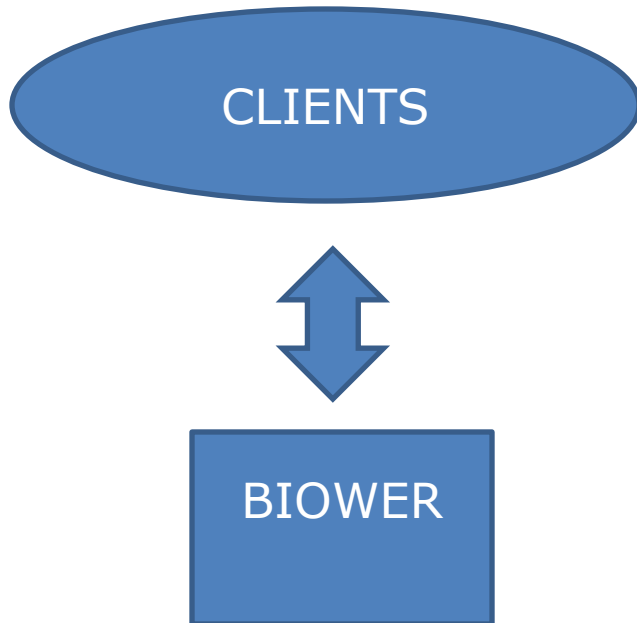


Clean energy and water



Biower – products and services



- Turn key supplier for biogas and waste water cleaning plants
- Biower is responsible for sales, marketing, project implementation and lifecycle services
- Dry fermentation biogas technology license from Kompogas
- Waste water cleaning based on innovative technologies of Finnish Clewer and Wiser
- In manufacturing and erection close partnership with SSG Sahala and HögforsSahala

CLEWER
-Technology

WISER
-Technology

KOMPOGAS
-Technology

SSG
- Service,
installation,
manufacture

HögforsSahala
- Manufacture

Biower - clean energy and water

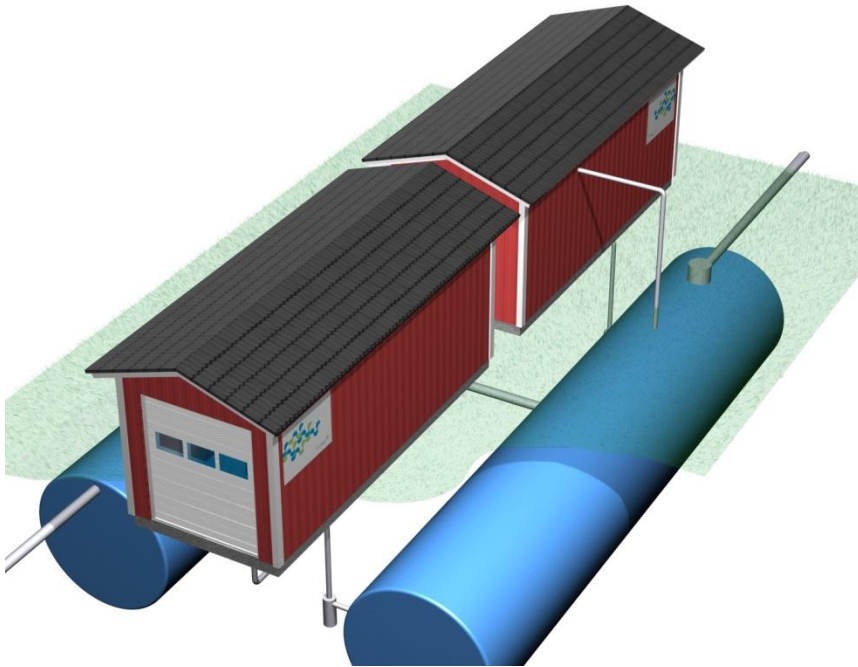
Biogas plants

- Converts biological waste to energy
- Produces renewable power, heat and fuel
- Gives a solution to EU requirements on recycling of bio wastes

