



WASTEWATER PLASMALYSIS

Hydrogen production and purification of wastewater

Organic compounds in industrial wastewater, liquid manure and fermentation residue water offer huge **energy potential**. Wastewater is of particular interest to Graforce because sludge water from sewage treatment plants and liquid manure from biogas plants contain large amounts of nitrogen and carbon compounds.

Until now, this nitrogen and carbon load had to be removed by using a complex purification process. In **wastewater plasmalysis**, these so-called pollutants, such as ammonium (NH₄), are split into hydrogen and nitrogen. With **Graforce membrane technology**, the gases are separated and stored in gas containers. The hydrogen can then be transported or used directly at the wastewater treatment plant in hydrogen CHPs for **CO₂-free power and heat generation**.

CONTACT

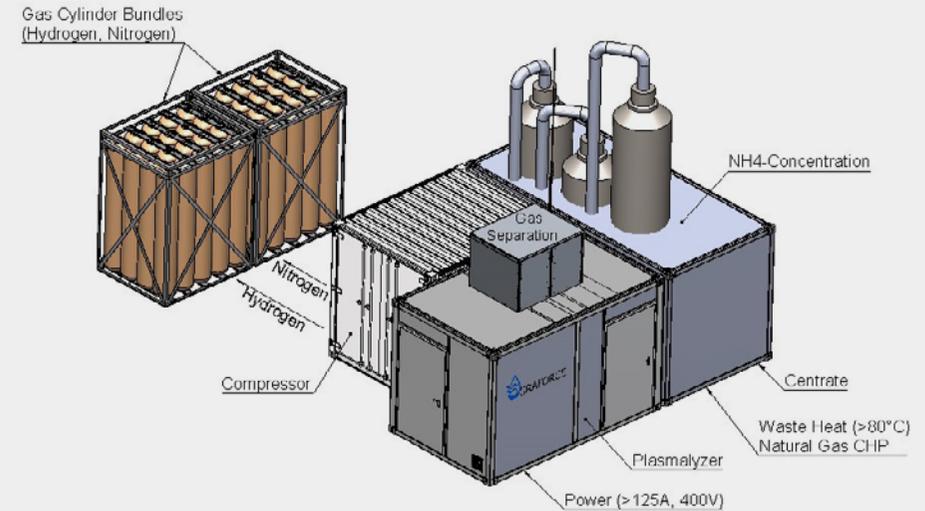
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🕒 PLANT SOLUTION

Graforce offers containerized wastewater treatment plants with a jet-loop technology for NH_4 concentration and a plasmalysis technology that breaks down the concentrated NH_4 and stores the separated hydrogen and nitrogen.

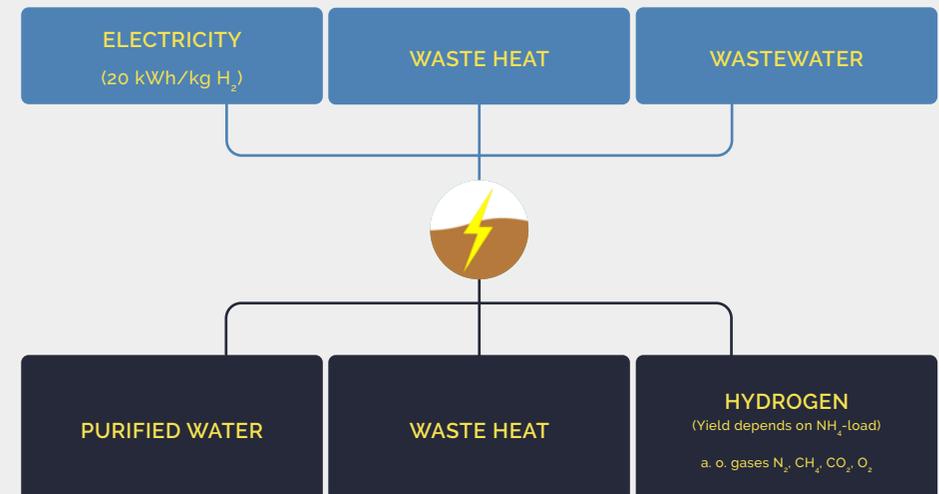
The plants enable the purification of industrial, commercial and municipal wastewater. Due to their modular design, they can be individually adapted to different tasks (e.g. elimination of nitrogen load).



🕒 PLASMALYSIS TECHNOLOGY

The recovery of nitrogen and hydrogen via wastewater plasmalysis enables an energy-efficient material cycle. Up until now, special purification processes have been needed to remove persistent pollutants from wastewater. Furthermore, conventional electrolysis technology cannot process contaminated water.

Plasmalysis from Graforce enables oxidative processes that generate hydroxyl radicals, hydrogen peroxide, ozone and UV radiation. These oxidize or mineralize the pollutants into smaller, degradable organic molecules. Plasmalysis can selectively break down the compounds in water, such as nitrogen and carbon compounds, drug residues, X-ray contrast agents and hormones.



◎ APPLICATIONS

The wastewater plant with capacities from 5 to 100 m³/h is ideally suited for the following industries:

- >> Biogas plants
- >> Sewage treatment plants
- >> Waste management companies e
- >> Manufacturing industry



◎ SPECIFICATIONS

Feed:
industrial wastewater, centrate
and fermentation residue water

Measurements:
2 x 20 foot containers à
(6058mm/2438mm/2591mm)

Optional container for compression
(4000mm/2000mm/2591mm)

Power range:
5 - 100 m³/h
(< 5 m³/h in the container)

NH₄-N > 1g/liter
COD > 2g/liter

H₂/N₂ purity:
98 % vol.

H₂/N₂ discharge pressure:
2 bar

Reduction in the NH₄ load :
75%-90%

Resources:
For the cleaning of 5 m³/h of
wastewater, for example, the follo-
wing operating media are neces-
sary or produced:

- 5 m³/h wastewater
- 20 kWh electricity + waste heat

By-product:
• waste heat
• H₂ und N₂

Please note:

- No acids are necessary
- Waste heat from the CHP
can be used