Krieg & Fischer Ingenieure GmbH

30 YEARS
OF EXPERIENCE
WORLDWIDE

TECHNOLOGY TAILORED TO YOUR NEEDS

BIOGAS | BIOMETHANE | HYDROGEN

KRIEG & FISCHER INGENIEURE GMBH
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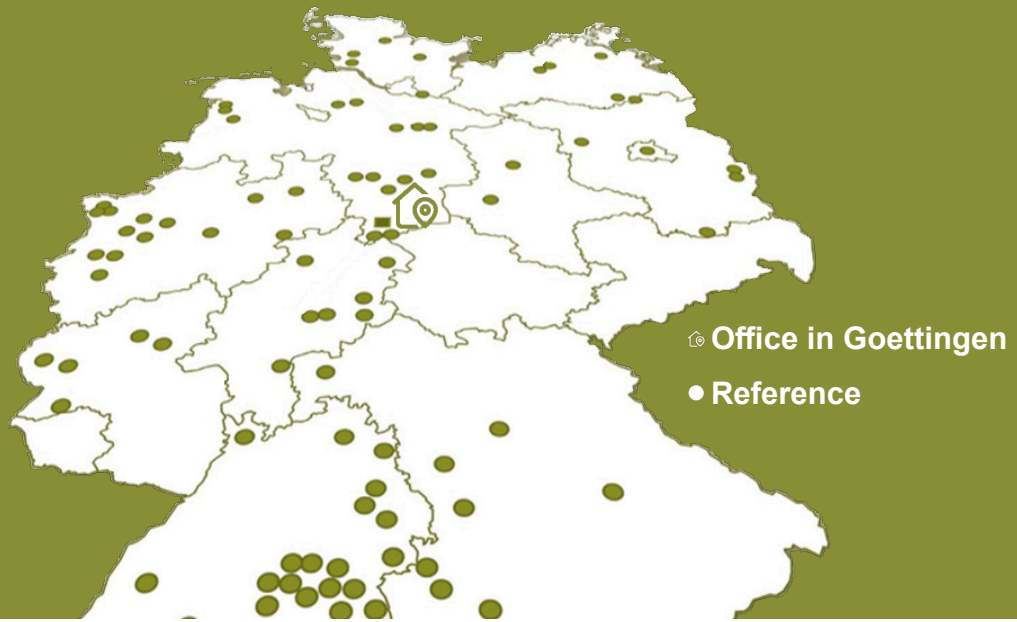
WWW.KRIEGFISCHER.DE

Expert engineering company

Krieg & Fischer Ingenieure GmbH

Krieg & Fischer Ingenieure GmbH is an expert engineering office with more than 25 years of experience in biogas technology.



- **Based in Germany**
- **Tailor-made solution**
- **170 references worldwide**

More Information

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Our Team

Krieg & Fischer Ingenieure GmbH

Our interdisciplinary team of process, civil, environmental and agricultural engineers and biologists, covers complete expertise needed for successful biogas project.

ENGINEERING MADE IN GERMANY

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Krieg & Fischer Ingenieure GmbH

Management

Raphael Thies is a process engineer with extensive experience in biogas since 2007. He has been the managing director of Krieg & Fischer since March 2017. His areas of expertise are biogas plant design and occupational safety, construction supervision, commissioning and start-up of biogas plants, control and electrical automation. In 2016, Raphael Thies was accredited by the Chamber of Engineers of Lower Saxony as an expert in the field of biogas.

Company History

Krieg & Fischer Ingenieure GmbH

Founded 1999
Foundation of Krieg & Fischer Ingenieure GmbH

Award for innovation 2003
Innovation award of the district of Goettingen for the fermentation of energy crops without liquid

20 years company anniversary 2019
In June Krieg & Fischer Ingenieure GmbH celebrates its 20th anniversary. 160 Biogas Plants References worldwide

World Biogas Award 2020
Krieg & Fischer becomes winner of the AD & Biogas World Biogas Expo Award 2020 in the "Circular Economy Award" category

