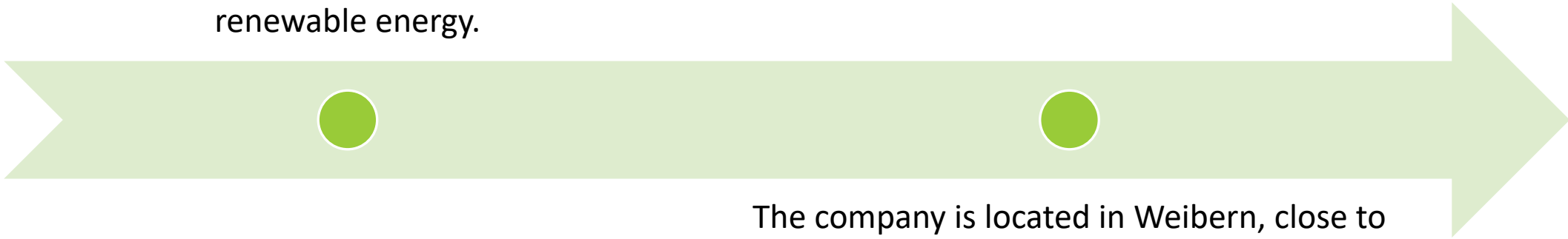
3A-Biogas

ENERGY FROM BIOWASTE – BIOGAS IN A CIRCULAR ECONOMY AND TWO EXAMPLES IN PRACTICE

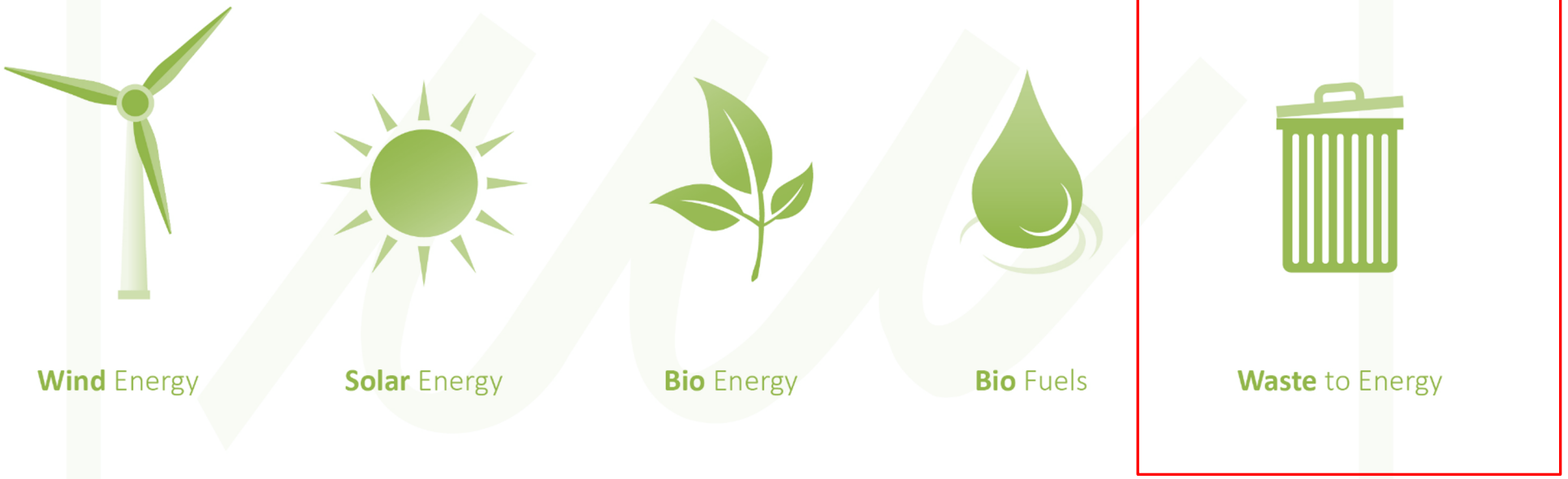
Müller Umwelttechnik

Müller Umwelttechnik is an engineering company founded in 1987 and deals with development of future-oriented services and solutions in the field of environmental technology, biosolids recycling and renewable energy.



