12 MW Anaerobic Digestion Plant

ENERLINC

BIOGAS COGENERATION

ENERLİNC ENERJİ

❖ Who we are

- Our biogas engineering operations extend along the entire biogas value chain, from project development to planning, financing, turnkey construction and operation of biogas plants with an output of 11 kW to 3,500 kW.
- In addition to engineering, we are also actively operating in the fields of Biogas OPO (Own Plant Operations), energy efficiency and agriculture.
- Biogas plants are constructed using our tried-and-tested PowerRing technology which offers numerous advantages in terms of energy efficiency, operating safety and availability.
- PowerRing and PowerCompact biogas plants have been operating successfully for more than 10 years, installed at over 100 reference plants.

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❖ Who we are

- **Enerlinc also take in place on cogeneration sales and after sale services.**
- **Enerlinc represents 2G Energy AG in Turkey as a exclusive distributor and A+++ service partner.**

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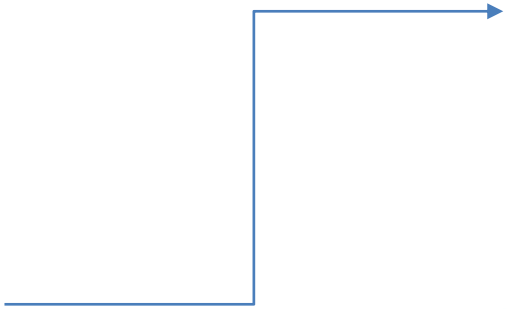
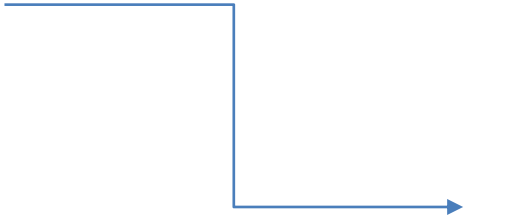
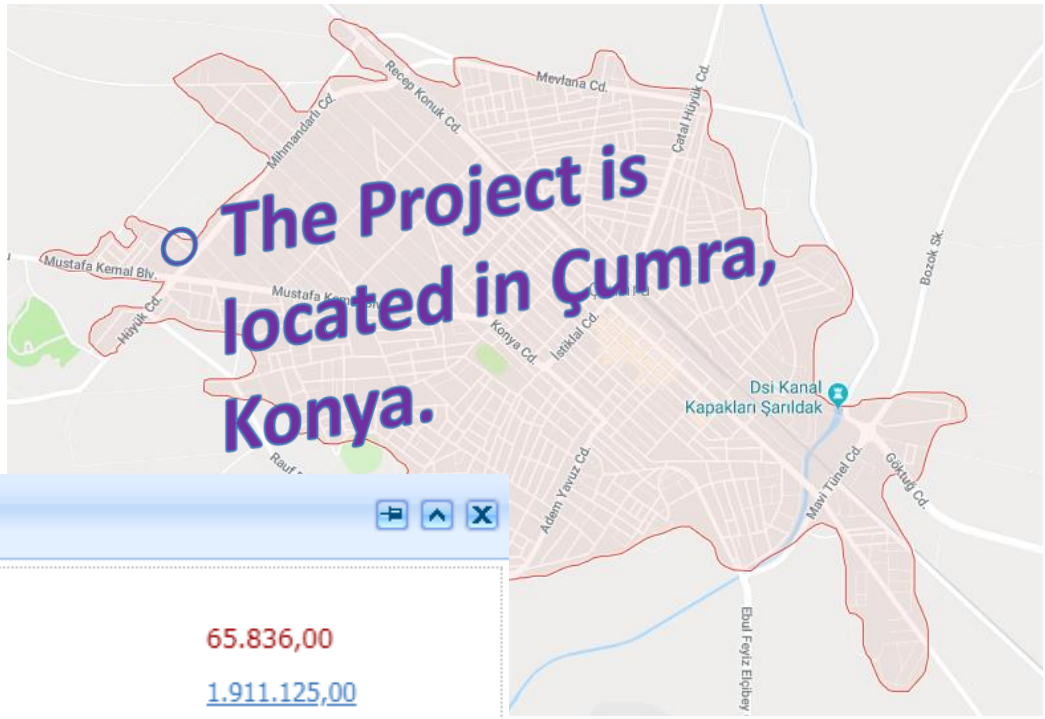




