
LPG
EXCEPTIONAL ENERGY

CLEAN, DECENTRALISED AND EFFICIENT ENERGY JUST LIKE LPG
BUT RENEWABLE

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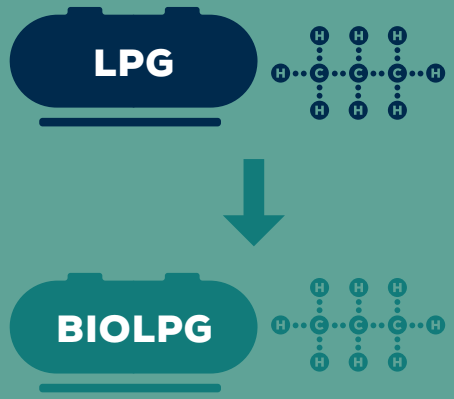
CLIMATE CHANGE IS HAPPENING, AND ACTION IS NECESSARY. THE LPG SUPPLY CHAIN HAS A ROLE TO PLAY IN DELIVERING COST-EFFECTIVE DECARBONISATION. INITIALLY, AS AN IMMEDIATE LIKE-FOR-LIKE ALTERNATIVE TO HIGH-CARBON FUELS SUCH AS COAL AND HEATING OIL, AND IN THE LONG-TERM, AS AN AGENT FOR DEEP DECARBONISATION THROUGH BIOLPG.




## A DROP-IN ALTERNATIVE

BIOLPG IS CHEMICALLY **IDENTICAL TO CONVENTIONAL LPG.** IT CAN REPLACE CONVENTIONAL LPG BUT **THE TWO CAN ALSO BE BLENDED** AND USED BY EXISTING APPLIANCES SUITABLE FOR USE WITH LPG, WITHOUT HAVING TO CHANGE OR UPGRADE EQUIPMENT OR APPLIANCES.

## LOWER THAN LOW CARBON FOOTPRINT

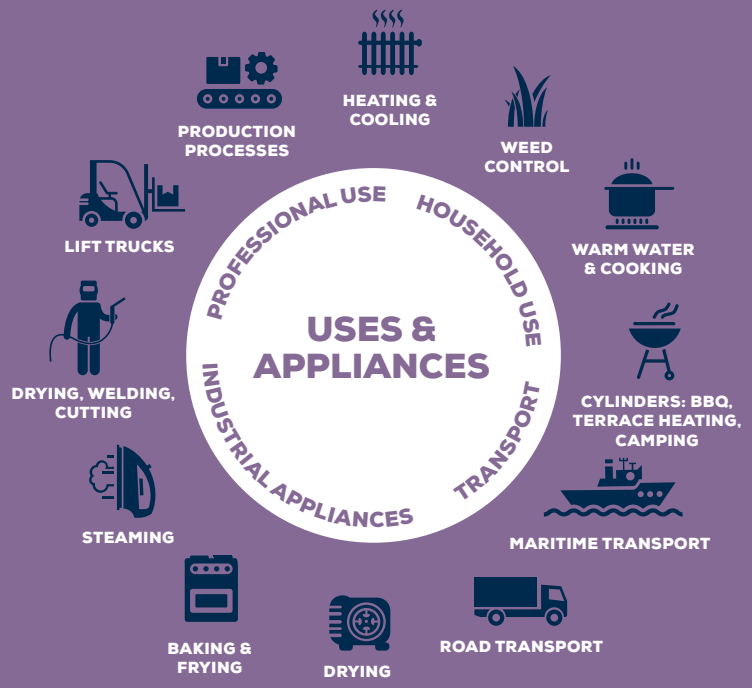
THE MISSION BEHIND THE DEVELOPMENT OF BIOLPG IS TO FURTHER **REDUCE CARBON EMISSIONS** AND THE ENVIRONMENTAL IMPACT OF LPG, WHICH ALREADY EMITS **35% LESS $CO_2$ THAN COAL AND 12% LESS THAN OIL.** BIOLPG FULFILS THAT MISSION – IT EMITS 73% LESS $CO_2$ THAN CONVENTIONAL LPG.

