Presentation
Biogas- and Kompostwerkes Bützberg

STADTREINIGUNG HAMBURG

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Introduction
Waste management in Germany

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- Main law in Germany: Closed Cycle Management Act (KRWG 2012)
  (amended in 2012 according to EU Waste Framework Directive)
- This act and resulting acts and ordinances determine all aspects of waste management: responsibilities for collection, climate and resource protection, treatment of waste, waste transport, design of landfills etc.
- Some regulations of Closed Cycle Management Act:
  - Responsibilities for waste disposal (household waste!)
  - Climate and resource protection
    - 5-step waste hierarchy (1. Prevention of waste, 2. Preparing for re-use, 3. Recycling, 4. Other recovery, e.g. energy recovery, 5. Disposal)
    - By 2015: Area-wide separate collection of biowaste, metals, plastics, paper and glass
    - By 2020: Quotas for substantial and energetic usage (e.g. 65 % recycling of municipal solid waste)

Biowaste-Treatment at SRH
Goal

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- Best praxis of treatment the biowaste of households

- Goal of the treatment:
  - ✓ Production of renewable energy
    (energy of 1 Mg Biowaste = 450 kWh)
  - ✓ Recovery of substantial resources and raising of the enviromental relief (mainly humus und phosphorous)
  - ✓ Treatment and recovery of the whole life time cycle of the waste
  - ✓ Optimizing and utilisation in Treatment and recovery

Biowastetreatment at SRH
Situation Today

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- Collecting green waste from the garden at the waste management systems in Hamburg
- Collecting seperate wood - mainly treated wood - energy recovery
- Seperate collecting of leaves for special treatment and recovery in pellets as agriculture fertilizer
- Commercial organic waste for treatrment in wet-fermentation at the **BioWerk Plant**
- Seperate collected biowaste in the bio-bin and treatment at the **Biogas- und Kompostwerk Bützberg**

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Course of the Project

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FLOW CHART

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whole life time cycle of qan apple

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Treatment

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Delivery and controling

Trucks tilt the waste and it will controlled for contraries, mostly that are bins or stone or sometimes trees.

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Treatment

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Bio-waste Delivery





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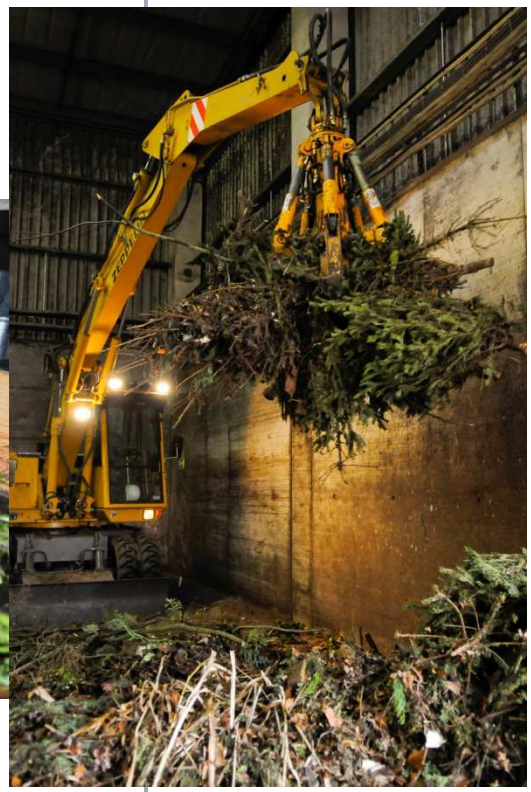
pretreatment

- Siffting by 80 mm perforation
- Breaking the material and extracting metall plastic bags or other small contraries



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Pretreatment and Variations of Contraries