Waste water cleaning

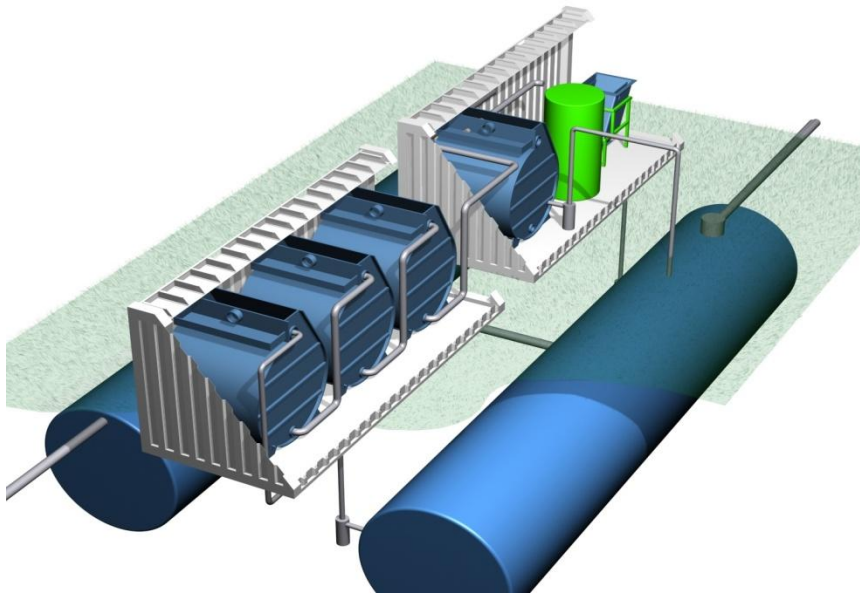
- Distributed solution providing cleaning efficiency of centralised treatment plants
- Cleans waste water from organic components as well as nitrogen, harmful chemicals and oil

Biower waste water cleaning plants



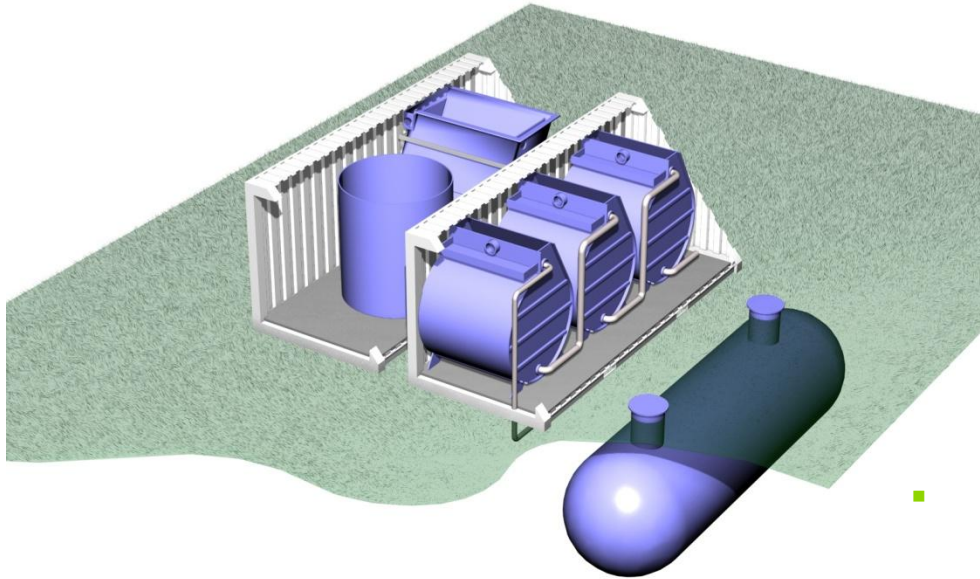
- Modular construction
- Innovative biological process for treatment of organic components and nitrogen
- Efficient flotation for cleaning of oil and solid components
- Superior cleaning efficiency
- Energy efficient
- Treats even difficult impurities