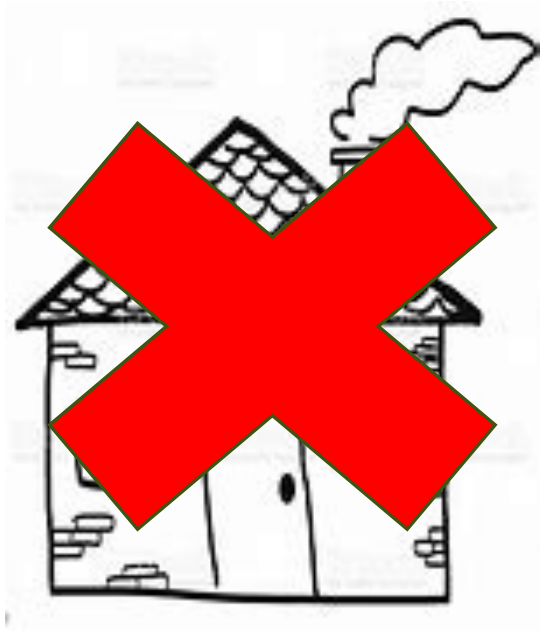
The company is located in Weibern, close to the river Danube in Austria and represents expertise and innovation, customer focus, reliability and responsibility.

Renewable energy



Circular economy

Energy from organics

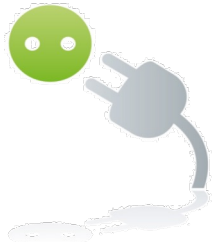


Food waste

Green waste, Manure

Organic fraction of municipal solid waste

3A Biogas



Electrical Energy

Biomethane

Thermal Energy

+

Fertilizer

Biogas – multi talent

Recycling of organic waste and residues

Generation of renewable energy in form of electricity, heat or biomethane

storage capability

Dry fermentation

Dry fermentation is a special process for producing biogas from solid and porous biomass such as organic waste from separate collection, manure, green waste and residues from food processing and production. Due to its´s robust technology polluted organic fractions from residual waste, including impurities, can also be treated to gain biogas before landfilling!

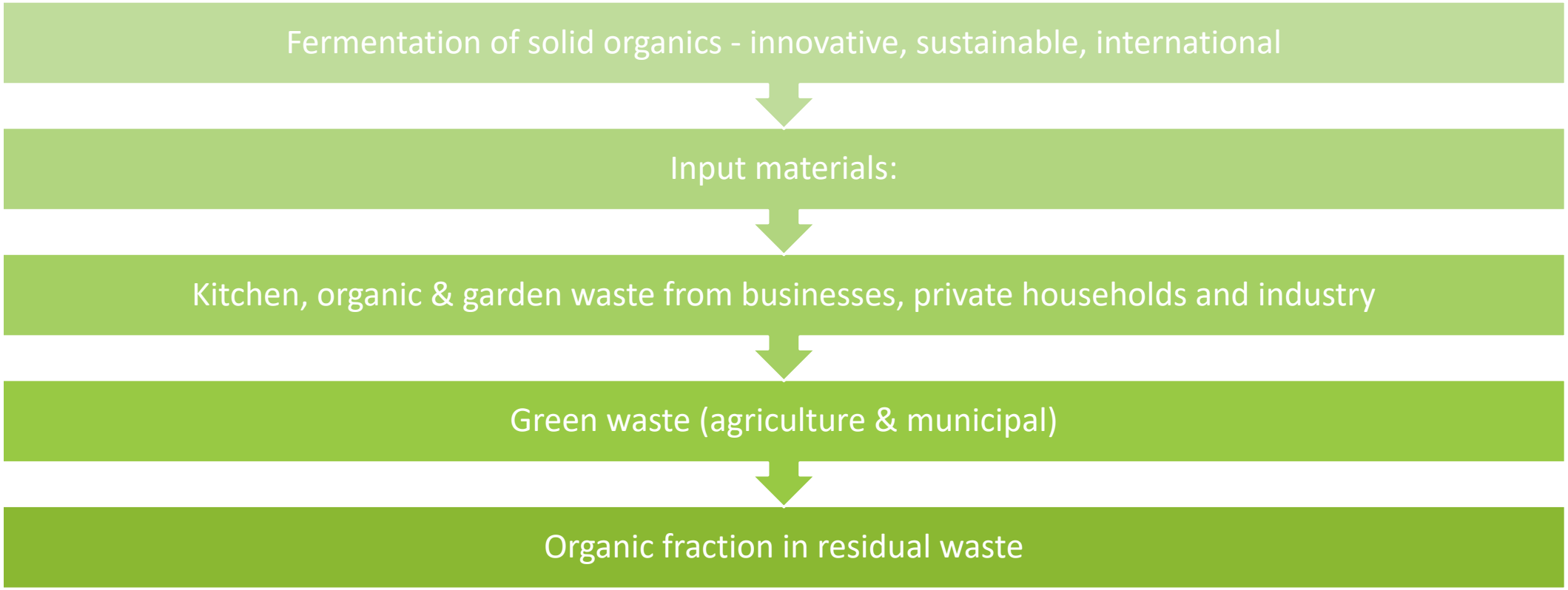
The designation of the process as “dry” serves to differentiate it from wet fermentation. The substrates used usually still contain a high proportion of water (up to 70%).

