

we make the move



Annual financial report 2021

Fluxys



fluxys

#wemakethemove

Be the transporter of the future energy carriers



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Our approach

The energy transition is different in every country and every continent. The approach and pace depend to a large extent on various factors, including the specific climate, economic and industrial characteristics of each region. Where the market is ready to move towards carbon-neutral molecules, Fluxys is ready as well.

We support biomethane initiatives, explore new technologies and invest in infrastructure to accommodate hydrogen, CO₂ and other molecules for the low-carbon future.

Our focus in 2021



Going to the market with tangible proposals for open access hydrogen and CO₂ infrastructure in Belgium's various industrial clusters and initiatives to underpin the hydrogen economy with infrastructure in Germany, Switzerland and Greece



Rolling out initiatives to help develop the biomethane market in Belgium and make bio-LNG available at the Zeebrugge LNG terminal



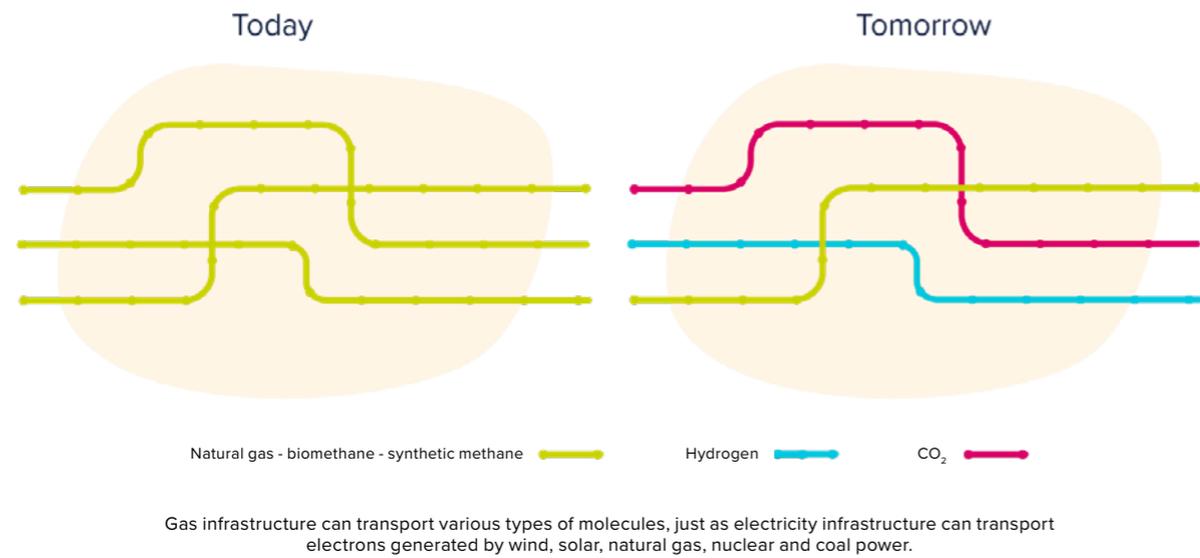
Systematically reducing our own climate impact



Working towards a European hydrogen backbone

An interconnected European network for hydrogen transmission is the cornerstone of a well-functioning hydrogen economy in Europe. To this end, since 2020 Fluxys has been working with other energy infrastructure companies within the European Hydrogen Backbone initiative. The initiative has

since grown into a joint plan to develop dedicated hydrogen infrastructure in 27 European countries. The plan provides for a hydrogen backbone which largely consists of repurposed infrastructure currently used to transport natural gas.

