



Krieg & Fischer Ingenieure GmbH



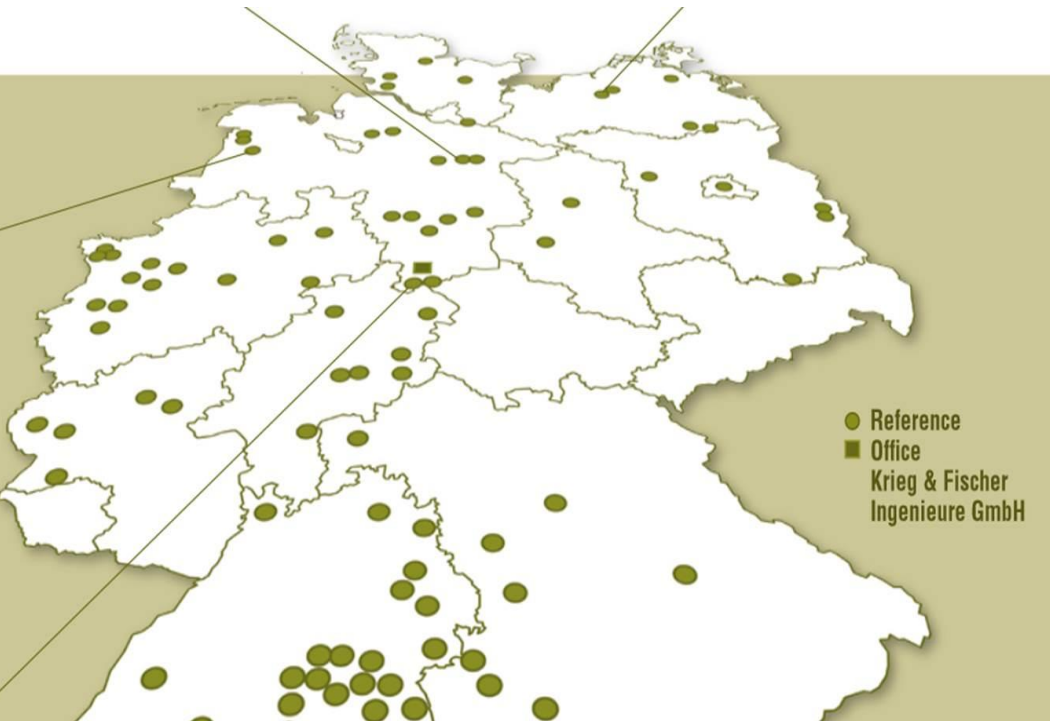
KRIEG & FISCHER INGENIEURE GMBH

BIOGAS PLANTS



- *Planning & Construction*
- *Worldwide*
- *25 years of experience*
- *160 references*
- *Made in Germany*

COMPANY LOCATION



Krieg & Fischer Ingenieure GmbH
Bertha-von-Suttner-Str.9
D-37085 Göttingen
Germany

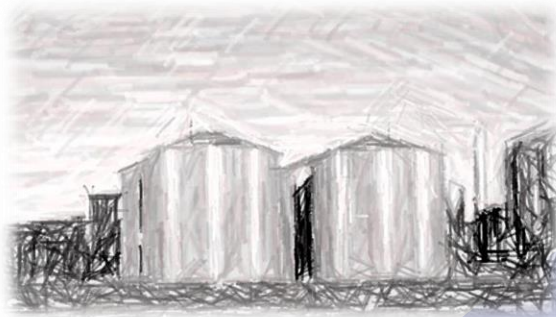
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Planning und Construction BIOGAS PLANTS

OUR OFFICE

Our range of services comprises provision of all types of service in the field of digestion of anaerobic process technologies and biogas technologies.



1999

...founded

2003

Award of
Innovation

2009

Sworn
Expert of
Biogas

2019

20 years
company
anniversary
160 Biogas
Plants
References
worldwide

**Planning und Construction
BIOGAS PLANTS**

GENERAL MANAGER:



Raphael Thies

Torsten Fischer

Torsten Fischer

has been active in the field of biogas since 1993. In this period he worked for two plant construction companies. The main aspects of his work were biogas plants for industrial bio-waste digestion and large-scale co-fermentation biogas plants. Since 2009 Torsten Fischer is sworn expert of biogas plants.

Raphael Thies

already works for Krieg & Fischer since 2007. Starting out as an engineer in the field of planning and processing, he now also works in the field of sales. Alongside founder and shareholder Torsten Fischer, Raphael Thies will, as of 2017, take up the position of an additional Managing Director. Since 2016 Raphael Thies is sworn expert of biogas plants

OUR TEAM



**Krieg & Fischer
Ingenieure GmbH**



OUR PARTNER



Japan: Eco HearT Inc.

Canada: Electrigaz Technologie Inc.

Bulgaria: Agroecon o.o.d.

