Building a net zero future

A time of change

We understand the need for an energy transition, and to deliver a net zero world. We believe liquid gas provides a valuable transitional option, with considerable advantages over other fossil fuels. For the longer term, we are developing renewable alternatives that can be readily integrated in the existing infrastructure.

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We understand the challenge

The energy transition is one of the most demanding strategic challenges we face – shifting away from fossil fuels and supporting customers in their journey to net zero carbon. We support the UK Government's commitment to net zero emissions by 2050 and the Government's Clean Air Strategy and have a clear plan for how we will meet the challenge.

Supporting off-grid Britain

14%

14% of UK homes are off-grid as well as schools, hospitals and businesses that are located in rural areas.

Hard to treat

Off-grid homes and businesses are often 'harder to treat' sectors with diverse heat requirements which cannot be purely electrified without significant cost and disruption to the consumer.

Less efficient

Rural homes are often older, larger and less energy efficient which means low carbon technologies such as heat pumps are less effective.

Energy intensive

Industrial process applications are energy intensive and require high grade heat in large volumes for which an electrical solution is not suitable.

We are part of the solution

- We are already supporting our customers in their transition to net zero by switching customers from oil to liquid gas
- We are sourcing lower carbon fuels such as biopropane and renewable DME while progressing our research in Hydrogen
- We believe that a mixed technology approach will provide the most cost-effective route to decarbonisation for the UK.

20% by 2025

We are committed to reduce our CO_2 emissions by 20% by 2025 (from a 2019 base)

100% by 2040

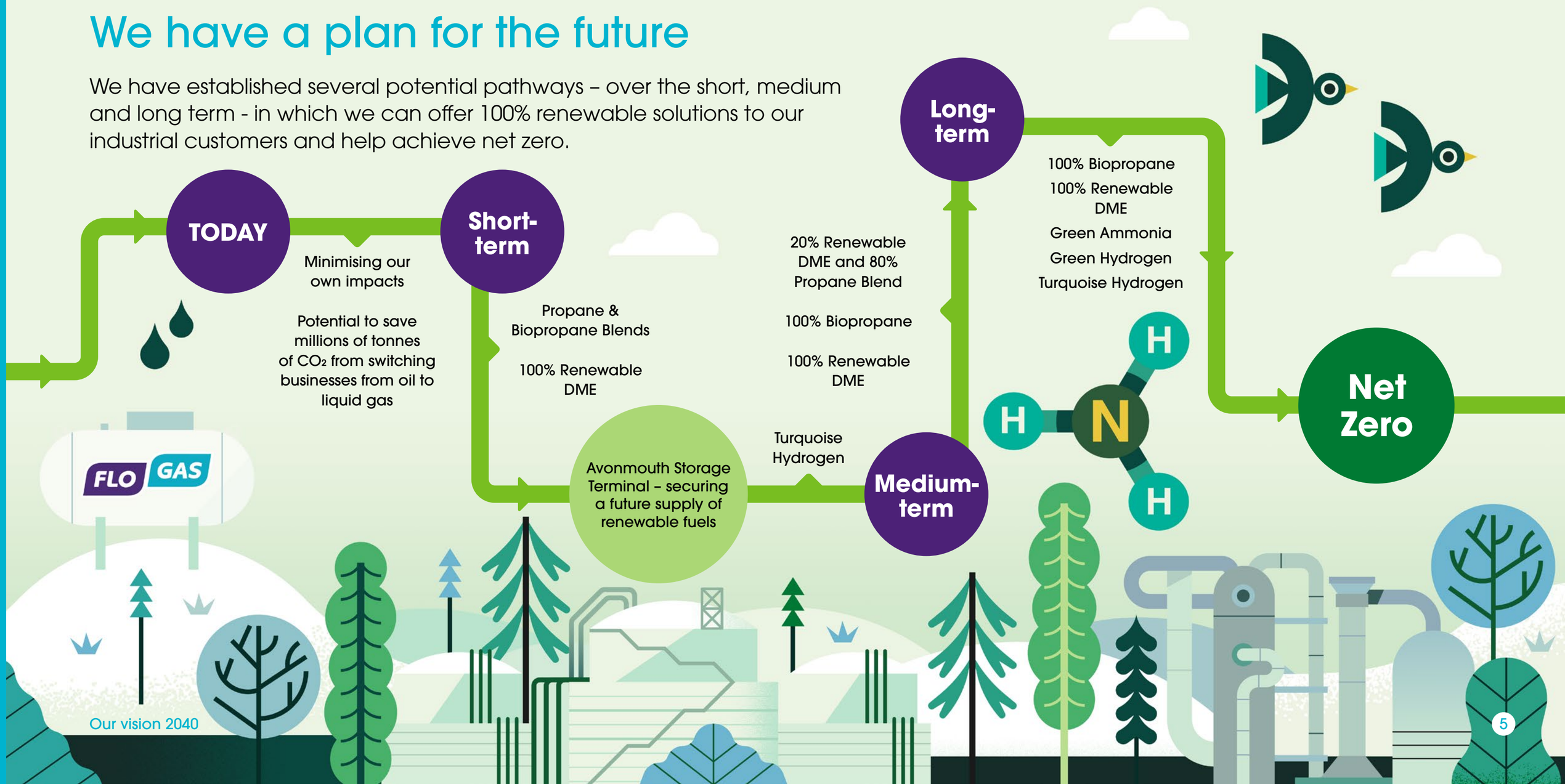
We endeavour to supply customers with 100% renewable energy solutions by 2040

