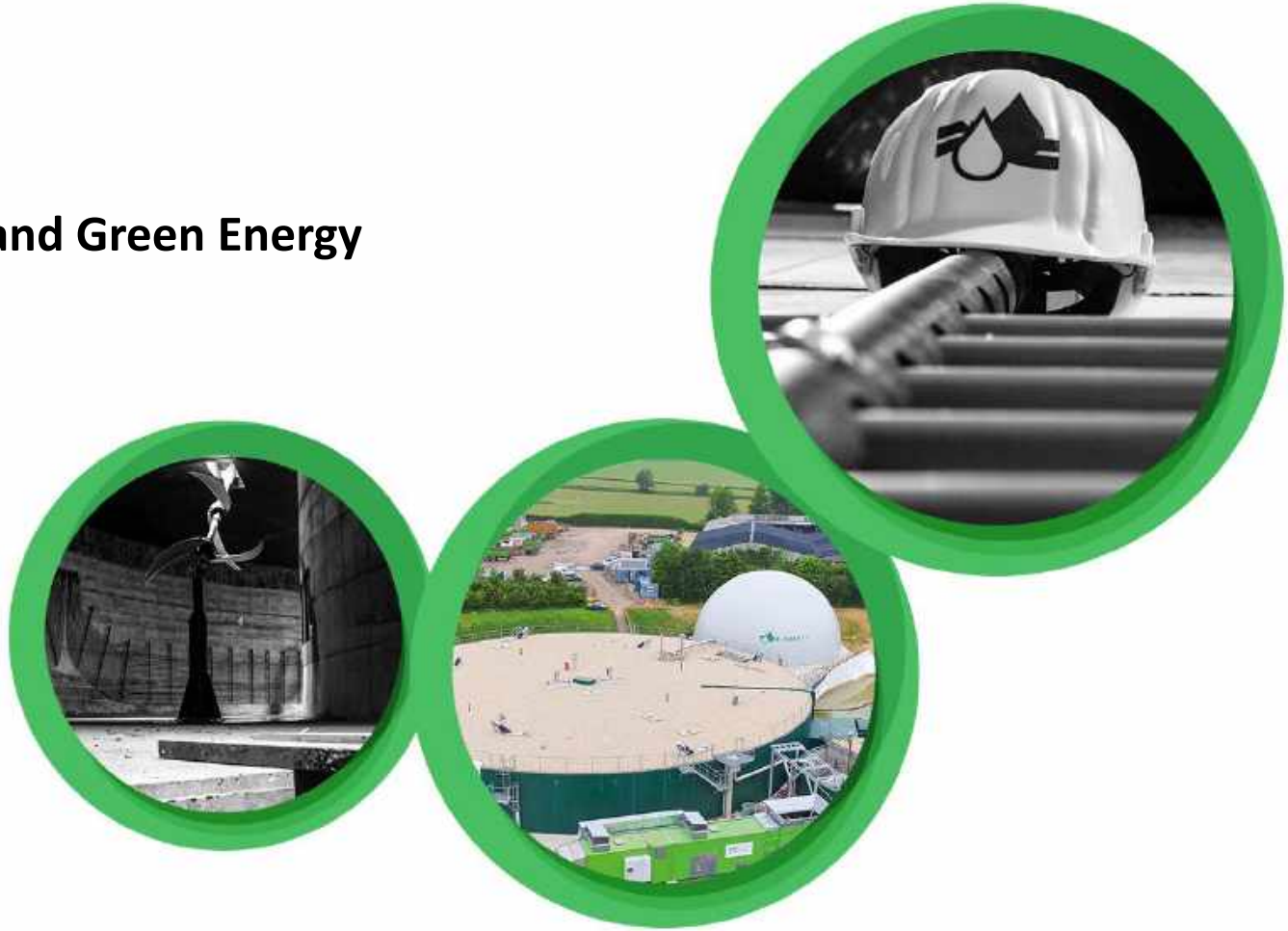
BIOGEST

Waste-To-Compost and Green Energy

29 September 2020

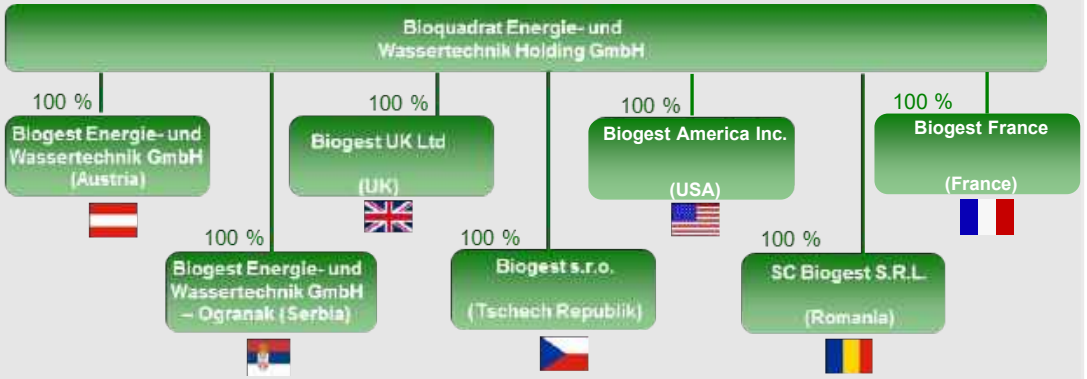


Biogest at a Glance

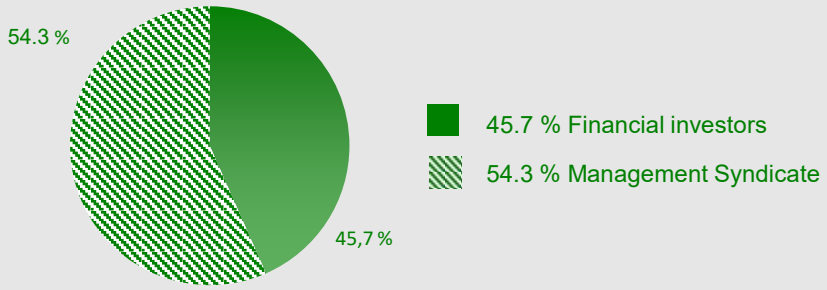
Company Profile

- **31 years of experience** in environmental engineering
- **Business segments:**
  - **Biogas Engineering**:
    Plan and build Biogas plants
  - **Own Plant Operations:**
    Own and operate Biogas plants
  - **Agriculture**:
    Sustainable products for food- and healthcare industry
- **Sites** in **AT** (Klosterneuburg/ Vienna, Sankt Valentin/ Linz), **US** (Denver), **UK** (Dumfries), **FR** (Changé), **CZ** (Breclav), **IT** (Sgonico), **RO** (Timisoara), **RS** (Beograd)