Dry fermentation works by regularly emptying and refilling the box fermenters with stackable substrate that is not previously moistened. Through the staggered operation of several fermenters (minimum number of fermenters 4) in a system, a steady gas production will be achieved, which allows a high utilization of the subsequent components, such as a combined heat and power or biogas upgrading unit.

A crucial role in dry fermentation is the inoculation of the newly filled fermenter with anaerobic microorganisms in order to quickly start the biogas process. Inoculation is carried out either by backmixing digestate from the previous batch and/or by moistening with percolate (process water). Liquid released during fermentation (percolate) is collected and fed back into the fermentation material (fermentation substrate) from above.

The temperatures required for anaerobic degradation are achieved through wall and/or underfloor heating. Like any other biogas plant, dry fermentation plants can be operated both mesophilically (approx. 40 °C) and thermophilically (approx. 55 °C).

3A-Biogas technology



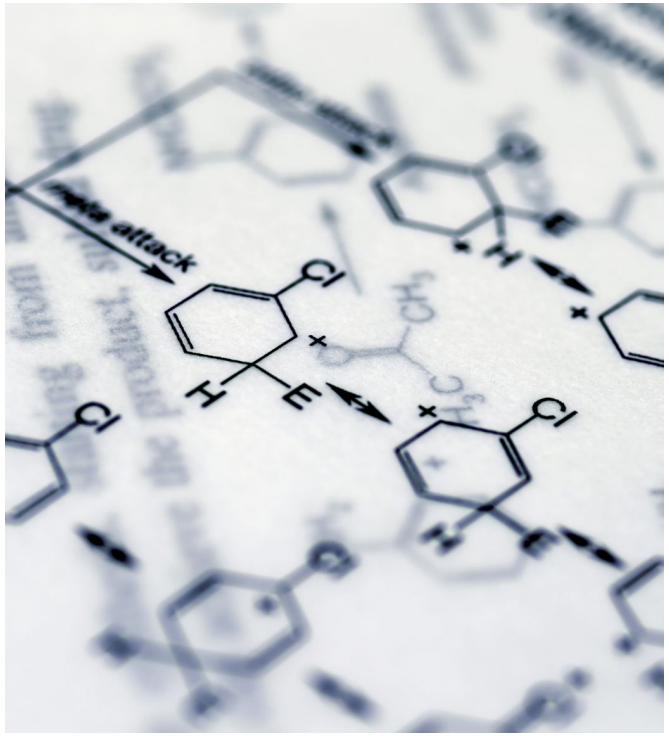
3A-Biogas process

The **3A Biogas** solid fermentation process runs in three phases: the first phase is aerobic (with oxygen), the second anaerobic (without oxygen) and the third phase is again aerobic. The name **3A Biogas** is also derived from this change between aerobic and anaerobic phases.

- 1st phase - aerobic: In the first phase, the material is ventilated, which leads to a temperature rise. Easily degradable organism is broken down. Depending on the reactivity of the substrate, this phase takes up to 24 hours and temperatures of up to 50 °C.

- 2nd phase - Anaerob: The second phase takes place under anaerobic conditions and starts when the entire oxygen is consumed. Methorization takes place in this process section and biogas is produced. The second phase takes between 21 and 35 days, the volume of the substrate is reduced.

- 3rd phase - aerobic: The third phase of the process begins with the controlled ventilation of the substrate. Due to the oxygen supply, the temperature increases up to 60 ° C and thus enables hygienization. The substrate is stabilized in this phase. In order to obtain compost with a higher degree of ripening, it is expedient to carry out the subsequent rotting on a suitable area.