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Treatment

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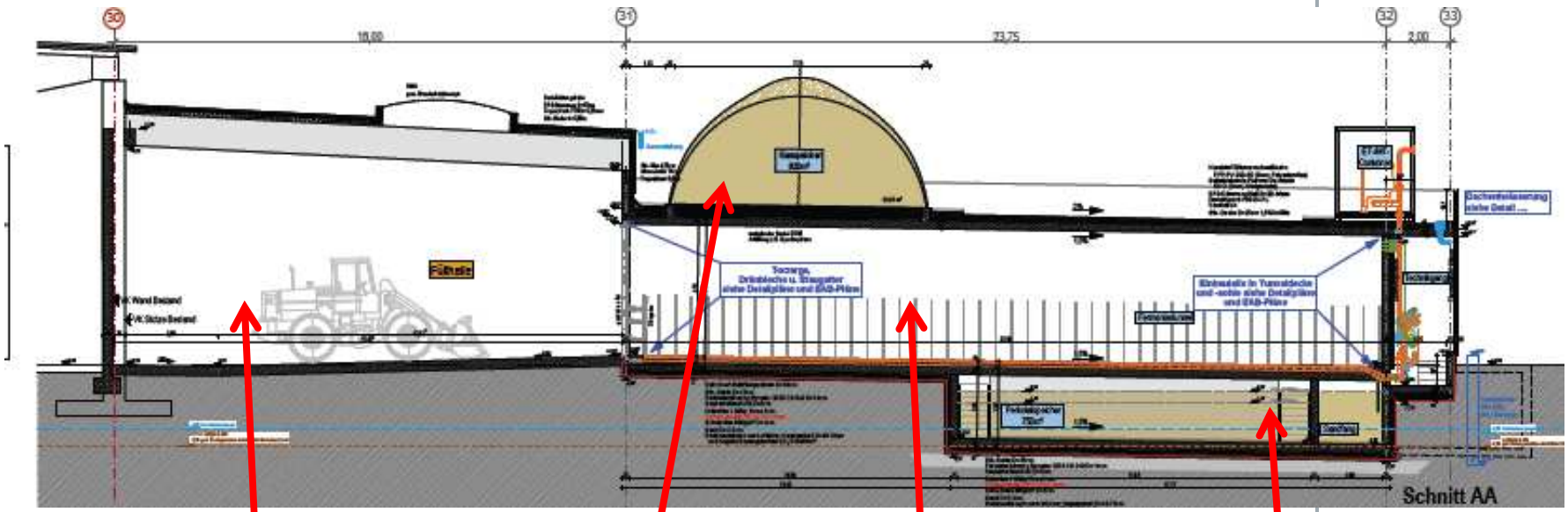
Fermentation



logistics area gasaccumulator fermenter Perkolat reservoir

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Treatment

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biofiltersystem
flare stack

Biogastreatment
and feeding

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Dry-Fermentation-System in Batches

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Treatment – air pollution control

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Quality of the raw air:

➔ **order:**

- The raw air after conditining in the fermenter has to contain a methanconcentration less 2%

➔ **Engeeniering :**

- Encase the whole plant
- Cascading raw air management
- Controlling der raw air management during the process
- Raw air as supply air to the heating supply system or to the flare stack

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Treatment - air pollution control

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Clean air:

➔ **order:**

- Ammonia-concentration of the exhaust air less 0,15 kg/h oder 30 mg/m³ (prevention nitrous oxid)

➔ **engeenierung:**

- 2 Biofilter (fermenter and rottehalle)
- Installation system acid washer ahead biofilter
- Controlling air quallity

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Treatment of the Biogas to Biomethan

