



storengy

METHANATION

**Biomethane's natural complement.
An innovative solution to valorize
the CO₂ of biogas.**



Are you operating one or several biog

Are you active in waste treatment? Would you like and the development of your region?

FIND OUT HOW METHANATION MEETS YOUR NEEDS.

AN INNOVATIVE TECHNICAL PROCESS REPRESENTING TWO MAIN DIRECT BENEFITS:

1

Suppress CO₂ emissions
from your biogas production facility,
using clean hydrogen (H₂)
to produce additional clean gas
(synthetic methane - synCH₄).

2

**Increase clean gas production
up to 50%** at your site,
with the same amount
of organic feedstock.

Good to know

Synthetic methane is a clean gas which can be injected in gas grids just like biomethane (bioCH₄). That's why it's one of the simplest solutions to draw benefit from the CO₂ from the biogas production process.



(1) Study about hydrogen and methanation as processes to benefit from surplus electricity, ADEME GRTgaz, 2014, p218. (2) Law no.2015-992 of 17 August 2015 about the Energy Transition for Green Growth (LTECV) sets the objective to have 10% of renewable gas in the grids by 2030.

as production units?

to contribute to solve the challenges of decarbonisation

METHANATION ALSO OFFERS INDIRECT BENEFITS DEPENDING ON FACILITIES, SUCH AS:

3
Recover lost heat up to 90%⁽¹⁾
from methanation unit as well as
the electrolyser (up to **70%**).

4
Valorize oxygen coproduced
during water electrolysis reaction
as feedstock for industrial process
(up to 70% OPEX reduction
in water treatment plants).

5
Utilize local hydrogen clusters.
Hydrogen production excess
can supply clean mobility uses,
offer back-up services or improve
existing electrolysers load factor
and economics.

VERY PROMISING PROSPECTS FOR THE SECTOR



More than 30 TWh in annual biomethane production for 2030,
inducing a high CO₂⁽²⁾ recovery potential.



30 to 50 TWh in annual synthetic methane production according
to the ADEME scenarios about the energy mix of the future⁽³⁾.

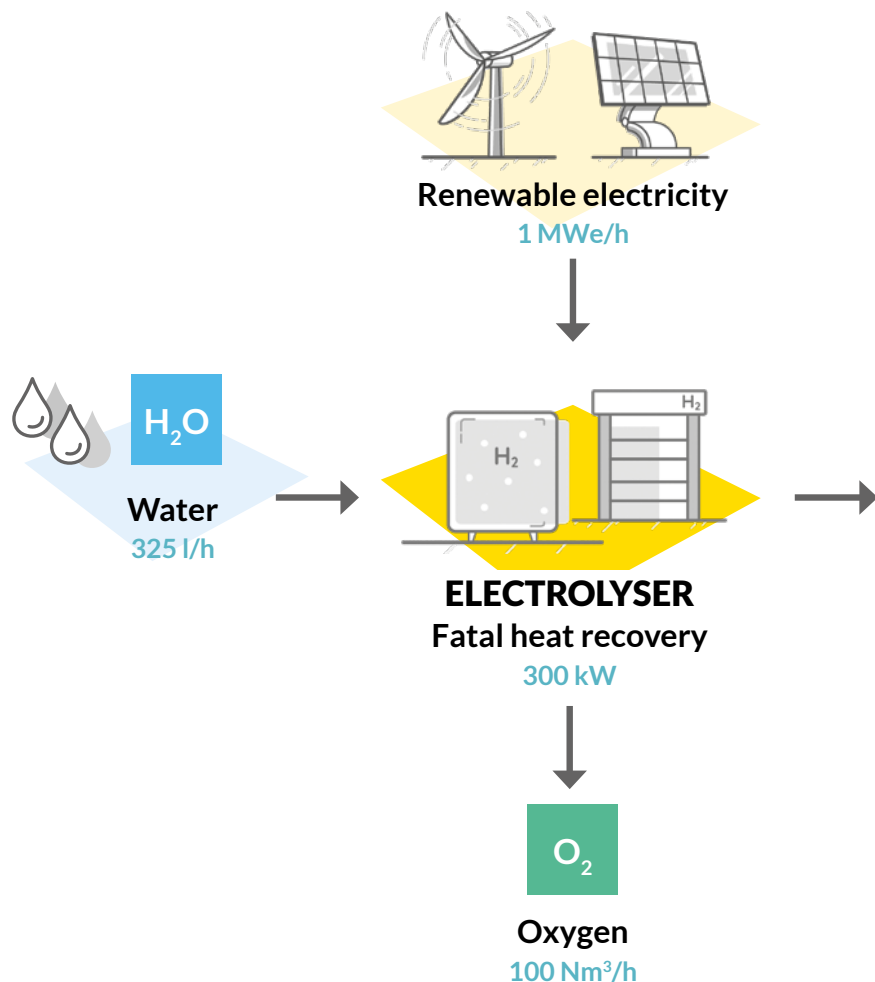
(3) Transitions 2050 study, Ademe.