Poland: Biogazowuie Polski

Italy: Inte.C.O. engineering

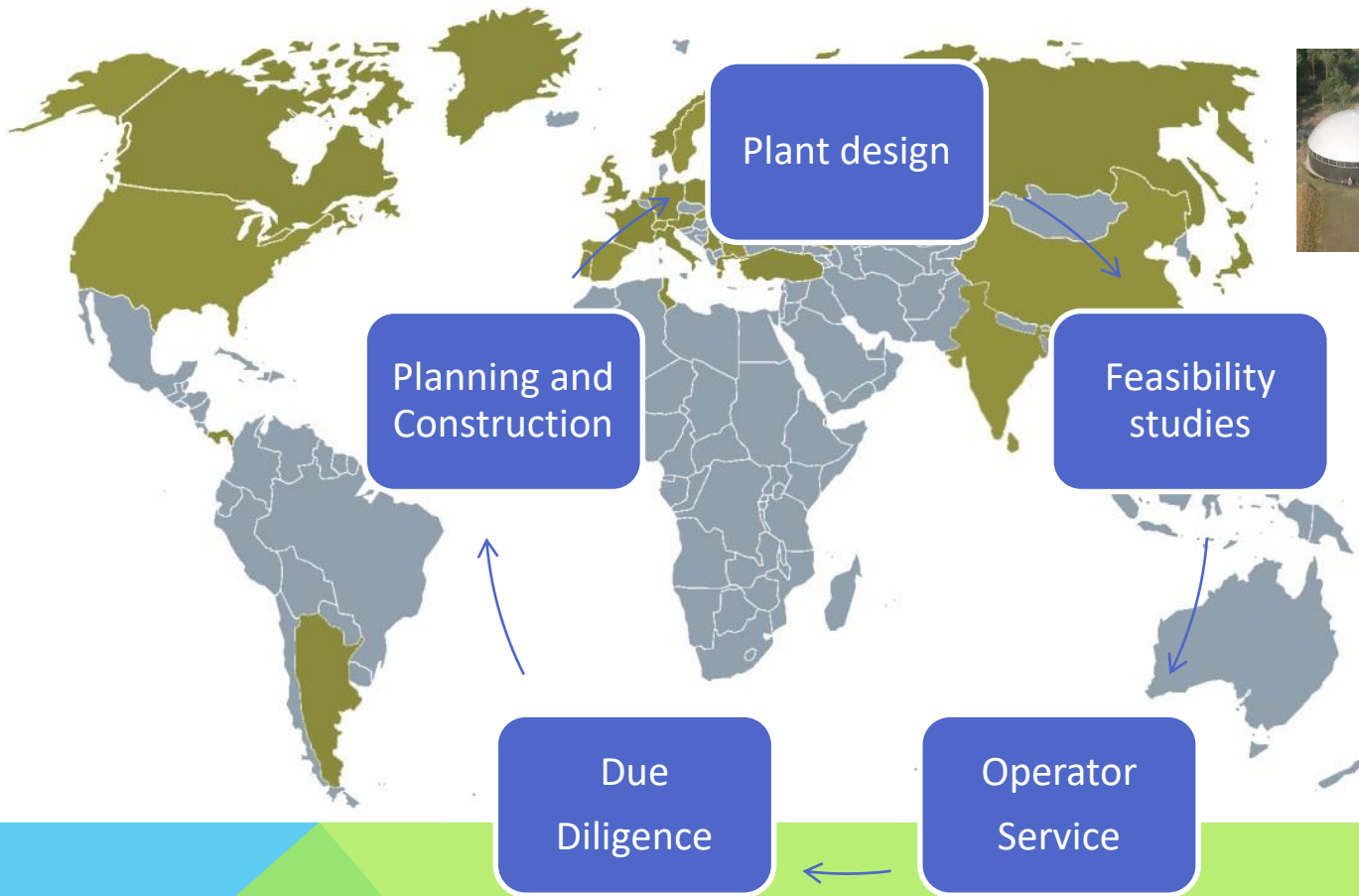
Spain: Ecobiogas

Serbia: Imes Biogas

Ukraine: Ecodevelop

