

Argus White Paper: Statistical Review of Global LPG



The Statistical Review of Global LPG is your resource for understanding where the market is and how it has developed.

This easy-to-use document gives you a wealth of data for over 120 countries, including:

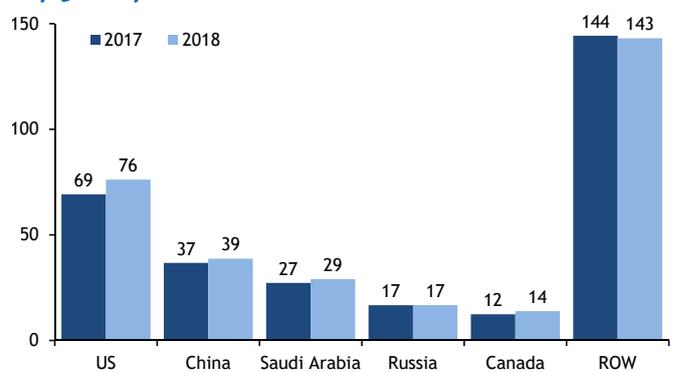
- Demand by sector (residential, transport, chemicals, industry, agriculture)
- Production by source (refining, gas processing)
- 10-year historical production and consumption for each country
- Autogas consumption, vehicles, and dispensing site by country
- Key propane, butane, naphtha, and ethane prices on a monthly basis for 2018
- Primary energy consumption by fuel

2018: Robust Growth

If 2017 was a landmark for the LPG industry — seeing production and consumption pass 300mn tonnes, then 2018 was a year of exceptional growth — on both sides of the balance.

Total global production for 2018 was estimated at 317mn t, around 3.6pc higher than in 2017, while consumption was assessed at 313mn t — 3.8pc higher than in 2017. A number of countries posted higher figures — to be expected in a higher crude price environment — but additional production from the US was the key figure, with a corresponding rise in export availability. 2018 saw US and Chinese output continue to

Top 5 LPG producers and rest of world



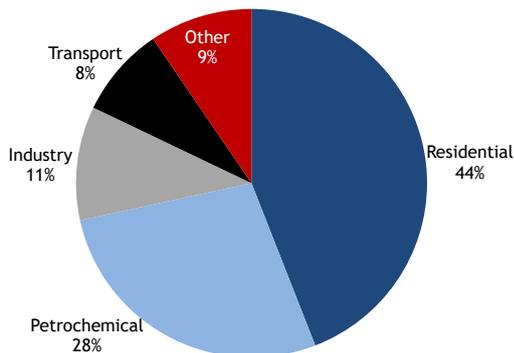
climb, with Russia and the Middle East remaining key sources of LPG for various export markets.

On the demand side, an additional 3.8pc of LPG was consumed globally in 2018, posting a total demand figure of 313mn t — the key gains were in the residential and petrochemicals sectors.

While the switch to propane and butane as a feedstock and developments in the production of propylene using propane dehydrogenation (PDH) may often grab the headlines concerning the role of LPG in global energy markets, it is in fact the residential sector that continues to dominate global demand — posting a total of more than 138mn t, up by almost 6mn t/yr compared with 2017.

While the majority of the gains are for cooking in the developing world, colder weather in many traditional heating markets resulted in slight increases or at a minimum stable demand in many countries. The all-important US market saw a significant gain in heating demand on the back of very severe cold weather at the beginning of the year.

LPG demand by sector, 2018



LPG at the heart of global development

A trend that is increasingly clear as we move to the new decade is the key role that LPG is already playing as a tool to aid the development of economies and the alleviation of poverty — particularly in Asia and Africa. LPG plays a key role in the less developed world, and the latest figures highlight the depth of penetration of LPG into a number of new markets.

The role of India and Indonesia as key consumers has been evident for some years — but as the third and tenth-highest consumers of LPG, respectively, and with a combined demand figure of more than 30mn t/yr — more than the entire EU — their impact on the global market and trade flows should not be understated. For the first time, US LPG has found its way to these markets, having previously been restricted to northeast Asia.

Indian demand growth slowed in 2018, with total demand recorded at 24.6mn t. But growth was still 4pc, and almost 1mn t more LPG was consumed compared with 2017. And while the Indian market is clearly not saturated, Indonesian demand growth was under 3pc for the first time since the country embarked on its enormously successful kerosene-to-LPG programme more than 10 years ago.