First project with CO_2 liquefaction 2022
Biogas upgrading and CO_2 liquefaction plant, food-grade quality CO_2 and dry-ice production

2000 2002 2004 2006 2008 2010 2012 2014 2016 2018 2020 2022 2024

Sworn expert in biogas 2009
Torsten Fischer is sworn in as the first publicly appointed expert for biogas of the Lower Saxony Chamber of Engineers on March 24

First biomethane/ RNG plant 2009
Biogas plant with gas upgrading and feed-in into the natural gas grid in Germany

Hydrogen 2023
Contract for planning services for the construction of an electrolyser in Germany

New Shareholder 2023
Raphael Thies and PlanET become shareholders! This strong cooperation within the biogas industry makes the company resilient for future challenges. K&F is still an independent engineering company.

More Information

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Our partners worldwide

Krieg & Fischer Ingenieure GmbH

ELECTRIGAZ
Kanada, Quebec

CES
Polen, Podłęże

INTE. CO.
Italy, Pordenone

ECOBIOGAS
Spanien, Vilasana, Lleida

LYS Enterprises
USA

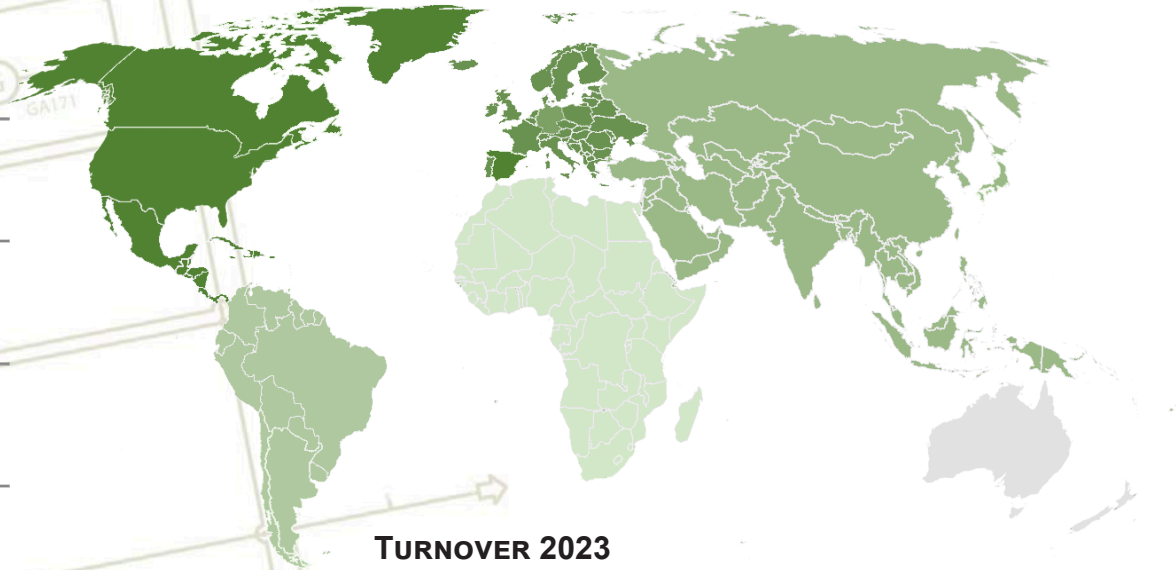
EMS Eco Metan
Solutions Ukraine

ECO HEART INC.
Japan

More Information

Turnover 2023

Krieg & Fischer Ingenieure GmbH



Turnover 2023

- Germany
- North America
- Europe
- Asia
- South America
- Africa

More Information

Services

Krieg & Fischer Ingenieure GmbH

- ☑ Studies
- ☑ Concept development
- ☑ Process technology
- ☑ Cost determination/ Calculation Permission
- ☑ Planning
- ☑ Construction management
- ☑ Start up
- ☑ Optimisation
- ☑ Due diligence
- ☑ Expert Opinion
- ☑ Operator Service

100% Independent

More Information

Solutions

Krieg & Fischer Ingenieure GmbH

Biogas

- Agriculture plants
- Industrial plants
- Biowaste plants (Organic residuals)