About the Project

❖Location



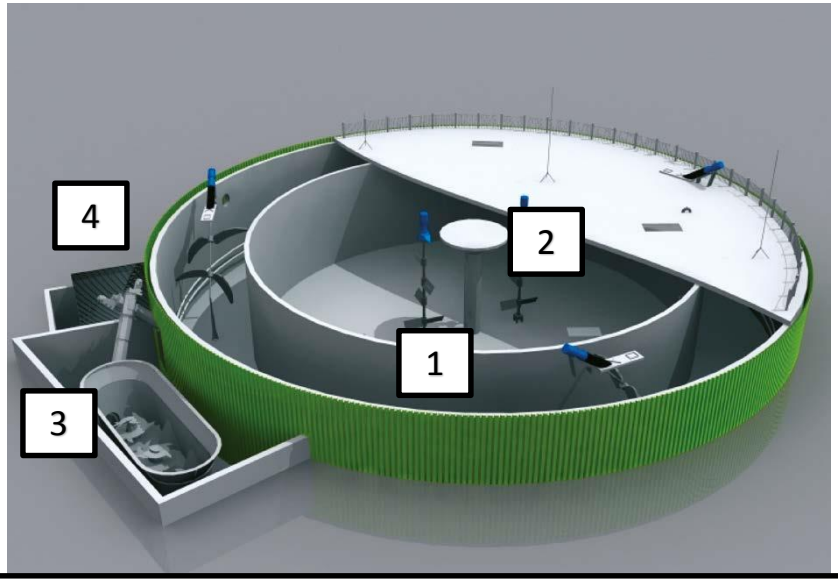
KONYA / ÇUMRA Genel Bilgi

Nufus :	65.836,00
Toplam Hayvan Sayısı (adet) :	1.911.125,00
Hayvansal Atık Miktarı (ton/yıl) :	827.321,00
Hayvansal Atıkların Enerji Değeri (TEP/yıl) :	7.433,71
Bitkisel Üretim Miktarı (ton/yıl) :	2.496.469,00
Bitkisel Atık Miktarı (ton/yıl) :	729.289,97
Bitkisel Atıkları Enerji Eşdeğeri (TEP/yıl)	302.529,04
Kentsel Katı Atık Miktarı (ton/yıl) :	22.588,33
Kentsel Organik Atıkların Enerji Değerleri (TEP/yıl) :	1.728,01
Atıkların Toplam Enerji Eşdeğeri (TEP/yıl) :	311.690,75
Biyodizel İşleme Lisansı Sahibi Firmalar :	0
Biyoetanol İşleme Lisansı Sahibi Firmalar :	0
Biyokütle Kaynaklı Elektrik Üretim Santral Sayısı :	0

Technology

❖ Model

The “POWERRING” concept allows a production capacity of up to 2.0 MW with a single structure.

