



Krieg & Fischer Ingenieure GmbH



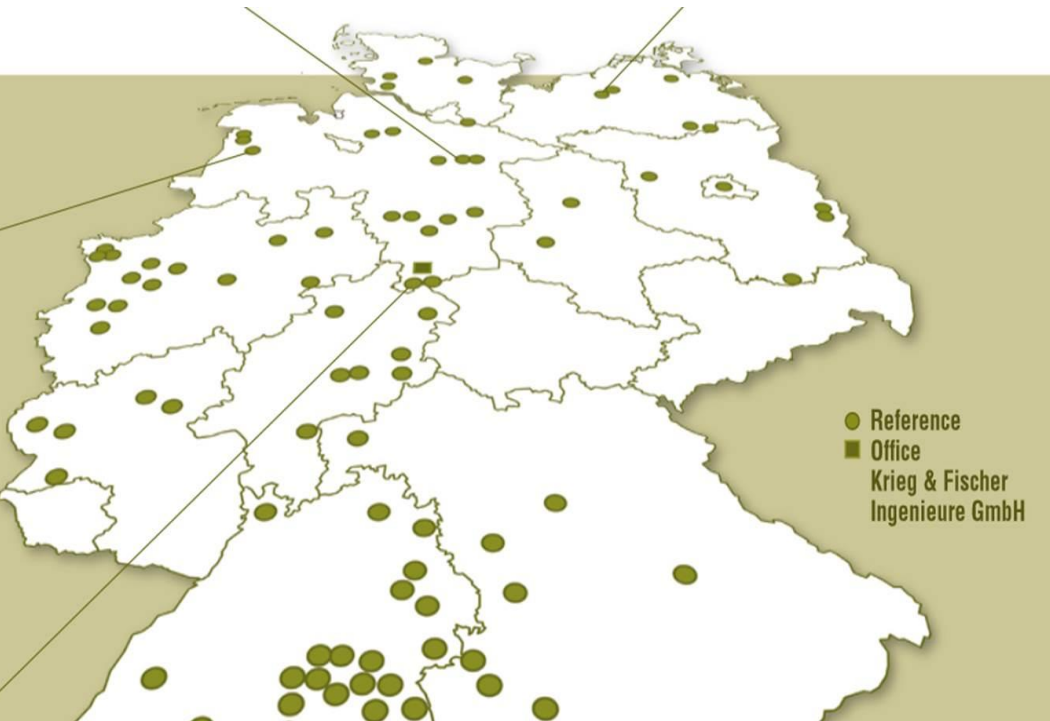
KRIEG & FISCHER INGENIEURE GMBH

BIOGAS PLANTS



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

COMPANY LOCATION IN THE MIDDLE OF 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.



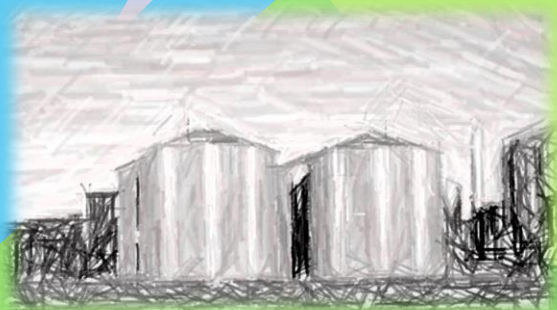
1999
founded

2003
Award of
Innovation

2009
Sworn
Expert of
Biogas

2019
20 years
company
anniversary
160 Biogas
Plants
References
worldwide

2020
World Biogas
AWARD



Planning und Construction BIOGAS PLANTS

GENERAL MANAGER:



Raphael Thies

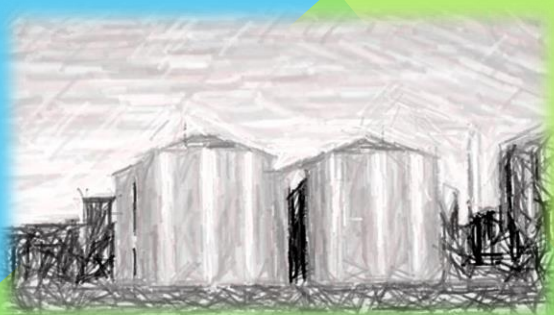
Torsten Fischer

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



Bulgaria: Agroecon o.o.d.