Biomethane

- Biogas upgrading
- CO_2-liquification
- Retrofitting CHP plants to Biomethane

Hydrogen

- Electrolysis
- Methanation

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Biogasplant for

Agriculture

Krieg & Fischer Ingenieure GmbH

FALKENSTEIN
Biogas Plant, Germany

Input: Corn silage, whole crop silage, sweet sorghum silage
Digester:
Steel tanks 2 x 3,100 m³
Co-generator:
Gas engine 2 x 716 kW_{el}

Features:
2 digester, 2 secondary digester, thermophilic operation, heat utilisation

FORCATE
Biogas Plant, Italy

Input:
Grass- and corn silage
Digester:
Steel tank 1,730 m³
Co-generator:
Gas engine 365 kW_{el}

Features:
1 digester, 1 secondary digester, separation,
thermophilic operation

SZEPIETOWO
Biogas Plant, Poland

Input: Rye-, corn- and grass silage, sugar beet pulp silage, waste pulp, potatoes, fruit pomance
Digester:
Glass coated steel tank 5,000 m³
Co-generator:
Gas engine 1,2 MWel

Features:
Biogas plant digesting organic waste: Digester, secondary digester with gas holder roof, storage tank, external heating, thermophilic operation

edGOPAC
Biogas Plant, Ukraine

Input:
Corn silage
Digester:
Steel tank 5,670 m³
Co-generator:
Gas engine 1.5 MW_{el}

Features:
1 digester 1 secondary digester with gas holder roof, mesophilic process

NEW YORK STATE 2
Biogas Plant, USA

Input: Straw and manure
Digester:
Steel tank 6 x 8,000 m³ + concrete tank 5000 m³
Biogas utilisation:
Biogas upgrading system 600 m³/h

Features:
1 digester 1 secondary digester with gas holder roof, mesophilic process, digestate heat recovery and dewatering system, external biological desulphurisation

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Biogasplant for

Industry

Krieg & Fischer Ingenieure GmbH

References

PRINCE EDWARD ISLAND
Biogas Plant, Canada

Input: Potato raw material, oil, potato sludge
Digester:
Glas coated steel tanks
4 x 5,500 m³
Gas utilisation:
Steam generation

Features:
1 Hydrolysis tank, 4 digester, 2 secondary digester, mesophilic operation, separation, heat utilisation

RIO CUARTO II
Biogas Plant, Argentina
Low-Carbon-Ethanol

Input:
Thin stillage, a residual material from bioethanol production
Digester:
Glas coated steel tank, 8,000 m³
Biogas output:
6MW; 2 x 1.2 MW_{el} in CHP

Features:
Biogas plant digesting energy crops and organic waste (expansion): Reception tank (pH, temperature), secondary digester with gas holder roof, solid input device, external desulphurization, heat usage in bioethanol plant

FUKUOKA
Biogas Plant, Japan

Input: Vegetable waste, residue of shochu, sludge from WWTP, okra, gluten
Digester:
Enamelled steel tank, 2 x 5,000 m³
Gas utilisation:
Gas engine 2 x 1,056 kW_{el}

Features:
Biogas plant digesting organic waste: 2 digester, 1 secondary digester with gas holder roof, mesophilic operation

VIERVERLATEN
Biogas Plant, Netherlands

Input: Sugar beet pulp, sugar beet fragments, potato waste
Digester:
Glas coated steel tanks
4 x 4,600 m³
Gas utilisation:
Biogas upgrading system, injection into the gas grid

Features:
4 digester, 1 secondary digester with gas holder, digestate treatment , gas cooling system, mesophilic operation, biogas upgrading system and injection into grid

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Biogasplant for

Biowaste

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References

HUNTSTOWN
Biogas Plant, Ireland

Input: Anaerobic fermentation of 92,000 t/a of waste (42,000 t/a biowaste and 50,000t/a organic waste from supermarkets and restaurants)
Digester:
2018/19: 4 x 4,900 m³ digester

Features:
4 digester, 2 secondary digester, external gas holder, specials grit removal, Thermal pressure hydrolysis process, input material cooling, 2 buffer tanks