3A-Biogas advantages

- Combination of aerobic and anaerobic treatment
- Closed treatment process® emission reduction (e.g. CO2)
- Renewable energy generation from solid organic waste
- Flexible system size, treatment capacity starting at 2.000t/year up to more than 100.000t/year
- Decarbonisation of electricity – generation of electricity over night when PV does not deliver
- Digestate in solid form – no energy demand for dewatering before composting

Reference

Location: Austria

Company: VFI GmbH

Input: 25.000t residues from food industry (sun flower residues, oil extract, etc.)

Size: 6 digesters (each 26,5x8,5m)

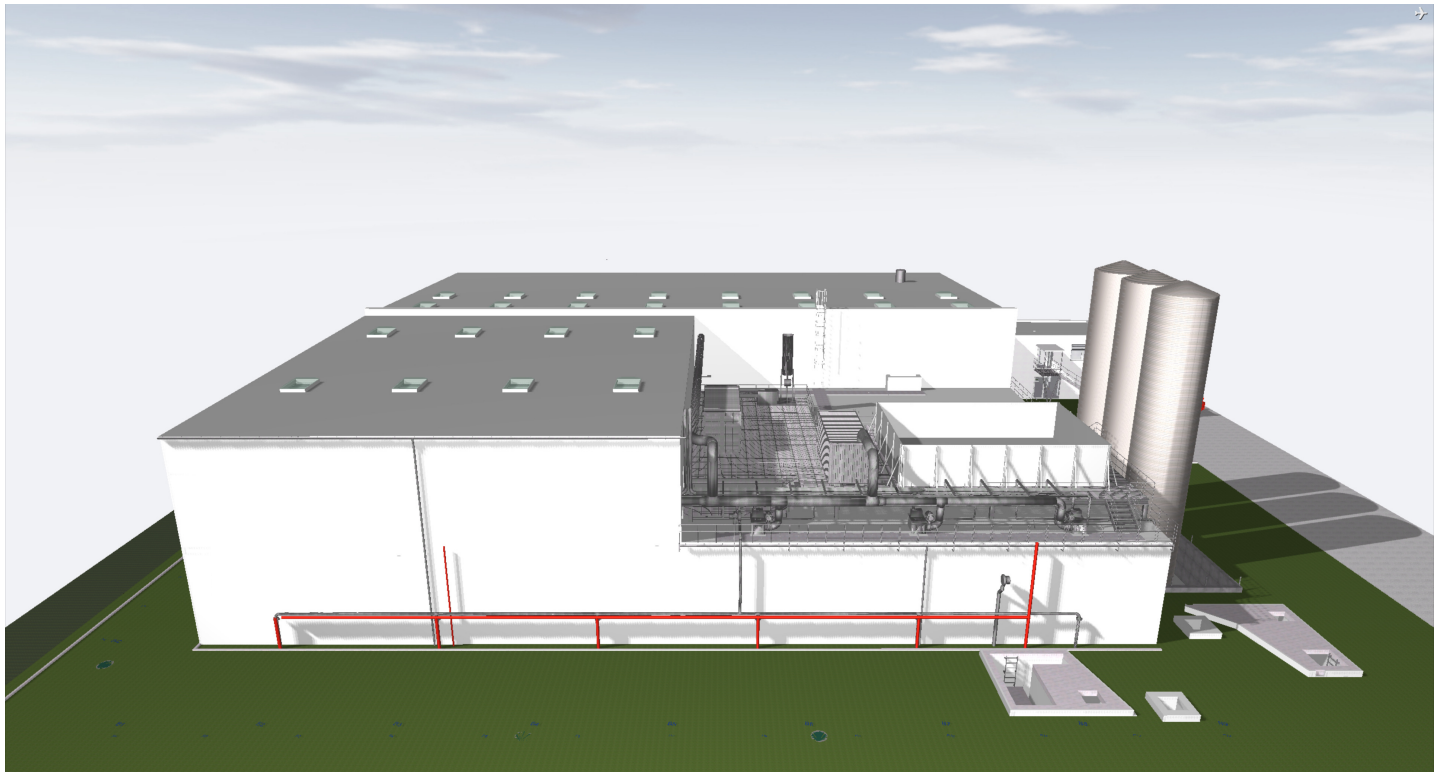
Output: Electricity & Heat (Steam)