Your carbon dioxide is valuable: make

Biogas from anaerobic digestion of organic substances is composed of The latter is normally lost during the purification process.

Did you know?

BioCO₂ is the part of CO₂ recovered after the purification of biogas. It is considered as a biogenic CO₂, or «organic» CO₂, in comparison to «fossil CO₂» derived from petrol or natural gas.



WHAT IS METHANATION?

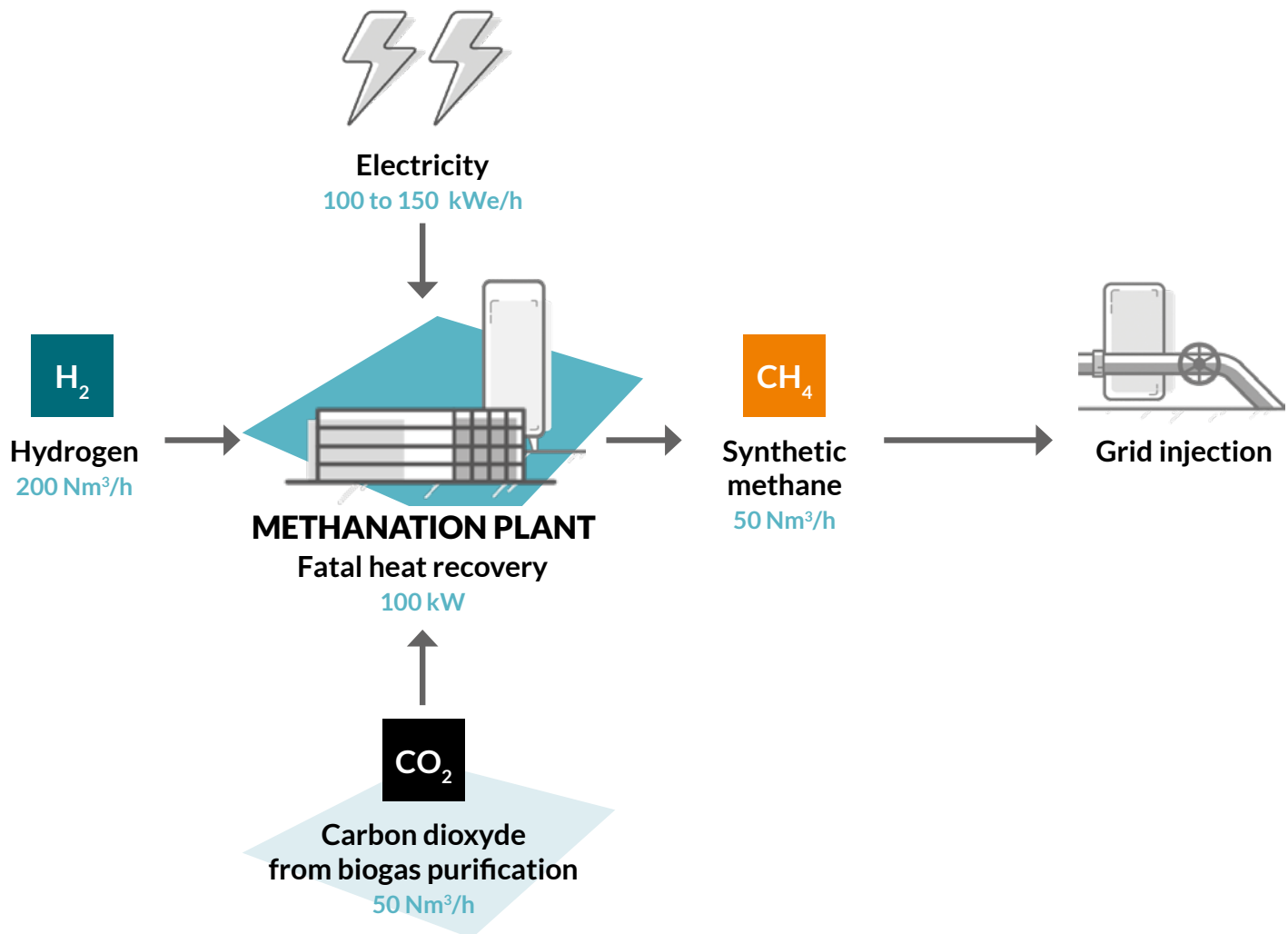
Methanation is an innovative solution which perfectly matches biomethane production. BioCO₂ extracted from biogas is mixed with green hydrogen to form synthetic methane without adding any further organic feedstock. Green hydrogen can be produced directly on site by water electrolysis and renewable power/electricity.

