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**Liquid Gas  
Europe**

LPG – The Smart  
Alternative,  
Everywhere  
You Need It



# VISION 2050

**THE CONTRIBUTION OF THE LPG  
INDUSTRY TO THE LONG-TERM  
DECARBONISATION OF THE  
EUROPEAN ENERGY MIX**





# Intro.

The European LPG industry is committed to support the ambitious climate and energy goals set by the EU for 2050.

We truly believe that LPG and renewable LPG, as clean-burning, versatile, and resource efficient gaseous fuels are perfectly placed to help reaching these goals especially in rural areas and in road transport. We particularly would like to highlight three fundamental issues, which we see crucial if the EU is to deliver the sustainable, cost-efficient, healthy and secure long-term energy transition that it is aiming for:

- 1 Climate change and air pollution are two sides of the same coin**
- 2 Shift to decentralised energy systems will require combining technologies**
- 3 Long term policy visibility is key to exploit all renewable fuels potential**

This publication outlines the vision of the European LPG industry for the next thirty years, and how it can be a valuable partner to the European Institutions in its efforts to decarbonise Europe.

**LPG and renewable LPG are clean and immediately available energy sources, which can be used practically anywhere, even in the most remote areas.**

## What is LPG?

LPG and renewable LPG are clean and immediately available energy sources, which can be used practically anywhere, even in the most remote areas with no access to the gas grid. LPG can be a by-product of natural gas processing or crude oil refining or it can be produced from a number of renewable feedstocks. The majority of renewable LPG produced today comes from the hydrotreatment of biological oil, waste and fats as a co-product of HVO biodiesel, but many other processes are expected to lead to steady growth in production capabilities. Although it is currently produced in modest quantities, renewable LPG could potentially satisfy up to 100% of EU's LPG demand by 2050.

LPG can be used to power many applications in the residential, commercial, industrial or transport segments, in which it can bring about significant environmental benefits. When used as a heating fuel, it is a low carbon and low polluting alternative to solid and liquid fuels which are still commonly used in rural and peri-urban areas. Its environmental benefits when it is used as a road transport fuel are recognised by the EU in its policies supporting alternative fuels.



# CLIMATE CHANGE AND AIR POLLUTION ARE TWO SIDES OF THE SAME COIN.

## Context.

The Paris agreement, and its subsequent translation into EU legislation, are an important step forward in the fight against the global threat of climate change. However, it is crucial that climate change policies and air quality policies are mutually consistent: in simpler terms, measures aiming to curb GHG emissions should not come at the price of increased air pollutant emissions.

**Air pollution is a silent killer in Europe**, rightly considered by the World Health Organisation as the biggest environmental risk to health in the EU, causing 400 000 premature deaths every year<sup>1</sup>.

A key issue raised by several major public bodies such as the European Environment Agency<sup>2</sup> and the European Court of Auditors is that a number of climate-related policies are negatively affecting air quality.

While the adverse effects of pro-diesel policies aimed at meeting CO<sub>2</sub> reduction obligations in transport are now widely recognised, similar caution should be applied for example to policies supporting the use of biomass in heating, due to its relatively high emissions of particulate matter.<sup>3</sup>

**Measures aiming to curb GHG emissions should not come at the price of increased air pollutant emissions.**

<sup>1</sup>European Court of Auditors (2018), *Special report no 23/2018: Air pollution: Our health still insufficiently protected*, available online at: [https://www.eca.europa.eu/Lists/ECADocuments/SR18\\_23/SR\\_AIR\\_QUALITY\\_EN.pdf](https://www.eca.europa.eu/Lists/ECADocuments/SR18_23/SR_AIR_QUALITY_EN.pdf)

<sup>2</sup>European Environment Agency (2018), *Air quality in Europe – 2018 report*, available online at [https://www.eea.europa.eu/publications/air-quality-in-europe-2018/at\\_download/file](https://www.eea.europa.eu/publications/air-quality-in-europe-2018/at_download/file)

<sup>3</sup>INNOVHUB (2017), *Studio comparativo sulle emissioni di apparecchi a gas GPL gasolio e pellet*, available online at <https://assogasliquidi.federchimica.it/docs/default-source/default-document-library/executive-summary-studio-innovhub.pdf>

# 1

**CLIMATE CHANGE  
AND AIR POLLUTION  
ARE TWO SIDES OF  
THE SAME COIN.**

## THE CONTRIBUTION OF LPG.



Switching from an oil or coal boiler to an LPG one can reduce emissions respectively by 25% and 50%.<sup>4</sup>



Contrary to liquid and solid fuels, LPG also emits virtually no black carbon, which is the second largest contributor to climate change after CO<sub>2</sub>. LPG boilers produce 60% less PM than oil boilers and 99% less PM than woody biomass stoves.<sup>5</sup>