Company Structure



Shareholder Structure

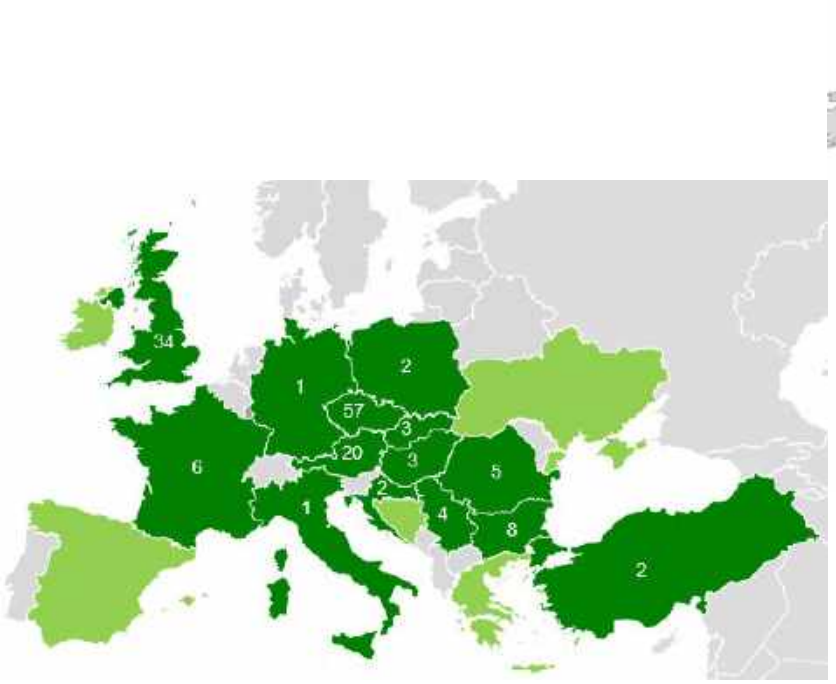


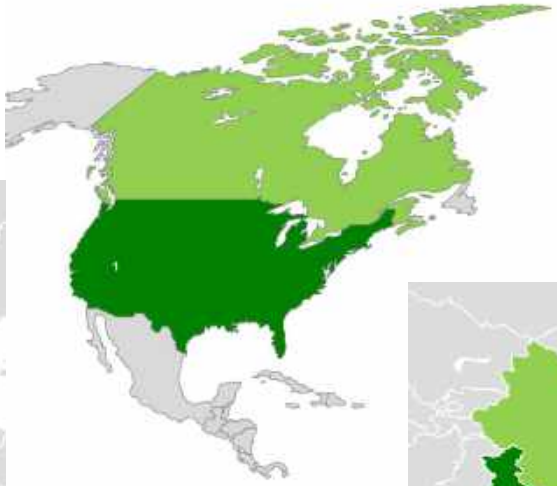
Awards

- Environmental Award City Klosterneuburg 2019
- ADBA BIOGAS 2016 UK – Best Int. Micro Plant - Power Compact
- Neuland Award 2009 & 2011 - Austria
- Export Price 2009 - Austria

Markets

Construction, Planning and Repowering
References in Europe, US and Asia





Core markets

Markets in preparation

BIOGEST Energie- und Wassertechnik GmbH

Utilization of waste by anaerobic digestion for producing energy and organic fertilizer



Waste	El. Power	Heat	Fuel	Fertilizer



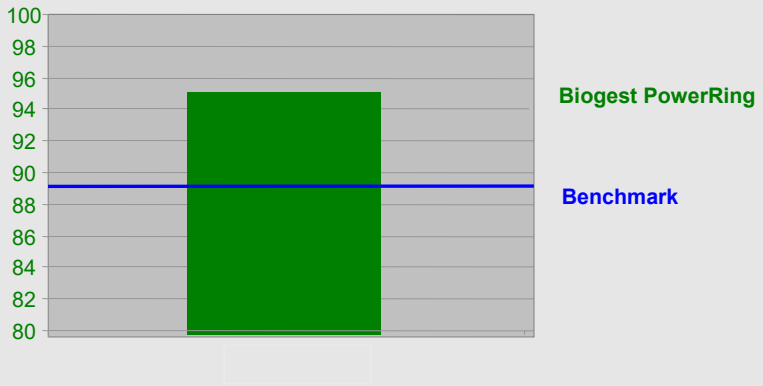

BIOGEST Energie- und Wassertechnik GmbH

PowerRing – Technology
(1-5 MWth)

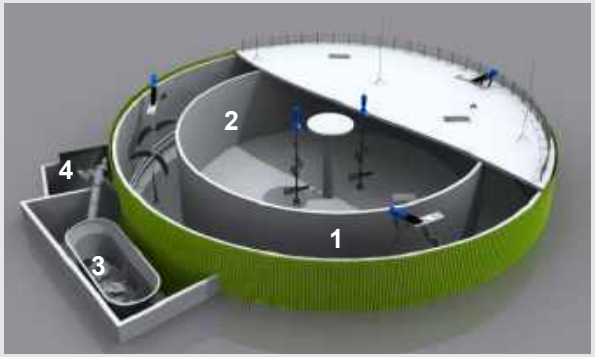
Technology Highlights

- High flexibility in substrate utilization
- Low process energy consumption due to the specific digester geometry (up to -60%)
- 84% degree of degradation (80% industry average) → lower substrate cost and emissions
- High reliability and stability of plant operation
- High full load hours averaging 95% compared to 89% industry average

