

Totalgaz is a privately owned company currently with an 11% share of the South African LP Gas market. They currently sell about 40,000 tonnes of LP Gas annually. They supply to all markets and their activities include bulk distribution by road and rail, cylinder refilling and local and regional (Southern Africa) LP Gas distribution. In terms of the rural residential sector, this accounts for around 35% of the company’s sales and they wish to greatly increase the current volumes of between 1000 and 1500 tons per months. Totalgaz wishes to expand their rural household market to support the socio-economic development of the poor in support of South African Government policy. As a company, Totalgaz is also a highly innovative and successful international LP Gas supply operation, with a wealth of experience in Africa and other developing regions of the world. It is this experience they have brought to the forefront in tackling the particular challenges of expanding the accessibility, affordability and acceptability to rural households.

South Africa is a large country around the same size as Western Europe. There are many different cultural groups, eleven official languages and highly developed sophisticated cities such as Johannesburg, Durban and Cape Town, a vibrant agricultural sector and yet many millions of the population are in need of modern energy services, especially in rural areas. In recent years, vast new towns have sprung up adjacent to the urban areas. New low cost housing is a pressing priority and the shack cities now characterise large expanses of the local landscape. Migration from rural areas to the cities has also become an increasing trend. Over the last ten to fifteen years the national electricity utility, Eskom has undertaken a highly innovative and successful urban household electrification programme, bringing grid electricity and prepayment metering to around 4.5 million urban households. However, in contrast, the majority of rural households remain without grid electricity. There is therefore an urgent need for a modern, safe and convenient, affordable thermal fuel for rural households, many of which are also poor.

In rural areas some 80% of households live in a cluster of mud and thatch dwellings. Typically such extended families may have up to 10 or 15 members who follow a traditional lifestyle of small scale farming and animal husbandry. They use thermal energy for cooking, space heating in the winter, heating water and refrigeration. Such households are typically dispersed over vast areas of undulating landscape. The Transkei, where the Xhosa originate in the Eastern Cape and Zululand in Kwa Zulu Natal, where the Zulu hail from, are typical of these rural areas. The South African marketplace for LP Gas is competitive with a number of different supply companies. Apart from the regulation of refinery gate bulk prices, the resale price of LP Gas is unregulated and competitive. LP Gas attracts resale VAT at 14%. Traditional fuels in rural areas include wood, cow dung, coal and paraffin which does not attract resale VAT. It is against this background that Totalgaz, following market research and consultation with stakeholders, developed the Shesha Package for low income households. Shesha means quick, fast and snappy.

The package consists of a branded 5 kg cylinder and combined cooker top. The cylinder and combined cooker top are robust and very stable; ideally suited to the harsh rural environment. The cylinders are easily portable and rural householders use wheelbarrows, donkey carts, pick-ups and public transport to return empty and collect filled cylinders from retail outlets. Totalgaz operate on a ratio of around one retail outlet or point of sale per 100 households. In this way, close proximity and accessibility to a regular supply of filled cylinders is assured.

A1.6 LP Gas Propaganda Vans for Creating Greater Public Awareness in India

The Hindustan Petroleum Corporation (HPCL) have developed a novel way to greatly increase public awareness about the availability and benefits of LP Gas in rural communities. With only a 15% penetration of LP Gas among the millions of rural households across India, HPCL have to improve public awareness of the product and benefits of this modern fuel. Potential household users also need to know where and how they can avail themselves of LP Gas. To meet this need in a cost effective manner while achieving maximum communication impact, HPCL devised what have become known as 'propaganda vans'.

The operation revolves around a 'propaganda van' that covers villages, haats and mandis (local village weekly markets) generating excitement and communicating the message of LP Gas. Typically the van is like a large panel van which is modified to give the look and feel of a publicity vehicle with adequate space inside to carry all the equipment and communications material. The respective local language is used in all communications. The body of the van is brightly painted with the LP Gas brand name, logo and a visual of both a gas cylinder as well as the cooking process. Important messages about LP Gas are prominently displayed all over the body of the van. The inside of the van carries a stove and cylinder, and audio visual and video equipment, with all publicity materials.

In co-ordination with the respective local dealer and sales officer, the van covers 2 to 5 villages every day on a pre-determined route. It drives in and around the village with announcements being made that it will stop at a particular place in the village at a particular time and invites villagers to visit the van. To generate excitement, in between announcements, popular songs are played. At the chosen spot, the van is then set up with the following:

- Banners and other display material
- Video show
- Stage with microphone and speakers
- Actual demonstration of cooking using LP Gas



Figure A.5 An LP Gas Propaganda Van

There is an audio visual entertainment show and in between there are LP Gas product demonstrations and communications of safety messages. This van aids the process of new connections (by collecting money and information and issuing a receipt). In case villagers do not have adequate money on that day, the van also informs them of when and where the distribution van will be coming next. The van then moves onto the next village.