As a transport fuel, recent real driving emission tests have shown that LPG vehicles produce 98% less NO<sub>x</sub> emissions than diesel cars. In addition, they emit 90% less particulates and 45% less carbon monoxide than gasoline cars.<sup>6</sup> Regarding CO<sub>2</sub>, LPG vehicles also produce 23% less well-to-wheel GHG emissions than diesel and 21% less than petrol.<sup>7</sup>

<sup>4</sup> Ecuity Economics elaboration based on IPCC Emissions Factor Database

<sup>5</sup> INNOVHUB (2017), *Studio comparativo sulle emissioni di apparecchi a gas GPL gasolio e pellet*, available online at <https://assogasliquidi.federchimica.it/docs/default-source/default-document-library/executive-summary-studio-innovhub.pdf>

<sup>6</sup> *Measuring emission performance of Autogas cars in real driving conditions*, available online at <https://liquidgaseurope.eu/images/publications/rde-tests-autogas.pdf>

<sup>7</sup> JEC (2014), *"well-to-wheels report" Version 4.a*, available online at [https://iet.jrc.ec.europa.eu/about-jec/sites/iet.jrc.ec.europa.eu/about-jec/files/documents/wtw\\_report\\_v4a\\_march\\_2014\\_final.pdf](https://iet.jrc.ec.europa.eu/about-jec/sites/iet.jrc.ec.europa.eu/about-jec/files/documents/wtw_report_v4a_march_2014_final.pdf)

# 1

**CLIMATE CHANGE  
AND AIR POLLUTION  
ARE TWO SIDES OF  
THE SAME COIN.**

## OUR SUGGESTIONS TO THE EU INSTITUTIONS:

- Use the upcoming revision of the EU Ambient Air Quality Directive to:
  - Align EU air quality standards with **WHO guidelines**
  - Strengthen the ambition of the compulsory **National Air Quality Plans**
  - Introduce more obligations on Member States to **inform the public about air quality**
- The recently adopted EU Governance of the Energy Union has introduced an obligation for member states to include an assessment of the environmental impact, with a focus on air quality, of the policies they implement in the scope of their National Energy and Climate Plans. The European Commission and the European Parliament should exert their power of scrutiny to **make sure that air quality is not overlooked.**
- Support all technologies providing significant benefits** in terms of both CO<sub>2</sub> and pollutant emission performance, in line with technology neutrality.
- Phase out any policy support** to energy solutions having both **high GHG and air pollutant footprints** (such as coal and heating oil), and be more selective in reviewing the role of solutions leading to adverse impact on air quality (such as biomass heating).



**SHIFT TO  
DECENTRALISED  
ENERGY SYSTEMS  
WILL REQUIRE  
COMBINING  
TECHNOLOGIES.**

# Context.

EU energy, climate and environmental policies tend to focus on urban areas' needs, the parts of the European territory where the population density is higher.

On that basis, certain technological options are often favoured by EU energy and climate policies fitting the characteristics and requirements of these areas, such as district heating, electric heating, or electromobility. While all these solutions have evident merits, they require dedicated and costly energy infrastructure, which are often not adequate for sparsely populated areas.

**This is in stark contrast with the reality of the residential energy mix in rural areas,** where the natural gas grid is generally unavailable and where 2/3 of the energy needs are covered by using high-carbon fuels such as heating oil and coal, or by burning biomass.<sup>8</sup>

The “electrification of everything,” which implies vastly strengthening the grid, seems a hardly realistic option in rural areas considering that the existing electric networks would require huge investments for taking the necessary increased load and for optimising its distribution.

At the same time, experts seem to agree on the need to switch to a more decentralised energy system, where prosumers, users locally producing renewable energy would take a larger role. Due to the intermittent nature of decentralised renewable electricity, the move towards this model will also require the inclusion of low-carbon fuels to act as a partner or back-up.

**The reality of the residential energy mix in rural areas is one where the natural gas grid is generally unavailable.**

<sup>8</sup>AEGPL (2011), *Beyond the Gas Grid - An LPG Industry Roadmap*, available online at [https://liquidgaseurope.eu/images/publications/beyond-the-gas-grid\\_aegpl\\_2011.pdf](https://liquidgaseurope.eu/images/publications/beyond-the-gas-grid_aegpl_2011.pdf)



## SHIFT TO DECENTRALISED ENERGY SYSTEMS WILL REQUIRE COMBINING TECHNOLOGIES.



## THE CONTRIBUTION OF LPG.



In addition to being clean-burning, LPG is an extremely versatile energy source, which can be used everywhere it is needed. LPG is largely available - either in cylinders or in bulk - across all European territories, even in areas where the availability of diversified energy sources is scarce.



LPG is a perfect fuel for the most modern low or zero carbon heating appliances such as gas heat pumps, hybrid installations, and fuel-cell micro-CHP's.



The key to success for decarbonising the buildings of today and tomorrow is in the promotion of low carbon technologies that;

- 1)** are fit for purpose in a given geography and local climate conditions
- 2)** can be combined and integrated with other technologies delivering additional benefits in terms of both efficiency and decarbonisation.
- 3)** are sufficiently affordable for average end-users. LPG's flexibility as a primary energy source will enable other low-carbon technologies, including locally produced renewable electricity, to reach a wider uptake.