## READILY AVAILABLE

BIOLPG IS NOT AN **INNOVATION FOR THE DISTANT FUTURE,** IT IS ALREADY AVAILABLE ON THE EUROPEAN MARKET IN QUANTITIES THAT CAN SERVICE THE ENERGY NEEDS OF THOUSANDS OF FAMILIES AND BUSINESSES. CURRENTLY **PRODUCTION IS BEING INCREASED AND THE MARKET UPSCALED.**

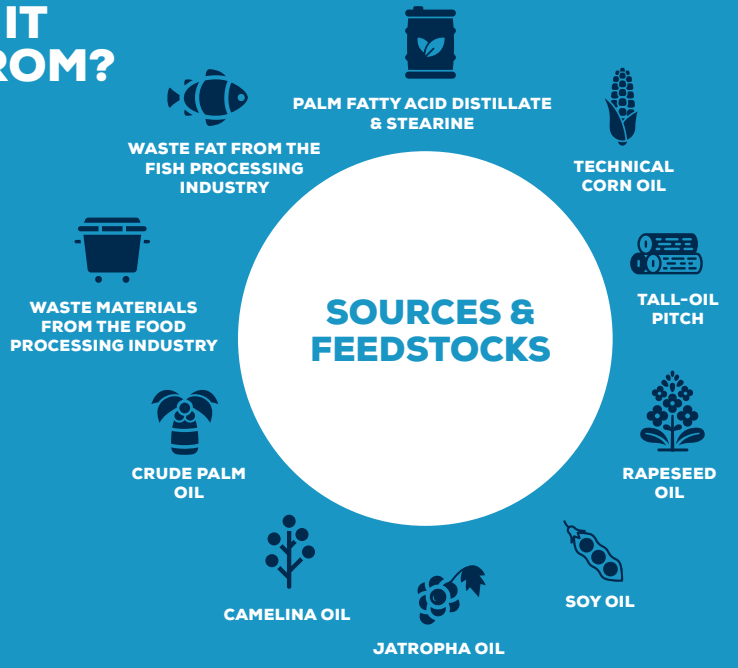
## WHAT IS IT USED FOR?

JUST LIKE LPG, BIOLPG CAN BE USED IN MANY DIFFERENT SECTORS, SUCH AS **DOMESTIC, COMMERCIAL, INDUSTRIAL, AGRICULTURAL AND FOR TRANSPORTATION.** WHEREVER HEAT, LIGHT OR POWER IS REQUIRED.




## WHAT IS IT MADE FROM?

**BIOLPG IS CREATED FROM RENEWABLE AND WASTE MATERIALS.** THE FEEDSTOCKS UNDERGO A SERIES OF SOPHISTICATED TREATMENTS TO PURIFY THEIR ENERGY CONTENT.



# SUSTAINABILITY

BIOLPG IS MADE FROM

**SUSTAINABLY PRODUCED RENEWABLE RAW MATERIALS**

FROM CAREFULLY SELECTED PARTNERS. OUR SECTOR SUPPORTS STRICT SUSTAINABILITY STANDARDS, TO WHICH WE ALSO HOLD OUR PARTNERS.
**FEEDSTOCK MUST BE FULLY TRACEABLE, SUSTAINABLE AND WELL MANAGED.**

**FIRST-GENERATION CROP BASED FEEDSTOCKS**

PLAY AN IMPORTANT ROLE IN THE INITIAL ROLL-OUT AND UPTAKE OF BIOLPG, AND WILL

**GRADUALLY BE PHASED OUT AND REPLACED**

BY WASTE AND RESIDUE MATERIALS.

**TO INCREASE THE AVAILABILITY OF SUCH ADVANCED MATERIALS,** THE LPG INDUSTRY AND ITS PARTNERS NEED THE NECESSARY

**TIME, TOOLS & TECHNOLOGY**

TO INNOVATE AND TO MAKE THIS CRUCIAL ENERGY TRANSITION HAPPEN TOWARDS 2050.

# HOW IS BIOLPG PRODUCED?

### BIO-REFINING

CONVERSION OF BIOMASS TO PRODUCE FUEL, HEAT, POWER AND CHEMICALS. A LARGE NUMBER OF TRADITIONAL OIL REFINERIES IN THE EU HAVE REFINERY TECHNOLOGY SUITABLE FOR HVO (RENEWABLE DIESEL) CONVERSION. AS SUCH, THE GLOBAL INSTALLED CAPACITY OF HVO-BIODIESEL IS EXPECTED TO INCREASE FROM 4.7 MILLION TONNES (MT) TODAY TO UP TO 20MT IN 2025.