"There is no single answer to the complex challenge of moving away from fossil fuels, but we are taking action and are excited to be an integral part of the solution."

Lee Gannon, Managing Director, Flogas Britain Ltd

We have a plan for the future

We have established several potential pathways – over the short, medium and long term - in which we can offer 100% renewable solutions to our industrial customers and help achieve net zero.



We are taking action now

43%
of our company carpool now electric or hybrid

Offset
77,287 tonnes
of our scope 1 and 2 emissions since 2019

New Business Development Director role to **focus on transition to renewable fuels**

Sustainability in all employee objectives from 2022

Exploring **alternative fuels**

Saved our customers
36,261 tonnes
of CO_2e annually

Nearly **90%**
of our waste is recycled, recovered, or reused

Received our **first shipment of biopropane** into the UK

Supporting energy security through investment in the Avonmouth Storage Terminal

Improving air quality and human health – by **reducing NOx, SOx emissions and Particulate Matter**

Helped customers meet regulatory standards

Switched to **100%** **green electricity**

Enhancing **quality of life** for off-grid Britain

Liquid Gas – a valuable transition fuel

- Liquid Gas refers to Liquefied Petroleum Gas (LPG) and Liquefied Natural Gas (LNG).
- LPG is a blanket term for two types of gas (propane and butane) which can be easily converted to liquid form and can be stored and transported safely.
- LNG is composed primarily of methane and is created by cooling natural gas to an extremely low temperature. LNG takes up about 600 times less space than natural gas making it more efficient to transport and store.
- LPG is a highly versatile energy source and is used in numerous applications across different off-grid industries including domestic heating and cooking, commercial heat, industrial heating and transport.

Switching all UK homes and businesses currently using oil to liquid gas could displace:

4.4 million tonnes
of oil in business

1.8 million tonnes
of oil in domestic

Resulting in:

4.19 million tonnes CO_2
saved per annum

Reduced NOx, SOx and PM

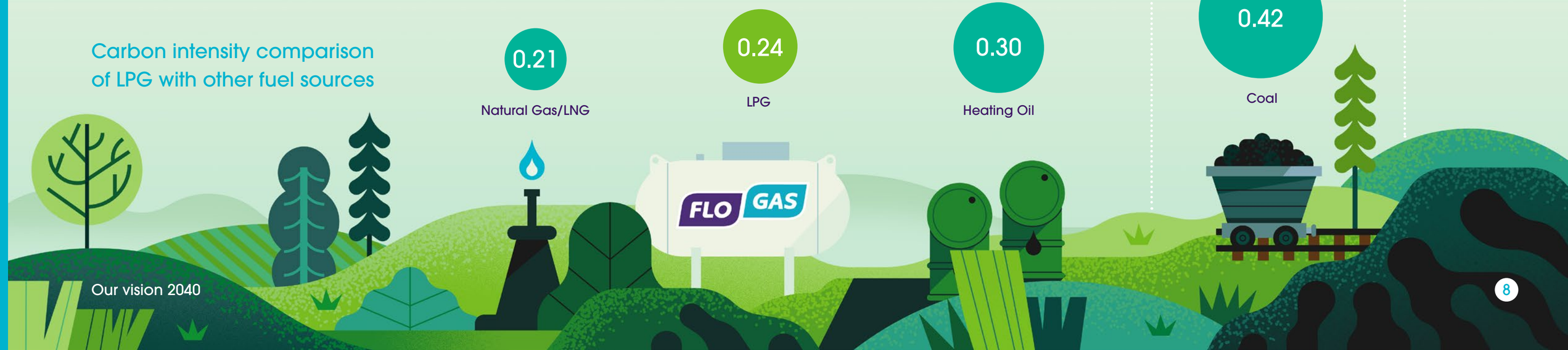
How does Liquid Gas compare to other fuels?

- For off-grid homes and businesses, LPG offers significant and immediate carbon savings and air quality benefits when compared to oil and coal.
- LPG has the lowest carbon footprint of all off-grid fossil fuels.
- LPG and LNG have an important role to play in the energy mix and provide a credible decarbonisation pathway in the energy transition through biopropane and BioLNG.

20% lower carbon intensity than oil and **30-40%** lower than coal

84% lower emissions of NOx, SO_2 and negligible particulate matter (PM) compared to oil

Carbon intensity comparison of LPG with other fuel sources



Biopropane

What is Biopropane?

A fuel made from renewable sources such as vegetable oils, waste fats, tallow and used cooking oils.[1]

What are its benefits?

Can be dropped in to existing LPG supply chains and appliances without change to tanks or boilers.

Potential supply

A full switch from fossil to bio LPG by 2040 is feasible in the UK.[4]

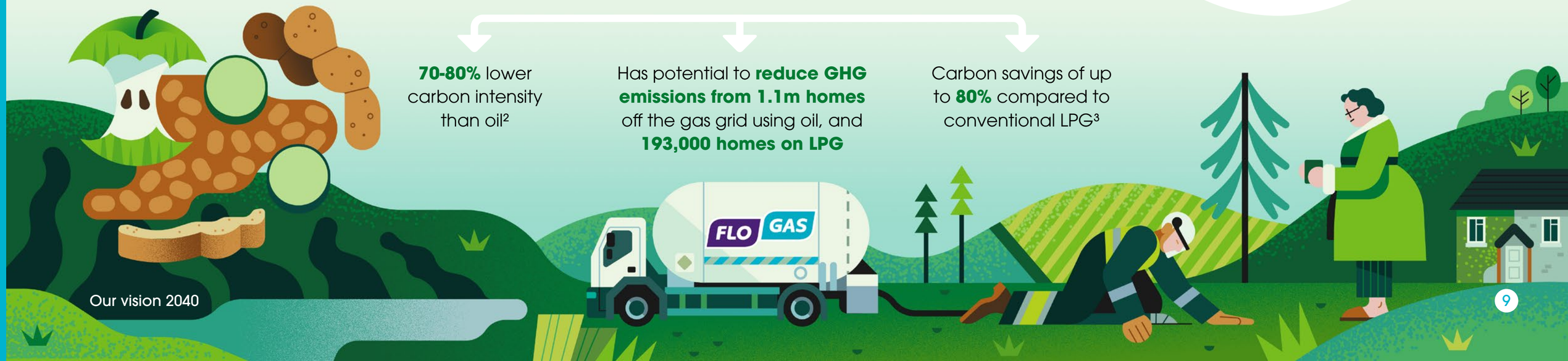
Hydrogenated vegetable oil biopropane is available in the UK market today.