Plant Performance in %



Biogest PowerRing



1 Main fermenter, **2** Post fermenter,
3 Feeding system, **4** Central pumping station

PowerCompact – Technology
(80–300 kWel)

Technology Highlights

- Designed specifically for small farms
- Able to handle large amounts of slurry and solid organic waste
- Fully automated operation and time-efficient maintenance
- The CHP/GUU, the heating system and the control room are all housed in the technology container which saves construction costs and valuable time
- Plug and Play – Due to the simple installation and short start-up period
- Use of high-quality plant components with a good price-performance ratio from well-known European manufacturers with numerous good references

Biogest PowerRing

1 Digester, **2** Technology container

Biomethane - Production

Biogas

Biomethane

Gas Entry Unit

Bio - CH_4

Compression 200 bar

Bio - CNG

Compression Cooling -162°

Bio - LNG

Carbon Dioxide

Compression Cooling

Food Grade CO_2

Good practice examples

CNG Public Transport

CNG Tractor with 180 HP

First Austrian Truck Biomethane Station

Aida runs with LNG

A changing Industry

2010	2020
BIOGAS	BIOMETHANE
ELECTRICITY and HEAT	FUEL
ENERGY CROPS	AGROWASTE and FOODWASTE
FARMERS	INVESTORS

Example 1 – Charchigné France

- **3.6 MWel** biogas plant in France (Mayenne)
- One of the largest agricultural biogas plants in France and the **largest Biogest plant**
- Total investment of 23 mEUR by 140 local famers together with the infrastructure fund **Meridiam**
- Operated on a plant area of 3 ha with agricultural waste and vegetable byproducts
- The supply of the feedstock (**130,000 t/a**) within a radius of 25 km
- The generated electricity is fed into the public grid and can supply approx. 8,500 households
- The heat (steam) can be provided for the neighbouring dairy industry.

Example 2 – Frogmary Green Farm, UK

- **Biomethane plant** with a capcity of **5 MWth** in Somerset, England
- Feedstock: **45.000 t/yr** of agro-waste and energy crops
- In operation since 2015, **one of the first biomethane injection plants in the UK**
- **Biogest PowerRing technology**, 1 digester 45/8 membrane upgrading system, electrical self consumption produced with own biogas
- Biomethane is injected into the natural gas grid supported by the **UK renewable heat incentive (RHI)**
- **Digestate** is dried and **used as fertilizer** on the organic farm

Example 3 – Ardud, Romania

- **1,5 MWel Biogas plant** in Satu Mare county
- In operation since 2015, started as energy crop plant and was transferred into a waste plant in 2019
- Feedstock: **50.000 t/yr** of agro-waste and energy crops such as grass mix, chicken litter, straw, destillery grains, pig manure, fruit and milk residues
- **Biogest PowerRing technology**, 1 digester 45/8 , electricity produced by one 1,5 MW Jenbacher gas engine.
- Green certificates and electricity is sold to ENEL on a 10 yr contract
- Owned and operated by Biogest together with a local partner
- Challenges: Feestock supply, CV price, environmental permit

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Biomethane Plant
Examples


Enfield (UK)