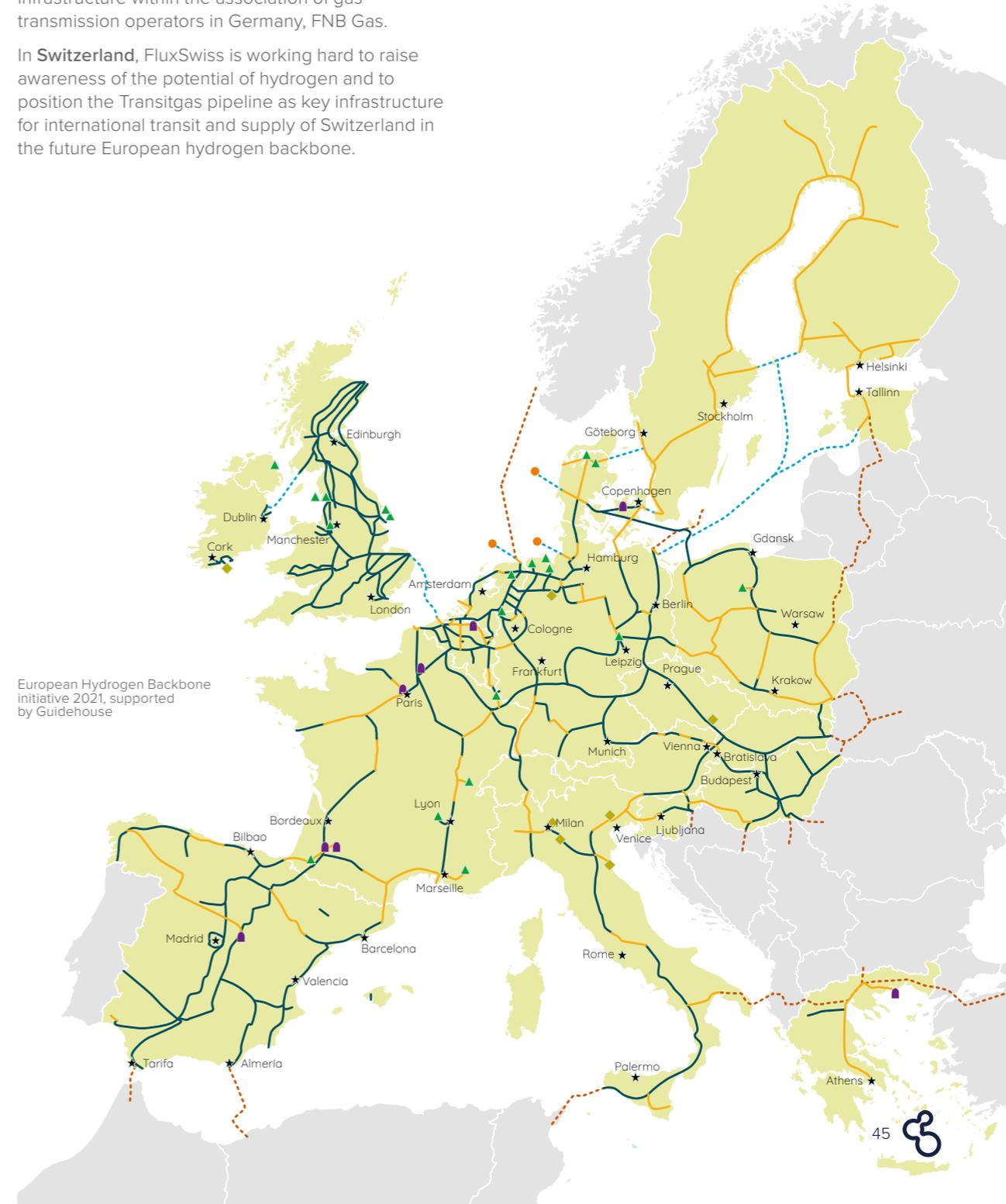


Belgium is the pilot country for Fluxys (see 'Building the hydrogen and CO₂ infrastructure for Belgium' on page 46).

In **Germany**, Fluxys is actively involved in developing the long-term vision for hydrogen transmission infrastructure within the association of gas transmission operators in Germany, FNB Gas.

In **Switzerland**, FluxSwiss is working hard to raise awareness of the potential of hydrogen and to position the Transitgas pipeline as key infrastructure for international transit and supply of Switzerland in the future European hydrogen backbone.

In **Greece**, DESFA and TAP are infrastructure partners in the White Dragon project, an initiative to kick-start the country's hydrogen economy.



Building the hydrogen and CO₂ infrastructure for Belgium

Using our infrastructure sustainably for the energy transition

Thanks to its energy transition strategy, Fluxys is ready to sustainably use its infrastructure in Belgium as a vital tool to help shape a carbon-neutral society. Our approach is fully in line with the hydrogen strategies of the European Commission and the Belgian federal government as well as the climate approach at regional level.

Taking into account the necessary legal and regulatory developments, we want to transform and develop our infrastructure into a multi-use system. In this system, in line with changing market needs, we will be transporting natural gas and biomethane as well as increasing quantities of hydrogen, CO₂ or other molecules that are needed to make the energy transition a success.