Biower Village Cleaner



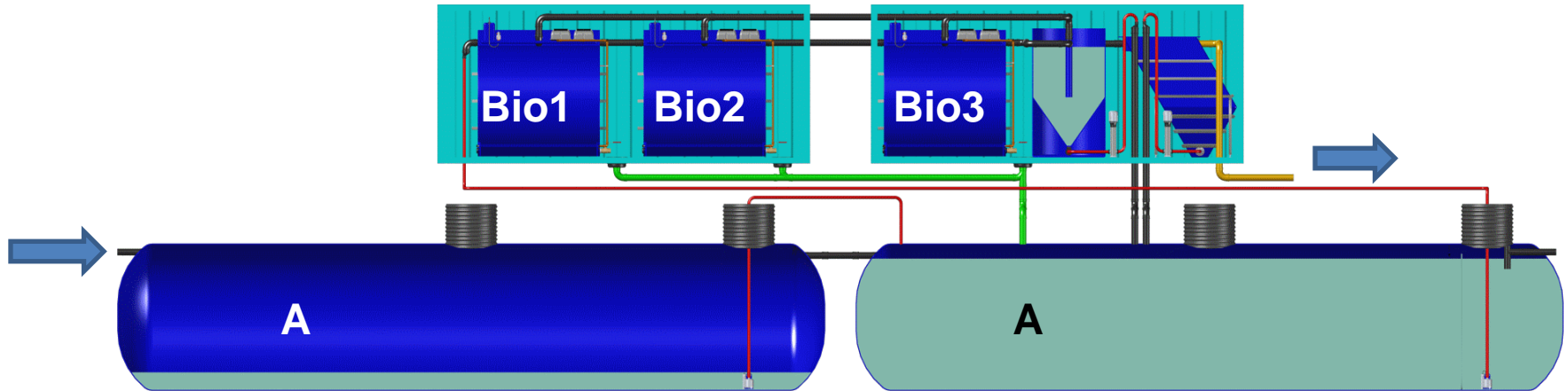
- For distributed waste water treatment
- For case where real cleaning matters and emissions have to be guaranteed
- For communities of 50-2000 inhabitants
- For hotels
- For extensions of existing treatment plants

Operation of Biower Village Cleaner



- Rotating bed reactor with carrier:
 - Big volume of carrier and bacteria in a compact reactor volume
 - Carrier in continuous rotation inside reactors
 - Rotation by pumping air into the cylinder
- Dead bacteria are returned to the sludge tank
- Each process section with defined bacteria for the actual purpose

Village Cleaner process



- Solid particles sediment on the bottom of sludge tank A
- The remaining water is directed to the biological treatment:
 - Denitrification (Bio1, anaerobic),
 - Carbon reduction (Bio2)
 - Nitrification (Bio3)
- After nitrification waste water is directed to mechanical clarifiers and further back to the nature

Technology comparison

	Rotating bed	Moving bed	Active sludge	Trickling filter	Biorotor
Size	+++	+	+	+	+
Energy consumption	+++	+	++	+	+
Hydraulic overload tolerance	+++	+++	-	+++	+++
Restart - ability	+++	+++	-	+	+
Temperature tolerance	+++	+++	+	+++	+++
Need to clean carrier	+++	+++	+++	-	-
Maintenance costs	+++	++	+++	-	-
Chlorine and detergent tolerance	+++	-	-	-	-