QINHUANGDAO
Biogas Plant, China

Input: Kitchen waste
Gas utilisation:
Biogas upgrading system, biomethane used as vehicle fuel
Digester:
2013/14: 2 x 3,400 m³ digester

Features:
Biogas plant digesting kitchen waste: pre-treatment with hydrocyclone, one hydrolysis tank, two digester, one storage tank, digestate treatment, mesophilic process, external heating and cooling

IM BRAHM
Biogas Plant, Germany

Input: Food waste
2005: 1490 m³ digester, 760 kW_{el}
2011: Additional digester & 2 CHP
2013: Storage tank with gas holder roof (6,000 m³)
2016: Digestate separation

Features:
Digester mixed with side-mounted mixers, gas holders on top of all tanks, secondary digester, esophilic operation, heat utilisation (pasteurisation kitchen waste, heating of buildings)

NOYON
Biogas Plant, France

Input: Sludge, fat, process water, cofermente, food residues
Gas utilisation:
Gas engine 716 kW_{el}
Digester:
Steel tank 3,500 m³ digester

Features:
Gas holder above secondary digester tank, mesophilic operation, separation of digestates, recirculation of process water, compost works, external heat use

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Biogasupgrading for

Biomethane / Renewable-Natural-Gas

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References

SEMD
Biogas Plant, Germany

Input: Corn silage
Gas production:
3.2 Mio. m³/a biogas
Digester:
Prestressed concrete prefabricated, element tank 2,500 m³

Features:
Agricultural biogas plant: gas holder above digester, secondary digester and digestate storage tank, mesophilic operation, biogas upgrading and injection into grid

JCBE DERBY
Biogas Plant, UK

Input: Hydrolised kitchen Cat. 2, paper & cardboard waste, straw
Gas production:
1,200 m³/h biogas, over 6 Mio. m³/a RNG
Digester:
Concrete steel tank 2 x 5,300 m³

Features:
Industrial biogas plant: digestion of hydrolysed waste. Thermal pressure hydrolysis process, buffer tank, cooling tank, mesophilic operation

ANKLAM
Biogas Plant, Germany

Input: Sugar beet, vinasse
Digester:
Glas coated steel tanks 4 x 4,600 m³
Biogas utilisation:
Biogas upgrading system, injection into the grid

Features:
Industrial biogas plant: 4 digester, 1 secondary digester, gas holder above secondary digester, digestate treatment, mesophilic operation, biogas upgrading and injection into grid

WUHU
Biogas Plant, China

Input:
Kitchen waste
Digester:
Steel tank welded 2 x 3,400 m³
Biogas utilisation:
Biogas upgrading system

Features:
Biogas plant digesting organic waste: 2 digester, 1 storage tank (by client), 2 hydrolysis tanks (by client), oil separation with heat recovery system

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Hydrogen

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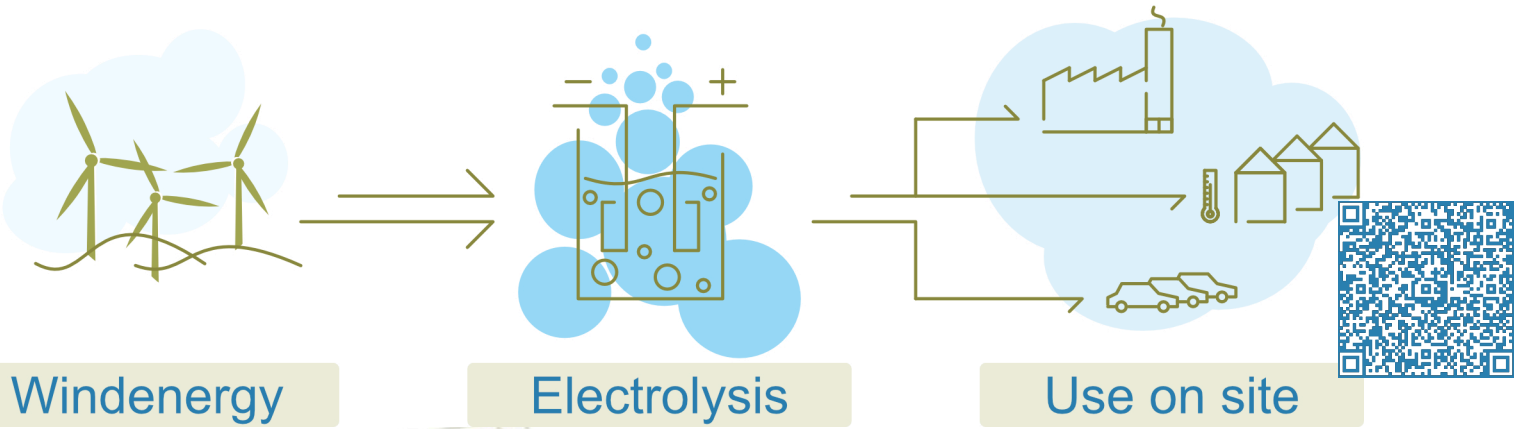
STAßFURT
Electrolysis, Germany

