

## LP GAS - MULTI PURPOSE ENERGY

LP Gas has literally thousands of uses around the home, on the farm, in commercial business, in industry and transportation. Wherever heat, light or power is required, LP Gas can be used.

The residential and commercial markets where it is used for cooking, heating, water heating, drying and refrigeration consume some 50% of the world total LP Gas retail sales. When LP Gas provides heat, power and light together, the combined system is a very cost effective total energy source.



Examples of LP Gas as a multi purpose energy include:

**Agriculture** • Crop drying • Distilling • Flame weeding • Greenhouses • **Commercial and Residential** • Air-conditioning • Cooking • Hot water • Radiant heating • Refrigeration • Space heating • **Industrial** • Ceramic and glass manufacturing • Chemical Feedstock • Drying • Laundry • Metal processing • Thawing • **Leisure** • Boats • Camping • Barbecues • Swimming pools • Terrace heaters • **Non-Fuel Uses** • Aerosols • Refrigerants • **Transportation** • Buses • Cars • Fork-lifts • Heavy duty trucks • Motor bikes



WORLD LP GAS ASSOCIATION

[WWW.WORLDPGAS.COM](http://WWW.WORLDPGAS.COM)

# LP GAS

MODERN ENERGY ANYWHERE



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## DISCOVER WHAT IS BEHIND IT

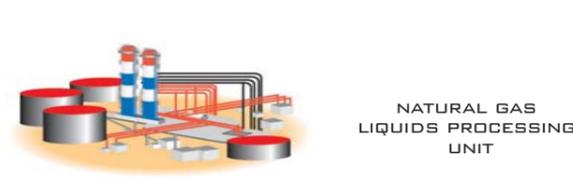
**Consider this :** Only LP Gas can serve such a wide variety of uses as cooking fuel for the family in South Africa and the community kitchen in India, refrigeration for the shop owner in Brazil, Autogas for taxis in Tokyo, welding for the car manufacturers in Germany, heat for the family home in Canada, flame weeding for the rancher in Texas, heat to provide lift for the first solo non-stop round the world balloon trip, hair spray for the Hollywood starlet and life saving fuel for Mt. Everest climbers. Even the Olympic torch is LP Gas powered. That is why it is sometimes referred to as the world's most multi-purpose fuel. This publication is intended to provide basic background information about LP Gas.



# THE LP GAS DISTRIBUTION CHAIN

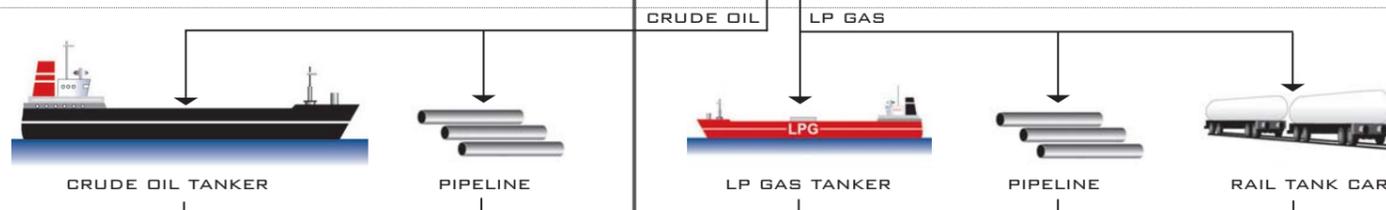
## STEP 1 PRODUCTION

The production of "field grade LP Gas" is the result of the treatment of NGLs. This treatment is necessary to produce: a) Oils that are suitable for transport to refineries and b) Natural gases that correspond with commercial specifications.



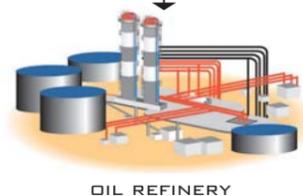
## STEP 2 TRANSPORTATION

While crude oil is transported from the production sites to refineries by tankers or pipelines, LP Gas is transported to storage terminals by large LP Gas carriers, pipelines or train.



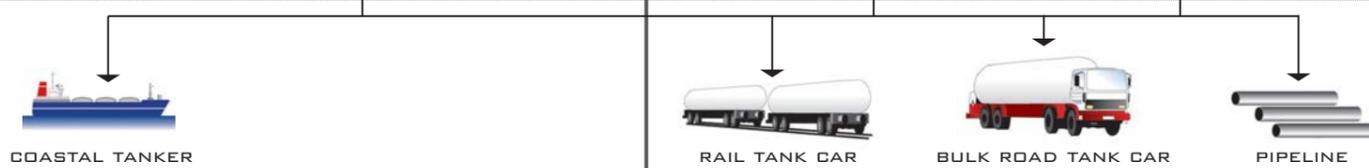
## STEP 3 REFINING AND STORAGE

Butane and propane can also result from the oil refining processes. LP Gas storage terminals store products that are imported in large quantities.