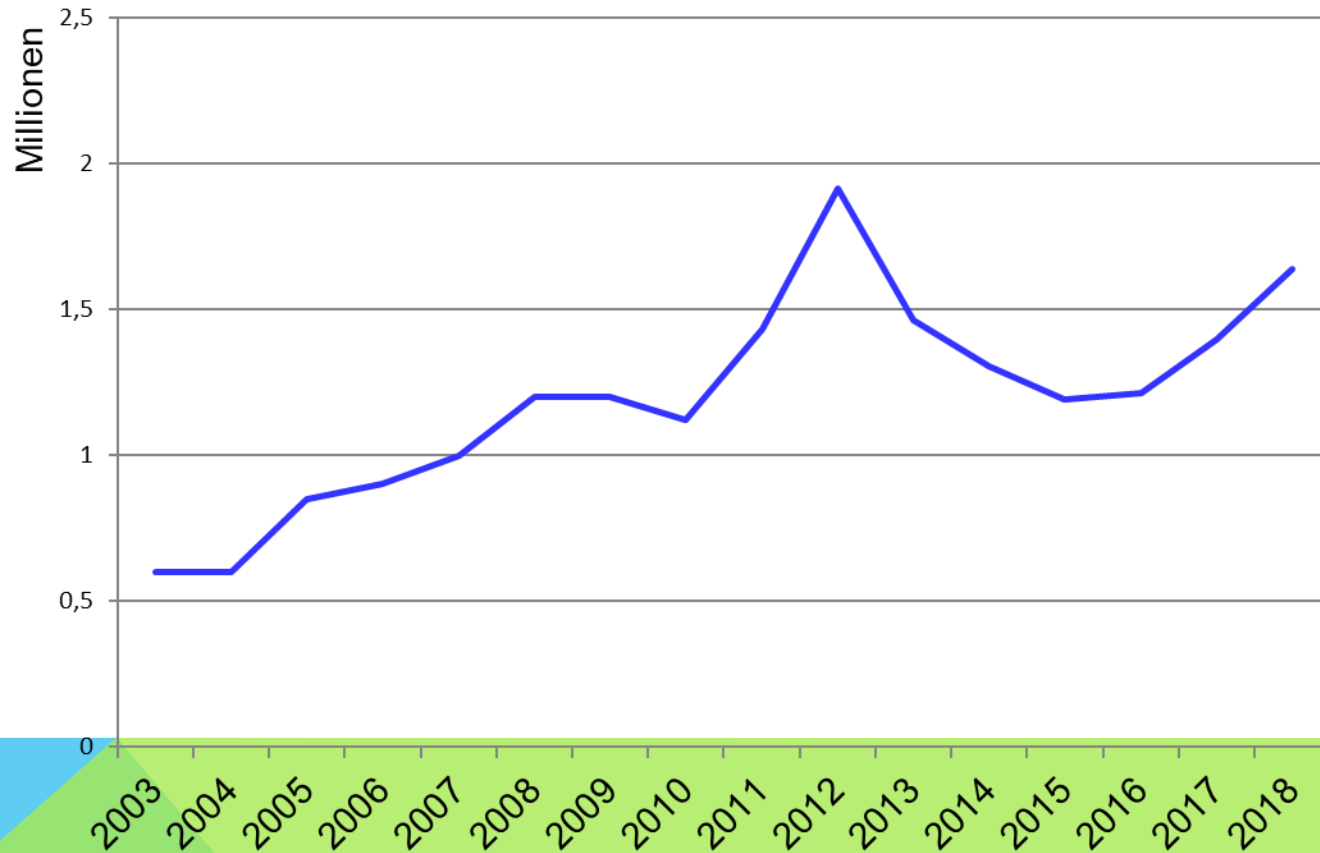
**Planning und Construction
BIOGAS PLANTS**

ACTIVITIES WORLD WIDE



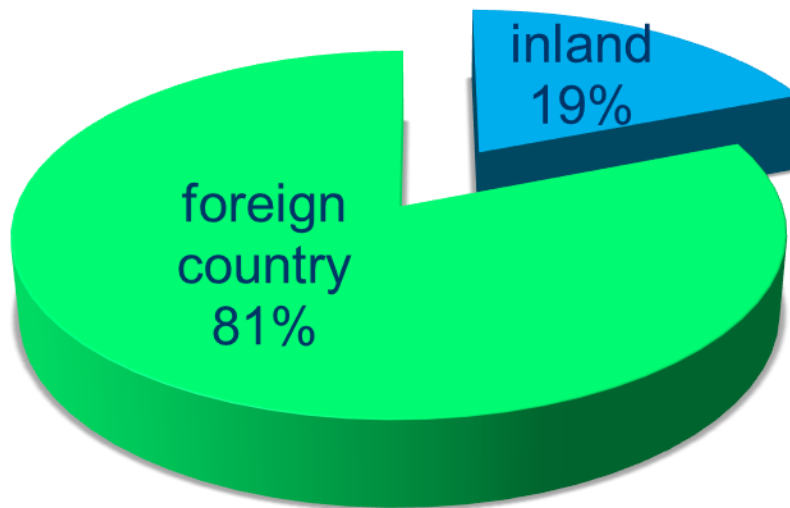
**Planning und Construction
BIOGAS PLANTS**