There are two methanation technologies: catalytic and biological methanation.

Type
Principle
Temperature
Catalyser
Advantages

the most of it through methanation!

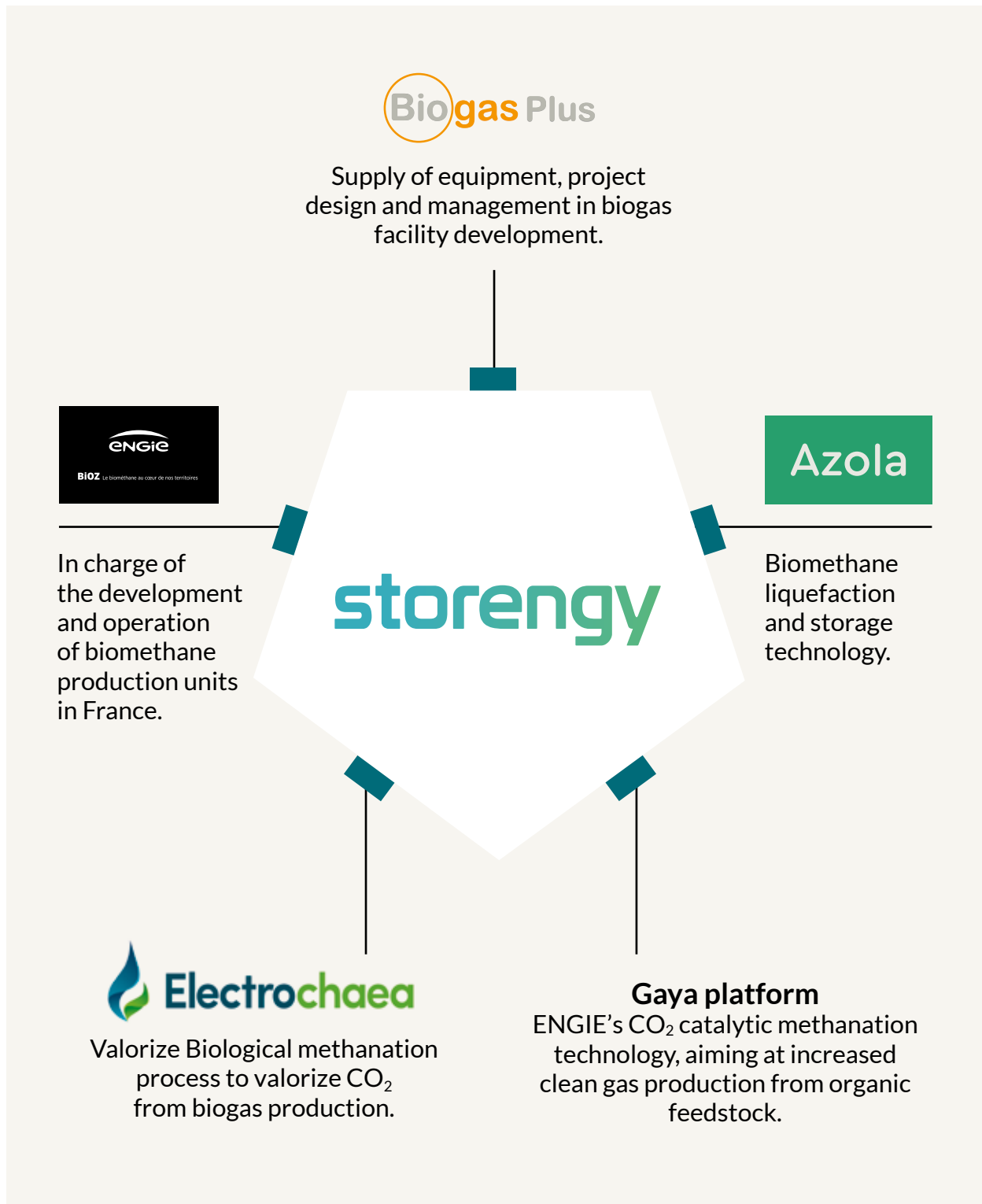
30% to 50% of CO₂.



