AD in Oslo - Production of Liquid Biomethane from Sorted Household Waste

City profile
Population 613 000
The capital region 1.14 mill
Population growth 2%
Oslo

EGE

Bio fertilizer
District heating
Biogas
Electric energy
Plastic packaging

Hazardous waste
Glas and metal
Paper and cardboard
Source sorting in Oslo
Optical sorting plant (Optibag)

World’s biggest, the only one with mechanical pre-sorting

**Line A and B;** Haraldrud - 100 000 t/y (1. oct 09)

**Line C;** Klemetsrud - 50 000 t/y (april 2012)

Sorted **food waste;** 11 161 t, **plastic waste;** 3263 t (2012)
Optical sorting plant
Biological treatment

- Food waste from households in Oslo
- Industrial food waste
- Biogas for 135 buses
- Bio fertilizer for 100 farms
Romerike Biogas Plant (RBA)

- Production of biogas and bio fertilizer
- Capacity: 50 000 t/y
- Two separate lines
- Based on thermal hydrolysis (THP)
Process Flow Illustration
Biological treatment (1)

PRE-TREATMENT
- Shredder, magnetic separator and bio separator/dekantor: Eliminates alien items (25 mm. sifter), water is then added to the process to produce slurry
- Skrew sifters (10 mm.)
- Reject is transported out (sand, plastic etc.)
- Intermediate buffer tank before next step
Biological treatment (2)

THERMAL HYDROLYSIS (THP)
1) Pre-heating (80-100°C)
2) High pressure “boil” process (130°C, 4 atm)
3) Flashtank (buffer tank)

BIO REACTORS
- Two tanks at RBA, 3200 m³
- 38°C for +/-24 days
- Bacteria culture tearing down the waste produce gas
From bio reactors to biogas: Upgrading

- Gas from reactors: 60% methane and 40% CO2.
- A compressor ensures stable and correct pressure and temperature before the gas is cleaned in a water scrubber = 97% methane
- New compressing and cooling process, CO2 adsorbing makes a 99% methane gas = LBG (Liquid Biogas)
LBG PLANT
Biogas from RBA

DISTRIBUTION AND BUSINESS
- Our client is the distributor AGA
- If overproduction: Gasflare, storing or utilizing as energy source at RBA

ENVIRONMENT
- LBG fra RBA saves 12 000 t CO2 emissions each year
- One kg food waste equals 0,13 l diesel fuel
Bio Fertilizer Production

1) LIQUID
Liquid biowaste is sifted (solid: 4,5 %) ca. 90 000 m3

2) SOLID
Separation of liquid bio waste gives a solid organic material and is delivered as solid bio waste (15 000 t.) Ts app 28%

3) CONCENTRATED
Liquid from separation is concentrated (12 000 m3) Ts 15%
Bio fertilizer from RBA

QUALITIES
- Essential nutrients (NPK)
- Liquid fertilizer easily adsorbed by ground
- Production: 90 000 m3/y

STRATEGIES AND DISTRIBUTION
- Felleskjøpet Agri is sales agent
- Culture experiments over years
Smell? Clean air?

TECHNOLOGY
- Waste bunker: Interlock system
- Low pressure conditions

AIR CLEANING SYSTEM
- Biological filter
- Liquid separator treatment of “smell”
THANK YOU

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