Carbon savings

70-80% lower carbon intensity than oil[2]

Has potential to **reduce GHG emissions from 1.1m homes** off the gas grid using oil, and **193,000 homes on LPG**

Carbon savings of up to **80%** compared to conventional LPG[3]



Renewable Dimethyl Ether (rDME)

What is rDME?

A colourless gas that can be handled as a liquid when lightly pressurized. It can be produced from animal waste, municipal waste, agriculture residues or sewage sludge.[5] rDME can be used to enable a sustainable transition for cooking and heating, and in industrial process and transport sectors.[6]

What are its benefits?

Up to 20% rDME can be blended with LPG with no modifications to boilers or equipment. 100% rDME can be used with limited modifications to equipment.[7]

Potential supply

Already produced at commercial scale.

World production of DME is approximately 5 million tonnes per year.

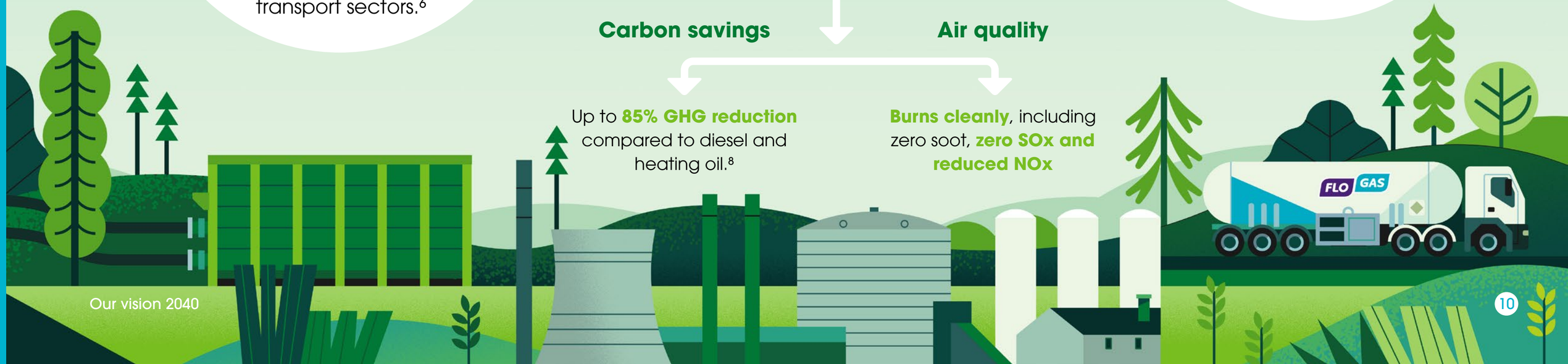
DME demand in Europe is around 80kton per year while production capacity is 140kton.[9]

Carbon savings

Up to **85% GHG reduction** compared to diesel and heating oil.[8]

Air quality

Burns cleanly, including zero soot, **zero SOx and reduced NOx**



Ammonia as a Hydrogen carrier

Hydrogen does not have a high energy density, making it difficult to transport by road. However Ammonia is a promising hydrogen carrier and can help overcome these challenges. To put this into context, one truck of ammonia contains the same energy content as more than seven trucks of compressed hydrogen.

What is it?

Green (or blue) ammonia can be synthesized from nitrogen and hydrogen via various methods. It can be compressed at moderate pressures and is easily liquefied for storage and transport – and is carbon free.

What are its uses?

Ammonia's main use is in the fertiliser industry but has other potential applications within 'hard to abate' sectors such as industrial process and marine.

What are its benefits?