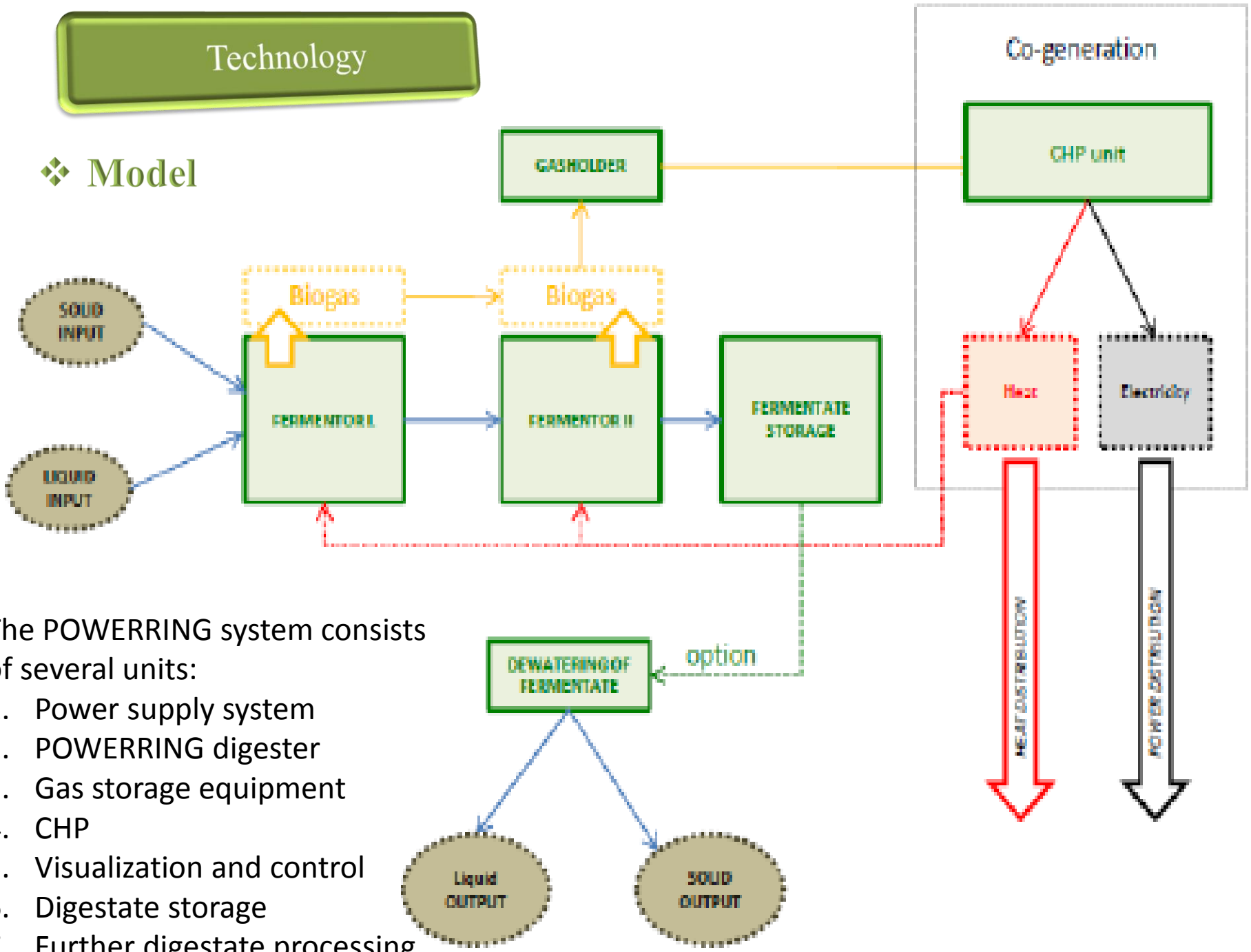


1. Main digester
2. Post digester
3. Feeding system
4. Central pumping station

The “POWERRING“ consists of two digesters – a main digester (the outer ring) and a secondary digester (the inner ring). Among the advantages of the POWERRING system are its modular and compact design, minimum heat loss, ideal mixer positioning (from top), low power consumption, optimum mixing of the entire digester contents (equal and optimum homogenization) and protection against formation of the stratification layer.

Technology

❖ Model



The POWERRING system consists of several units:

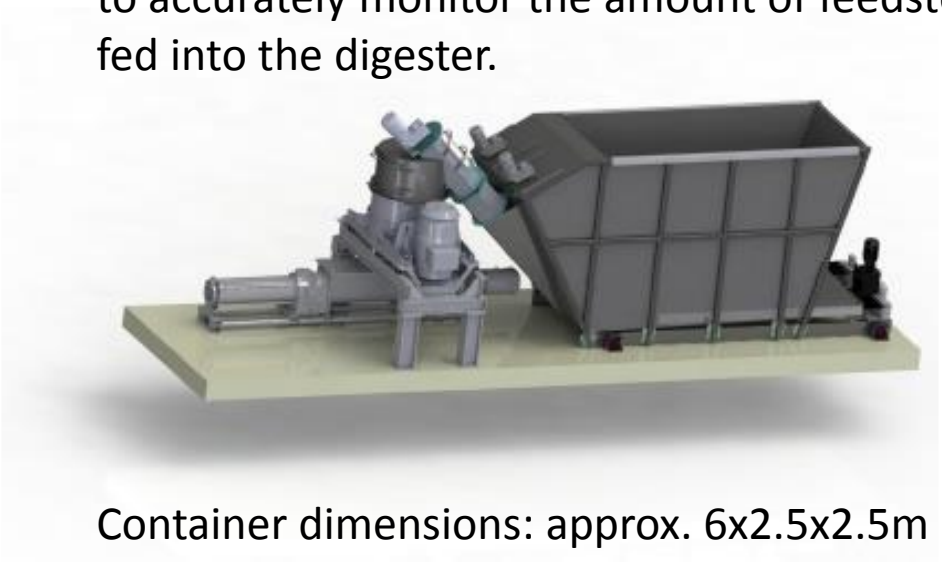
1. Power supply system
2. POWERRING digester
3. Gas storage equipment
4. CHP
5. Visualization and control
6. Digestate storage
7. Further digestate processing