Catalytic	Biological
Hydrogenation	Biological digestion
300° C to 350° C	30° C to 70° C
Chemical catalysis	Micro-organisms
<ul style="list-style-type: none"> • Higher efficiency • Mature technology • Compliant with grid injection specifications • Lost heat recovery +++ 	<ul style="list-style-type: none"> • Tolerance to impurities contained in biogas • Resistant to most usual contaminants (except oxygen) • Flexibility of operations • Lost heat recovery +

Storengy's expertise to support your recovery ambitions.

AN INNOVATIVE ECOSYSTEM TO SUPPORT YOUR AMBITIONS



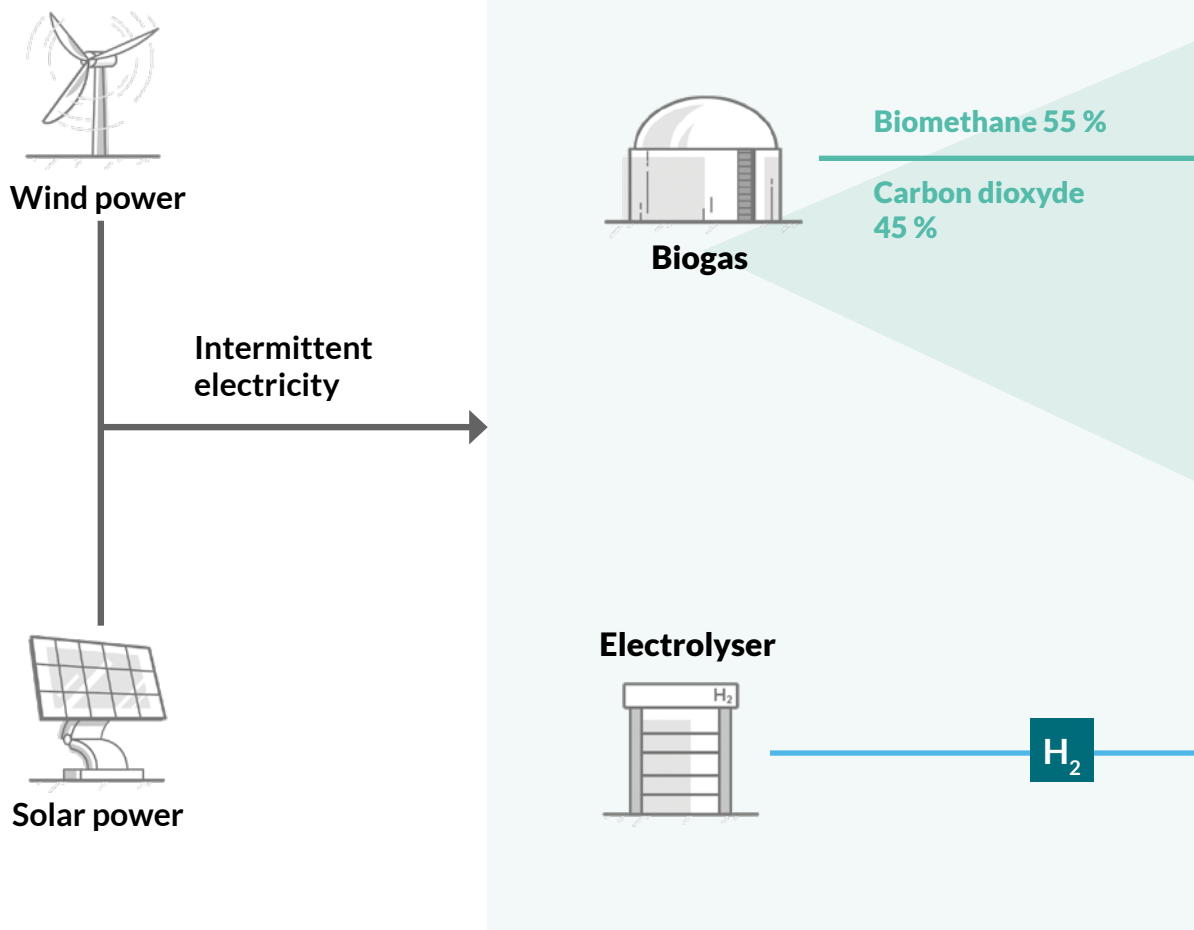
clean gas production and CO₂

WHAT STORENGY OFFERS

- ✔ **High-level pioneering expertise in clean gases,** with more than ten projects in biomethane ecosystems, hydrogen, and Carbon Capture and Utilisation (CCU).
- ✔ **Operational experience on the whole value chain** of clean gas production - from origination & financing to operating production sites.
- ✔ **Forerunner experience in project development since 2017,** with an ambitious target of **300 MW production capacity by 2025** in France & worldwide through our subsidiaries.



The first demonstration project of Power-to-Gas* associated with an designed and operated by Storengy and its partners.



Pioneering project to kick-start Power-to-Gas sector in France at industrial scale.

Location: Centre-Val de Loire region, Angé (41).

