

# Valorisation of food waste in a circular economy

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*Fra affald til bæredygtige grønne løsninger*

# Gemidan Ecogi supports circular economy



# Gemidan Philosophy

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

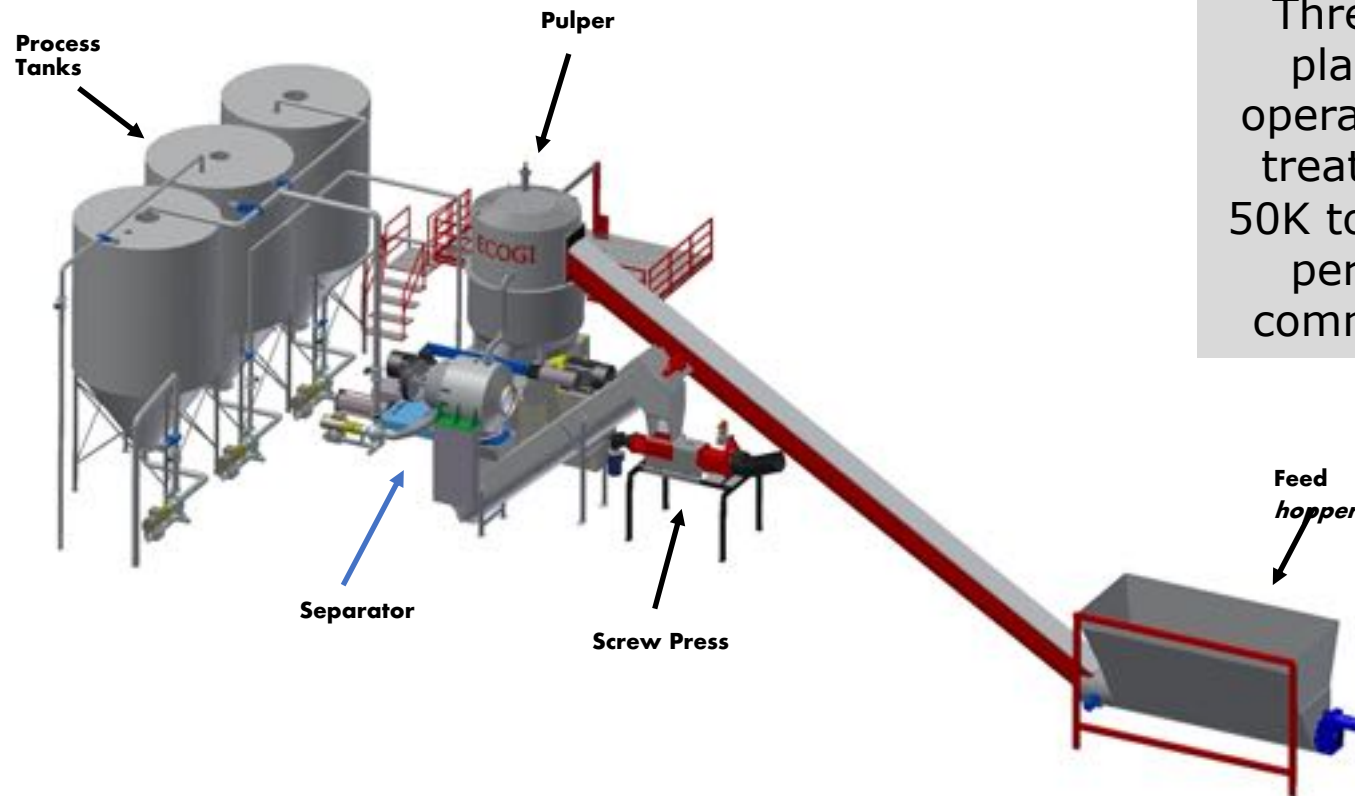
Basics tenants of Gemidan Ecogi pre-treatment system:

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)*



Three Gemidan Ecogi plants are currently operational in Denmark, treating between 25 & 50K tonnes of food waste per year. First plant commissioned in 2012.



# System Specifications

- Capacity: 8 – 10 ton of waste per hour (200 ton/day)
  - Additional lines can be added for higher volumes
- Dry matter content in the bio-pulp is adjustable
  - Between 10-20%
- 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 depending upon 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.*



# Pureness of the Biopulp

- 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
- **Environmental Technology Verification** – 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 to these future demands.



# Efficiency of the system

The Ecogi system recovers more than 95% of the potential methane, which is documented in the ETV certificate.

*Recovery based on expected methane yield in biogas plants*

Test run	1	2	3
Washing water (particles <3 mm) ton VS	0.0143	0.0182	0.0135
Organic material (particles >3 mm) mm ton VS	0.1163	0.0707	0.0816
Organic ton VS in input	1.80	1.44	1.24
Loss of methane potential washing water m <sup>3</sup> CH <sub>4</sub>	5.72	7.27	5.41
Loss of methane potential larger organics >3 mm m <sup>3</sup> CH <sub>4</sub>	23.26	14.14	16.32
Sum loss m <sup>3</sup> CH <sub>4</sub>	28.98	21.41	21.73
m <sup>3</sup> CH <sub>4</sub>	720.07	574.46	495.87
% recovery CH <sub>4</sub>	95.98	96.27	95.62



# Ecogi plant in Næstved, Zealand, DK

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



# Ecogi plant in Frederikshavn, Jutland, DK

*Began operation May 2019.*



# Video

- <https://www.youtube.com/watch?v=hUouMYSjI-E&t=9s>



# Questions?

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