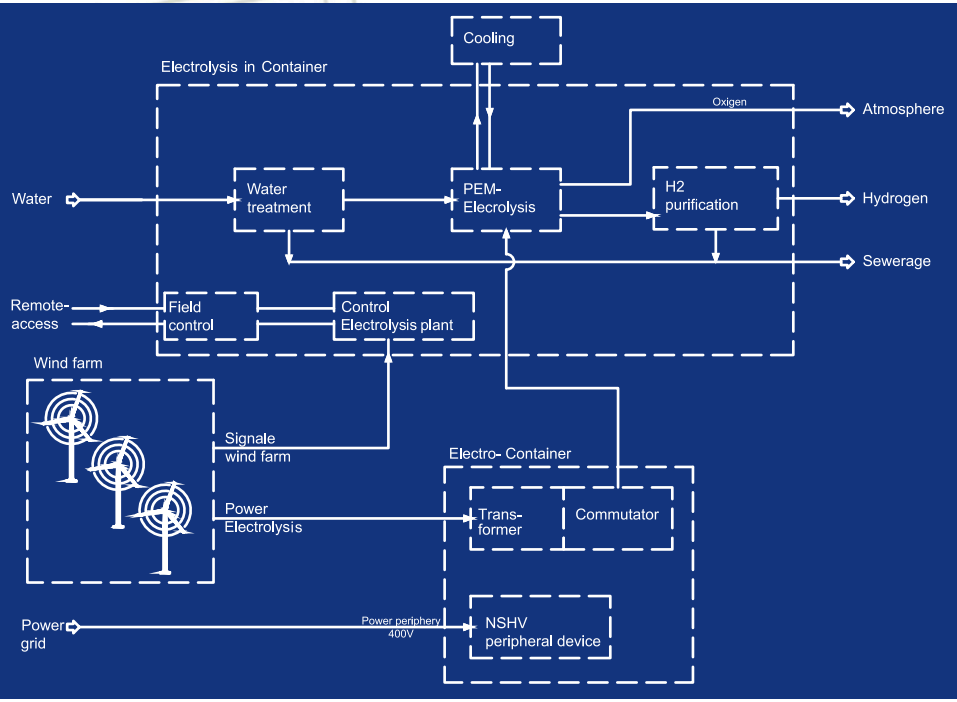
Project:
Energy Region Staßfurt, production of hydrogen from green electricity. The electrolyzer is operated exclusively and continuously by the wind farm with green electricity

Process engineering
Water electrolysis plant with 1 MW water electrolysis system, basic process PEM (Proton Exchange Membrane) H-Tec with an efficiency of 77%.



H_2O Production
1 MW electrical; 130 t/a Green hydrogen from wind power

Use of H_2O
To supply a hydrogen refuelling station on the nearby motorway and to feed into the natural gas grid.



