

# Pre-treatment Solutions for Biogas Production

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24<sup>th</sup> of February 2022



*From waste to a sustainable, green resource*

# Gemidan Philosophy

*Provide a system to extract the maximum energy and nutrient benefits from organic waste sources.*

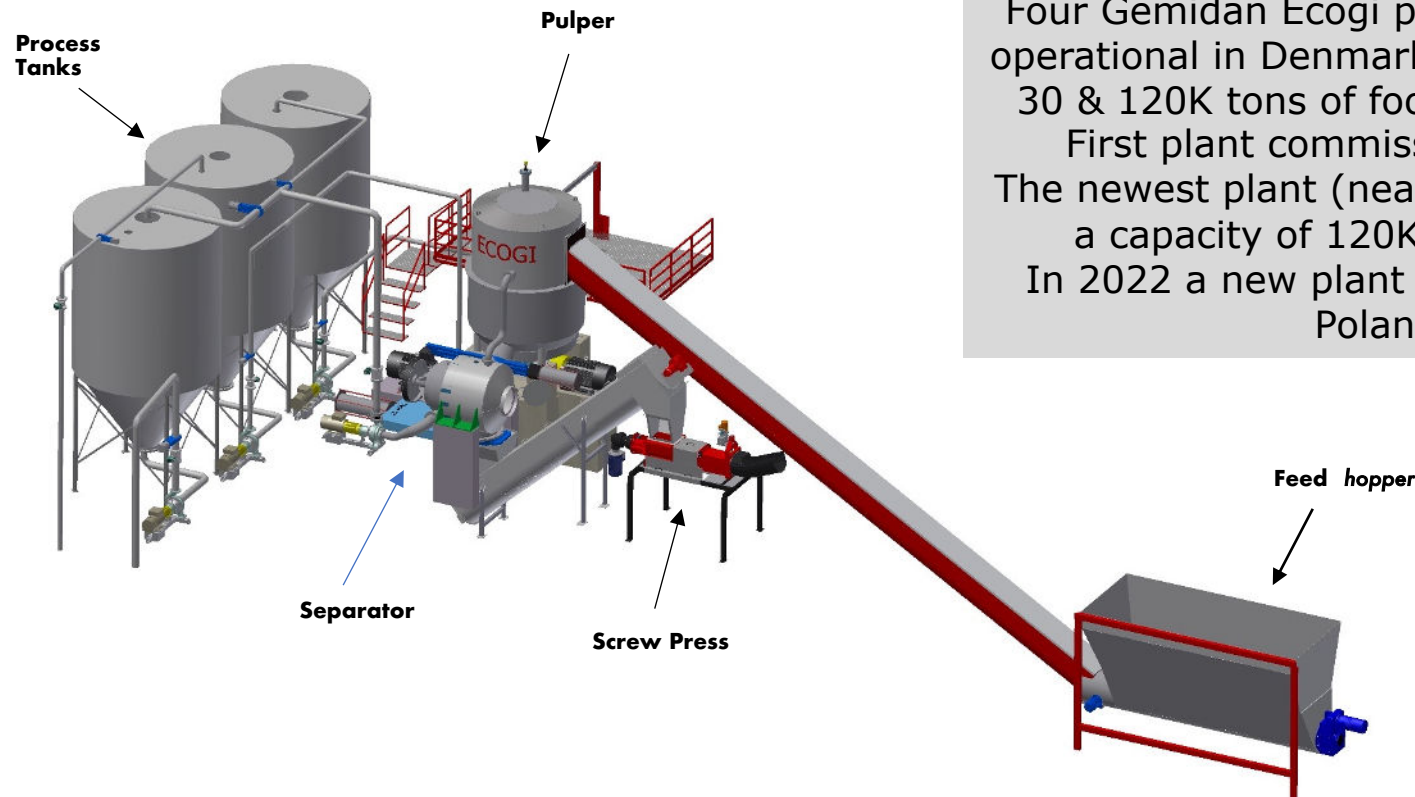
Basics tenants of Gemidan Ecogi pre-treatment system:

1. Flexibility to accept any type of packaging (plastic, glass, paper, metal).
2. Produce a clean, quality bio-pulp that will maximize gas production and provide a high value fertilizer.
3. Low maintenance and labor requirements.



# Standard Ecogi Facility Components

*(Not just a de-packaging system – a fully integrated solution for food waste pre-treatment and bio-pulp production)*



Four Gemidan Ecogi plants are currently operational in Denmark, treating between 30 & 120K tons of food waste per year. First plant commissioned in 2012. The newest plant (near Copenhagen) has a capacity of 120K tons per year. In 2022 a new plant will be installed in Poland.