### POWER TO GAS (P2G)

A TECHNOLOGY WHICH CONVERTS ELECTRICAL POWER TO A GAS FUEL. COMBINING THE ELECTRICITY AND GAS SYSTEM (KNOWN AS SECTOR COUPLING) CAN INCREASE EFFICIENCY AND FLEXIBILITY OF THE ENERGY SYSTEM AND ULTIMATELY LOWER THE COST OF DECARBONISATION.

### ANAEROBIC DIGESTION (AD)

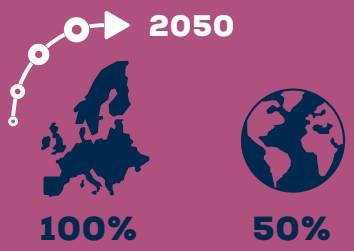
THE BREAKDOWN OF ORGANIC MATERIAL BY MICRO-ORGANISMS, IN THE ABSENCE OF OXYGEN. THIS PROCESS PRODUCES BIOGAS (SUCH AS BIOLPG). AD IS A KEY PROCESS FOR DEVELOPING A CIRCULAR ECONOMY AS IT ELIMINATES WASTE AND REGENERATES NATURAL SYSTEMS.

### GASIFICATION AND PYROLYSIS

A PROCESS THAT USES HEAT, PRESSURE AND STEAM TO CONVERT BIOMASS MATERIALS SUCH AS FOREST AND AGRICULTURE WASTE INTO GASEOUS COMPONENTS THAT CAN BE USED IN VARIOUS APPLICATIONS. GASIFICATION IS ANOTHER SOLUTION THAT COMPLIMENTS AND SUPPORTS THE CIRCULAR ECONOMY.

# SUPPLY OUTLOOK

## CHALLENGE

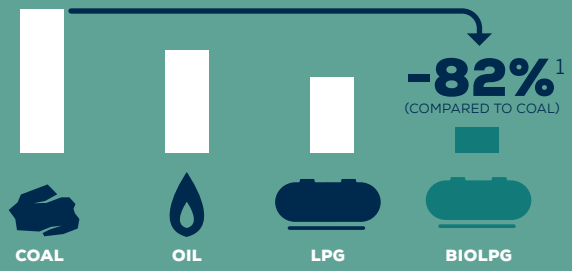



ONE OF THE CHALLENGES WITH BIOFUEL PRODUCTION IS THE EXPECTATION THAT FEEDSTOCKS WILL BE SCARCE. POLICY-MAKERS SHOULD LOOK TO SUPPORT SUSTAINABLE BIOGAS DEPLOYMENT WHERE IT CAN PROVIDE THE GREATEST BENEFIT.

# IN THE MIX

## BIOLPG IS HIGH-PERFORMING

IN COMPARISON TO OTHER FUELS




WHILST FEEDSTOCKS VARY, BIOLPG HAS A **TYPICAL EMISSION FACTOR** WHICH IS SUBSTANTIALLY LOWER THAN HEATING OIL AND COAL.

[1] CoM Default Emission Factors for the Member States of the EU (2017) – European Commission and Bilans Ges (2017) – Ademe

# BIOLPG HAS HIGH POTENTIAL

## A PARTNER TO RENEWABLES & EFFICIENT TECHNOLOGIES

BIOLPG IS **COMPATIBLE WITH EXISTING TECHNOLOGIES, AND HYBRID SYSTEMS.** AS AN EASILY STORABLE FUEL, THIS PROVIDES CONSUMERS AND BUSINESSES WITH FLEXIBILITY AND SECURITY OF SUPPLY.

### SOLAR THERMAL

BIOLPG PROVIDES FLEXIBLE TOP UP TO HOT WATER AND SPACE HEATING.

### SMALL SCALE WIND

BIOLPG CAN BE STORED COST-EFFECTIVELY AND BACKUP INTERMITTENT RENEWABLE GENERATION WHEN REQUIRED.

# VALUE

BIOLPG IS AN OPTIMAL SOLUTION IN HARD-TO-DECARBONISE AREAS AND SECTORS OF THE ECONOMY

## RURAL & OFF-GRID AREAS

BIOLPG IS THE BEST SOLUTION FOR
**COST-EFFECTIVE DECARBONISATION**
OF RURAL HOMES.