More Information

Engineering made in Germany

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Technology

Different types of digesters and mixers

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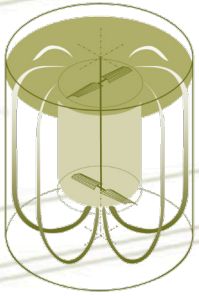
High upright digester

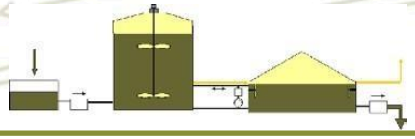
Flat digester with gasholder roof

Horizontal/Plug flow digester

High upright digester/ CSTR

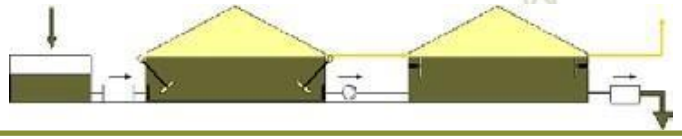
- Designed for large plants up to 10,000 m³.
- Mixing is by means of a top-mounted mixer which operates continuously.
- Constant gas production
- Low heat loss
- Reinforced concrete or bolted steel depending on size.
- Internal/External Heat Exchanger
- One-stage/two-stage digestion





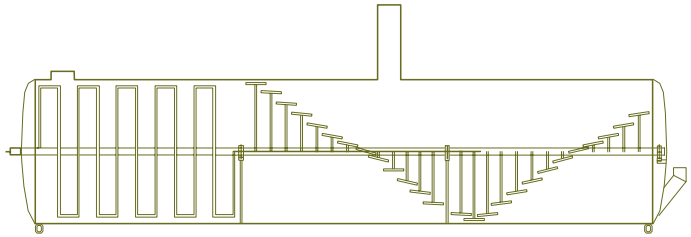
Flat digester

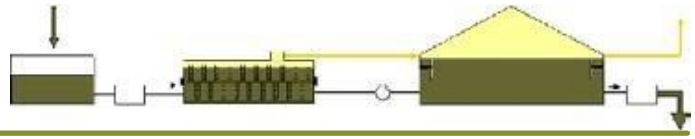
- Best suited for small to medium biogas plants with low dry matter substrates that are easy to mix.
- Integrated gas storage in the gas holder roof
- Cost saving digester tank design
- Easy mixing and heating conditions



Horizontal / Plug flow digester

- Optimum mixing
- High dry matter content
- High sediment content
- For special substrates
- Plug flow
- Paddle mixer





Technology

More Details

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Dry Feeder

Pasteurization

Pumping room

External heat exchanger

Overpressure-vacuum relief valve

Process control systems

Technology
Biogas utilization

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Biogas upgrading

KF Company car with CNG engine


Cosun Beet


Dry Ice

Biomethane / RNG

- Different Biogas upgrading technologies
- Injection into gas grid
- Purification and use as transportation fuel
  Compressed natural gas (CNG);
  Liqufied natural gas (LNG)
- Methanation

More Information

CO_2-liquefaction

- Use of by-product in biogas upgrading as biogenic CO_2
- Virtually no emissions or losses
- Reduction of carbon footprint
- Purification and liquefaction of CO_2
- Food grade CO_2

BIOERDGAS ISENHAGEN
Biomethane and CO_2-liquefaction plant, Germany

Conversion of 2 existing biogas plants fed with energy crops, chicken and cattle manure into biomethane and CO_2 liquefaction.

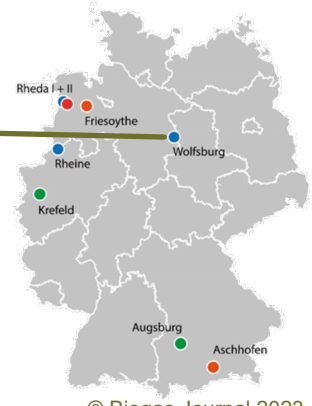
Biogas plant output:
1,400 Nm³/h biogas

CO_2 liquefaction plant producing food grade CO_2:
1.1 t/h

Dry Ice production:
1,000t/a

Features:
Biogas upgrading, CO_2 liquefaction, dry ice production, heat recovery for digesters and nearby villages

All CO_2-liquefaction plants in Germany



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- planned
- under construction
- in operation

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