The typical agenda for the propaganda vans are as follows:

- How to use LP Gas and the benefits
- Safety
- Price structure of LP Gas (initial and recurring plus information on availability and the pricing of low cost stoves)
- Finance Schemes (when available)
- Where, when, and how refills can be obtained and bought
- Co-ordination for release of new supply points

In addition, the operation also leaves behind promotional material in the villages in the form of wall paintings, banners and tin plates. These are highly visual and low on text since literacy levels are low. They serve to reinforce the messages of the propaganda van.

A1.7 Small Cylinder Packs for Low Income Households in Sri Lanka

Shell Gas Lanka Ltd (SGLL) is a joint venture company where Shell owns 51% of the equity with the balance being owned by the Government of Sri Lanka. With a market share of 85% and annual LP Gas sales of almost 150,000 metric tons SGLL supply the industrial, commercial, autogas and domestic market sectors. The company is involved in the importation, bulk storage, onward bulk distribution to filling plants and industrial customers; and, cylinder refilling and distribution. SGLL covers the entire geographical area of the island of Sri Lanka. At present, there is only one active competitor who claims around 15% share of the total LP Gas market.

The residential usage penetration of LP Gas is estimated at around 30% overall although it is not uniform in all provinces. Out of the eight provinces, the Western Province accounts for nearly 60% with the most underdeveloped geographical areas in the North East and the Uva Province. There are over 1 million households on the island that has a total area of 65,650 sq km's. LP Gas for residential use is a price controlled item and subject to the provisions of the Consumer Affairs Authority Act.

SGLL own branded cylinders and operate a deposit system with a refundable and non- refundable component. They have 1840 point-of-sale outlets and on average there are approximately 640 households per retailer. Rural residential customers are divided into two segments in Sri Lanka. Middle income households that have a number of common characteristics such as large extended families, decisions made by husband, mainly single story 3 to 4 bedroom houses with large kitchen and garden, mostly with grid electricity, dispersed housing, grows own vegetables, spices and fruits, owns a paddy field, listens to radio and watch TV, reads newspapers, buys provisions from village fair and many women are employed as village school teachers. In contrast, the other group, the low income households, may be characterised as being influenced by income, not brand conscious, daily wage earners, often manual and heavy duty labourers, living in single room temporary dwellings, no access to electricity (unless illegally tapped from grid), 2 to 4 children per family and dwellings very close to each other. Firewood, wood shavings/sawdust are the most popular fuels among this segment. Kerosene is also used where it is dangerous to use firewood in their small dwellings.

As a developing country there is economic growth and rural masses are gradually migrating into middle income groups. This process is facilitated by lifestyle changes and use of LPG often is a catalyst in the process. It frees up their time from gathering firewood for more productive activities. The main barrier to switching from firewood to LPG cooking is the initial investment needed to purchase a cooker, gas cylinder and the accessories. However, most households in the rural areas end up becoming 'dual' fuel users whenever the price of LPG escalates.

In order to encourage the conversion of non LPG users to a Shell Gas user SGLL have developed a special cooker package which includes a low cost basic single burner cooker, 2.3.kg cylinder, regulator, hose and clips. Certain distributors also offer this package on easy payment terms, thus bearing the total liability of the deal. The special cooker package is sold at a special price to encourage new users to switch to LPG. Although the low income household segment is highly influenced by fluctuations in the retail price of LPG, the promotion of the affordable cooker packages consisting of 2.3 kg cylinder + single burner cooker in rural areas has significantly assisted in the conversion from firewood to LPG usage for cooking among poor households.

A1.8 Portable Rural LP Gas Supply Skids in India

Hindustan Petroleum in making LP Gas more readily accessible to rural households in India, have introduced rural marketing skids. The concept was developed for providing filled cylinders to the rural markets to reduce the costs of transportation by increasing the ratio of bulk to packed transport and also to allow for distribution in areas where there are no distributors.

The rural filling skids consist of the following equipment:

- Stationery electronic filling scales - 4 for filling 300 cylinders per hour
- Electronic check weigh scale
- Valve testing unit
- Test bath
- Evacuation stand for 1 cylinder
- Chain/Roller conveyer

All the above equipment is mounted on a skid along with a roller/chain conveyer as required. Necessary provisions are made for connecting the system to the existing conveyors so that the cylinders can be transferred to and from these filling systems onto the existing conveyors. These facilities have a capacity for filling 300 5 Kg cylinders per hour. LP Gas and air connection to the system are extended from the existing piping. The bottling in this case, is directly carried out from the bulk tankers received from the nearby bulk storage plants.



Figure A.6 LP Gas Supply Skids

The system is set up as close to the consumption point as possible and filled cylinders from this point are carried to the nearby villages for distribution through the last leg of the supply chain. This includes despatch of filled cylinders in smaller capacity trucks/matadors (range from 50 to 100 cylinders each) to the various distribution points in rural markets, for the customers to pick up filled cylinders and deposit empty cylinders. The empty cylinders so received from customers are carried back to the distributor by the same matadors.

The distribution points and the days of operation are normally finalised by the distributor along with the local Sales Officers and the village people. Once this is finalised, the same is communicated to the villagers through the propaganda vans and also through word of mouth. The normal practice is for the villagers to come with the empty cylinders, deposit the empty cylinder, pay for the refill in cash and carry back the filled cylinders.