Technology references



Land fill at Kuusamo, Finland



Tropiclandia spa in Finland



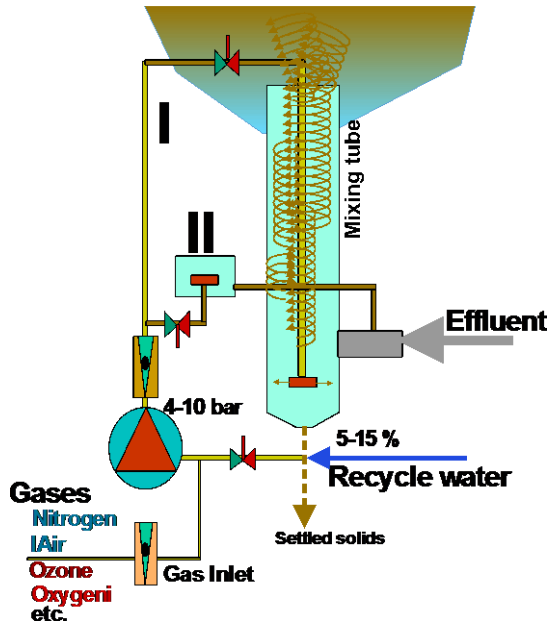
Car wash system in Finland

Purification of solid matter

Wiser flotation

Capacity 4-25 m³/basin m²

Energy consumption 20-30 Wh/m³



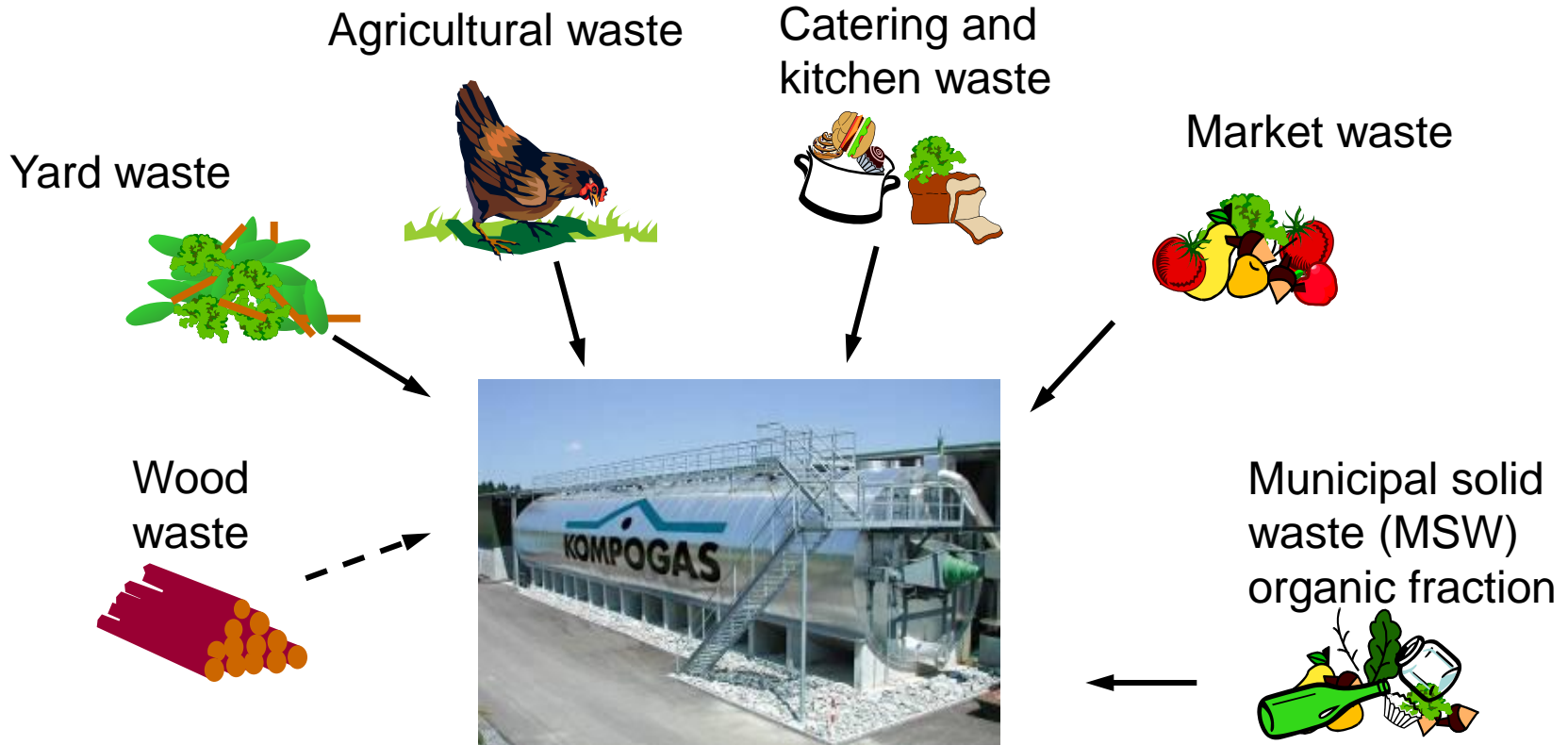
- New flotation method
- Low energy consumption
 - Dispersion water production in pumps
 - Effective flotation in a mixing tube
- Minimal maintenance requirements
 - Self cleaning nozzle
 - No pressure vessel inspections
- Minimal space requirements
 - Installation is possible inside an existing basin
- Based on Wiser technology