## STEP 4 TRANSPORTATION

The LP Gas is then delivered by train, road, coastal tanker or pipeline to cylinder filling plants and intermediate-size storage areas.



## STEP 5 BOTTLING AND STORAGE

Cylinders are filled with butane and propane at bottling plants. LP Gas is generally stored in pressurised tanks (vessels or spheres) in intermediary storage centres.



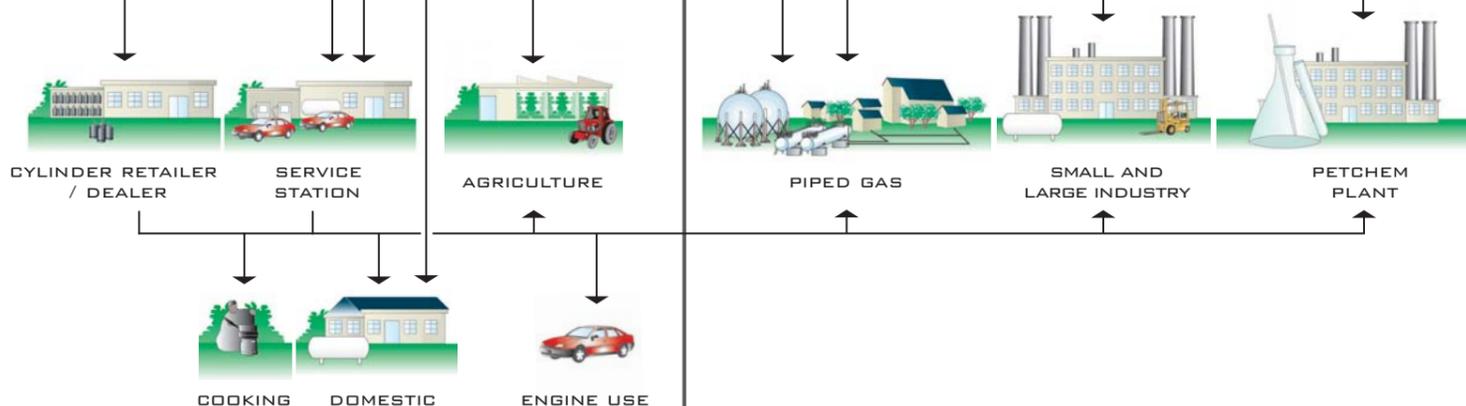
## STEP 6 DISTRIBUTION

LP Gas can be transported virtually anywhere, either in cylinders or bulk. Trucks transport butane and propane cylinders from the bottling plant to retailers, as well as to private and professional customers. Meanwhile, small bulk trucks distribute LP Gas from the storage centres to various consumers.



## STEP 7 END USERS

LP Gas is easily available to end users through cylinder sales points such as commercial stores or service stations close to their locations. Customers requiring larger volumes can purchase LP Gas in bulk.



## EQUIPMENT MANUFACTURES

Companies around the world provide filling, storage, controlling and safety equipment as well as services to the LP Gas industry and end users.



# WHY USE LP GAS ?

LP Gas is a modern and safe energy which can be used anywhere. Other energy sources are available, so why chose LP Gas over the alternatives? Many good reasons include:



### Accessible

LP Gas can be accessible to everyone everywhere today without major infrastructure investment, particularly in areas of developping countries with no access to modern, grid-based energy. Nothing needs to be invented and there are enough reserves to last many decades.

### Clean

LP Gas is very clean burning and has lower greenhouse gas emissions than any other fossil fuel when measured on a total fuel cycle. Originating mainly from natural gas production, it will not contaminate soil or aquifers in the event of a leak.

### Convenient

LP Gas is a multi-purpose energy. There are more than a thousand applications, from cooking, heating, air conditioning and transportation, to cigarette lighters and even the Olympic torch.

### Efficient

LP Gas is cost-effective, since a high proportion of its energy content is converted into heat. LP Gas can be up to five times more efficient than traditional fuels, resulting in less energy wastage and better use of our planet's resources.