IN THE EU ALONE,
**40.7 MILLION HOUSEHOLDS**[2]
ARE LOCATED IN RURAL AREAS THAT ARE NOT CONNECTED TO THE GAS GRID.

THEIR HEATING PREDOMINANTLY COMES FROM

**HEATING OIL & COAL**[3]

THE FACT THAT THESE PROPERTIES ARE GENERALLY OLDER AND NOT ENERGY EFFICIENT AND THEIR INHABITANTS MORE LIKELY TO BE AT THE RISK OF POVERTY MAKES DECARBONISATION VERY CHALLENGING.

[2] Rural Energy Matters Report (2016) – FREE Initiative
[3] Mapping and analyses of the current and future heating/cooling fuel deployment (2016) – European Commission

## INDUSTRY

BIOLPG CAN FUEL
**HIGH-TEMPERATURE INDUSTRIAL PROCESSES**
REQUIRING A GASEOUS FUEL.

IT IS ABLE TO REPLACE
**HIGH-CARBON FOSSIL FUELS**
THAT CURRENTLY ACCOUNT FOR ABOUT **22%**
**OF ENERGY USED IN EU INDUSTRIAL COMBUSTION**[4].

[4] Decarbonisation and industrial demand for gas in Europe (2019) – The Oxford Institute for Energy Studies

## EXISTING BUILDING STOCK


BIOLPG CAN BE COMBUSTED IN EXISTING
**LPG BOILERS**
SAVING BOTH THE **HOUSEHOLD BUDGET, AND HASSLE** FROM SWITCHING TO A NEW HEATING SYSTEM.


THERE ARE AN ESTIMATED
**2,000,000 LPG BOILERS**[5]
IN THE EU THAT CAN LOCK-INTO LOWER $CO_2$ EMISSIONS COST-EFFECTIVELY.

[5] Space and combination heaters market analysis (2019) – European Commission DG Energy

## WITH ITS INHERENT BENEFITS IT CAN ALSO SET THOSE AREAS ON A LOW-CARBON PATHWAY

### COST EFFECTIVE

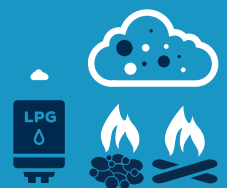
BIOLPG CAN BE UTILISED IN EXISTING GAS BOILERS, THAT ARE

**3–4**
**TIMES CHEAPER** THAN AN **AIR SOURCE HEAT PUMP**

**8–9**
**TIMES CHEAPER** THAN A GROUND SOURCE HEAT PUMP TO INSTALL IN A HOUSE[6].

### CLEAN

BIOLPG IS A CLEAN BURNING FUEL THAT PRODUCES
**VERY LOW CONCENTRATIONS**
OF HARMFUL AIR POLLUTANTS.




COMBUSTING BIOLPG IN A BOILER PRODUCES
**90%–99%**
**LOWER CONCENTRATIONS**
OF PARTICULATE MATTER (PM) THAN HEATING OIL, COAL, AND BIOMASS[7]

[6] Space and combination heaters market analysis (2019) – European Commission DG Energy
[7] EMEP/EEA air pollutant emission inventory guidebook (2017) – European Environment Agency

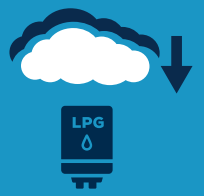
### FLEXIBLE

BIOLPG CAN BE EASILY AND COST-EFFECTIVELY
**STORED AND TRANSPORTED,**
MAKING IT A FLEXIBLE FUEL SUITABLE FOR A WIDE RANGE OF APPLICATIONS.

IT CAN BE USED IN EXISTING GAS TECHNOLOGIES AND STORED COMPACTLY IN
**STORAGE VESSELS,**
WHICH SAVES SPACE AND EXPENSE.

### LOW-CARBON

WHEN USED IN A TYPICAL GAS BOILER, BIOLPG CAN REDUCE
**GREENHOUSE GAS EMISSIONS BY**
**70%–80%**
AGAINST HEATING OIL.




THIS CAN BE LOWERED FURTHER WHEN BIOLPG IS CONSUMED IN A
**HYBRID HEAT PUMP, OR COMBINED HEAT & POWER SYSTEM,**
AND WHEN ENERGY EFFICIENCY MEASURES ARE INSTALLED.