TURNOVER 2003-2018

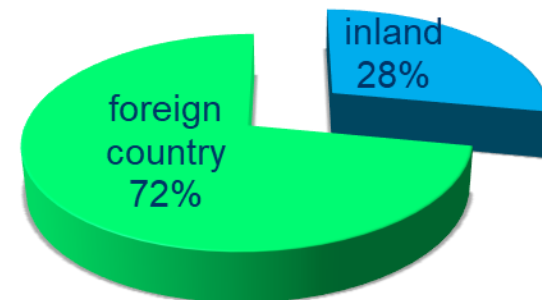


DISTRIBUTION OF TURNOVER

Turnover 2018



Turnover 2017

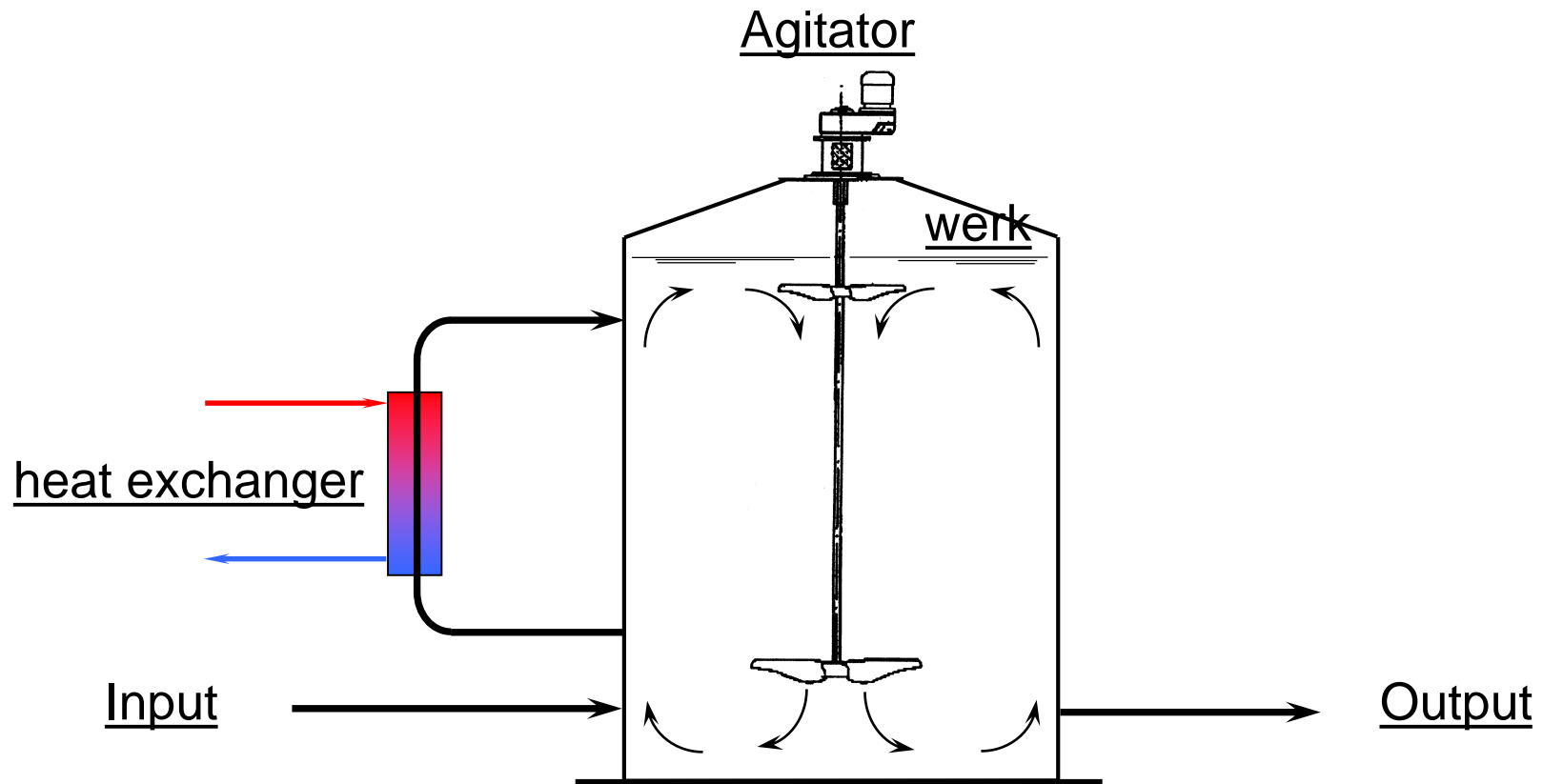


OUR SERVICE OFFERING



Studies * Concept development * Process technology * Cost determination/
Calculation Permission * Planning * Construction management * Start-up *
Optimisation * Due diligence * Expert Opinion * Operator Service new 2014

