



Bright Renewables

Company presentation

WWW.BRIGHT-RENEWABLES.COM

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- 🌿 Bright Cryogenics – CO₂ liquefaction



Company information

Bright Renewables

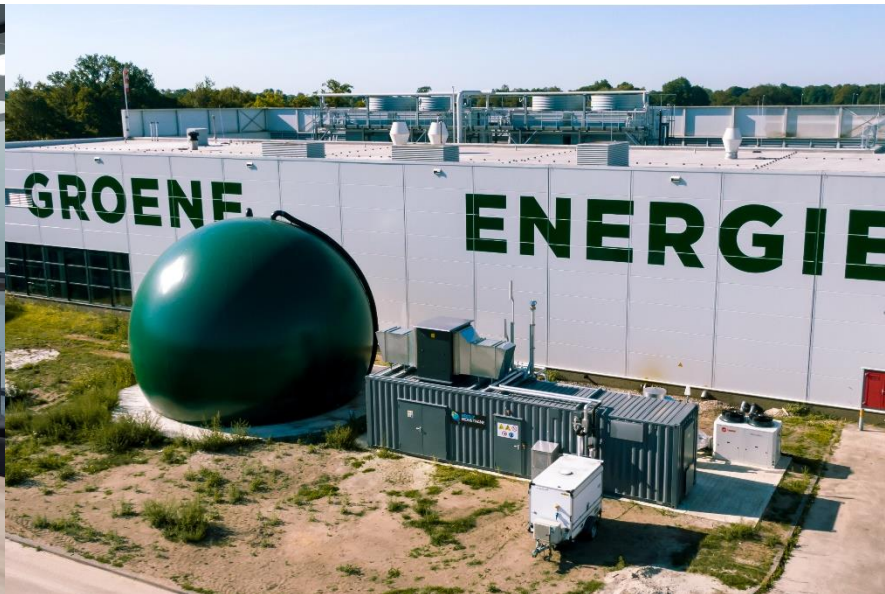
A photograph of a brick building with large windows. The words "BRIGHT BIOMETHANE" are mounted on the building in large, blue, 3D letters. The "BRIGHT" part is in a lighter blue, and "BIOMETHANE" is in a darker blue. To the left of the text is a colorful, stylized logo of a leaf or flame. The building is set against a clear blue sky.

BRIGHT
BIOMETHANE

The upgrade for a “bright” future



Over 200 employees in 2024 (>550 in the group)