Technology

❖ Plant structure: Feed system

Liquid and solid substrates are fed into the POWERRING digester separately, via a feeding system or via a pumping station. The liquid substrate goes directly from the farm or from other places via pipelines into the pre-tank. The pre-tanks have a capacity of 1000m3 each (total of 2000m3) and are divided in 3 chambers. Only two of these chambers require mixers/agitators, being equipped with 2x11kW ones and 4x15kW ones. The liquid substrate is pumped from the pre-tank into the digester by 6 central pumps, each with a power of 15 kW and is located in a container.

The central pumps connect the storage tanks with the digesters. Manure and energy crops are fed into the digester by 12 BioG 100m3 automatic feeding systems. To help with the grinding of the solid substrate, 12 Limator Disintegrator have been chosen. The feeding systems are equipped with a scale (included) to accurately monitor the amount of feedstock fed into the digester.



Container dimensions: approx. 6x2.5x2.5m

Technology

❖ Plant structure: Digester

Each "POWERRING“ digester consists of 2 digesters – a main digester and a secondary digester. The digester is 8 m high and the filling level is 7.5 m. The diameter of the digester is 45/26 m. The advantage of the POWERRING system lies in the design of the process for optimal agitation and mixing.

The main digester consists of:

- 8 PC Large blade mixer 15kW downward [8m]; total: 48 mixers

The secondary digester consists of:

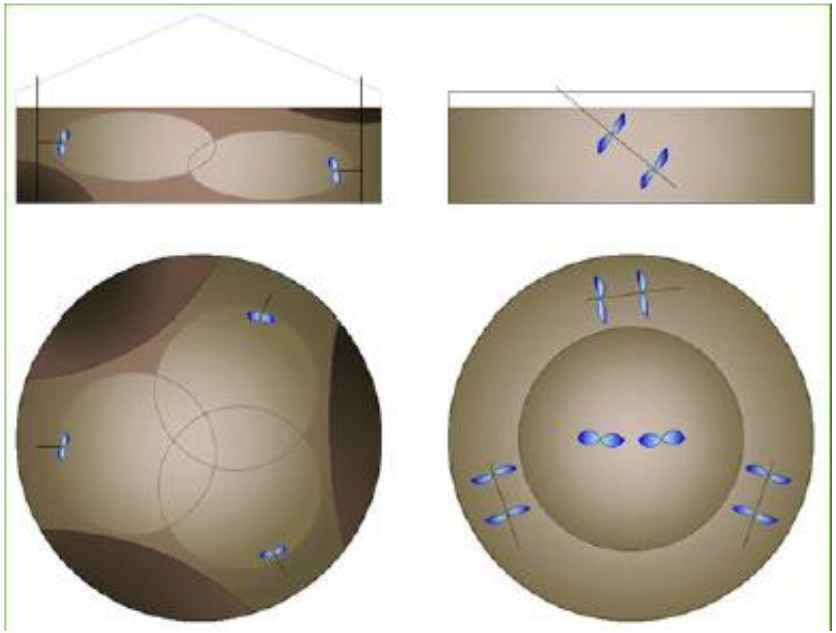
- 2 PC Paddle mixer, 15kW (vertical) [8m]; Total: 12 mixers

Technology

❖ Plant structure: Digester

The mixing technique of the system assures:

- Optimum homogenization of the entire digester content – ensuring protection against formation of a sediment layer.
- Substrate mixing takes place in horizontal and vertical directions over the whole main digester area, with low power consumption.
- Stirrers can be repaired without emptying the PowerRing digester. This is important, as emptying the digester takes a lot of time and means the loss of substrates.