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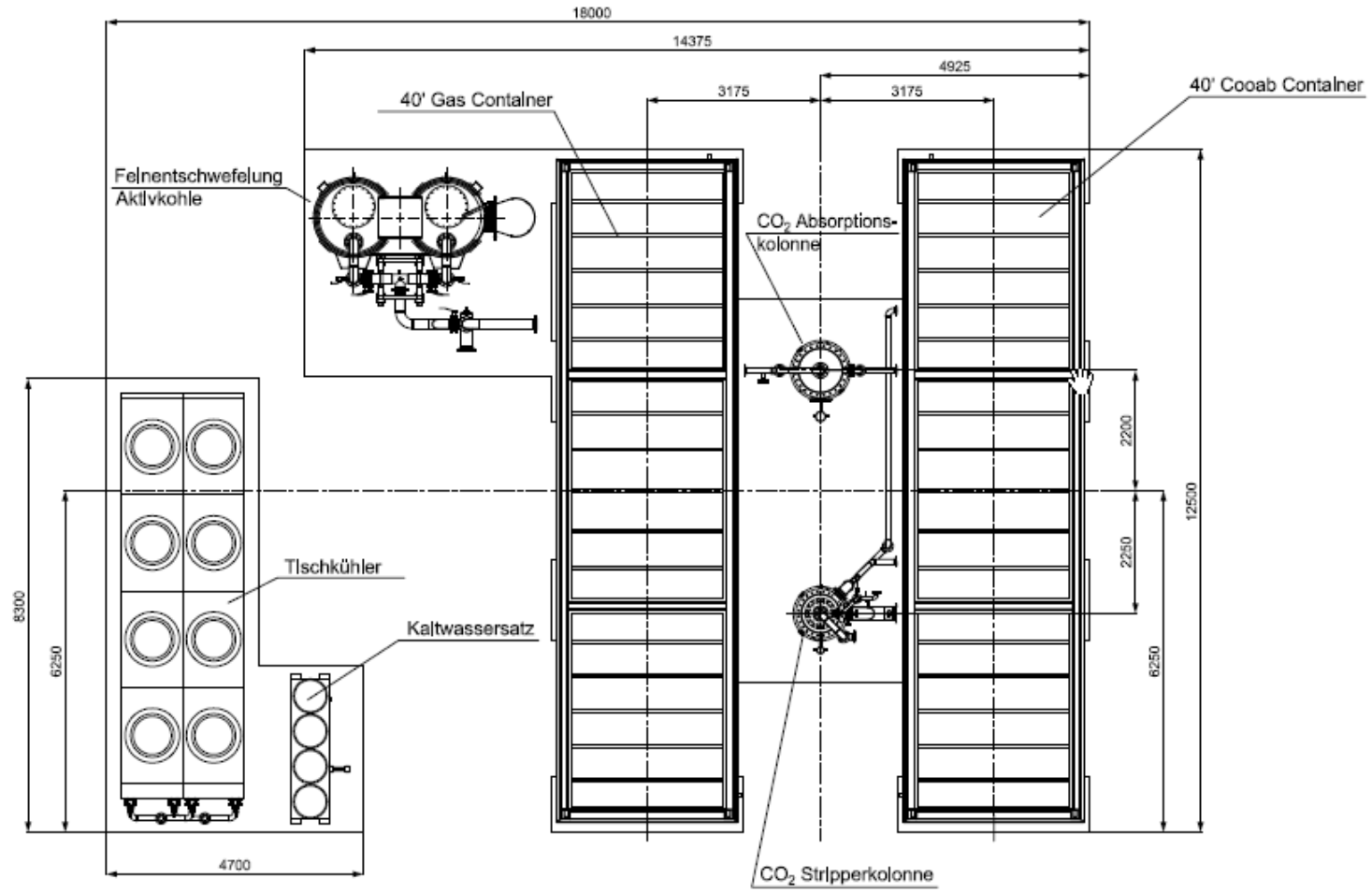

Biogas: under 48% CO_2 (Carbon dioxide) and over 52 % CH_4 (Methan)

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Gasaccumulator

Heatingsystem

Biogastreatment to Biomethan

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Start composting:

The conditioned digestate coney to the first windrow.

It is build in layers via the brigde.

It has a volume about 800 m³ .

(22 m wide und 14 m long, 2.5 til 2.8 m high , corresponding to 2,5 or 3 emptying of fermenters

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Rottehalle: Input ➡ Moving ➡ Mature Compost

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Composting process:

- For the oxygen supply fresh air is pressed through the material. In the first time the compressed aeration changes the air up to six times per hour, in the last part the change is only one time per hour.
- Two times the week the material is moved by a windrow mover, named „Wendelin“. It moves the material with two bucket wheels and there is a technical instrument to controll the moisture and the temperature. If the moiture is too low, water is added.
- The main factor to controll the process is the monitoring of the temperaturdistribution. It is to verify that in minimum on week there is a temperature more than 60 degreees, it is need for hygenic harmless. In the maintime the temperature is more than 70 degrees.

Biogas- and Compostingplant Bützberg Treatment

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Biogas- and Composting Plant Bützberg
Treatment

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Fineprocessing

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VI. Fine processing and the compost:

- The output is siffting to 10 mm, the underflow ist the product compost. It ist mature compost
- The overflow ist cleaned from plastic via an air seperator and it is use for structure material and woody fuel

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Storage and Product

Biogas- and Composting Plant Bützberg Facts

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Amount of

- Input bio-and greenwaste: 70.000 t/a
- Output contraries: max ca. 3.500 t/a

Energy

- Biogasproduction about 350 – 700 m^3 Biogas/h
- Biomethan after treatment (Aminwäsche): about. 2,5 bis 2,8 Mio m^3/a
  - ➢ Conditoning biogas to methan and feeding to the main gas distribution system of the Schleswig-Holstein Netz AG, marketing byVattenfall
- Energy content biomethan ca.10 kWh/m^3 = 25 Mio kWh/a