Biogas systems

- Dry decomposition method
- Good energy gain
- Stable gas production
- Hygienic residual can be used as natural fertilizer
- Minimal amount of waste water
- Based on Kompogas technology with more than 40 references and 15 years operational experience

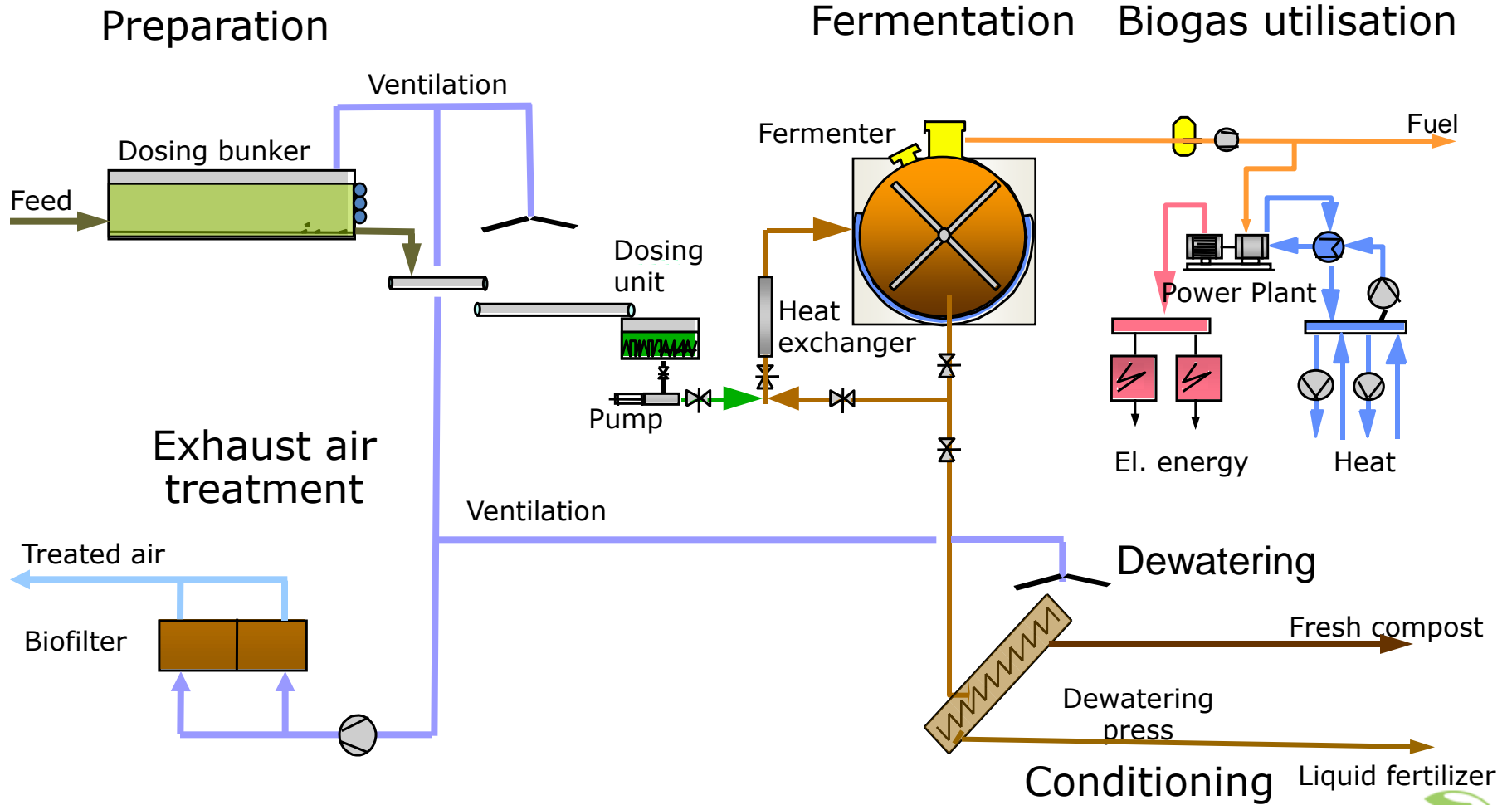


What kind of waste can be processed?



