



Krieg & Fischer Ingenieure GmbH

KRIEG & FISCHER INGENIEURE GMBH
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35 YEARS
OF EXPERIENCE
WORLDWIDE

TECHNOLOGY
TAILORED TO YOUR NEEDS

BIOGAS

BIOMETHANE

HYDROGEN

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.



🏠 Office in Goettingen

● Reference

■ Based in Germany

■ Tailor-made solution

■ 170 references worldwide

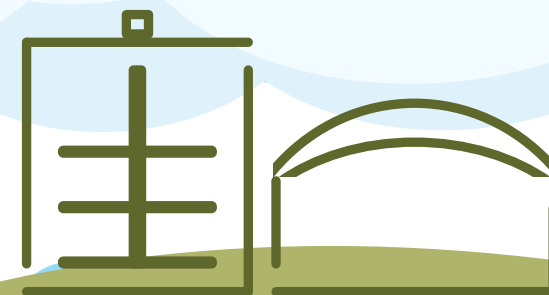
MORE INFORMATION



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.





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

WORLD BIOGAS AWARD 2020

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

20 YEARS

COMPANY ANNIVERSARY 2019

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

FIRST PROJECT WITH

CO₂ LIQUEFACTION 2022

Biogas upgrading and CO₂ liquefaction plant, food-grade quality CO₂ and dry-ice production

2000 2002 2004 2006 2008 2010 2012 2014 2016 2018 2020 2022 2024 2026

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

HYDROGEN 2023

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

FIRST BIOMETHANE/ RNG PLANT 2009

Biogas plant with gas upgrading and feed-in into the natural gas grid 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





Krieg & Fischer Ingenieure GmbH

Our partners worldwide



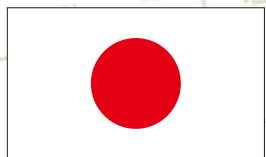
CES
Polen, Podłęże



ECOBIOGAS
Spanien, Vilasana,
Lleida



EMS Eco Metan
Solutions Ukraine



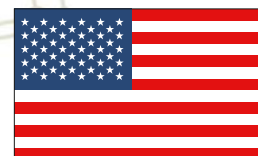
ECO HEART INC.
Japan



ELECTRIGAZ
Kanada, Quebec



INTE. CO.
Italy, Pordenone



LYS Enterprises
USA



MORE INFORMATION

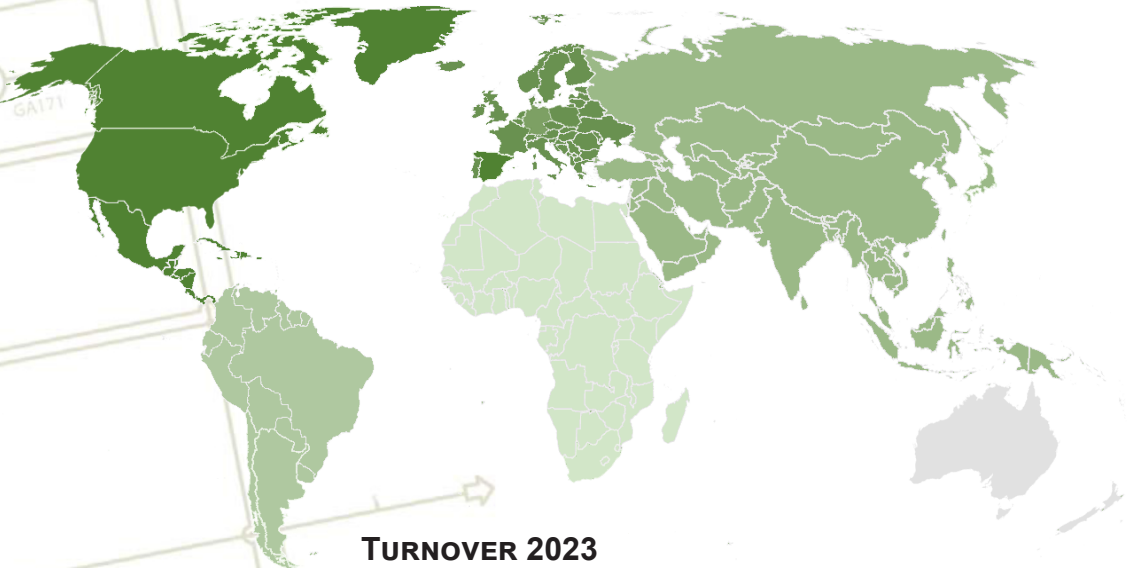




Krieg & Fischer Ingenieure GmbH

Turnover 2023

Turnover 2003 - 2022



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

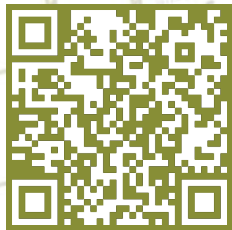


Solutions



Biogas

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



Biomethane

- Biogas upgrading
- CO₂-liquification
- Retrofitting CHP plants to Biomethane



Hydrogen

- Electrolysis
- Methanation





Biogasplant for Agriculture



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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 pomace
Digester:
 Glass coated steel tank 5,000 m³
Co-generator:
 Gas engine 1,2 MW_{el}