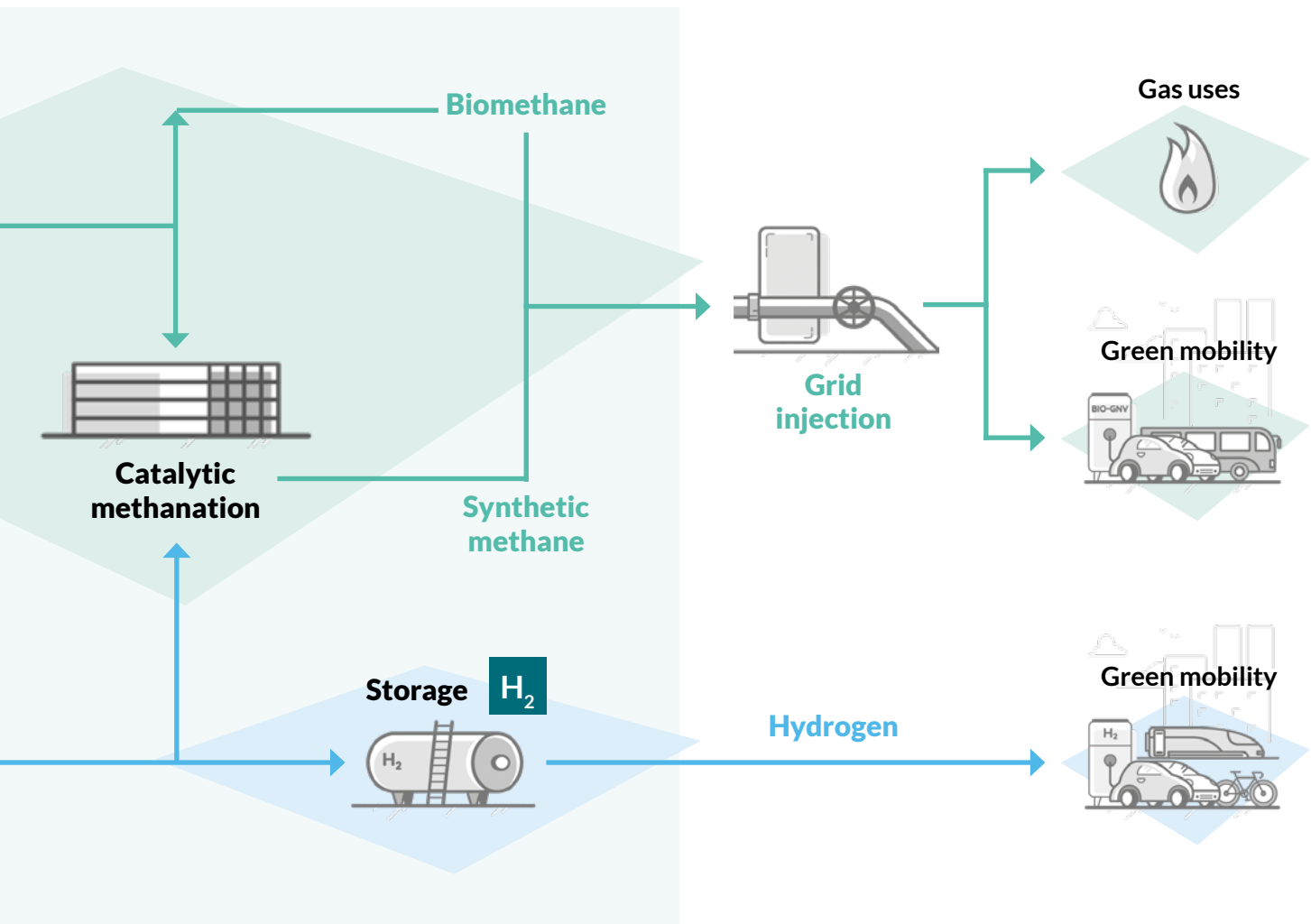
Type of methanation: catalytic.

Commissioning of Méthycentre - start of the experimental operation stage of Power-to-Gas: 2022.

Surplus production from solar and wind power, as well as CO₂ produced by biogas production from agricultural waste will be used to produce 3 clean gases (biomethane, green hydrogen and synthetic methane). Hydrogen is used for vehicles, synthetic methane and biomethane are injected into the grid.

* Power-to-Gas is the transformation of electricity into gas (CH₄), thus allowing to store the initial renewable energy for a long period of time, and to transport it through the existing gas infrastructure.