Frogmary / UK


Burton / UK


Great Hele / UK


Willand / UK


Wittersheim / FR

Plant Examples


Crofthead / UK

Aberdeen/ UK


Charchigne/FR


Hradesice/ CZ


Chynorany/ SK


Utzenaich/ AT

Reference Biogas Plants

Construction, Planning and Repowering References

2020	FROGMARY 3 (UK)	
	OAK VALLY 1 (US)	420 Nm3/h
	ENFIELD EXTENSION (UK)	
	ANKA (TR)	1500 kW
2019	ZELARINO (IT)	300 kW
	CONFOLENS (FR)	235 Nm3/h
	HC KOREA (AS)	124 kW
	AKYURT I (TR)	3000 kW
2018	UNIVERSITY (IN)	100 kW
	WORTHY FARM (UK)	124 kW
	AKYURT II (TR)	3000 kW
	FROGMARY (UK)	124 kW
	METHA CONFOLENTAIS (FR)	gas injection 850 kW
2017	WILLAND (UK)	3500 kW
	WITTERSHEIM (FR)	gas injection 1500 kW
	CHARCHIGNÉ (FR)	3 600 kW
	AGROPLUS (RS)	1000 kW
	CESTEREG (RS)	600 kW
	AHI ENERGI (TK)	6500 kW
	SLADOJEVCI (HR)	1000 kW
2016	STARA PAZOVA 2	637 kW
	PENGELLY (UK)	1 000 kW
	ARKLEBY HALL (UK)	1 000 kW
	ASSE LE BERENGER (FR)	500 kW
2015	PULLACH (DE)	500 kW
	BURTON AGNES (UK)	500 kW + gas injection 2 000 kW
	POLLYBELL (UK)	500 kW + gas injection 2 000 kW
	HONEYBOURNE (UK)	500 kW
	KINGSWEEK (UK)	250 kW
	MILL-NURSERIES (UK)	2 000 kW
	HILLFIELDS (UK)	124 kW
	FROGMARY (UK)	499 kW + gas injection 2 000 kW
	MANN (UK)	124 kW
	RUSHYWOOD (UK)	500 kW
	JOHNSTON (UK)	124 kW
	GREAT HELE (UK)	500 kW

2014	SOLAR (BG)	637 KW
	ARDUD (RO)	1500 KW
	ENFIELD (UK)	499 KW + gas injection 2 000 KW
	BILSTHORPE (UK)	500 KW + gas injection 2 000 KW
	DODDS (UK)	124 KW
	LITTLETON (UK)	124 KW
	CALLENDER (UK)	124 KW
	GLEBE (UK)	124 KW
	MONIKI (UK)	500 KW
	Y-FARMS (UK)	124kW
	COSTON (UK)	500kW
	BROADMEADOWS (UK)	124kW
	SLAVYANOVO (BG)	800 kW
	ABERDEEN (UK)	526 kW
	HOGSBROOK (UK)	1 300 kW
	BRAMHAM (UK)	1 200 kW
	DJULOVAC (HR)	1 000 kW
	BJALO POLE (BG)	600 KW

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Reference Biogas Plants

Construction, Planning and Repowering References

2014	STAMBOLIJSKI (BG)	1 000 KW
	AKSAKOVO (BG)	1 000 KW
	TINWALD (UK)	1 200 KW
2013	JUSTICETOWN (UK)	100 kW
	KIRKBRIDE HOUSE (UK)	500 kW
	GELTBRIDGE (UK)	250 kW
	PECKMOOR (UK)	500 kW
	BEARLEY (UK)	2 000 kW
	CHAVANAGE (UK)	2 000 kW
	VRBAS II (RS)	500 kW
	CHOTYCANY II (CZ)	99 kW
	GARBOVA (RO)	1 000 kW
	CEFA BIHOR (RO)	2 900 kW
	VETRKOVICE (CZ)	526 kW
	TOPOLJE 1 (HR)	330 kW
	KLOUZOVICE II (CZ)	526 kW
	TAKO (CZ)	549 kW
	ZALUZI-MORINA II (CZ)	549 kW
	BELCICE (CZ)	526 kW
	STARA PAZOVA II	300 kW
2012	LYSICE-BYCKOVICE (CZ)	548 kW
	BALS (CZ)	1 000 kW
	TOFALU (HU)	1 000 kW
	AVICOLA (RO)	600 kW
	DOBRICH (BG)	800 kW
	SATU MARE (RO) – OPO	1 500 kW
	MECIN (CZ)	600 kW
	STRIZOVICE II (CZ)	600 kW
	SKALSKO (CZ)	600 kW
	STRIZOVICE (CZ)	600 kW
	HORINEVES (CZ)	1 000 kW
	ZAKAVA (CZ)	998 kW
	LUKOVA (CZ)	600 kW
	LHOTA POD LIBCANY (CZ)	600 kW
	TISOVA (CZ)	999 KW