First infrastructure in 2026

Our approach to providing Belgium with the necessary hydrogen and CO₂ infrastructure takes shape in cooperation with our customers, the authorities, neighbouring operators, distribution system operators and other stakeholders.

The plan is to develop, in line with market needs, infrastructure in industrial clusters, establish connections between them and with neighbouring countries. This will allow us to lay the foundations for Belgium's lasting role as an energy hub in North-West Europe for the molecules of the future.

We aim to have the first hydrogen and/or CO₂ infrastructure in place for use in 2026. In early 2021, we asked the market which volumes would be needed from which sources and going to which destinations. At the end of that year and in early 2022, we went back to the market with tangible proposals for hydrogen and CO₂ infrastructure in various industrial clusters. We are ready to get started.

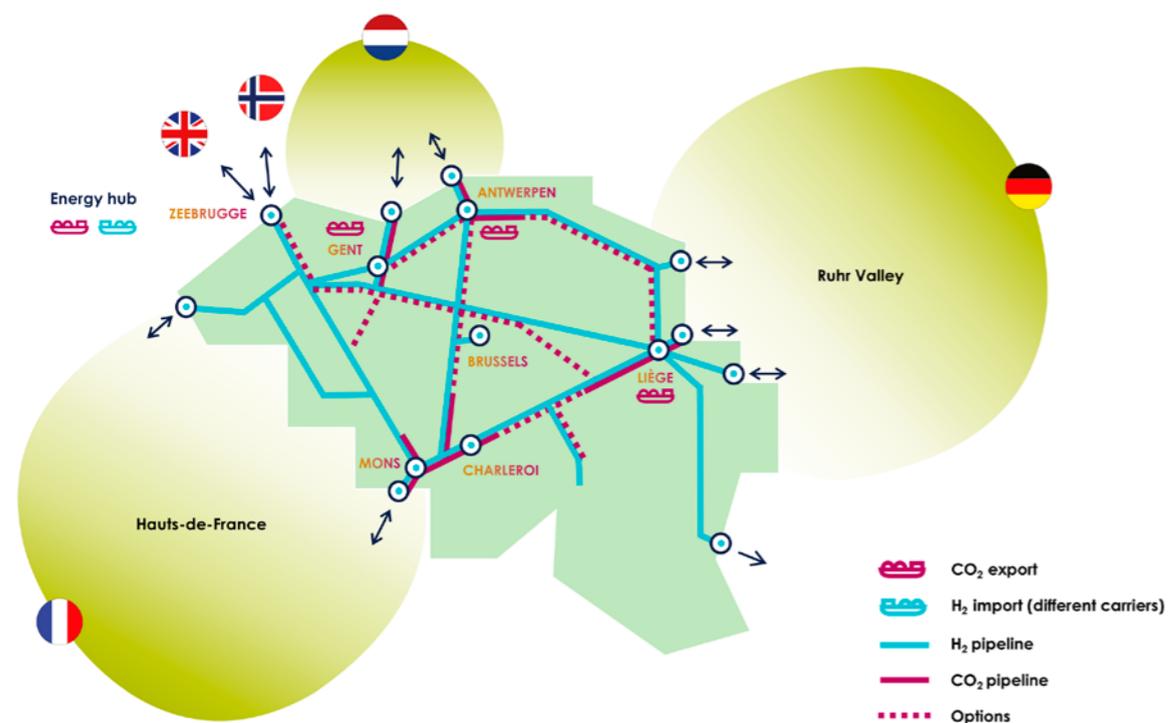
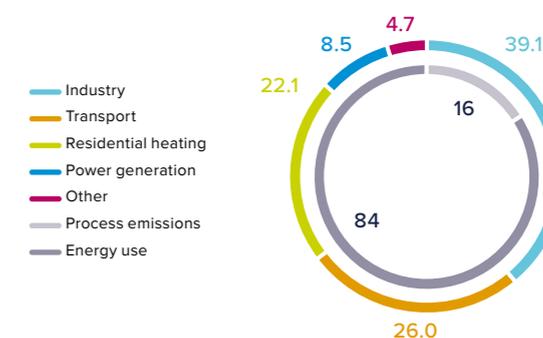
Infrastructure to transport hydrogen and CO₂: a dual solution

Approximately 40% of Belgium's CO₂ emissions are generated by energy consumption or process emissions in industry. Reconfiguring our infrastructure is a cost-efficient solution to cutting industrial CO₂ emissions, consequently making a major contribution to achieving climate targets.