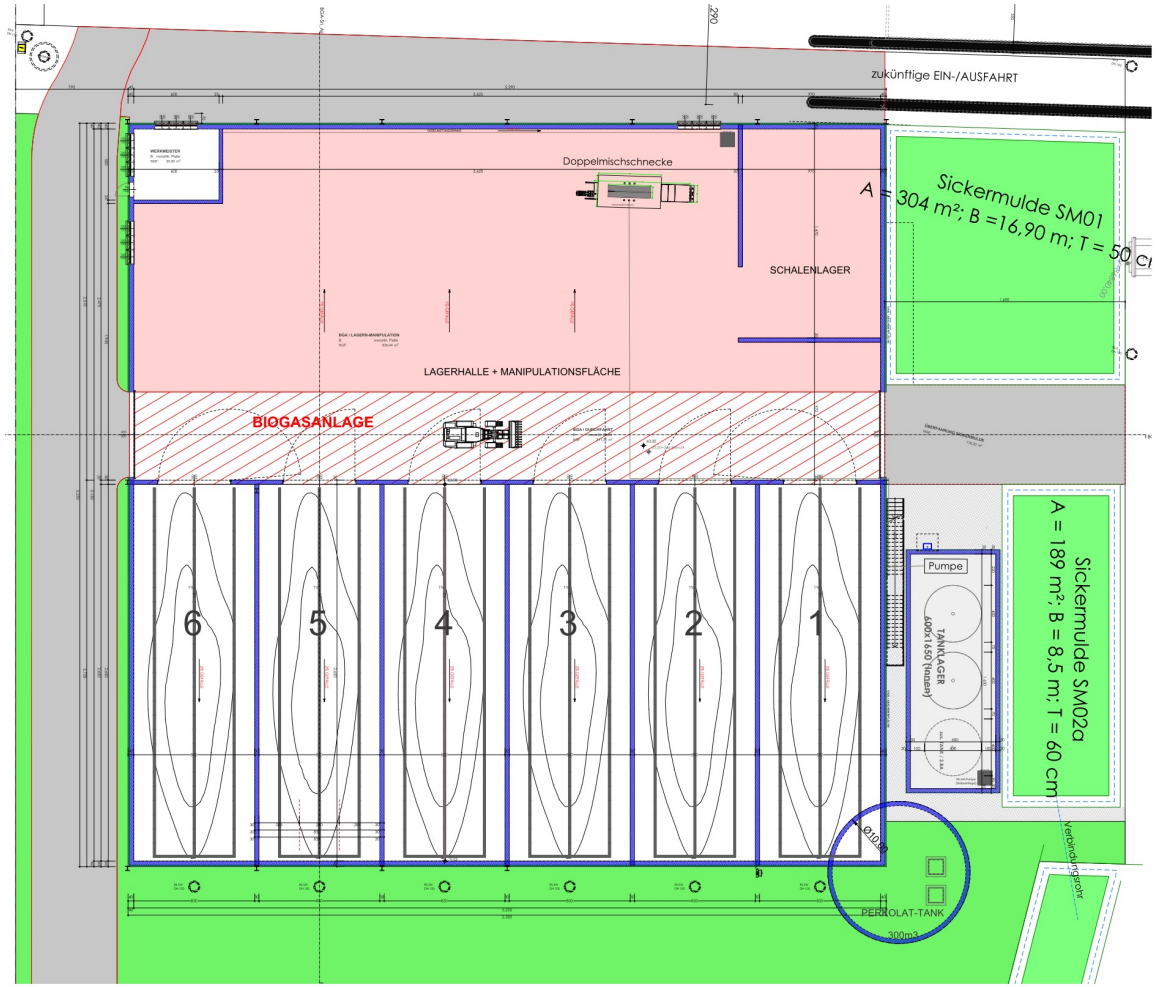
Biogas: 135 m^3/t Input (60 % CH4)