Ammonia's energy density is 150% of liquid hydrogen making it easier to store and transport hydrogen.[10]

Liquid ammonia has similar physical properties to LPG, providing an opportunity to use existing storage, transportation and terminal equipment.[11]

Potential supply

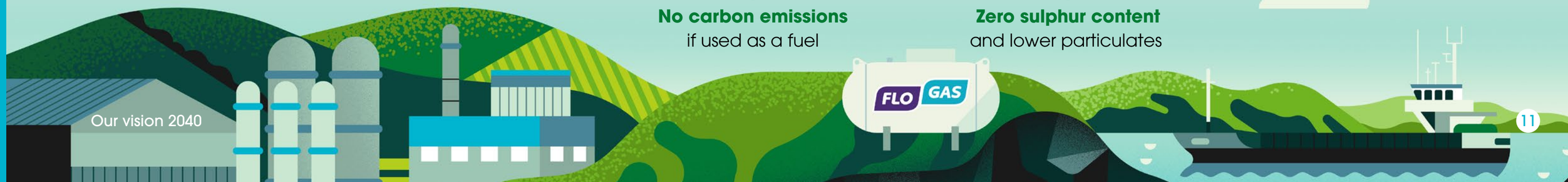
The second most widely produced commodity globally, with a production of over 180 million tonnes in 2019.[12]

Carbon savings

No carbon emissions if used as a fuel

Air quality

Zero sulphur content and lower particulates



We are working to deliver a renewable future

We are taking action now, through our investments, studies, research and partnering agreements, to build a portfolio of renewable energy supplies that can meet today's needs and tomorrow's.

Biopropane

Received our first shipment into the UK.

Partnered with the University of South Wales to build on their research into the anaerobic production of methane and hydrogen gas.

Investigating other pathways to produce biopropane.

Renewable DME

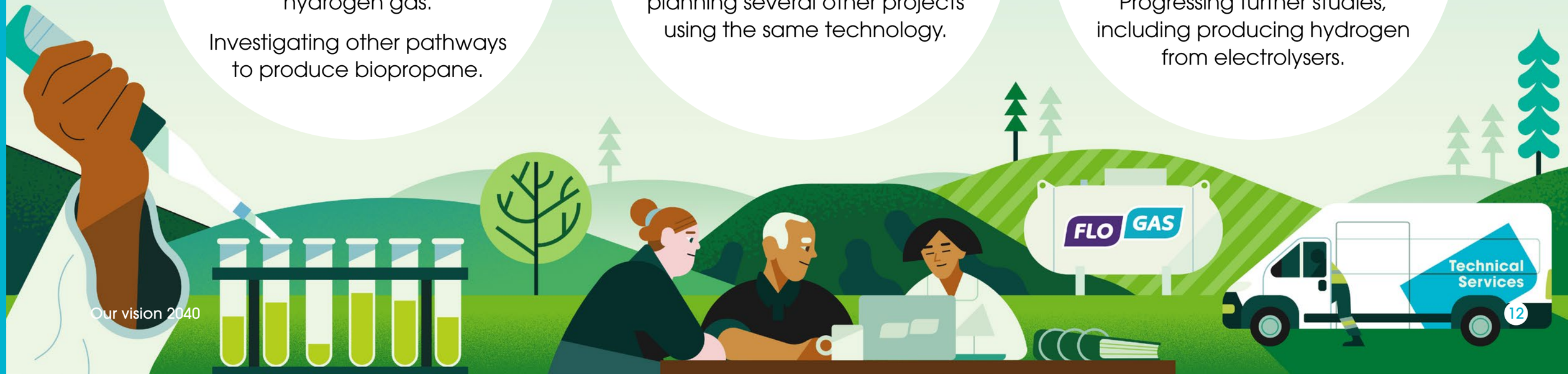
Securing supplies of renewable DME produced from pyrolysis of waste to syngas to methanol to renewable DME.

Planning to launch a blend of rDME in propane in 2023 while planning several other projects using the same technology.

Ammonia as a Hydrogen carrier

Completed a study to show that our current infrastructure, both storage tanks and road tankers, can be adapted to be compatible with ammonia.