**SHIFT TO  
DECENTRALISED  
ENERGY SYSTEMS  
WILL REQUIRE  
COMBINING  
TECHNOLOGIES.**

## OUR SUGGESTIONS TO THE EU INSTITUTIONS:



Recognise in the EU long-term decarbonisation strategy that:

- /// **Affordability and cost-efficiency are key** to make the energy transition a reality, especially in rural areas
- /// **Clean-burning fuels such as LPG are a key partner** for enabling the wider uptake of locally produced renewable electricity



**Maintain a technology-neutral approach** in EU energy efficiency policies, especially when comparing electric appliances and similar appliances running on primary energy in the context of the ecodesign and energy labelling schemes.





**LONG TERM POLICY  
VISIBILITY IS KEY  
TO EXPLOIT THE  
POTENTIAL OF ALL  
RENEWABLE FUELS.**

## Context.

While an increase in use of gaseous fuels instead of higher carbon liquid and solid fuels already offers today promising benefits, a large part of the long term European decarbonisation potential will come with the development of equivalent fuels from renewable origins.

Such transition based on drop-in renewable fuels allows to rely on an existing distribution infrastructure, to tap into a strong knowledge base from the original industry and to avoid technological lock-in, as new engines and high-efficiency heating technologies can generally function with renewable fuels the same way they do with its conventional equivalent.

**However, the production of renewable fuels requires carefully planned investments** which can only happen when a predictable legal and policy framework is in place, especially in regard to supportive measures and sustainability criteria of renewable feedstocks.

**The long term European decarbonisation potential will come with the development of fuels from renewable origins.**

# 3

**LONG TERM POLICY VISIBILITY IS KEY TO EXPLOIT THE POTENTIAL OF ALL RENEWABLE FUELS.**

## THE CONTRIBUTION OF LPG.



The first large scale distribution of BioLPG in Europe has started recently. BioLPG has the same chemical composition as LPG, and therefore is an equally low polluting fuel but has a much lower carbon footprint than conventional LPG thanks to its biological origin. A recent study shows that the carbon footprint of renewable LPG can be up to 94% lower than conventional LPG. The gradual increase of the renewable content in LPG will have no impact on the end-user as it can be used with the same appliances and engines as conventional LPG.



The majority of the BioLPG on the market today is produced from the hydrotreatment of biological oil and fats as a co-product of HVO biodiesel, but it is also being produced from the fermentation of glucose by bacteria, yeasts or other microorganisms. Other renewable LPG innovative production processes combining atmospheric CO<sub>2</sub> with renewable hydrogen, produced from water hydrolysis are also being explored. In the longer term, the biggest potential of BioLPG production lies in advanced chemical processing of cellulose and waste, which involves converting residues from agriculture and forestry or organic municipal waste into BioLPG.



While the available renewable LPG production for the next few years is estimated to be around 250 ktonnes, experts believe that due to the abundance of cellulose, the total availability of renewable LPG in Europe could reach 20-25 million tonnes per year in 2050, covering entirely the demand of LPG for energy use.



With the right policy environment in place for the producers to secure the necessary feedstock and sustain a stable business model, the entire LPG distribution chain could therefore be fully decarbonised by the horizon 2050. Our industry will be thriving to deliver on this ambitious objective.



3

**LONG TERM POLICY  
VISIBILITY IS KEY  
TO EXPLOIT THE  
POTENTIAL OF ALL  
RENEWABLE FUELS.**

## OUR SUGGESTIONS TO THE EU INSTITUTIONS:

- Factor in the cost efficiency of renewable fuels ("**drop-in**" **benefit**) versus standalone technologies requiring dedicated infrastructure when assessing the different pathways for long-term decarbonisation.
- Earmark R&D European funds from Horizon Europe** for the decarbonisation of the rural energy mix.
- Take into account that **retrofitting technologies**, for instance converting a gasoline car to run on LPG or BioLPG, can help decarbonising in a **cost-efficient** manner the existing fleet of vehicles.
- Create stable and predictable **sustainability criteria** for bioenergy, to give the right signal to the market to invest in necessary renewable fuel production infrastructures.

# ABOUT LPG



## AVAILABLE NOW

LPG supply is increasing every year and it can be sourced from many different regions, including Europe.



## CLEAN ENERGY

As a mix of propane and butane gas, LPG helps improve air quality and emits fewer greenhouse gases than many alternatives.



## PORTABLE

LPG needs no pipeline so it can be used in urban, rural and remote areas.



## OFF-GRID

LPG covers 17% of the heating and cooking energy needs of the 40 million households in the EU28 living outside the natural gas grid.



## MOVING

About 8 million vehicles in the European Union serviced by an extensive refueling network (an increase of 20%).