Poland: Biogazowuie Polski

Spain: Ecobiogas

Ukraine: Ecodevelop

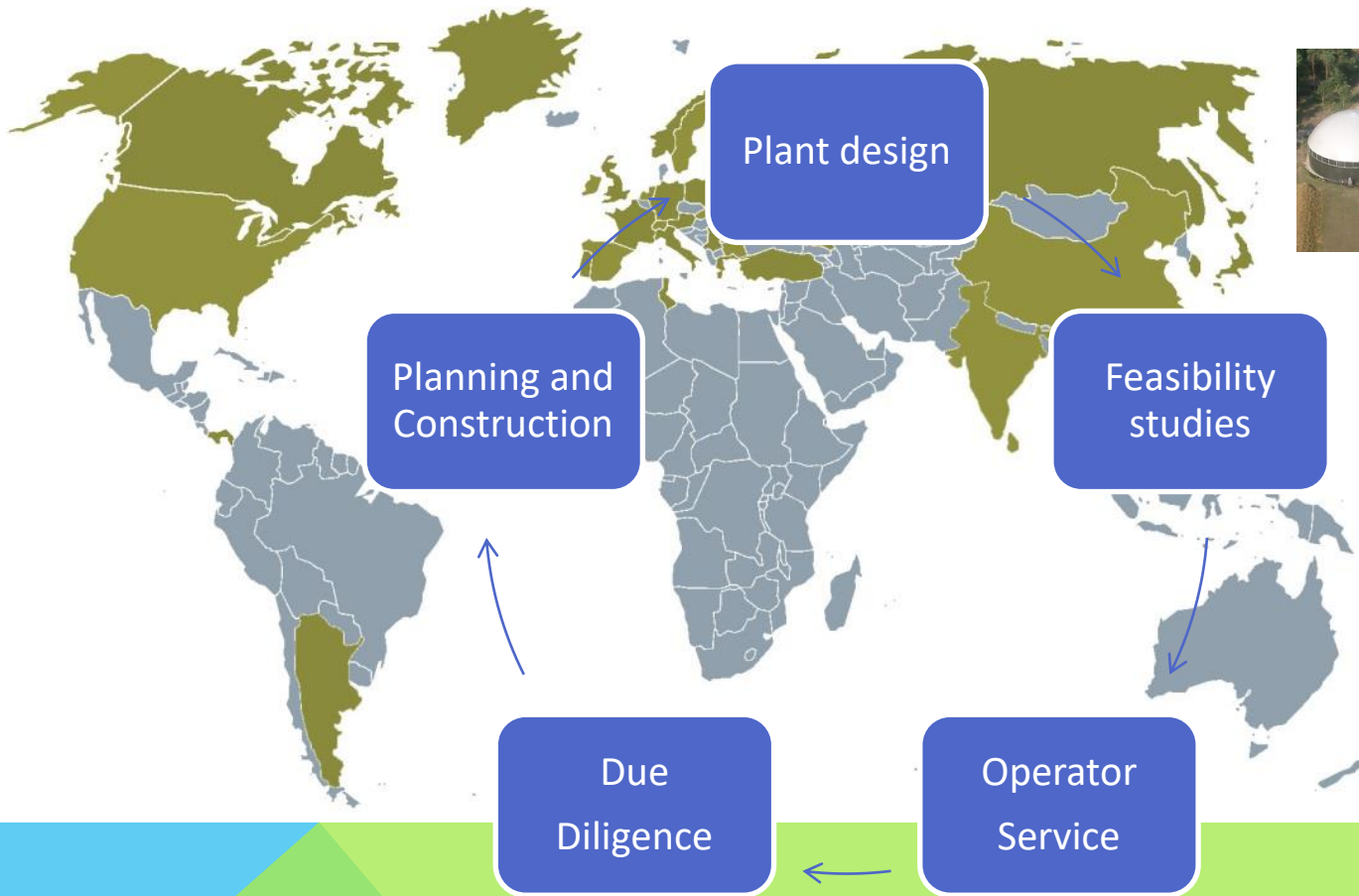
Japan: Eco HearT Inc.