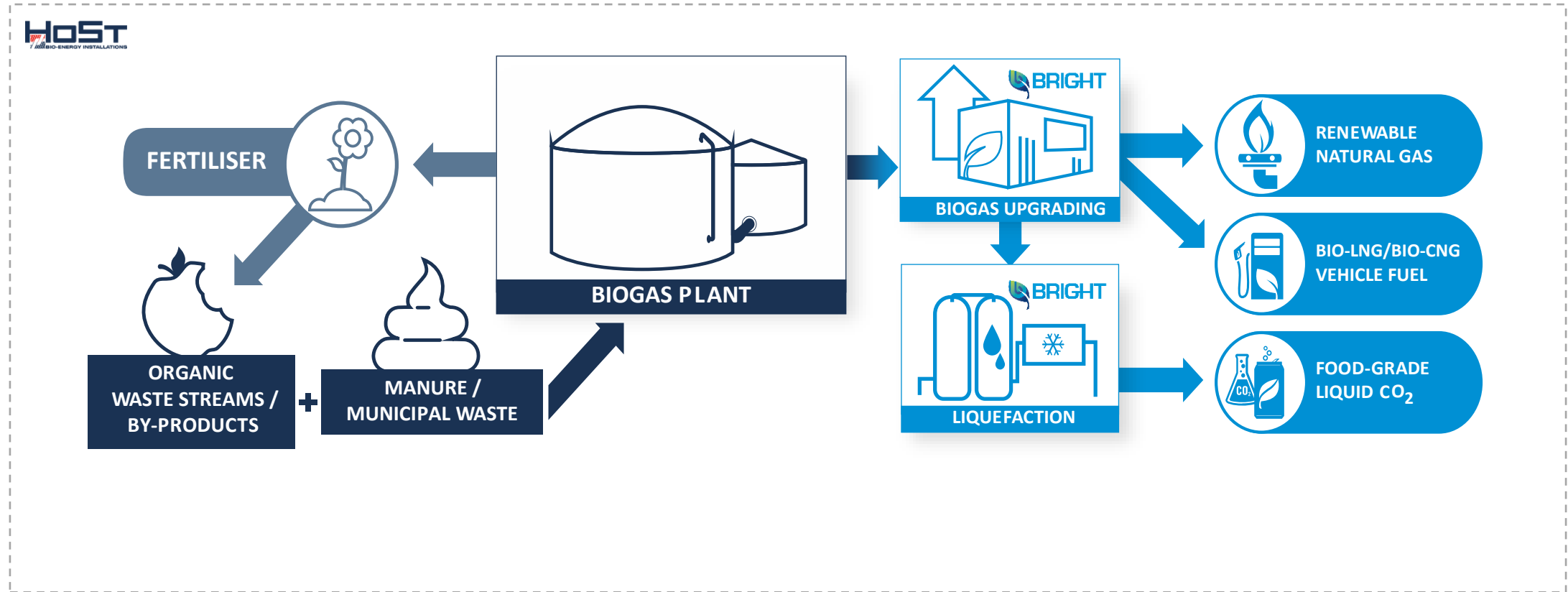


Approximately 250 systems worldwide



**Headquarters in Enschede (NL).
Offices in France, Latvia, USA**

Biogas-to-X



Service and Maintenance

Bright offers remote and on-site maintenance for streamlined service with smart glasses and 24/7 support.

- 🌀 Speed up maintenance, repair and inspection processes.
- 🌀 Predictive maintenance interventions based on data from our own-to-operate plants.
- 🌀 High plant availability
- 🌀 Warehouses stocked with the main spare parts for each type of system.
- 🌀 Warehouses located strategically