2012	STAROSEDLSKY HRADEK (CZ)	835 kW
	GRODZIEC SLASKI (PL)	600 kW
	HORAK – CHOTOVICE (CZ)	637 kW
	PRUSINKY (CZ)	998 kW
2011	OTICE (CZ)	526 kW
	PRESTOVICE (CZ)	800 kW
	KOSTELNI VYDRI (CZ)	600 kW
	HLUBOS (CZ)	834 kW
	NECHANICE (CZ)	800 kW
	HRADESICE (CZ) - OPO	660 kW
	VELKE NEMCICE (CZ)	998 kW
	HLOHOVEC (SK)	526 kW
	VESTEC (CZ)	800 kW
	CERNA (CZ)	526 kW
	VYSOKE (CZ)	526 kW
	BREST (BG)	1 200 kW
	KOSOVA HORA (CZ)	834 kW
	RTYNE (CZ)	400 kW
	HROTOVICE (CZ)	600 kW
	KUNZAK (CZ)	600 kW
	DOLNI NEMCI (CZ)	999 kW
	KLOUZOVICE (CZ)	1 063 kW
	MILEC (CZ)	526 kW
	LESNA (CZ)	320 kW
	SOSNICOWICE (PL)	526 kW
	TRENCIANSKA TEPLA (SK)	1 000 kW
	CHRAST (CZ)	600 kW
	RADOVESICE (CZ)	834 kW
2010	MORINA (CZ)	526 kW
	MOKROVRATA/DOBRIS (CZ)	625 kW
	STARE SMRKOVICE (CZ)	600 kW
	VRBAS (RS)	1 000 kW
	BECEJ (RS)	1 000 kW
	GAV KREMS (AT)	380 kW
	TIMISOARA COUNTY (RO)	3 500 kW
	STADLEC (CZ)	330 kW

Reference Biogas Plants

Construction, Planning and Repowering References

2010	PETROVICE U SEDLCAN (CZ)	834 kW
	PETROVICE BISTRICE (CZ)	999 kW
	UJEZD U CHOCNE (CZ)	999 kW
2009	MILKMEN (HU)	1 000 kW
	CHYNORANY (SK)	995 kW
	NOVOSEDLY (CZ)	526 kW
	YAMBOL (BG)	500 kW
2008	DESOV (CZ)	526 kW
	KRIZANOV (CZ)	526 kW
	TISTIN (CZ)	526 kW
	DRAHOBUDICE (CZ)	526 kW
2007	HLEBNOC (UA)	400 kW
	NOVE LHOTICE – LIBOMERICE (CZ)	526 kW
	LIBEN – DOLNY BREZANY (CZ)	526 kW
	KRASNA HORA (CZ)	526 kW
	CHOTYCANY (CZ)	526 kW
	NEUKIRCHEN (AT)	250 kW
2006	GAV KREMS II (AT)	125 kW
	ÖKOENERGIE GUTAU (AT)	250 kW
	STEINHAUS (AT)	100 kW
2005	ARGE BIOGAS EGGERDING (AT)	500 kW
	GAV KREMS I (AT)	125 kW
	BIOENGERIE WACHTBERG (AT)	250 kW
	NONNDORF (AT)	500 kW
	PRELLENKIRCHEN DEUTSCH HASLAU (AT)	500 kW
2004	PROJEKT NEUSTROM II (AT)	200 kW
	BIOGAS GmbH MOLLN (AT)	250 kW
	BIOGAS MANK GmbH (AT)	500 kW
	ÖKOENERGIE UTZENAICH GmbH (AT)	500 kW
	FAN BIOGAS ASPACH KEG (AT)	500 kW
	BIOENERGIE THENING GmbH i.G. (AT)	500 kW
	WEIBERN (AT)	500 kW
2003	BIOENERGIE KALLHAM GmbH (AT)	250 kW
	CSOBAJ (HU)	90 kW
	KLEIN PYRACH (AT)	150 kW
2001	PROJEKT NEUSTROM I (AT)	150 kW