# System Specifications

- Capacity: 10–13 ton of waste per hour (250 ton/day)
  - Additional lines can be added for higher volumes
- Dry matter content in the bio-pulp is adjustable
  - Between 10-18%
- Extremely small particle size in the bio-pulp allows for accelerated biogas production
- Highly automated system with low OPEX
  - SCADA can be operated remotely
  - Staffing 1-3 hours per day – *depends on design*





# System Flexibility

- The Ecogi technology is a combined de-packaging and pre-treatment system.
- During the pulping process the packaging will be “opened” allowing the organics to be dissolved into the liquid fraction.
- ‘Low impact’ approach allows larger pieces to be extracted more easily.
- That means that the system is able to treat and properly manage **food waste from residential, commercial, institutional and industrial streams.**



# Flexibility – Paper, Cans, Glass, Plastic, Cardboard

*The Ecogi system can handle **all types of packaging***





# Flexibility due to contaminated waste (full capacity up to 20% contamination)

*The Ecogi system can handle **all types of waste***





# Pureness of the Biopulp

- The system was designed to meet the demand of Danish farmers for high-quality organic fertilizer and strict Denmark/EU regulations.
- The pureness of biopulp is "second to none."
- The Ecogi process is the **only** food waste pre-treatment system to obtain **ETV certificate**
  - documents the pureness and the recovery of the potential methane in the waste
- **E**nvironmental **T**echnology **V**erification – a global, third-party verification program for environmental technologies.





# Pureness of the Biopulp

Results from the ETV Certificate:

Table 2 Analysed purity of products (17% dry matter)

	Test run 1%	Test run 2%	Test run 3%	Average %	Standard deviation %
Purity product all impurities (17% dry matter)	99.948	99.967	99.960	99.96	0.01
Purity mix plastics (17% dry matter)	99.992	99.995	99.996	99.996	0.002

# Pureness of the Biopulp

- Expected that more stringent regulations for use of digestate as a fertilizer are coming – will demand biopulp purity.
- In Denmark we don't only measure the weight of the plastic, we also have to measure the covered area of plastic.
- Ecogi is prepared for these future demands.





# Declaration of the Biopulp

## BIOPULP

Clean biofuel for biogas plants

Produced by:

Gemidan KomTek

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[www.komtek.dk](http://www.komtek.dk)



## Declaration

70999-15

06. Nov. 2019

Biopulp from source-sorted organic residual materials (waste) from public, private, retail and industry  
Approval number DK-06-03-intp-051 to handling of animal by-products in category 3 material for organic biomass.

### Product description:

Biopulp is an energy source for use in biogas plants for the production of biogas.

The product is produced from source-sorted household waste and other organic materials from both retail and food industries in cat. 3 in accordance with the animal by-products regulation.

The product is characterized by the majority of the organic particles being very small, most of which are less than 0,1 mm, and is easily marketable to biogas plants. Biopulp is a very homogeneous product with a very low level of impurities like plastic, glass, stone and metal.

Biopulp is produced on KomTek's Ecogi plant that uses wet-pulping technology with subsequent effective separation of rejection of undesired substances.

### Danish legislation applicable:

Biopulp must be declared after Requirements described in Order No. 1001 of 27-6-2018 on the use of waste for agriculture purposes.

Calculated specs from analysis with 17% dry matter			Analyses		
			Latest	Average	
Total N	4,2	kg/ton wet weight	24,7	28,3	kg/ton dry matter
Phosphorus (P)	0,56		3,3	4,2	
Magnesium (Mg)	0,83		4,9	3,4	
Potassium (K)	1,33		7,8	8,5	
Sulfur (S)	0,46	m³ biogas	2,7	3,0	
Biogas (calculated)	119				

Purity of biopulp	Limits	Latest analysis 19-30067	Average
Area covered in plastic cm² per% TS	1 cm² per% TS measured in one liter of biopulp	0,20	0,32
Plastic in dry matter% in TS	Plastic > 2 mm is 0.15% by weight per dry matter	0,012	0,015
Physical impurities in dry matter% in TS	Plastic, glass and composite materials > 2 mm is 0.5% by weight / dry matter	0,100	0,124

mg/kg dry matter	Limits	Latest analysis 19-30068	Average
Lead (Pb)	120	3,3	4,4
Cadmium (Cd)	0,8	0,07	0,12
Chromium (Cr)	100	1,4	4,3
Chromium 6 (Cr)	-	0**	0**
Copper (Cu)	1000	97	76
Nickel (Ni)	30	2,2	4,0
Zinc (Zn)	4000	448	347
Mercury (Hg)	0,8	0**	0,03
PAH	3	0**	0,73
NPE	20	1,50	0,9
DEPH	50	0**	3,7
IAS	1300	0**	158

