

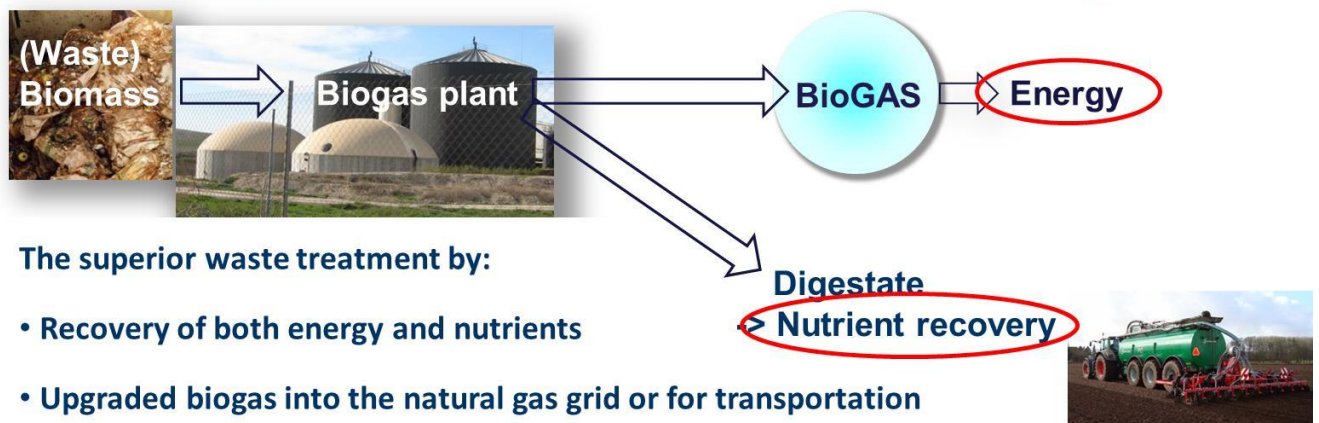
# Anaerobic digestion – the method of choice for the treatment of organic waste and nutrient recovery

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Anaerobic digestion (AD), i.e. the microbial conversion of organic matter into methane and CO<sub>2</sub> by anaerobic microbial co-cultures, offers the advantage of both energy production in the form of methane and nutrient recovery by applying the digestate as fertilizer. The organic fraction of municipal solid waste (OFMSW) with high moisture content that is not favorable for incineration is an ideal substrate for AD, either in co-digestion with manure or sewage sludge or in mono-digestion in so called dry digestion reactor systems. Source separated OFMSW and food waste show in both AD treatment systems high methane yields of 50 – 100 m<sup>3</sup>/ton, which make this waste in demand for manure based biogas plants to boost the relatively low yields from manure. Furthermore, the produced biogas can not only be used for renewable electricity production in a combined heat and power plant, but also as biofuel in the transportation sector after upgrading into biomethane by removal of CO<sub>2</sub> from the biogas. And finally, biogas production is foreseen to play a major role to balance higher shares of fluctuating electricity supply from wind and solar in the future. This makes the conversion of organic waste into biogas even more versatile. The successful application of OFMSW as co-substrate in the biogas process and the applicability of the final digestate as fertilizer are, however, highly dependent on the collection system and the pretreatment before entering the biogas reactor. A homogenization of the waste is needed for easy feeding into the reactor while impurities such as plastics, (heavy) metals and xenobiotics may jeopardize the use of the digestate as fertilizer. Recent full-scale application of source sorting waste with subsequent pulping before supply to the biogas plant showed low content of impurities and proofed biogas production of OFMSW as the most sustainable waste treatment concept applicable in large-scale.

## Anaerobic digestion – method of choice for the treatment of organic waste



The superior waste treatment by:

- Recovery of both energy and nutrients
- Upgraded biogas into the natural gas grid or for transportation
- Flexible biogas production for balancing fluctuating electricity production
- Biogas plants in different scales

## Collection – Pretreatment – Biogas process of OFMSW

Collection



Pretreatment



Biogas Process



The efficiency of the conversion of OFMSW into biogas is only successful in combination with an efficient and well-functioning collection + pretreatment system.

## AD of OFMSW from Copenhagen municipality

### OFMSW from Copenhagen municipality:

Total: 57,000 tons/year  
Currently collected: 8,000 tons/year,  
in 2020: 20,000 tons/year

OFMSW pulp to Hashøj biogas plant for  
**Co-digestion with manure**



### Waste pretreatment at HCS, Glostrup



Hammer mill and blower sieve to remove plastic bags,  
followed by “washing” of the waste with rain water,  
capacity: 60,000 tons/year