Industrial processes for which electricity is not an option – a range of industrial processes require high temperatures where (renewable) electricity is not an option. Connecting these industries into hydrogen supply enables them to switch to a carbon-neutral alternative. The same goes for industries that use carbon-intensive feedstock.

Industrial processes that produce CO₂ – the capture and use or storage of CO₂ is considered a key technology for reducing CO₂ emissions and creating clusters for the circular reuse of CO₂ in the production of, for example, carbon-neutral biofuels. This technology is particularly important for hard-to-abate sectors with processes inherently generating CO₂ emissions. The availability of infrastructure to transport captured CO₂ to destinations for reuse or storage is a cornerstone of this solution.

Belgium: breakdown of CO₂ emissions
(in million tonnes, source: klimaat.be)



Various projects to develop the hydrogen market and CO₂ chains

Fluxys is working with a range of partners on various projects to carve out a place for hydrogen as an energy carrier and for CO₂ capture and reuse/storage chains within the energy system and the wider economy.

HyOffWind

HyOffWind is a project developed by Virya Energy and Fluxys to construct a power-to-gas facility in Zeebrugge that converts renewable electricity into green hydrogen. Fluxys' role in the project focuses on the infrastructure and is separate from the commercial aspects related to the production and sale of green hydrogen.

HyOffWind is designed as an industrial-scale facility with the capacity to electrolyse 25 MW of electricity (with the potential to scale capacity up to 100 MW). In early 2022, HyOffWind has signed an agreement with John Cockerill and BESIX to design and build the facility. The final investment decision for the project is expected in the course of 2022.

Hydrogen imports

Any viable hydrogen economy requires enough renewable electricity to be generated to produce green hydrogen. However, at present Belgium only has limited potential to generate renewable electricity as a source of green hydrogen. 'Blue hydrogen' is one alternative. This is hydrogen produced from natural gas, where the released CO₂ is captured and reused or stored. Using available technologies, more than 95% of the CO₂ released can be captured and other technologies such as pyrolysis are also under development to produce low-carbon hydrogen.

The import of carbon-neutral hydrogen is another important option if the hydrogen sector continues to grow. DEME, ENGIE, EXMAR, Fluxys, the ports of Antwerp and Zeebrugge and WaterstofNet therefore have joined forces in the Hydrogen Import Coalition. The partners completed a large-scale industrial study mapping out the financial, technical and regulatory aspects of the entire hydrogen import chain, from production abroad to supply via ships and pipelines to Belgium and onward distribution.

The study concluded that hydrogen imports are both technically and economically feasible. This forms the basis of subsequent action, including pilot projects to supply green molecules from countries where wind and sun are available in abundance.

The Hydrogen Import Coalition is supported by Flux50 and receives financial support from Flanders Innovation & Entrepreneurship.



Hydrogen panels

Researchers from KU Leuven have developed game-changing hydrogen panels that are a highly efficient means of producing green hydrogen from sunlight and water vapour in the air. Fluxys installed several of these panels on the green roof of its Anderlecht lab with a view to joining forces with the university and conducting extensive tests for a year.

The measurements and analyses conducted at the Fluxys lab will highlight variations in the production profile and hydrogen composition depending on the direction of the panels, the weather conditions, the time of day and the season. Researchers from KU Leuven can then use these data to further hone the technology.

H2GridLab

H2GridLab is an initiative to establish a participatory lab on the Anderlecht site of distribution system operator Sibelga to carry out tests, roll out pilot projects and amass knowledge of green hydrogen, local storage thereof, injection into networks and its role in the decarbonisation of public distribution. H2GridLab is supported by Belgium's federal Energy Transition Fund.

Semi-industrial installations such as gas turbines and fuel cells will be set up and tested in a second phase starting in late 2022.

Antwerp@C

Antwerp@C is a project to halve CO₂ emissions in the port of Antwerp by 2030 by building open access CO₂ infrastructure. In this initiative, Fluxys joins forces with Air Liquide, BASF, Borealis, ExxonMobil, INEOS, Port of Antwerp and TotalEnergies. Once the technical studies are complete, a final investment decision is expected by the end of 2022.

Antwerp@C was awarded a European grant from the Connecting Europe Facility. The funds are used to conduct studies into a CO₂ pipeline at the port of Antwerp, a CO₂ pipeline to the Netherlands and a terminal to liquefy captured CO₂ for export by ship.