It is some of the smaller countries in Asia and Africa that

% are showing the highest growth rates. Bangladesh once again posted strong figures, as it saw demand reach almost 800,000 t — up from less than 50,000 t/yr just five years ago, and a number of countries in south and southeast Asia posted increases of 7-10pc, including Vietnam, the Philippines, Sri Lanka and Nepal.

Sub-Saharan African growth was particularly robust at almost 9pc, with Nigeria leading the way with an estimated 780,000 t/yr. The country is likely to be the first in sub-Saharan Africa to consume more than 1mn t/yr in the next few years.

Robust economic growth in a number of countries combined with additional imports — mainly from the Mideast Gulf — resulted in most countries in the region seeing additional uptake of LPG. Further primary infrastructure projects in Kenya and South Africa among others are expected to help sustain this trend in the future.

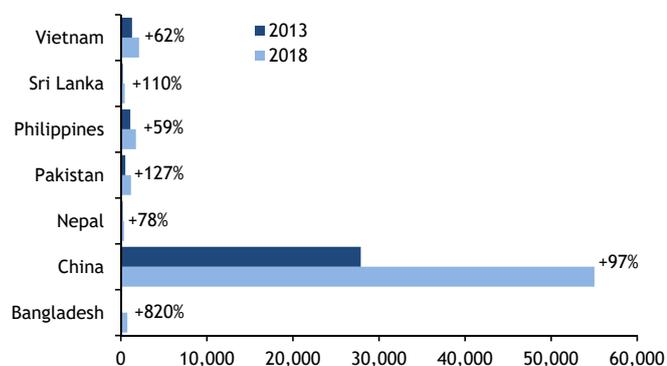
Autogas stable, yet diverging

Global autogas demand was stable in 2018 compared with 2017 with total demand at just over 26mn t. But this masks a trend that has emerged in recent years whereby some of the fuel's more traditional markets in Asia and northwest Europe are seeing sustained decline, while a number of newcomers report strong growth.

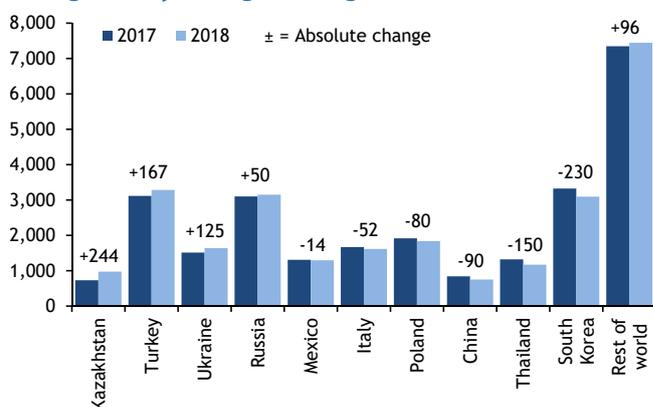
Thailand, Australia, Japan and South Korea, all of which have long-standing autogas markets, each saw declines of 10-15pc compared with 2017, which shows a consistent trend with previous years. But South Korean volumes may see a change of fortunes soon owing to an adjustment to government policy, which will allow members of the general public to purchase and drive autogas vehicles for the first time. Up to now, ownership of autogas vehicles was restricted to specific groups, such as veterans and the disabled.

Some countries posted strong figures in the transport sector. Ukraine, which has seen strong growth over the past five years, once again consumed a record amount of autogas

LPG demand, selected markets



Changes in top 10 largest autogas markets and ROW



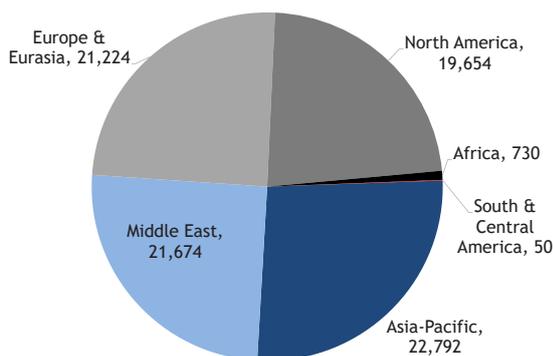
— 1.83mn t in 2018, up from 1.6mn t in 2017. The country continues to benefit from the wide availability of second-hand autogas vehicles and propane, much of it sourced from Russia and Kazakhstan.