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

WOODCREST 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

MORE INFORMATION →





Biogasplant for Industry



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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

MORE INFORMATION →





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, special 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:

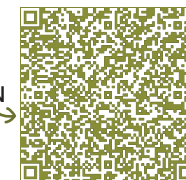
Gas engine 716 kW_{el}

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

MORE INFORMATION →



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

MORE INFORMATION →



Hydrogen

STAßFURT Electrolysis, Germany

Project:

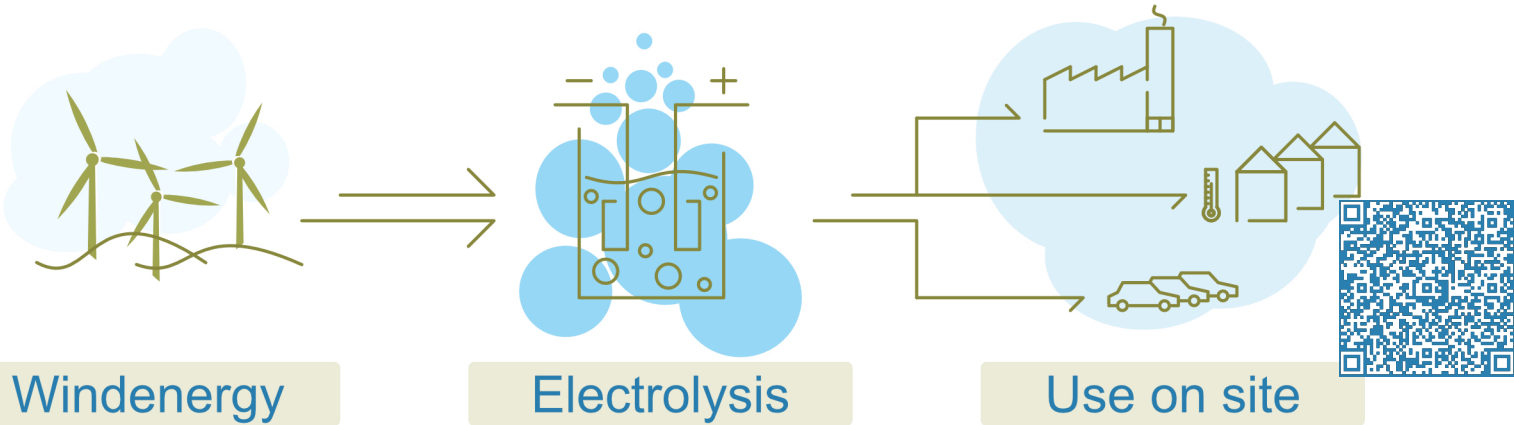
Energy Region Staßfurt, production of hydrogen from green electricity. The electrolyzer is operated exclusively and continuously by the wind farm with green electricity

Process engineering

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



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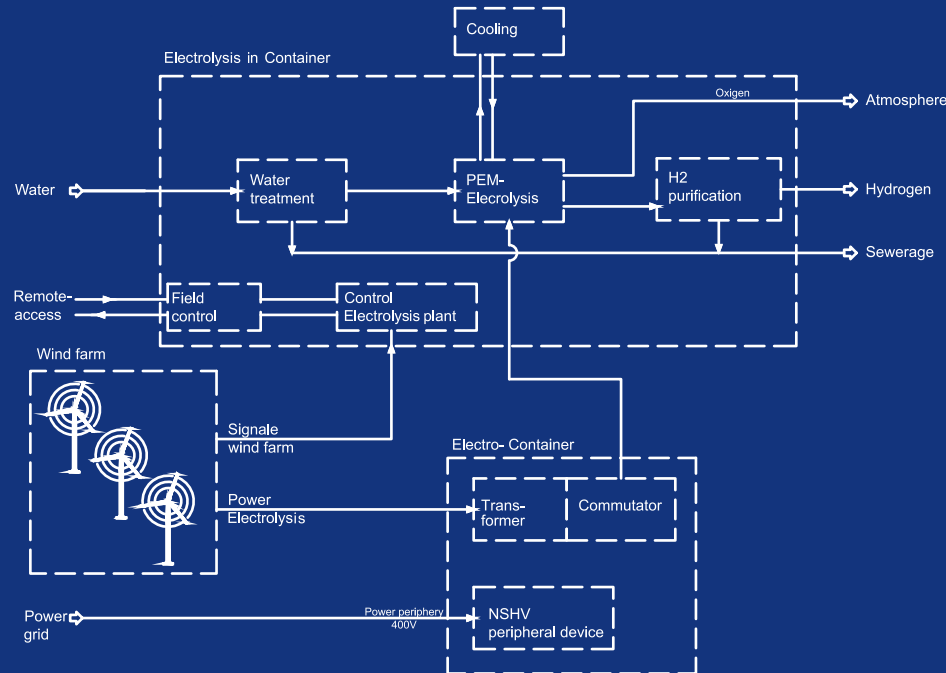