Canada: Electrigan Technologie Inc

. Italy: Inte.C.O. engineering

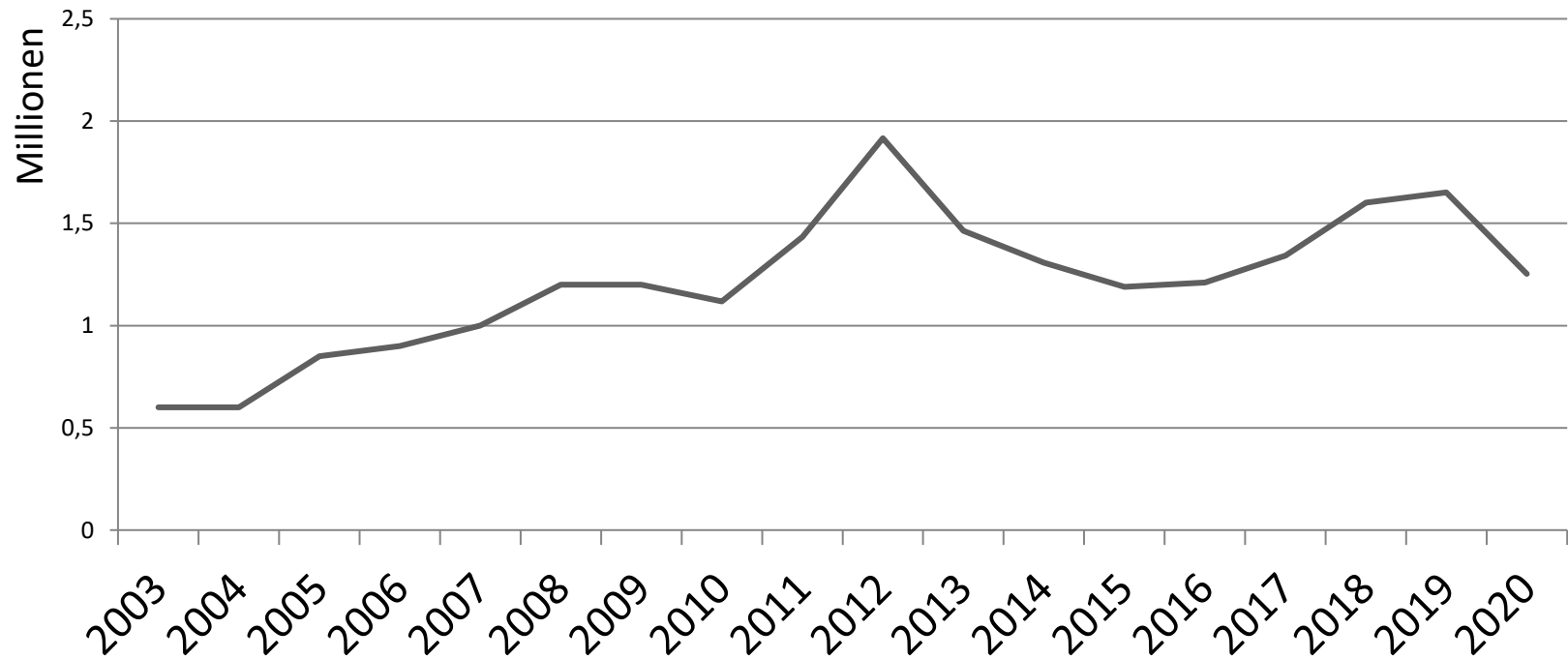
**Planning und Construction
BIOGAS PLANTS**

ACTIVITIES WORLD WIDE



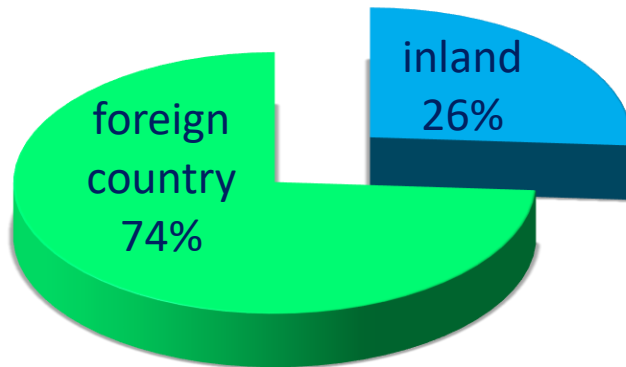
**Planning und Construction
BIOGAS PLANTS**