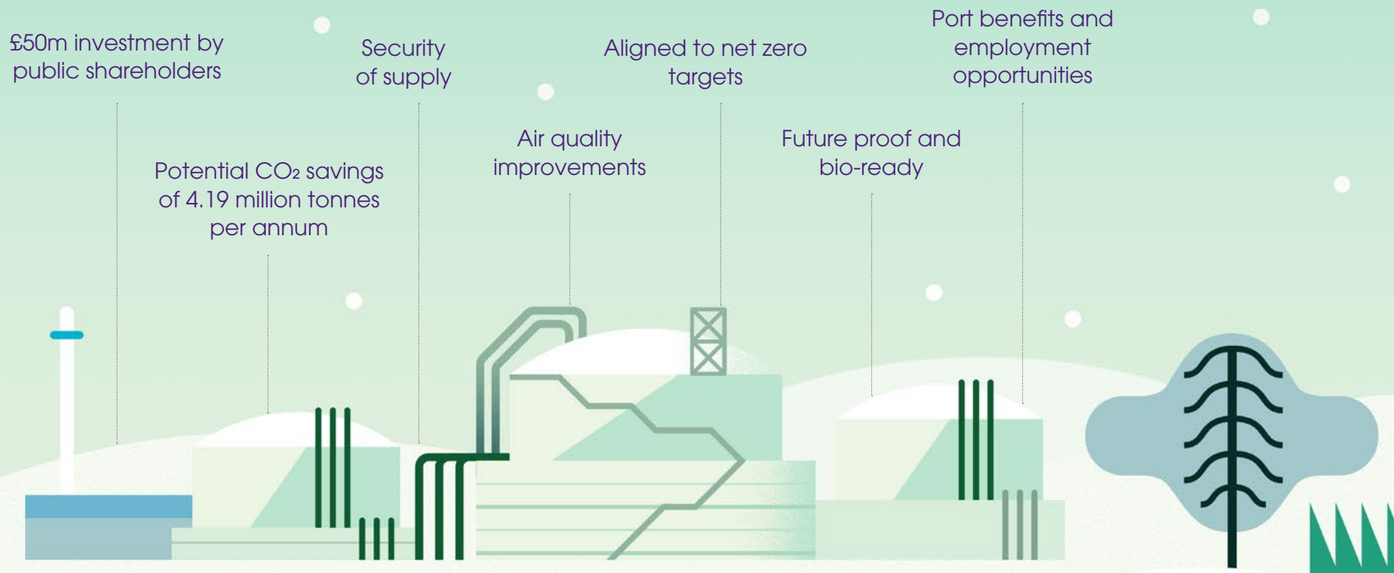
Progressing further studies, including producing hydrogen from electrolysers.



Investing for the future: Avonmouth Storage Terminal

- We are progressing work to convert the former national grid LNG facility at Avonmouth to an LPG storage terminal – which will be renewable ready.
- The facility has the capacity to store 34,564 tonnes of LPG – the equivalent to the annual use of 30,000 homes.
- The terminal will be operational by autumn 2022.
- A planning application has been submitted to develop/build an underground gas pipeline which will connect the storage terminal to Bristol port through industrial areas.

A range of benefits



The Avonmouth storage terminal has an important role to play in decarbonising off-grid Britain. The facility provides security of supply during the transition from oil to gas while opening a potential global supply of renewable fuels in the UK in the future.

Our long-term commitment

By partnering with us, we can support you on your drive to a lower carbon world. We have a clear plan for the future that can help off-grid homes and businesses respond to and manage the energy transition.

We are taking action now to cut our own emissions and to develop fuels that will help you, our customers, reduce your own emissions.

Join us, as we work to build a net zero future.

To find out how we can help you on your journey to net zero, contact us:

0800 123 4567

transition@flogas.co.uk

or visit **flogas.co.uk/transition**

References

Biopropane

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2. WLPGA: The Role of LPG and BioLPG in Europe
3. Liquid Gas Europe: BioLPG: A Renewable Pathway Towards 2050, 2021
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