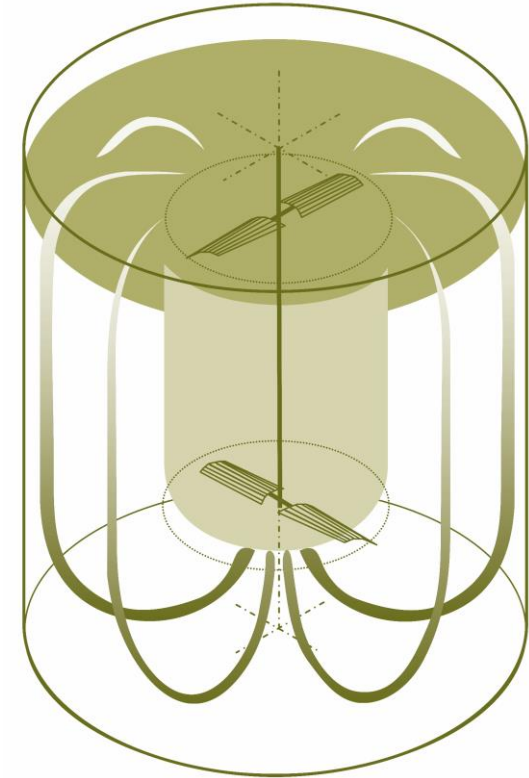
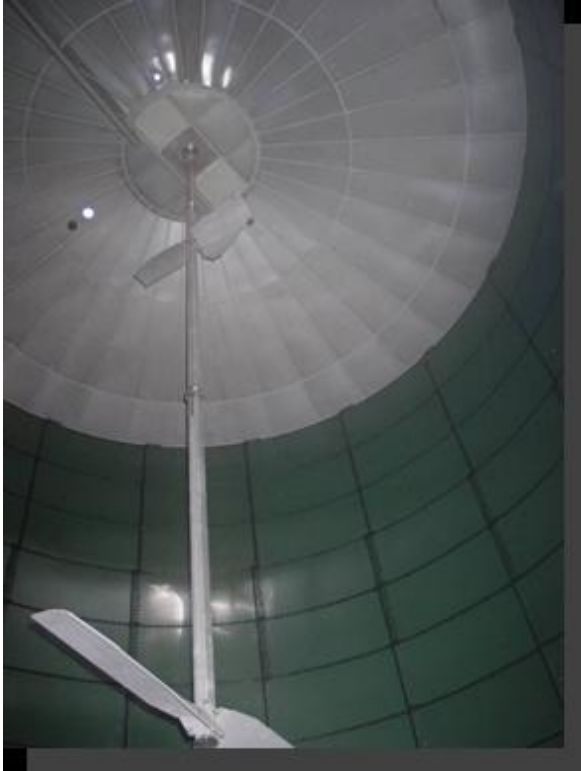
TECHNICAL DETAILS



High upright digester / CSTR

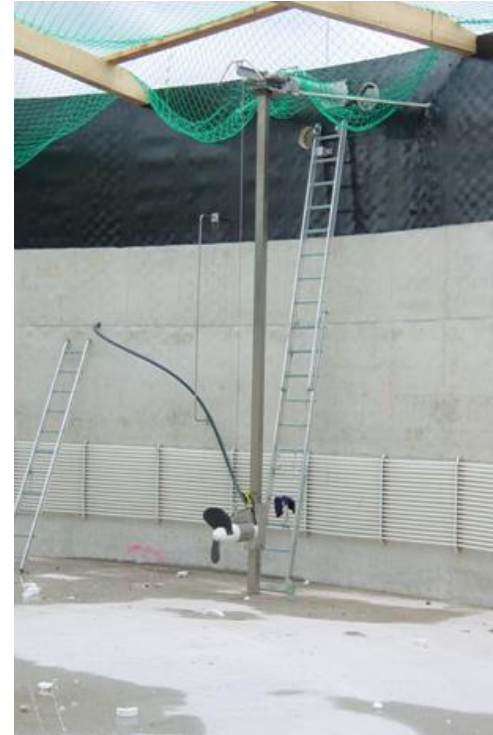
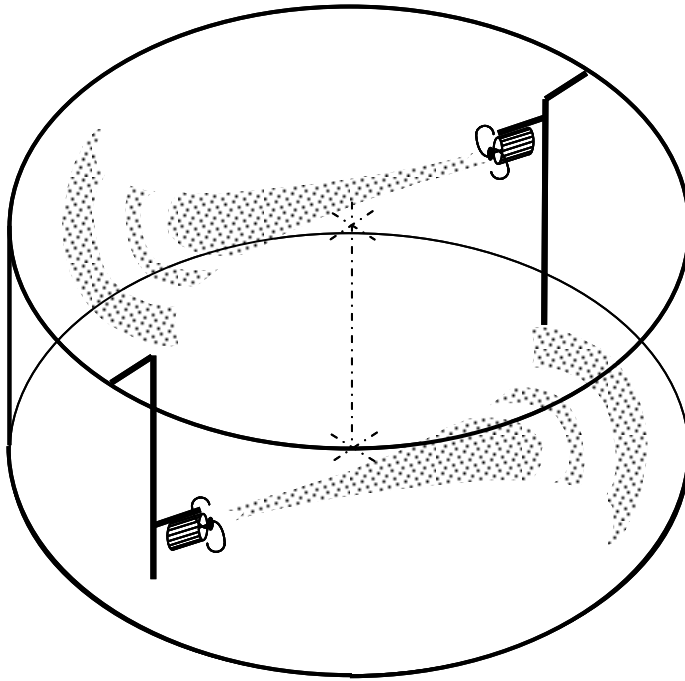
Established for large-scale plants with volumes up to 5,000 m³. Mixing is done by a top mounted mixer that is continuously operating. Material: Reinforced concrete or glass coated steel depending on the size. The digester is followed by a secondary digester with a gas holder roof • Homogeneous mixing • Constant gas production • Low heat loss