TURNOVER 2003-2020

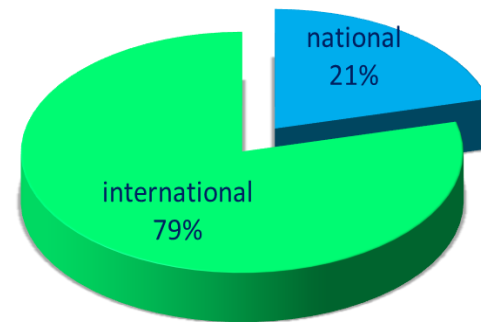


DISTRIBUTION OF TURNOVER

Turnover 2020



Turnover 2019

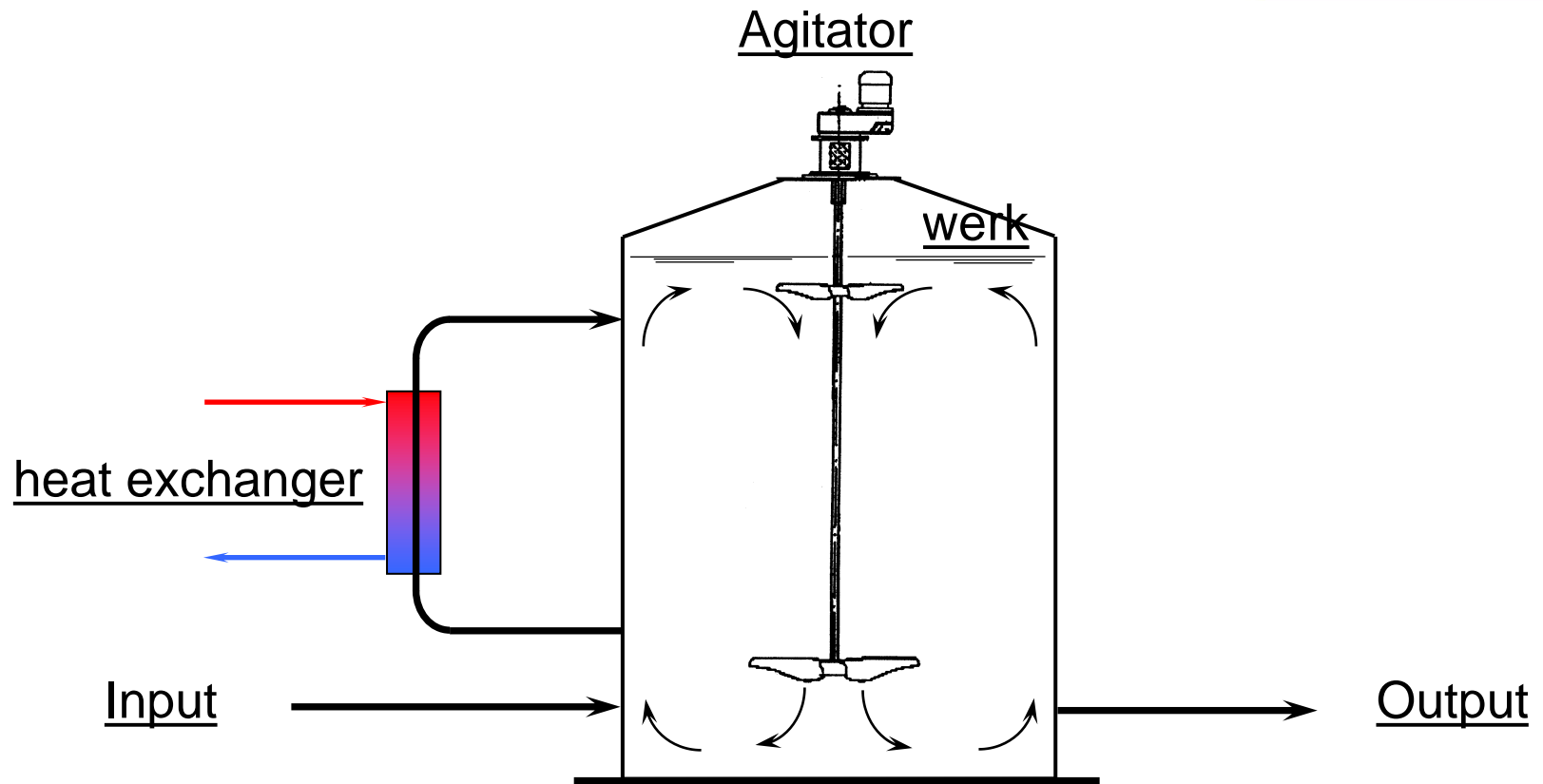


OUR SERVICE OFFERING



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

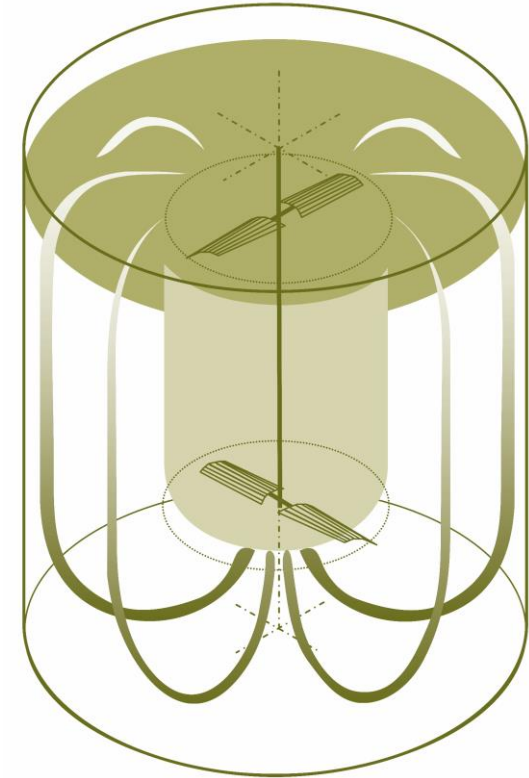
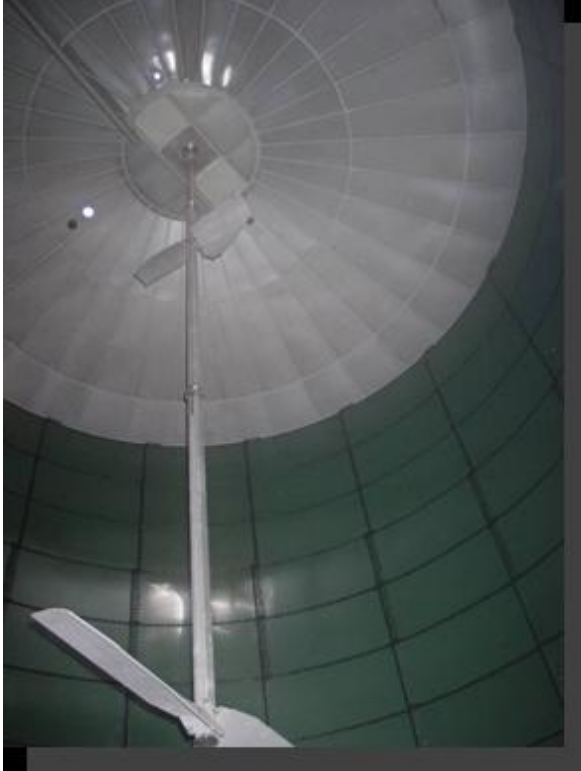
TECHNICAL DETAILS



High upright digester / CSTR

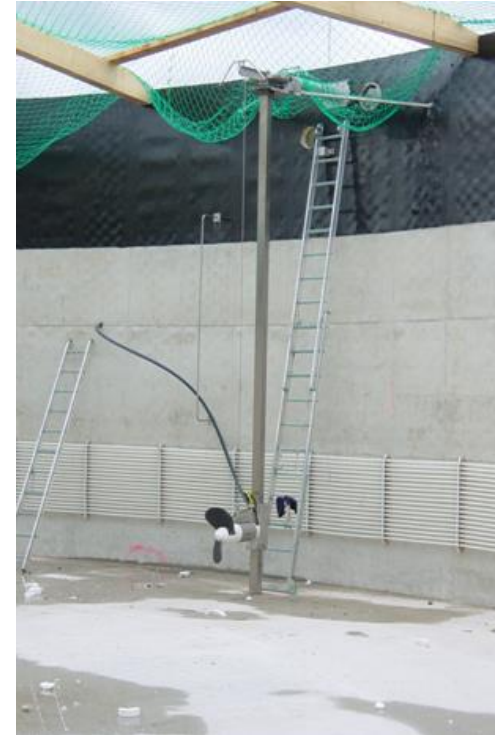