H₂O Production

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

Use of H₂O

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



MORE INFORMATION



Technology

Different types of digesters and mixers



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High upright digester



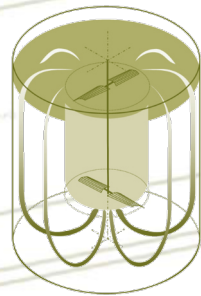
Flat digester with gasholder roof



Horizontal/Plug flow digester

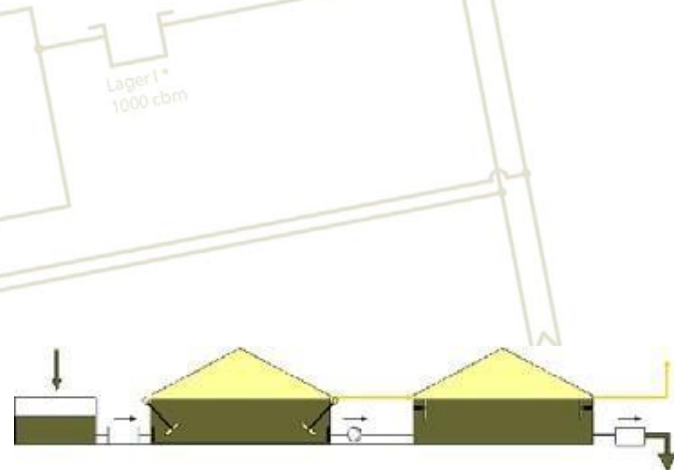
High upright digester/ CSTR

- 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



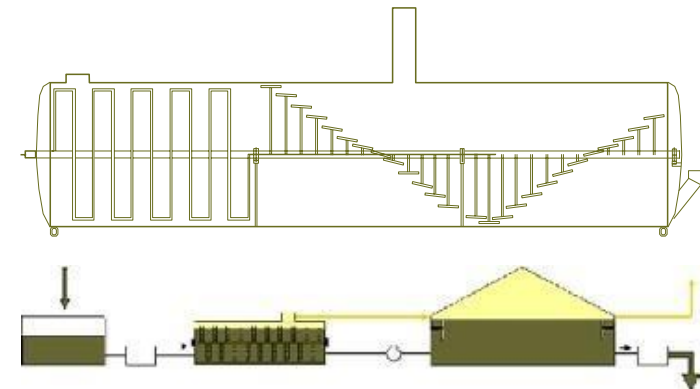
Flat digester

- 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);
Liquefied natural gas (LNG)
- Methanation

BIOERDGAS ISENHAGEN Biomethane and CO₂- liquefaction plant, Germany

Conversion of 2 existing biogas plants fed with energy crops, chicken and cattle manure into biomethane and CO₂ liquefaction.

Biogas plant output:
1,400 Nm³/h biogas

CO₂ liquefaction plant producing food grade CO₂:
1.1 t/h

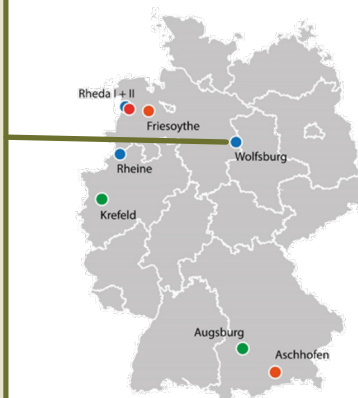
Dry Ice production:
1,000t/a

Features:

Biogas upgrading, CO₂ liquefaction, dry ice production, heat recovery for digesters and nearby villages

- Use of by-product in biogas upgrading as biogenic CO₂
- Virtually no emissions or losses
- Reduction of carbon footprint
- Purification and liquefaction of CO₂
- Food grade CO₂

All CO₂-liquefaction plants in Germany



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MORE INFORMATION



MORE INFORMATION



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MORE INFORMATION