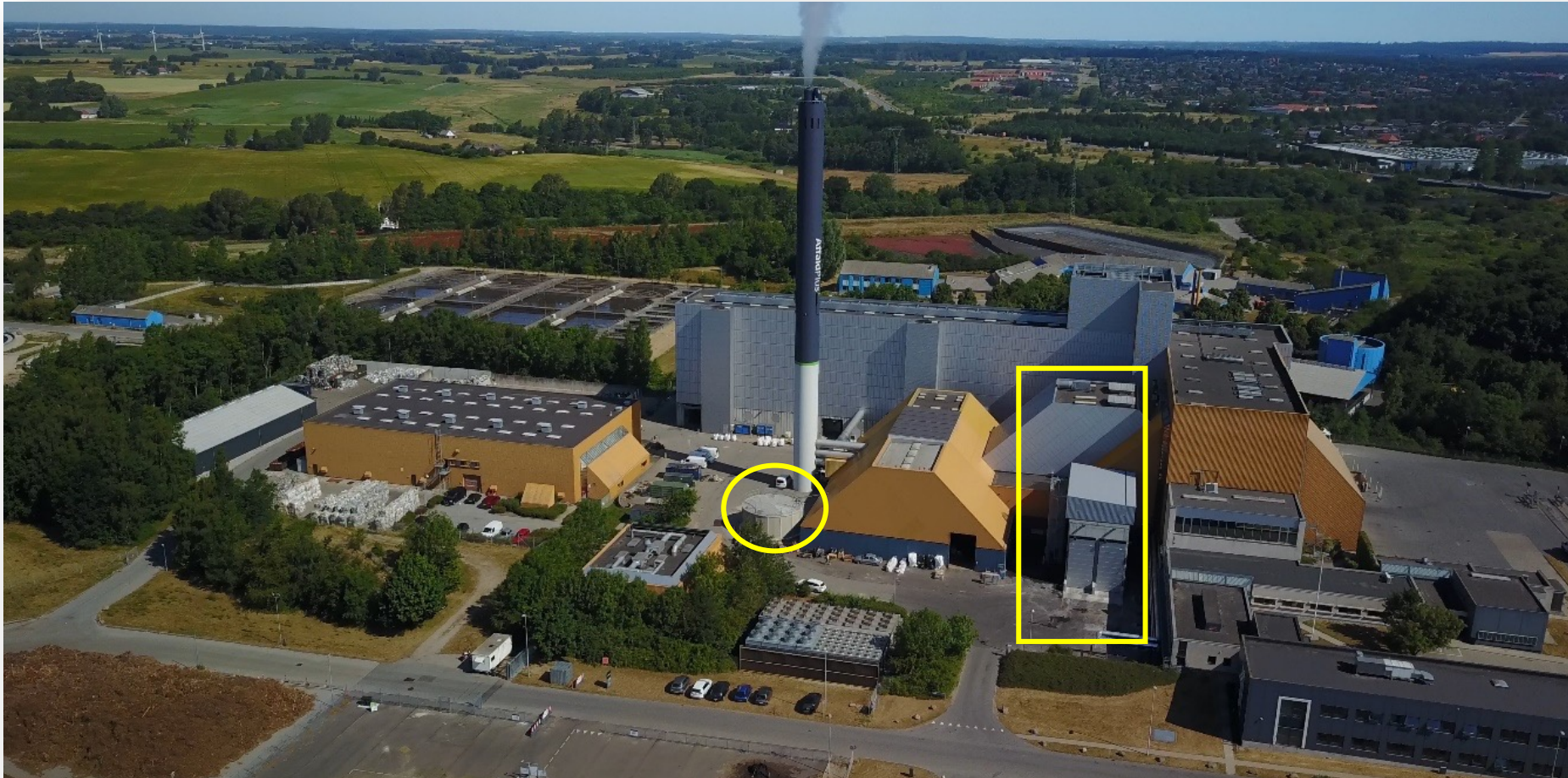
\*\*Concentration 0 are values "non-measurable"





# Ecogi plant in Næstved, Zealand, DK

*Installed in existing municipal waste-to-energy facility.*





# Ecogi plant in Frederikshavn, Jutland, DK

*Greenfield project - Began operation May 2019.*





# Ecogi plant near Copenhagen, DK

With 2 Ecogi lines - *Began operation January 2021*





# Questions?

Further information on <http://ecogi.dk/en/frontpage/>



# Video from Frederikshavn plant

<https://www.youtube.com/watch?v=hUouMYSjI-E&t=101s>