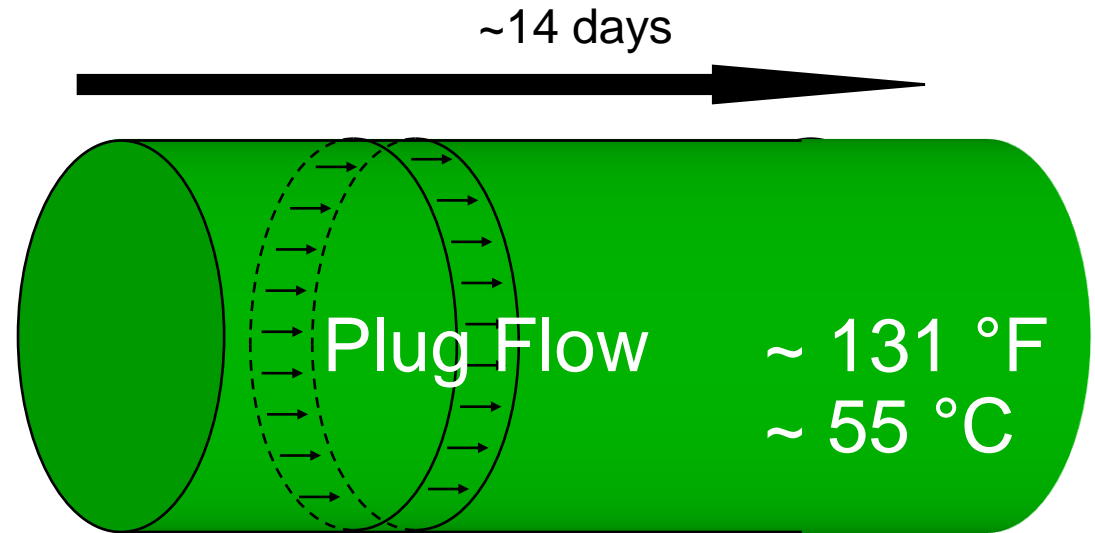
Ensures ecological disposal of biogenous waste

Process flow of Anaerobic Digestion



Kompogas dry digestion

- Defined retention time
- All conditions under control -> low noise or odour emissions
- Big energy surplus
- Hygienisation meets national or EU standards
- No bypass risk of unfermented material due to plug flow



Advantages over mesophilic system:

- Hygienic
- High gas yield
- Lower retention time

Dry system - Plug flow - Thermophilic process

Benefits of dry Anaerobic Digestion



- CO₂-neutral
- Produces renewable energy
 - 100-130 Nm³ biogas/t biogenic waste
- Sanitation of biogenic waste
- No competition between biomass and food-production
- Closed ecological cycle

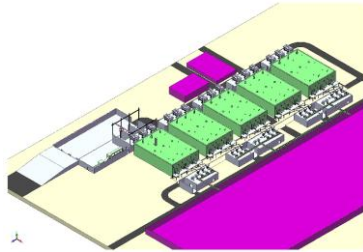
The better way to treat waste



Kompogas system references

More than 40 plants worldwide

Capacities 4000 – 274000 ton/a



Doha, Emirates of Qatar
Start up: 2009
Capacity: 274 000 t/a
Licenser: Keppel Seghers



Montpellier, France
Start up: 2008
Capacity: 100 000 t/a
Licenser: Vinci Environnement



Klingnau, Switzerland
Start up: 2008
Capacity: 20 000 t/a
Operator: Kompogas AG



Kompogas system references

Dry Anaerobic Digestion plant (AD) for Mechanical-Biological Waste Treatment (MBT): Rostock, Germany



Capacity over all: 135 000 t/a
MSW

(Municipal Solid Waste)

Capacity AD: 40 000 t/a
OFMSW

(Organic Fraction Municipal Solid Waste)

Start up: 2008

Design Build by
Küttel/Kompogas Corp.



Biower as turn-key supplier



- Full turn-key deliveries
- Based on solid product technologies
- Competent partners for maintenance
- Solid manufacturing and installation expertise through partner companies
- Tens of years' experience:
 - renewable energy project management
 - major international EPC project management

Leading technologies from a single supplier

Biower 

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