Ghent Carbon Hub

Fluxys, ArcelorMittal and North Sea Port join forces to develop an open access CO₂ terminal in the port of Ghent. The idea is to liquefy CO₂ captured in the wider port area at the terminal for export.

Power-to-Methanol Antwerp

Methanol is an essential multi-purpose raw material for the chemical industry and has many other applications as well. Fluxys is an infrastructure partner in the Power-to-Methanol Antwerp project, an initiative to build a demonstration plant to produce 8,000 tonnes of sustainable methanol a year, avoiding at least an equivalent volume of CO₂ emissions. In 2021, the project received €1 million in financial support from the Flemish government. The partners in this project are ENGIE, Fluxys, Indaver, INOVYN, Oiltanking, Port of Antwerp and the Flemish Environmental Holding Company.

Optimum reuse of our infrastructure: knowledge is power

Together with various academic institutions and partners, Fluxys is looking extensively into the modalities for transporting hydrogen and CO₂ in its infrastructure.

HyFit and Hysource

Two projects with universities to study the influence of hydrogen on pipeline steels and welding.

PIPELHYNE

Programme with GRTgaz, National Grid and ENGIE to test different types of steel for their sensitivity to hydrogen.

FutureGrid hydrogen test facility

Fluxys Belgium is working with National Grid, its UK counterpart, and Northern Gas Networks, the distribution system operator for the North of England, to develop a hydrogen test facility. The facility is intended to test the transmission of hydrogen in real conditions in various domains, with existing natural gas infrastructure forming a mini-network separate from the existing network.

The tests will start in 2022 and are an important addition to our own research into the reuse of existing natural gas infrastructure. Expert group DNV and the universities of Durham and Edinburgh are also involved in the test facility.

Underground storage

We are investigating the modalities for hydrogen storage at our Loenhout underground storage facility. In 2021, preparations were made to inject hydrogen for underground storage and we expect to be able to carry out the first tests in 2022.

Other research avenues

Fluxys is working with universities to map additional research to support the development of hydrogen and CO₂ infrastructure. Other possible research includes additional solutions to help Fluxys make its own activities climate-neutral.

Helping to develop the biomethane market

Out of the starting blocks

The production of biomethane in Belgium is getting off the ground, but is still lagging behind neighbouring countries. At present, five biomethane units are operational: two in Flanders and three in Wallonia. An additional five are expected by 2024, increasing annual generation to around 1 TWh.

Significant potential

At the request of the Belgian gas federation gas.be, ValBiom carried out a study into the potential contribution of locally produced biogas in Belgium, concluding that biogas could cover about one fifth of household gas consumption by 2030. In addition, biomethane can also be imported from neighbouring countries. Cross-border exchanges of biomethane should be encouraged by developing an international system of guarantees of origin and sustainability certificates.

Producers: connecting to the network

In addition to being able to inject into the networks of distribution system operators, large biomethane plants in Belgium can also connect to Fluxys Belgium's high-pressure network. Based on the applications we received in 2021, we expect to establish the first direct connections to our network from 2024 onwards.



Also research into optimal cooperation between gas and electricity networks

The role of gas in a low-carbon context

A project with universities investigating the role of renewable molecules in the energy transition. The research is intended to produce an energy system model to support a renewable energy policy that combines support for renewable electricity and for renewable gas.

Interaction between energy networks

Together with a university, research is being conducted into the interactions between different energy networks with a view to creating a simulation model for the Belgian energy system that integrates electricity, hydrogen and natural gas.