Technology

❖ Plant structure: Gas storage and gas equipment

The mixing technique of the system assures:

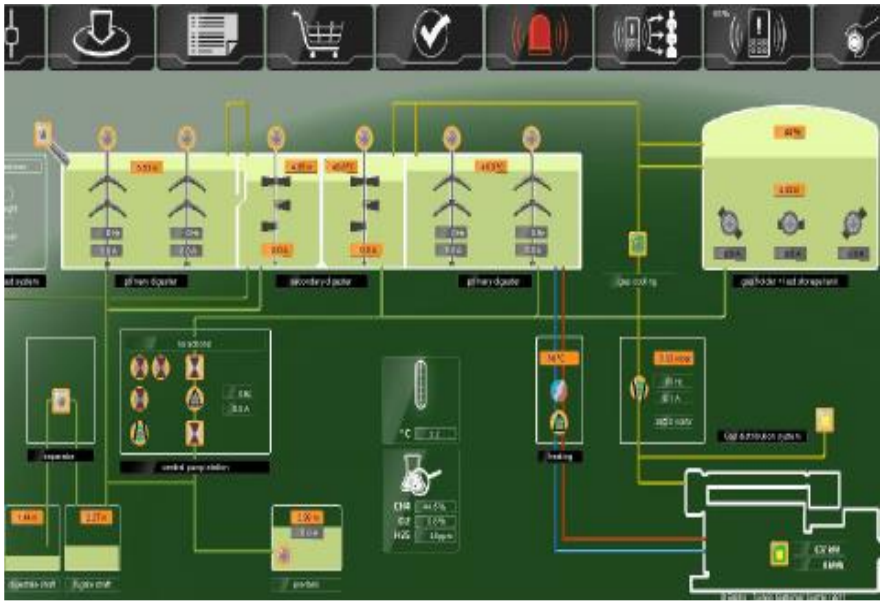
The gas is stored in a ¾ shpere double membrane storage. The double diaphragm system seals and provides a storage volume of 2.640m³; 4 of these will be installed. The outer wall ensures the stability of the roof and the internal wall ensures the tightness of stored biogas. A fan runs continuously and maintains the stability of the sphere while ensuring a constant pressure despite variations in supply and withdrawal of gas. This device guarantees a constant supply of the gas treatment plant. The gas level is continuously measured and controlled by the system, which automatically adjusts the substrate supply. When the gas level drops below a certain level, additional substrates are automatically introduced into the digester. If the storage is full, the system will automatically reduce the introduction of the substrates. The system also includes all the controls of gas quality; all the parameters are permanently recorded which facilitates the interpretation of the data.

Technology

❖ Plant structure: Control and visualization system

The plant includes an extended operation system for the control of equipment and aggregates. This allows the user to analyze data and to view several graphical representations of the process parameters easily.

The advanced operating system, allows data recording, monitoring and creation of perspectives and protocols. The operator always has control over the units and is able to view all necessary information.



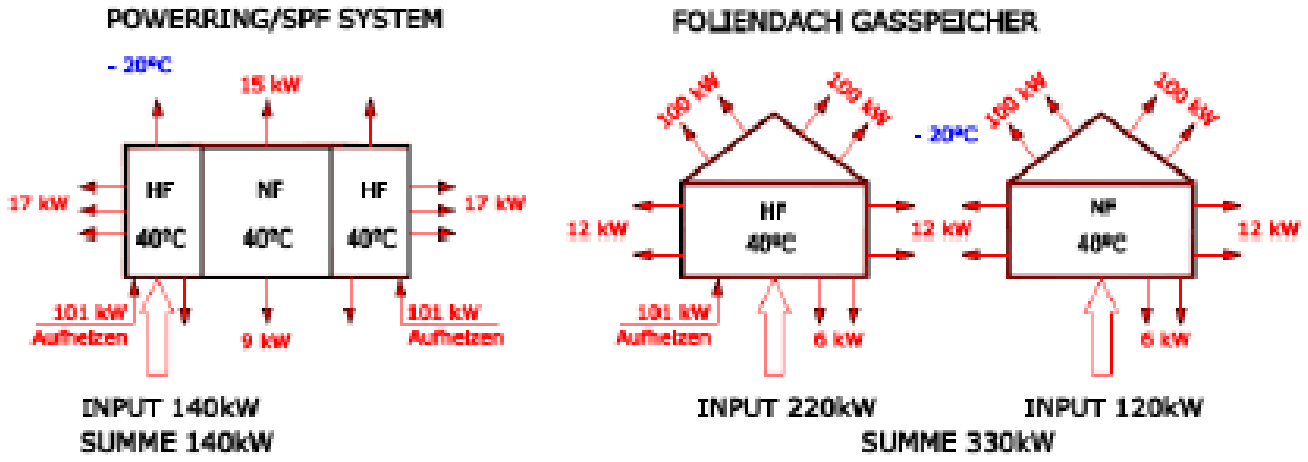
Data on electricity and heat production, substrate consumption, gas consumption and own consumption is automatically recorded by the control system and allows users to prepare a monthly or annual report. The control system is connected to the Internet and can be operated remotely. It is also available as a smartphone app, allowing mobile operation and control.