TECHNICAL DETAILS



Agitator in the digester tank and its effect

TECHNICAL DETAILS



Flat digester•

Best suited for small to medium sized biogas plants with substrates with low dry matter content that is easy to mix • Height up to 6 m • Volumes up to 2,000 m³ • Integrated gas storage in gas holder roof • Cost saving digester tank design • Simple mixing and heating conditions

TECHNICAL DETAILS



**Wood construction in the
secondary digester tank**



**Gas holder on top of
secondary digester tank**

TECHNICAL DETAILS



Pumping room

Pumps, valves and pipes specific to the plant substrate



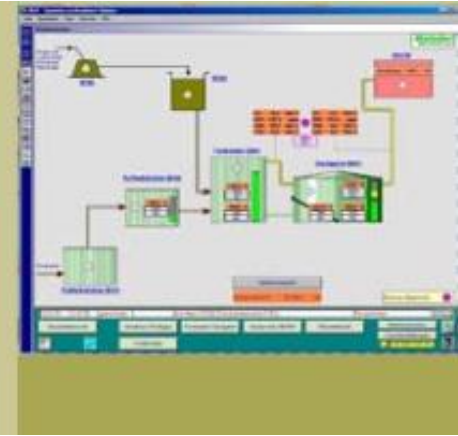
External heat exchanger

to heat the substrate



Overpressure-vacuum relief valve

for safety reasons



Process control system

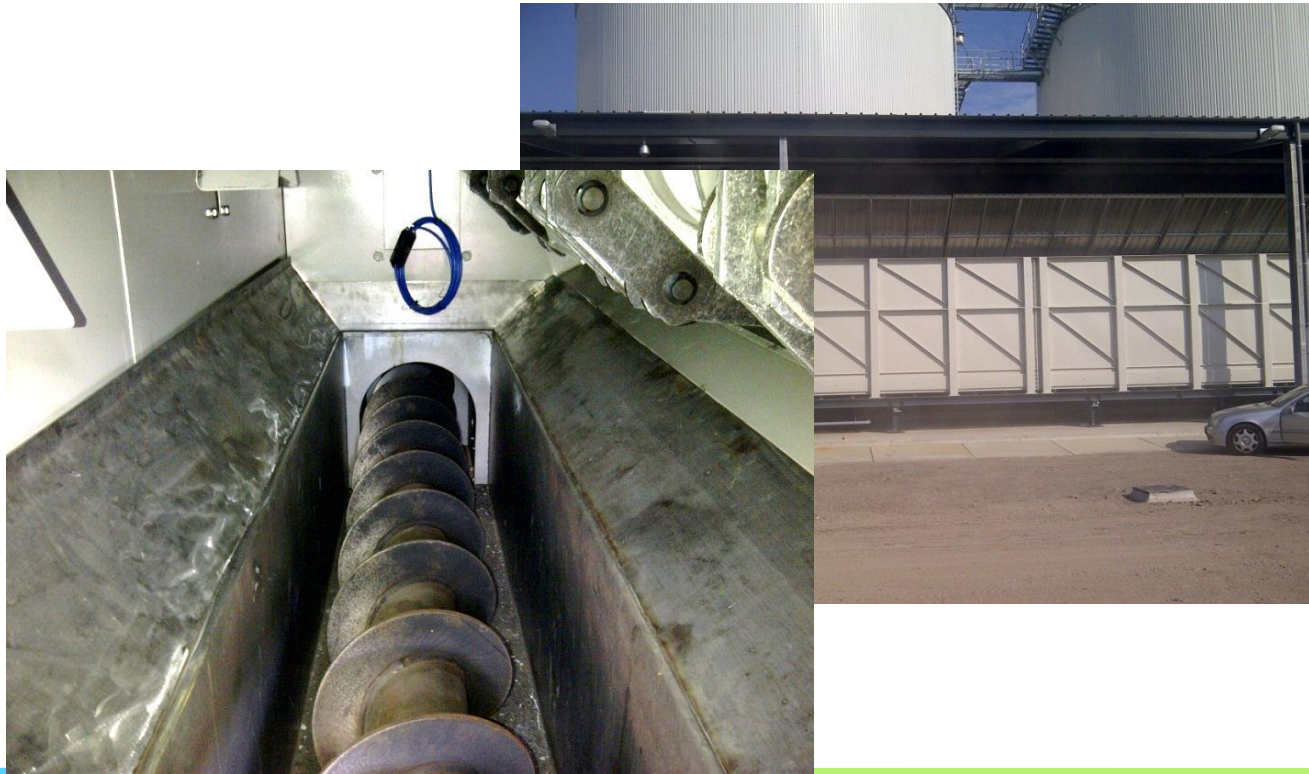
system control, monitoring and worldwide access to the biogas plant