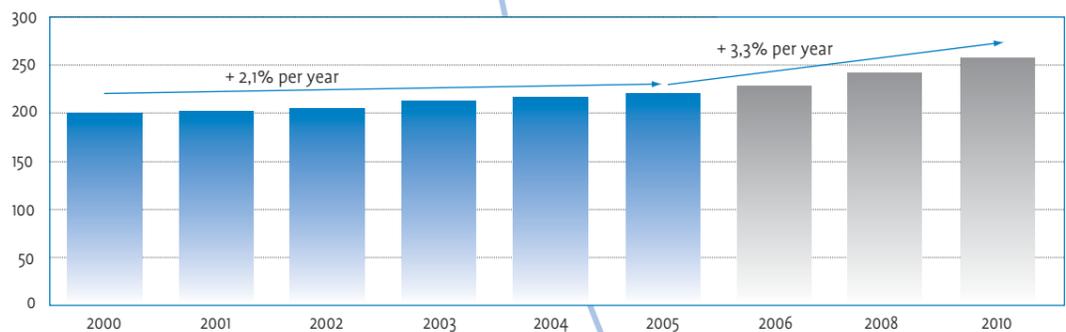
### Portable

LP Gas can be transported, stored, and used virtually anywhere in the world. It does not require a fixed network and will not deteriorate over time.

### Safe

LP Gas compared to other fuels has an excellent safety record worldwide when handled properly and is non-toxic.

Global LP Gas Growth



LP Gas supply and demand in million tons  
From 200 million tons in 2000 to more than 260 million tons forecast in 2010  
Source: Purvin and Gertz, MCH

# WHAT IS LP GAS ?

LP Gas (or LPG) stands for "Liquefied Petroleum Gas". The term is widely used to describe two prominent members of a family of light hydrocarbons called "Natural Gas Liquids" (NGLs): propane (C<sub>3</sub>H<sub>8</sub>) and butane (C<sub>4</sub>H<sub>10</sub>). The other members of the NGLs family, ethane and condensates, have their own distinctive markets.

The term "liquefied gas" may seem a contradiction in terms since all things in nature are either a liquid or a solid or a gas. Yet, liquidity is the unique character of LP Gas that makes it such a popular and widely used fuel. At normal temperature and pressure, LP Gas is gaseous. It changes to a liquid when subjected to modest pressure or cooling. In liquid form the tank pressure is about twice the pressure in a normal truck tyre, which means it is very safe when properly handled.



LP Gas is liquefied to make it easy to transport and store. One unit of liquid has the same energy content as 270 units of gas. As a gas, the container to hold the fuel would be 270 times larger than what is required as a liquid. In other words, LP Gas has density (compactness) for storage and transportation, yet all the benefits of a clean gaseous fuel when used at the burner tip. It is also worth noting that LP Gas is a clean, green fuel, with less harmful emissions and greenhouse gasses than other fuels such as petrol, kerosene, oil and diesel.



LP Gas usually consists of a mixture of propane and butane for standard heating and cooking purposes. Propane starts vaporising above -45°C, so it is more versatile for general use. Butane starts vaporising above -2°C and requires either a propane/butane mixture in cold environments or pre-heating as it will not vaporise as readily as propane. LP Gas can also be used in specialised applications that require a more rigorous specification. Examples include food processing, aerosol propellants and automotive fuel.

LP Gas is a derivative of two large energy industries: the processing of natural gas liquids and the refining of crude oil.

### Natural gas processing

When gas is drawn from the earth, it is a mixture of several gases and liquids. Commercial natural gas is mainly composed of methane. However, it also contains ethane, propane and butane in accordance with the specifications for natural gas in each country in which it is distributed. Therefore, before natural gas is marketed, some NGLs, including LP Gases (propane and butane) are separated out, depending on the "wetness" of the gas produced: NGLs represent 1 to 10% of the unprocessed gas stream.

Some NGLs are also trapped in crude oil. In order to stabilise the crude oil for pipeline or tanker distribution, these "associated" or "natural gases" are further processed into LP Gas. Worldwide, gas processing is the source of approximately 60% of LP Gas produced.

### Crude oil refining

In an oil refinery, LP Gases are produced at various stages: atmospheric distillation, reforming, cracking and others. The LP Gas produced will be between 1 and 4% of crude oil processed. This yield will depend on the type of crude oil, the degree of sophistication of the oil refinery and the market values of propane and butane compared to other oils products. Worldwide, refining is the source of approximately 40% of LP Gas produced.

Like all other hydrocarbons obtained from oil and gas, LP Gas has its own distinct marketing advantages and can perform nearly every fuel function as the primary fuels from which it is derived. Furthermore, LP Gas supply is growing faster than any other oil products. As a result, demand for LP Gas is steadily growing throughout the world and forecasts show this trend will continue.