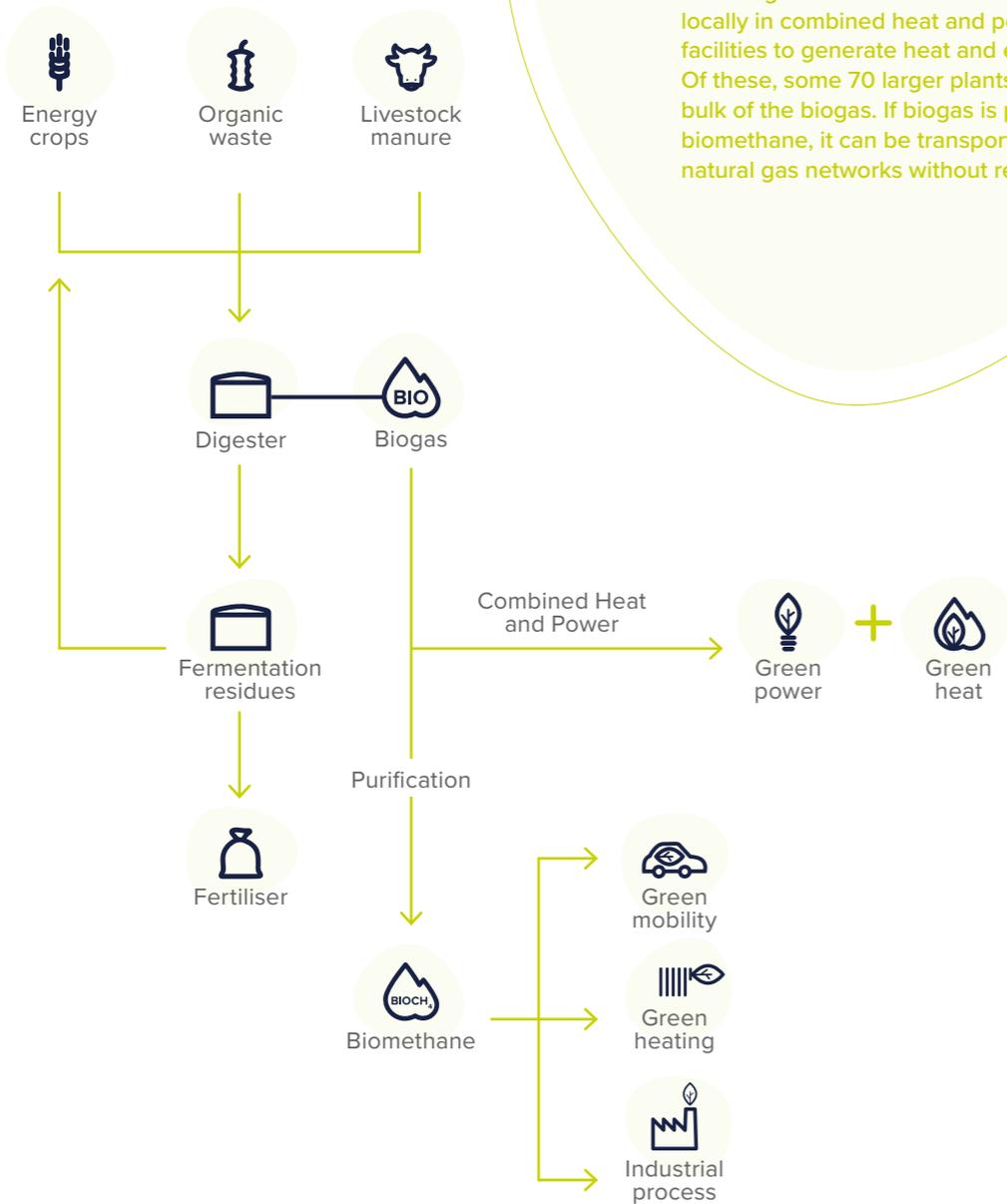
Zeebrugge LNG terminal makes available bio-LNG

Since 2020, the LNG terminal in Zeebrugge has been certified as a European approved process plant to make bio-LNG available as a fuel for transport. In 2021, around one hundred trailers and two bunker vessels were loaded with bio-LNG. As bio-LNG enables shipping and heavy goods transport to fully decarbonise, we expect demand for bio-LNG at the terminal to rise sharply in the coming years.



Biogas, carbon neutral

Biogas is carbon neutral and is extracted from organic matter such as sludge, garden waste, the remains of fruit and vegetables, or animal waste like cow manure. Belgium is currently home to around 200 biogas facilities where biogas is used locally in combined heat and power (CHP) facilities to generate heat and electricity. Of these, some 70 larger plants supply the bulk of the biogas. If biogas is purified into biomethane, it can be transported via the natural gas networks without restriction.



Systematically reducing our own climate impact

Fluxys aims to achieve net-zero greenhouse gas emissions for its own operations by 2035. This target was set in 2021. In Belgium, since 2019 we have been working with a comprehensive programme to achieve our first milestone: halving our own greenhouse gas emissions by 2025 compared to 2017 levels. The programme is on track to meet that objective.

3 additional regasifiers with seawater

Three additional regasifiers with seawater are being built to boost send-out capacity at the LNG terminal in Zeebrugge. Using the heat from seawater to regasify LNG will significantly reduce the terminal's energy consumption and emissions.



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