TECHNICAL DETAILS



Input device for solid substrates

TECHNICAL DETAILS



Solid input device with liquid input device and storage capacity

TECHNICAL DETAILS

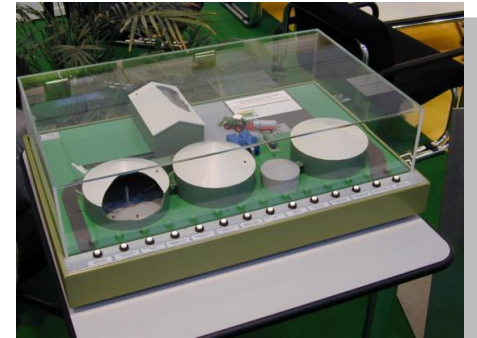
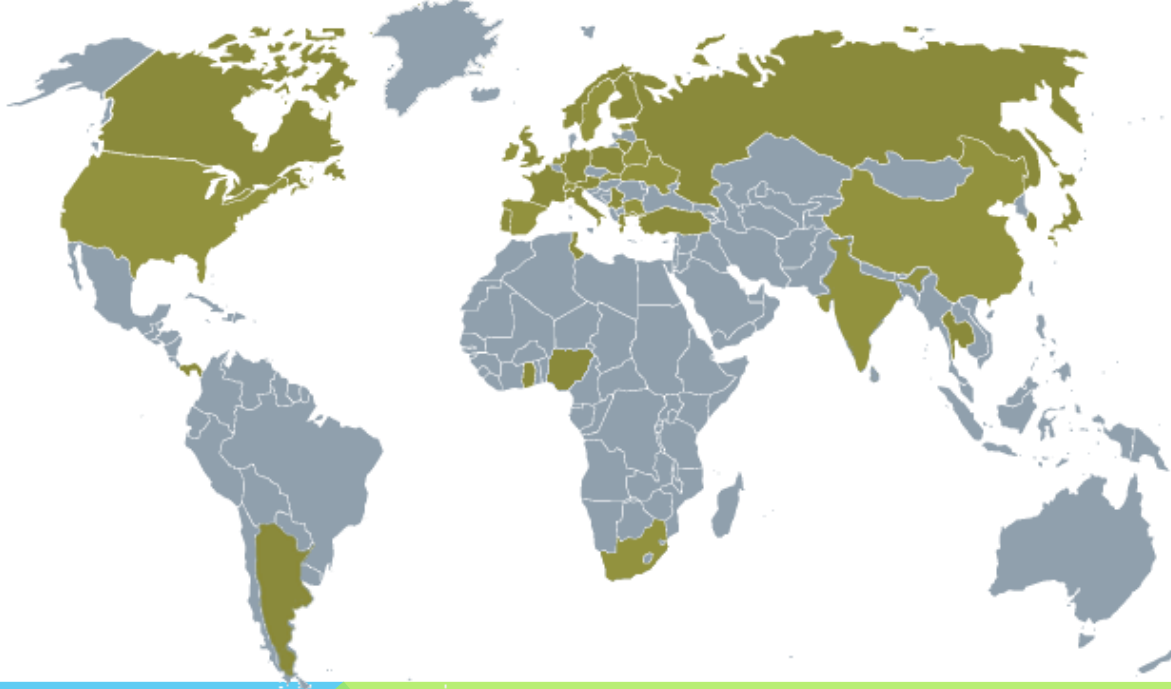


Biogas upgrading and injection of bio-methane
into the natural gas grid

REFERENCE OF BIOGAS PLANT

113 BIOGAS PLANTS IN GERMANY

44 BIOGAS PLANTS WORLDWIDE



Austria, Argentina, Canada,
China, Finland, France,
Germany, Italy, Japan,
Lithuania, the Netherlands,
Poland, Slowacai, Spain,
Swiss, Russia, USA

CHINA

BIOGAS PLANT QINHUANGDAO

Location: China
Construction Period: 2014
Input: Kitchen waste
Fermenter: Steel tank, 2 x 3,400 m³
Co-generator: Biogas upgrading
Further biogas plant in China:

- Deqingyan II (2012),
- Jiaozuo (2016/17),
- Wuhu (2016/17)



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Conception, preplanning, permission detailed and final construction plans, supervision of construction, start-up