A1.9 Facilitating a Low Income Household LP Gas Programme in South Africa

In South Africa there are very low rates of Residential LP Gas usage per capita (1.9 kg/year) and up until 2004, no major programmes had ever been or were planned for the marketing of LP Gas in rural areas.

During April 2004, a UNDP/WLPGA Rural Energy Challenge workshop was held in South Africa, which for the first time brought all the players around the table and initiated discussion on barriers to delivery, plus what should be done. Following the workshop, the proceedings were prepared and circulated, and that is where it could have so easily ended. With the typical post conference syndrome transpiring and all delegates returning home to their normal duties and responsibilities, delivery to the poor somehow receives low priority.

Fortunately, one or two of the LP Gas industry players were starting to look at the commercial opportunity in earnest, but complexity of delivery within the South African market and a lack of a facilitating policy framework was a significant barrier. Discussions within the LP Gas Safety Association of South Africa during June of 2004, culminated in the appointment of facilitating agents to assist in the development of a peri-urban and rural delivery programme.

The first obstacle faced was formulation of a combined Industry position and the commitment of as many of the suppliers as possible. This took the form of a series of unilateral discussions to independently ascertain company aspirations, interests and agendas. Next, a draft document was prepared with an initial common position and communicated independently to potential participating suppliers, giving opportunity for confidential feedback. Following a second iteration of the document, all the participating suppliers were able to meet, agree on the contents and jointly commit to initial delivery targets. The document called "A Low Income Household Market Enabling Framework" was presented to the department and Minister of Minerals and Energy.

Next, extensive work was carried out, formulating an implementation framework under which the participating suppliers would be able to agree on what would be delivered, together with the way results would be measured and reported. The actual delivery models, operational matters and market areas were left entirely up to the individual players, thereby harnessing competitive commercial drive. A total of four suppliers have launched products in the market, with nearly 60 000 households switched to LP Gas under internal supply company pilot projects.

Further efforts were made to raise a suitable appliance grant subsidy to help customers to switch to LP Gas. A commercial route was followed with a demand side management proposal to the electricity utility, whereby the roll out of LP Gas cooking and water heating appliances would switch households from using electricity or prevent those on traditional fuels from switching to electricity.

In parallel there have been ongoing interfacing activities with the Department of Minerals and Energy. At the Annual budget speech in April 2005, the South African Minister of Energy specifically referred to the proposed programme. The last hurdle to be overcome before the entire programme launches hopefully in November 2005, is final agreements between the Industry and the Ministry of Energy.

Throughout the process credible impartial facilitation has been central to the establishment of this private public partnership, together with the promotion of a common vision.

A1.10 Mid-Day School Meal Scheme in India

The Government of India introduced in 1995 a national programme for midday meal provision for all rural primary schools. In order to provide a clean environment for the kitchens in schools operating midday meal schemes, HPCL have provided LP Gas supply and service to around 40,000 schools across the country.

This scheme relates primary education with nutrition and health. The programme is intended to give a boost to universalisation of Primary Education by increasing enrolment, retention and attendance and simultaneously impacting upon nutritional status of students in primary classes. Presently the programme is being implemented in all States and is operating in 583 Districts.

Government assistance that is provided in support of this feeding scheme consists of the following elements:

- 100 gram food grains (wheat or rice) per child per school per day where cooked meals are served
- Transport subsidy for movement of food grains from depots to schools
- Food grain is supplied through Food Corporation of India and the cost is reimbursed.

Funds for running the scheme are drawn from the Education Fund of the State budget for each school. This varies depending upon the attendance pattern and strength of the respective schools. In all cases the material cost is the same at Rs 1.00 per student per meal. Out of this the fuel cost component is around 20 Paise per student per meal depending on the type of village and area.



Figure A.7 Preparing the Mid-day School Meal in India

The security deposit for the cylinder and regulators are paid in advance by the State Government. They also procure the gas stoves through a tender.

Each school is given a budget of 20 paise per student per day towards the fuel cost. The modus operandi is for the remittance of the amount for the refill supply is left at the discretion of the individual distribution company in the districts. In certain districts the schools are directly making the payments to the distributor on receipt of the refills. In some other schools, the distributors are sending periodic invoices to the respective local educational authority for reimbursement.

Since the schools are located at varied distances from the local LP Gas distributorships, the local distribution companies are also authorised to finalise the transportation rate for refill supplies. An additional transport subsidy is being reimbursed for deliveries beyond the trading area of the distributorship.

Appendix 02.

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Declarations

The report was undertaken for the WLPGA by Integrated Energy Solutions (Pty) Ltd, an independent energy consulting practice based in Cape Town, South Africa specialising in the deployment of modern energy to contribute to the reduction of poverty throughout the world.

Much of the study was derived from survey responses from LP Gas organisations and their representatives from around the world. Every effort has been made to protect their commercial confidentiality in the process, resulting in limited direct quotation from their inputs and official clearance for all case studies that were included.

This specific document has been independently prepared by consultants Chris Hazard and Paul Harris of Integrated Energy Solutions, South Africa and has no bias or obligation towards any organisations.

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