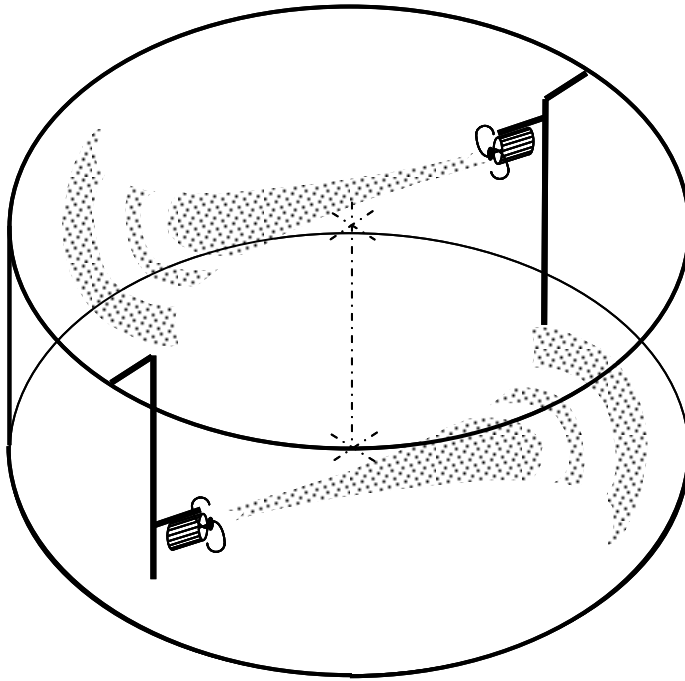
Established for large-scale plants with volumes up to 5,000 m³. Mixing is done by a top mounted mixer that is continuously operating. Material: Reinforced concrete or glass coated steel depending on the size. The digester is followed by a secondary digester with a gas holder roof • Homogeneous mixing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