JAPAN

BIOGAS PLANT FUKUOKA

Location: Japan
Construction Period: 2016/17
Input: Vegetable waste, residue of shochu, sludge from WWTP, okra, gluten
Fermenter: enameled steel tank, 2 x 5,000 m³
Co-generator: Gas engine 2 x 1,056 kW_{el}
Further biogas plants in Japan:

- Fukuoka (2016/2017), Daisen (2013/2014)
- Bekai (2000/2001), Kawagoe (2019/2020)
- Tottori (1999/2000), Hamanaka, (2019/2020),
- Revacs (2019/2020)



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GERMANY

BIOGAS PLANT ANKLAM

Location: Germany
Construction Period: 2012
Input: Sugar beets, vinasse
Fermenter: Steel tank, 4x4,480 m³
Co-generator: Gas upgrading,
gas injection

Further more then

- 113 biogas plant in Germany



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and final construction plans, supervision of
construction, start-up

NETHERLANDS BIOGAS PLANT DINTELOORD

Location: The Netherlands
Construction Period: 2011
Input: Sugar beets, vegetable waste (potatoes, chicoree)
Fermenter: Steel tank, 4 x 4,480 m³
Co-generator: biogas upgrading, gas injection
Further biogas plant in the Netherlands:

- Viverlaten (2012)
- Dinteloord (2011)
- Nij Bosma Zahte (2000)



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GERMANY BIOGAS PLANT SEMD

Location: Germany
Construction Period: 2009/10
Input: Corn silage
Fermenter: Prestressed concrete, prefabricated element tank, 2,473 m³
Co-generator: Biogas upgrading and injection into the gas grid



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functional tender, award and supervision of
construction, project management, final
acceptance

FRANCE

BIOGAS PLANT NOYON

Location:	France
Construction Period:	2007
Input:	Sewage sludge, fats, food residuals, co-substrates, process water
Fermenter:	Steel tank, 3,000 m ³
Co-generator:	Gas engine, 716 kW _{el}
Further biogas plants in France:	
•	Bretagne (2007)



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and Final Engineering, Construction
Supervision, Start-up

CANADA

BIOGAS PLANT PRINZ EDWARD ISLAND

Location:	Canada
Construction Period:	2007
Input:	Potato raw materials, oil, potato sludge
Fermenter:	Steel tank, 22,000 m ³
Co-generator:	Thermal use of biogas
Further biogas plants in Canada:	
•	Cudworth Pork 2004



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and Final Engineering, Construction
Supervision, Start-up

USA

BIOGAS PLANT INLAND EMPIRE

Location:	USA
Construction Period:	2006
Input:	Manure, waste
Fermenter:	Two steel tanks, 4,500 m ³
Co-generator:	Feeding into the gas distribution systems



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Detailed and Final Engineering, Construction
Supervision, Start-up

GERMANY

BIOGAS PLANT IM BRAHM

Location:	Germany
Construction Period:	2005
Input:	Pig manure, kitchen waste, fats, grain
Fermenter:	Concrete Tank, 1,205 m ³
Co-generator:	Gas engine, 4 x 190 kW
Costs:	About. € 1,000,000



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Conception, Preplanning, Permitting, Detailed and Final Engineering, Construction Supervision, Start-up and several enlargements

CANADA

BIOGAS PLANT CUDWORTH PORK

Location:	Canada
Construction Period:	2003
Input:	Pig Manure
Fermenter:	Steel Tank, 2,000 m ³
Co-generator:	Micro gas turbines, 4 x 30 kW
Spezial Features:	Gasholder above secondary digester tank



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Detailed and Final Engineering, Construction
Supervision, Start-up

GERMANY

BIOGAS PLANT BÖCKERMANN

Location:	Germany
Construction Period:	2002
Input:	Manure, other organic waste
Fermenter:	Glass coated steel tank, 2,500 m ³
Co-generator:	Dual fuel co-generator 2 x 170 kW _{el}



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and Final Engineering, Construction
Supervision, Start-up

GERMANY

BIOGAS PLANT WIETZENDORF

Location:	Germany
Construction Period:	2001/2002
Input:	Potato pulp
Fermenter:	Steel Tank, 4 x 2,500 m ³
Co-generator:	Gas engine, 2 x 2,1 MW _{el}
Costs:	about € 25,000,000



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Supervision, Start-up

INTERNATIONAL TRADE FAIR

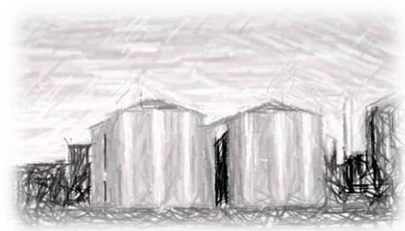


IFAT
Germany

NEXPO
Japan

GREENEXPO
Ukraine

SINO-GERMAN
China



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