Substantial recovery

- compost ca. 35.000 t/a
  - ⇨ marketing: private gardener, agriculture
- Structurmaterial ca. 5.000 t/a - Energy produktion in biomass heating plants

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Product

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Application range for quality compost :

- Agriculturen, privat and professional gardeners :
  - Fertilizer (main and micro nutrients,
  - Humusreproduction
  - General soil conditioning
- Production of potting soil:
  - peatsubstitution (mainly from gardenwaste)
  - potting soils (mixing of compost and components)
  - Mix of compost and nativ soil for production topsoil
- Recultivation:
  - Regenation of usefull areas for example landfill

Using the quality system of the Bundesgütegemeinschaft Kompost

GÜTEZEICHEN KOMPOST RAL

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Product

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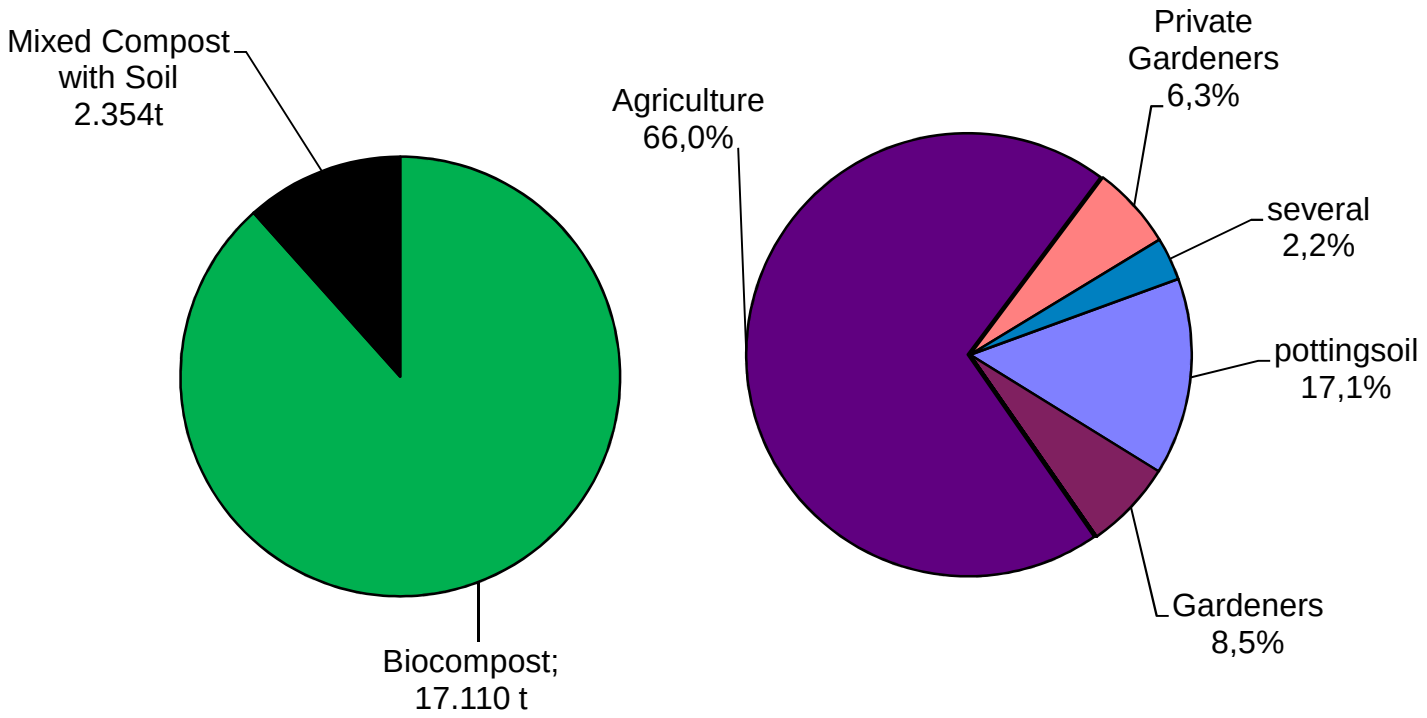
- Production and marketing today



Conclusion

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- increaising requirement:
  - Recycling of nutrients, particulary Phophorus
  - Humusfertilization to protect the function of the soil
  - Renewable energy

- becoming more impotant
  - Substantial and
  - Energetic recycling of biowaste
  - Consiering climate influences in Treatment and recycling
  - Life time cycle of waste of waste and hierachy of waste treatment