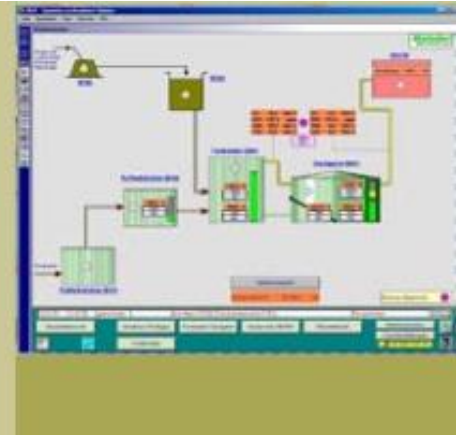
External heat exchanger

to heat the substrate



Overpressure-vacuum relief valve

for safety reasons



Process control system

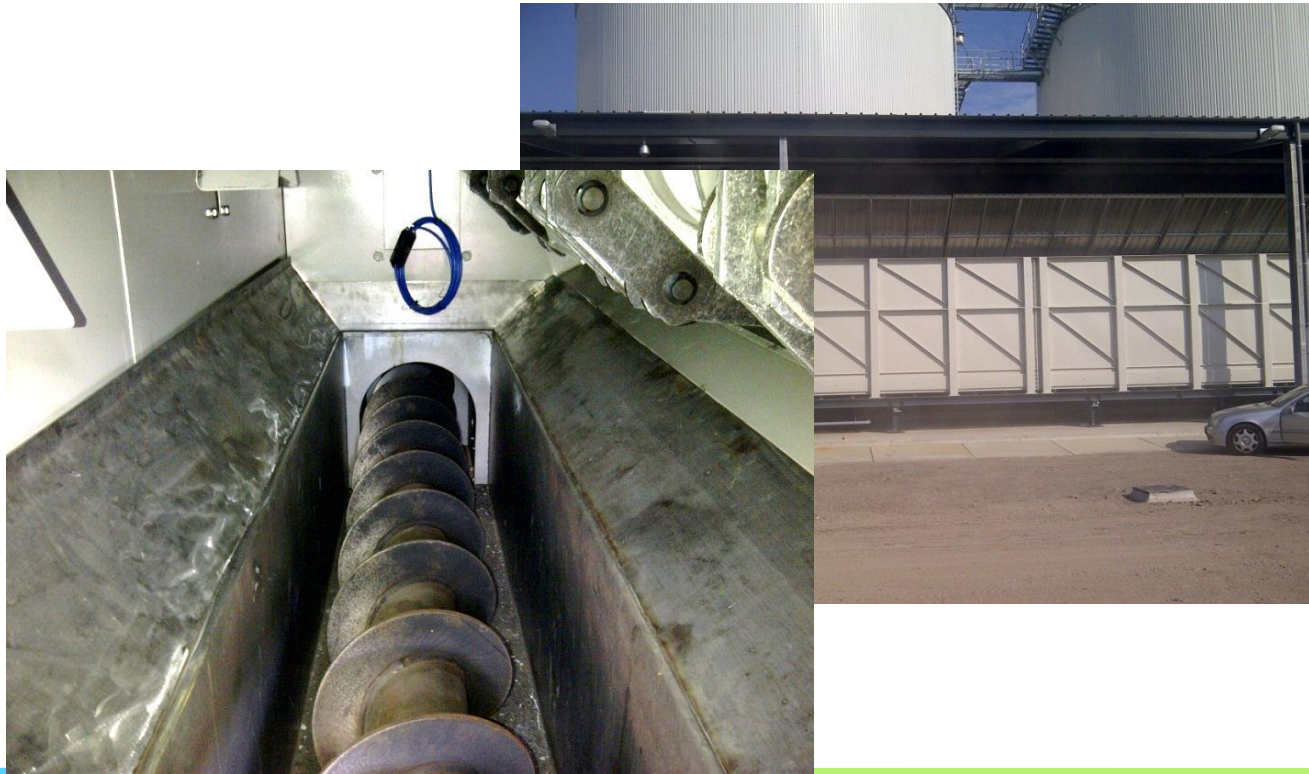
system control, monitoring and worldwide access to the biogas plant