agricultural biogas plant in France,



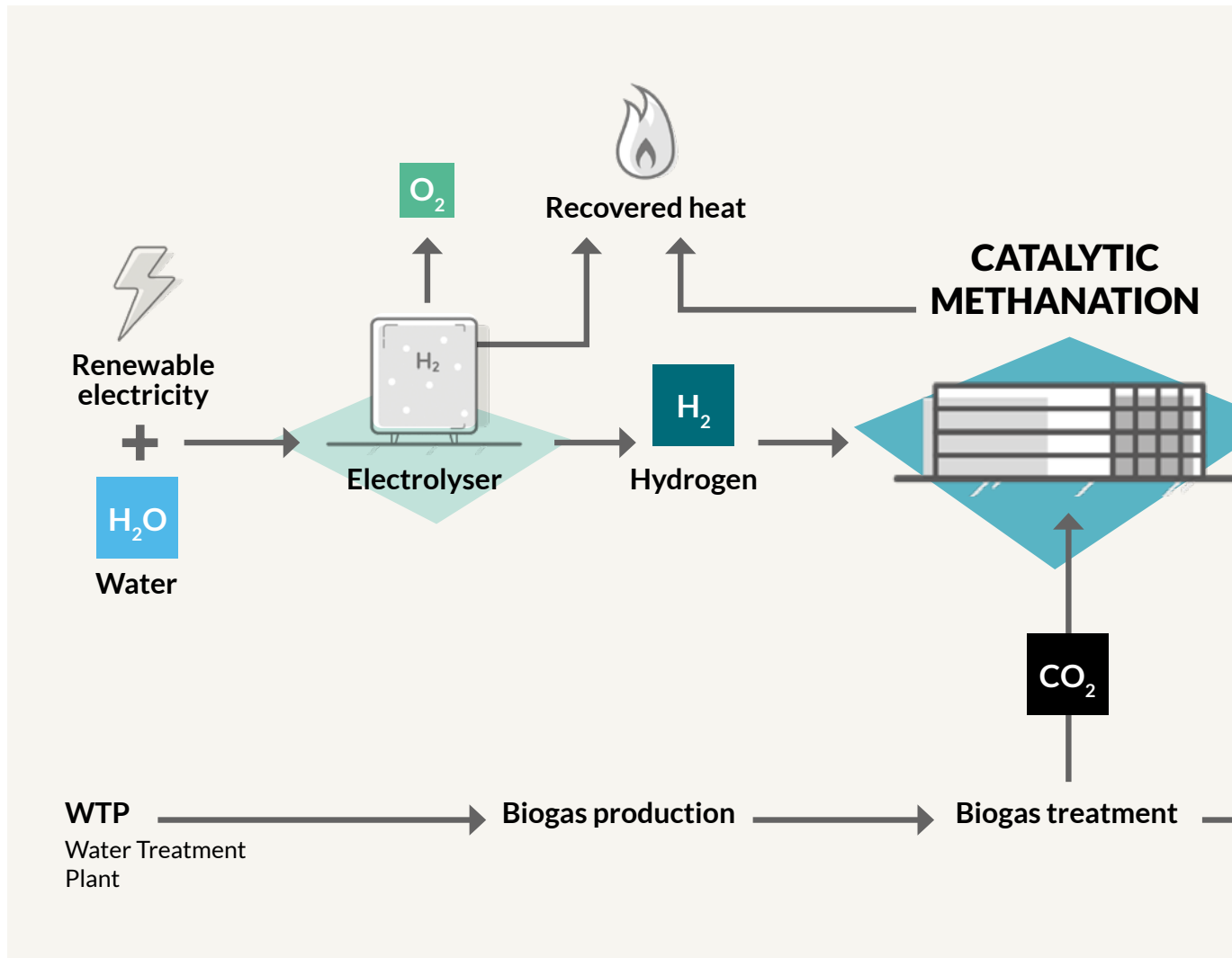
Production: 50 Nm³/h of clean gas + 5 kg/d of green H₂.

Gas consumption of approx. 800 households and 20 light vehicles.

Additional benefits: lost heat and oxygen recovered.

Power of the electrolyser: 0,25 MW.

A world first industrial scale Carbon Captur & Utilization project to by anaerobic digestion of sludges at the Lescar WTP, in collaboration



A technological breakthrough in methanation processes.