Technology

❖ Advantages of POWERRING - system

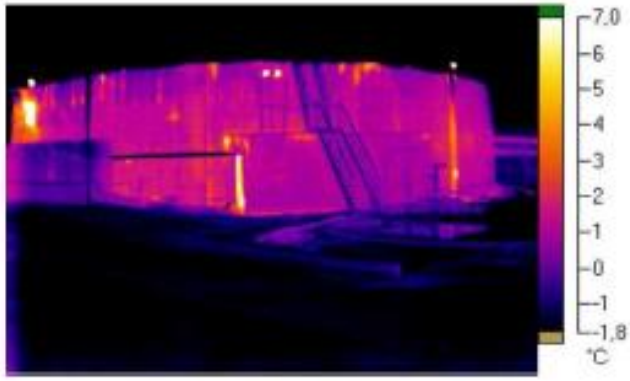
The PowerRing system is suitable for almost all substrates (raw material). Even difficult-to-degrade substrates can be used without pre-treatment and are easily processed. Thanks to a specially developed feed concept and selective substrate management, even large slurry volumes can be used without any losses in the breakdown of renewable raw materials. As a result, the PowerRing is perfectly suited for facilities with large slurry volumes.

High degree of degradation - There is no substitute for digester volume. Low overall volumetric loading and selective biological activation of the post digester ensure optimum degradation, resulting in lower substrate costs.

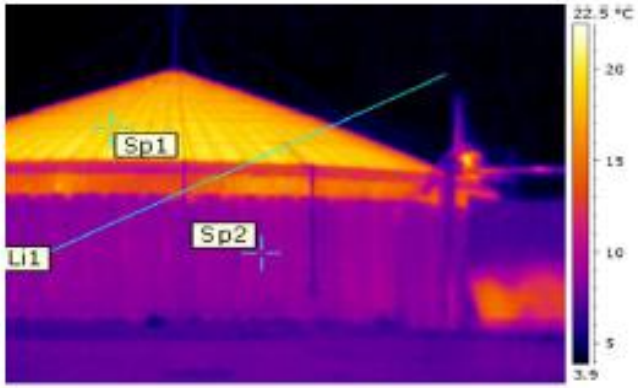


Technology

❖ Advantages of POWERRING - system



Heat losses: digester with concrete roof



Heat losses: digester covered with gasholder

Low energy consumption - With the PowerRing, the agitation system and digester geometry are perfectly matched, so the energy consumption in the main digester, which is designed as an agitation duct, can be optimized. Heat losses can be minimized thanks to the thermally insulated digester cover. The plants are thus perfectly suited for use in continental climatic conditions, with very cold winters, and the heat can be used for other purposes.

High percentage of full-load hours - Up to 99 % of full-load hours per year were registered at our reference plants. This result is attributable to the high level of operational safety and a special automatic feed system.

Technology

❖ Advantages of Investment

- Ready to begin construction
- All production and investment support licences are in hand
- The land is hired from the municipilaty for 10 years.
- 10 years feed-in tariff officially guaranteed ($ 0.133/kW and possible extras for domestic productions)
- Biogas plants produce more electricity than solar power plants in less area.
- All raw materials contracts are already signed with the farmers.