Petrochemicals rebound

Having seen a fall in demand for LPG as a feedstock in 2017, 2018 figures demonstrate the continued value that the fuel brings to the non-energy sector. Total petrochemicals demand was up by 8pc on the year as the price of LPG in Europe in particular saw more cracking of both grades, with at least one large facility upgrading its capacity to take cheap propane. Global demand in this sector stood at 86mn t in 2018.

The trend is less visible in North America where ethane is king, and while Asian demand was higher, particularly in Taiwan and South Korea, it is propane dehydrogenation (PdH) plants that are primarily responsible for additional use of LPG in this sector in Asia.

Petrochemical demand for LPG, by region '000t,

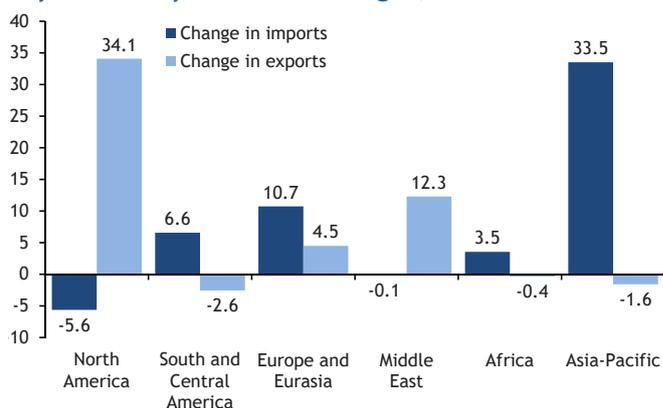


Trade routes evolve

The long-running saga of the Mariner East 2 pipeline expansion, connecting the Marcellus and Utica shale formations ultimately to Marcus Hook on the US east coast, still held many twists and turns in 2018 and the project had only begun limited operations at the very end of the year. But other projects advanced, such as Canada's Ridley Island export terminal on the Pacific northwest coast, which was ready to export 40,000 b/d of propane in the second quarter of 2019. More export terminals are on the way, as result of the continued oversupply of LPG in North America, which was a key feature of 2018.

The range of global capital investment in infrastructure looked particularly heartening for the LPG sector. Diverse projects are on the way across the world, such as Wanhua Chemical's plan to expand its Chinese underground storage cavern to

Import and export volume changes, 2008 to 2018 '000t



1.2mn t by 2020, and Switzerland-based Ineos' plan to build a new propane dehydrogenation plant in northwest Europe. In Asia, Sri Lanka's new terminal at the port of Hambantota nears completion and another terminal project in Port Klang, Malaysia broke ground in early 2019.

Shipping picks up

While the shipping market did not see the kind of rebound many owners had hoped for — they would need to wait until 2019 to see a significant increase in spot and time charter rates — the market did see slightly higher rates in 2018 as the tonne-mile requirements for global LPG were higher than ever. This was counterbalanced by a number of additional vessels, but the rate of expansion of the fleet began to slow down as the building cycle entered a calmer phase.

Market conditions

A higher crude price environment than in 2017 saw LPG prices rise for a second year running, although the gains were lighter than in the previous year. The Argus North Sea Index gained by \$65/t in propane and by \$35/t in butane compared with the previous year, both averaging just over \$500/t across the year.

Opec's sustained effort at managing the global crude market paid dividends as crude benchmarks hit the \$85/bl mark in October — their highest since 2014. But volatility was in evidence as the market fell by almost \$35/bl by the end of the year. A combination of economic uncertainty, the US-China trade war, and political tensions in the Middle East were among the reasons for the sharp rise and fall in prices.

Production strength in LPG across the world kept a lid on prices relative to crude, as incremental demand from Asia in particular helped clear the market. Absent from market conditions this year was concern around US propane inventories, which remained at comfortable levels, and unlike 2017 did not incite any significant price rises.

For more information:

 contact@argusmedia.com

 +44 20 7780 4200

 www.argusmedia.com

 @argusmedia