Bright Biomethane

Biogas upgrading technology

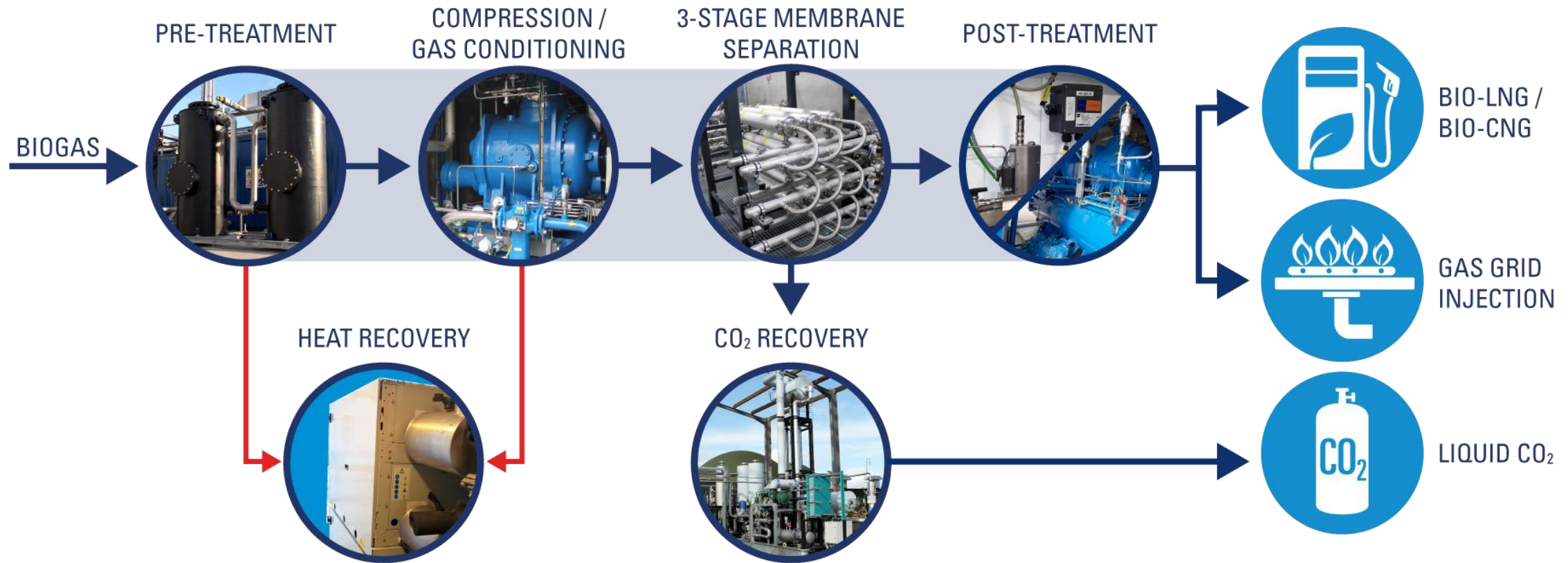


Bright Biomethane

- 🌊 **Proprietary PurePac technology:** modular systems ranging from 200 Nm³/h to 5000 Nm³/h capacity
- 🌊 **Best in class in terms of efficiency and ROI**, continuously improved by in-house R&D team and own testing facilities
- 🌊 **Complete technology range offering:** CO₂ liquefaction, CNG/LNG production, Virtual Pipeline and Biogas to Hydrogen (in development)
- 🌊 **Support from product consultancy to commissioning** and maintenance service throughout the world
- 🌊 **Seamless integration with full range of AD technology providers**
- 🌊 **Suitable for all climates and countries**



Bright Biomethane



Bright Biomethane

PurePac Compact



Capacity: 200 – 750 Nm³/h
Biogas
CO₂ Liquefaction possible: Yes
Bio-CNG: Yes

PurePac Medium



Capacity: 750 – 1.500 Nm³/h
Biogas
CO₂ Liquefaction possible: Yes
Bio-CNG: Yes

PurePac Grand



Capacity: 1.500 – 2.500 Nm³/h
Biogas
CO₂ Liquefaction possible: Yes
Bio-CNG: Yes

PurePac Supra



Capacity: 2.500-3.500 Nm³/h
Biogas
CO₂ Liquefaction possible: Yes
Bio-CNG: Yes

Bright Biomethane – PurePac SUPRA

Bright Renewables, high-tech supplier of renewable gas systems, is the first to integrate **Evonik's** SEPURAN® Green G5X 11" in its membrane separation-based biogas upgrading technology.

These newly launched membranes feature the highest capacity of its kind on the market and are designed to decrease costs and maintenance and increase assembly efficiency



Bright Biomethane

Advantages of system

- 🌿 **Easy installation:** containerized units
- 🌿 **Easy to scale up:** modular design
- 🌿 **>97% availability of the system guaranteed (8500 h/ year)**
- 🌿 **Minimum loss of biomethane:** methane recovery 99.5 %
- 🌿 **Automatic operations:** minimal routine checks needed
- 🌿 **Expected product lifetime:** >20 years
- 🌿 **Low operational costs:** no chemicals, no water, no heat needed, consumables reduced to electricity and activated carbon
- 🌿 **Heat recovery:** up to 0.15 kWth/Nm³