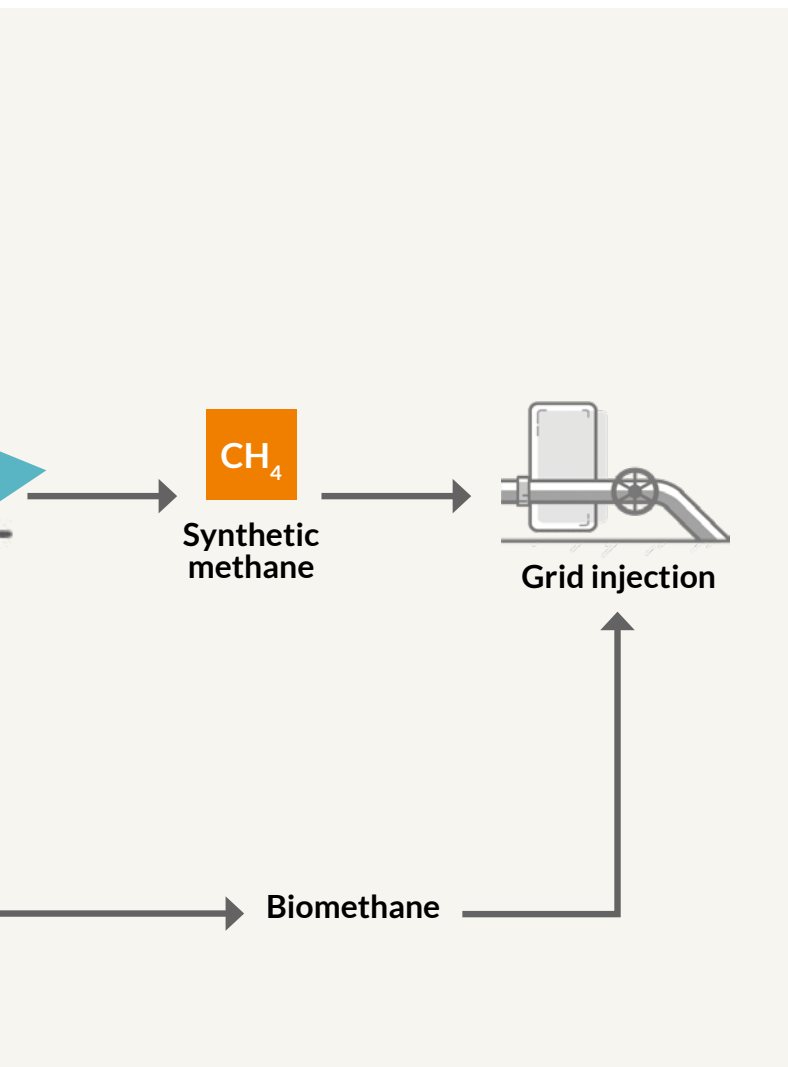
Location: Urban community Pau Béarn Pyrénées (64).

Type of methanation: catalytic.

Production: 124 Nm³/h in total biomethane production + 69 Nm³/h of synthetic methane, totalling 13 GWh/year in clean gases.

Consumption: represents heating for approx. 1,200 households.

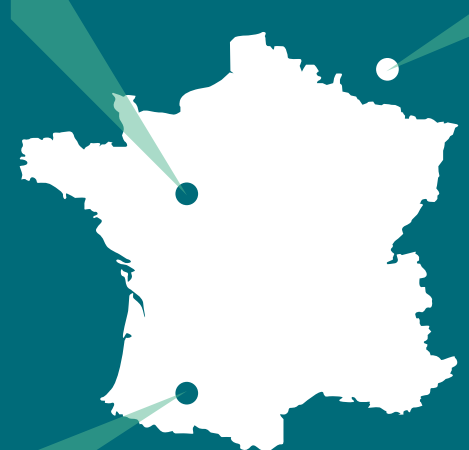
valorize 100% of CO₂ produced with SUEZ.



SYNTHETIC GAS

MÉTHYCENTRE Centre-Val de Loire Region, Angé (41).

COLUMBUS
Belgium.



PAUL LESCAR
Urban community of Pau Béarn, Pyrénées (64).

Direct benefits: 100 % of the CO₂ from biogas production is captured and utilised, representing 3,143 tons of CO₂ avoided/year.

Electrolyser: 1,3 MW.

Commissioning: first injection of synthetic methane planned for 2023.

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Let's work together to reduce carbon emissions with methanation solutions!

Are you an operator

of one or several biogas production units?

Are you active

in waste and waste water treatment?

Are you a public authority

and want to optimize local resources management?

We can help to improve your carbon footprint and increase production of local clean energy. Storengy offers a flexible solutions portfolio:



Pre-feasibility studies and design



Engineering



Construction



Monitoring, operation and maintenance of your facilities



Investment

We develop, co-invest and integrate projects, from the design and implementation stage to operation and maintenance.

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