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

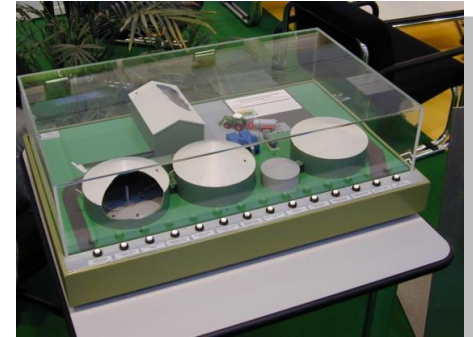
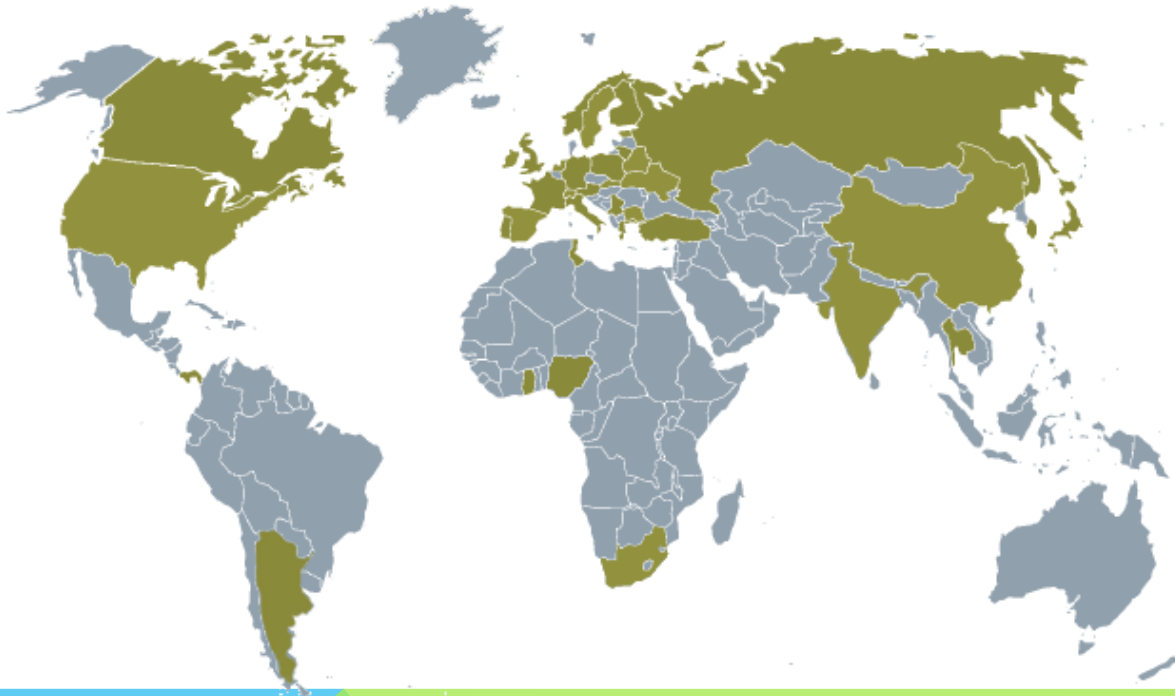
REFERENCE OF BIOGAS PLANT

113 BIOGAS PLANTS IN GERMANY

47 BIOGAS PLANTS WORLDWIDE



Krieg & Fischer Ingenieure GmbH



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

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:

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

Krieg & Fischer Ingenieure GmbH

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



ARGENTINIA

BIOGAS PLANT RIO CUARTO II

Location: Argentina

Construction Period: 2017/2018

Input: Thin stillage (corn silage, vinasses), a residual material from ethanol production

Fermenter: Glass coated steel tank, 8,000 m³

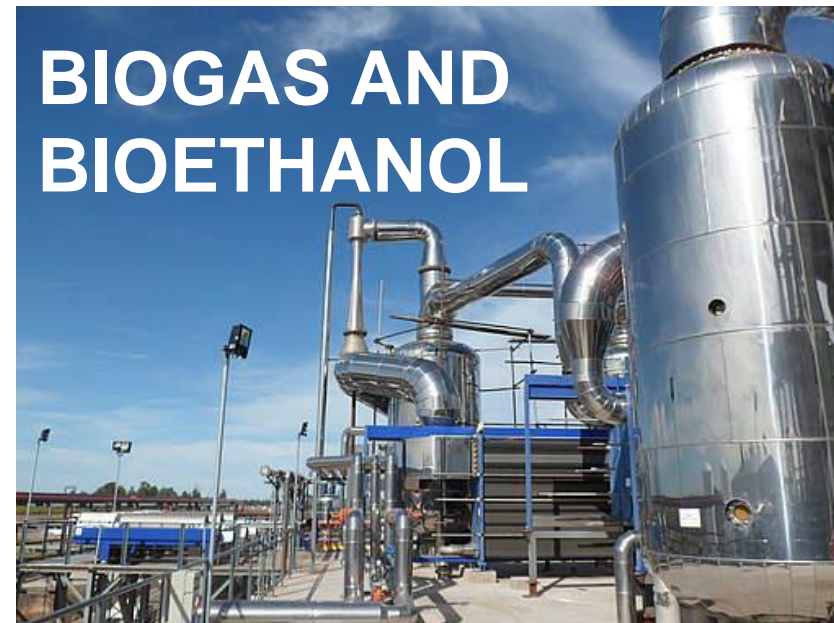
Co-generator: total: 2,927 kWel: 1,200 kWel in CHP; 1,727 kWel in a boiler for internal consumption of the bioethanol process

Further biogas plant in the Netherlands:

- Rio Cuarto I (2012)

Krieg & Fischer Ingenieure GmbH

Basic evaluation, pre-, draft- and execution planning, tendering, participating in contract awarding process, site management/project controlling, start-up, training for operators



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)



Krieg & Fischer Ingenieure GmbH :

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

IRELAND HUNTSTOWN

Location: Ireland
Construction Period: 2018/19
Input: Hydrolysed (TPH) biowaste and kitchen waste
Fermenter: Steel tanks, 4 x 4,900 m³
Co-generator: Gas engine 2 x 2,4 MW_{el}

Special sand removal ,cooling of input material, 2 buffertanks, external gas storage



Further biogas plants in Ireland:

- Mc Donnell (2009)

Krieg & Fischer Ingenieure GmbH :

Basic evaluation, pre-, draft- and execution planning, tendering, participating in contract awarding process, site management/project controlling, start-up, operator training and instruction

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



Krieg & Fischer Ingenieure GmbH

Conception, Preplanning, Permission, Detailed
and Final Engineering, Construction
Supervision, Start-up

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

- 123 biogas plant in Germany



Krieg & Fischer Ingenieure GmbH

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

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

FRANCE

BIOGAS PLANT NOYON

Location: France

Construction Period: 2007

Input: Sewage sludge, fats, food residuals, co-substrates, process water

Fermenter: Steel tank, 3,000 m³

Co-generator: Gas engine, 716 kW_{el}

Further biogas plants in France:

- Bretagne (2007)

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



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

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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Conception, Preplanning, Permitting, 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



Krieg & Fischer Ingenieure GmbH

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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Conception, Preplanning, Permission,
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}



Krieg & Fischer Ingenieure GmbH

Conception, Preplanning, Permitting, Detailed
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



Krieg & Fischer Ingenieure GmbH

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

INTERNATIONAL TRADE FAIR

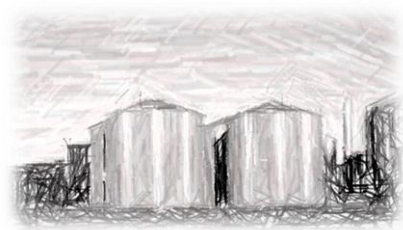


IFAT
Germany

NEXPO
Japan

GREENEXPO
Ukraine

SINO-GERMAN
China



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