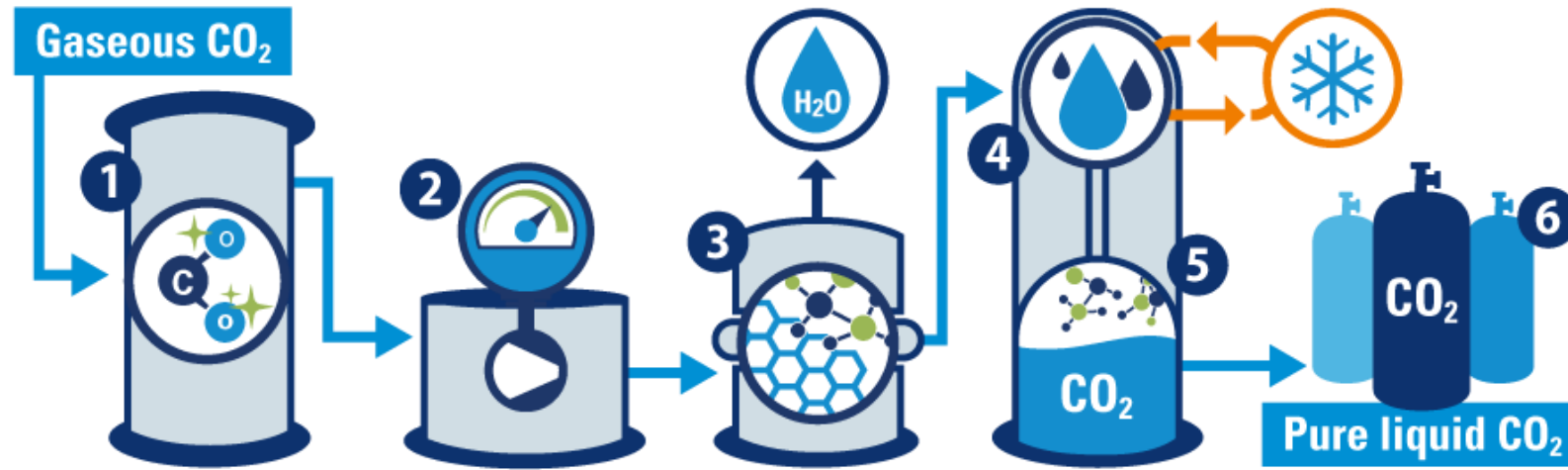


Bright Cryogenics

CO₂ liquefaction



CO₂ liquefaction flowchart



1

The CO₂ is filtered using an activated carbon filter.

2

A non-lubricated compressor pressurizes the CO₂.

3

H₂O is removed by pre-cooling and drying the CO₂.

4

CO₂ is liquefied using CO₂ as a refrigerant.

5

Non-condensable gasses are removed in the distillation tower.

6

The liquid CO₂ flows into an insulated storage tank.

Product Range

Mini



Capacity: 300 – 600 kg/h
Parts: 40 ft. Container
Reboiler

Compact



Capacity: 800 – 1200 kg/h
Parts: 40 ft. Container
Reboiler

Medium



Capacity: 1500 – 4000 kg/h
Parts: 40 ft. Container
20 ft. Container
Reboiler

Grand



Capacity: 4500 – 8000 kg/h
Parts: 40 ft. Container
2x 20 ft./40 ft.
Container
Reboiler

CO₂ liquefaction

- 🌿 **Purification and liquefaction** enabling an additional revenue stream by producing food grade quality liquid CO₂ for horticulture-, food- and refrigeration-industry.
- 🌿 **Proprietary Bright technology** developed in-house and tested on own facility. Unique by using CO₂ as a refrigerant, thus no Freon or Ammonia.
- 🌿 **Improvement of the carbon intensity score** of the facility by reduction of CH₄ loss (methane slip) in upgrading.
- 🌿 **Containerized solution** for plug & play installation on-site with quick start up.



Bright Renewables

Case Study Biomethane + LCO₂



CASE STUDY – UPG+LCO₂

UPGRADING UNIT

FLOWRATE BIOGAS	1400 Nm ³ /h
RECOVERY RATE	100% (99.5% only upg)
BIOGAS SOURCE	Waste Water Treatment
MODEL	PurePac Grand

CO₂ LIQUEFACTION UNIT

FLOWRATE CO ₂	1200 Kg/h CO ₂
CO ₂ PURITY	99.9%
PRESSURE	16-18 barg
REFRIGERANT	R744 (CO ₂)



CASE STUDY – UPG+LCO₂

UPGRADING UNIT

FLOWRATE BIOGAS	1900 Nm ³ /h
RECOVERY RATE	100% (99.5% only upg)
BIOGAS SOURCE	AD agroindustrial byproducts
MODEL	PurePac Grand

CO₂ LIQUEFACTION UNIT

FLOWRATE CO₂	2000 Kg/h CO ₂
CO₂ PURITY	99.9%
PRESSURE	16-18 barg
REFRIGERANT	R744 (CO ₂)



CASE STUDY – UPG+LCO₂

UPGRADING UNIT

FLOWRATE BIOGAS	750 Nm ³ /h
RECOVERY RATE	100% (99.5% only upg)
BIOGAS SOURCE	AD manure, agricultural byproducts
MODEL	PurePac Compact

CO₂ LIQUEFACTION UNIT

FLOWRATE CO ₂	700 Kg/h CO ₂
CO ₂ PURITY	99.9%
PRESSURE	16-18 barg
REFRIGERANT	R744 (CO ₂)





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