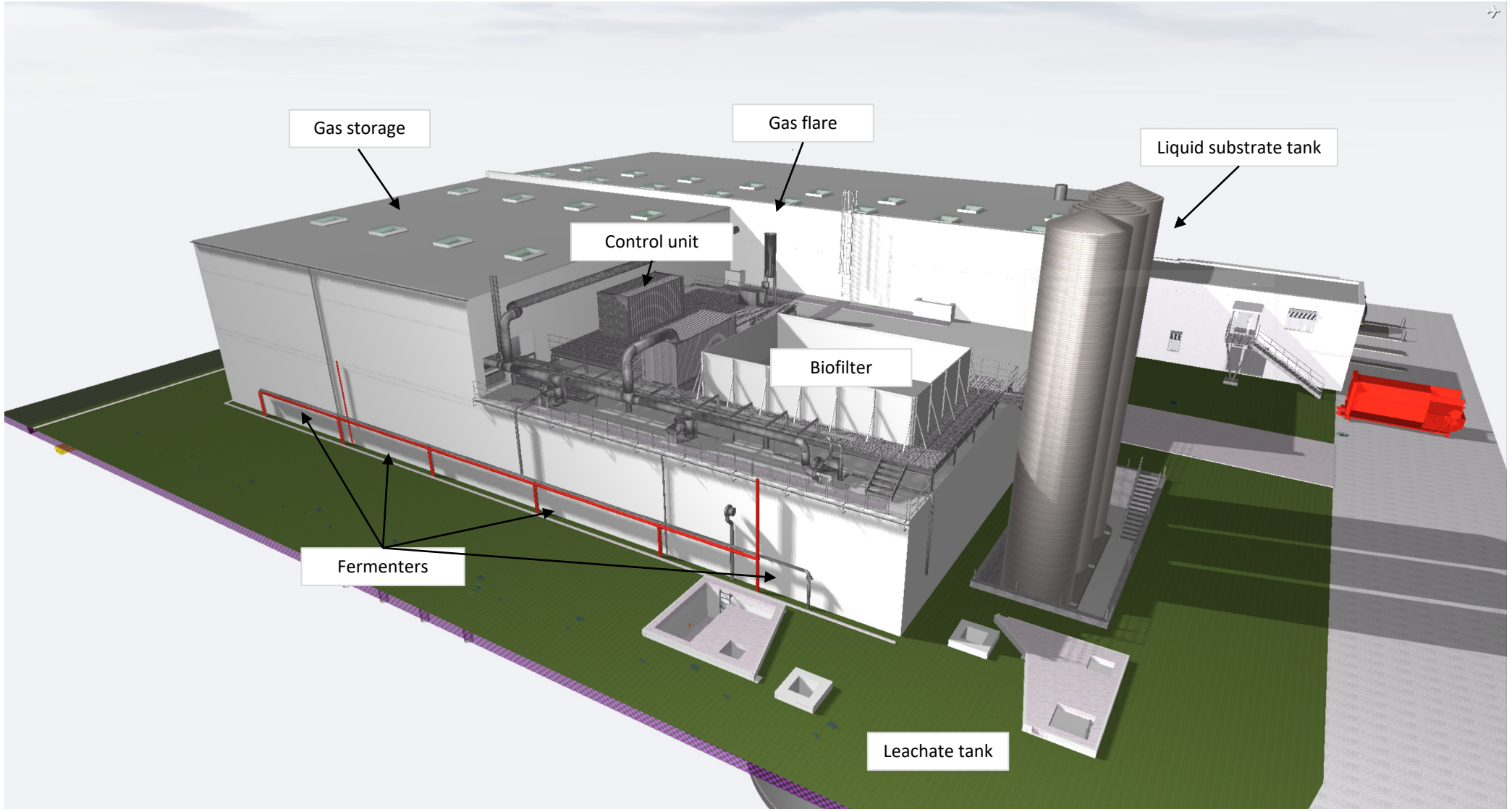
Energy total: 8.100.000 kWh/a

Electricity: 3.402.000 kWh/a

Heat: 3.726.000 kWh/a




zukünftige EIN-/AUSFAHRT
Doppelmischschnecke
SCHALENLAGER
LAGERHALLE + MANIPULATIONSFLÄCHE
BIOGASANLAGE
Sickermulde SM01
A = 304 m²; B =16,90 m; T = 50 cm
Sickermulde SM02a
A = 189 m²; B = 8,5 m; T = 60 cm
Pumpe
TANKLAGER
6
5
4
3
2
1
PERKOLAT-TANK
300m3


Gas storage
Gas flare
Liquid substrate tank
Control unit
Biofilter
Fermenters
Leachate tank


Oils for Life
STRAAG


1
2


INTERNATIONAL
INNOVATIV
NACHHALTIG
3A
Biogas
Neue Energie.

Reference

Location: Wiener Neustadt (Austria)

Company: WNSKS

Input: 7.500t organic waste (separate collection)

Size: 15 containers (each 8x3m)

Output: Electricity & Heat

Biogas yield 80 m³/t Input (55 % CH4)

Energy total: 3.300.000 kWh/a

Electricity: 1.254.000 kWh/a

Heat: 1.650.000 kWh/a

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