

# **BIOGAS from PÄÄSKÜLA LANDFILL, TALLINN, ESTONIA**

**INDREK TIIDEMANN  
TERTS Ltd, ESTONIA**

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# TALLINN PÄÄSKÜLA LANDFILL

- Tallinn - the capital of Estonia, is the largest town in Estonia with the population of appr. 400,000 inhabitants. Annually 200 - 220 thousand tonnes of organic waste was generated in Tallinn, which was stored in the Pääsküla landfill. The Pääsküla landfill was opened in 1962 and today its area occure about 25 ha with the average height of garbage layer up to 40 meters.



# BIOGAS PROJECT

Yesterday's waste... ...energy today

- In 1994 the gas company Eesti Gaas Ltd and some private investors started to carry out a biogas-producing project at Pääsküla. A new company Terts Ltd was founded.
- In 1994 3000 meters of gas filters and 1000 meters of connections pipes was installed. Today these numbers are 7200 m and 3100 m.



# BIOGAS PROJECT

**Yesterday's waste...**

**...energy today**

<b>Estimated biogas output (real output)</b>	<b>1000 nm<sup>3</sup>/hour (700 nm<sup>3</sup>/hour)</b>
<b>Estimated heat production (real production)</b>	<b>5 MW/h (4 MWh)</b>
<b>Methane content in biogas</b>	<b>CH<sub>4</sub> content about 65 % (presumed 50 %)</b>
<b>Total production of heat energy</b>	<b>12-20 GWh/year</b>
<b>Investment cost in 1994 All investments to 2003</b>	<b>5 million EEK (0.32 million €) 15 million EEK (0,96 million €)</b>

# Production

- Products supplied:
- Biogas → heating company Fortum Termest
- Heat → heating company Tallinna Küte
- Power → energy company Eesti Energia



# Cogeneration heat and power station

- Cogeneration heat and power station (CHP), owned by Terts Ltd, was commissioned on December 5, 2001.
- Installed ordinary Otto gas engine made by company Jenbacher (Austria)
- CHP electrical output is 836 kW and thermal output is 1050 kW.



# Production of energy, 2002

- Sold biogas → 5285 MWh
- Heat → 5700 MWh
- Power (electricity) → 6888 MWh
  
- Turnover, 2002 → 7,4 MEEK (0,47 M€)



# Environmental benefits of CHP

- **Emission reduction (ton CO<sub>2</sub> eq./year):**
- - **Annual basis → 36 387**
- - **During project lifetime (15 y) → 618 195**
- Reduction of NO<sub>x</sub> emissions about 150 tons and of SO<sub>2</sub> about 400 tons per year. (Project Identification Note; for ECCN project, client DG TREN)
- In 2001, 3.28 million m<sup>3</sup> of landfill gas (with 59% CH<sub>4</sub> content ) was collected. This amount corresponds to 1521 tons of CH<sub>4</sub>



# Future trends and goals

- Pääsküla landfill will be closed in 2005
- Biogas amount will increase up to 1800 nm<sup>3</sup>/h
- Installation of new CHP unit to Pääsküla, ~ 1 MWe
- Installation of new CHP plant to new landfill of Tallinn (Jõelähtme). Estimated beginning of project after year 2006.
- Installation of new CHP plant near Tallinn, running on biogas produced from chicken and cattle manure (energy transforming process → anaerobic digestion), 2005 -2006.



# Biogas production company

- Terts Ltd was established in 1993.
- Owners of Terts Ltd are:  
Kare Löfgren 51% of shares, Sweden, Essent Energie 40% of shares, Holland, Indrek Tiidemann 9% of shares, Estonia
- Turnover in 2000 105 000 €,
- Turnover in 2001 126 500 €,
- Turnover in 2002 470 000 €.



# Cooperation with partners

- Joint work with Swedish investor has given new horizontal biogas collection tubes technology, 1994-2003
- Joint work with Dutch investor solved new CPH long term investment, 2001-2003



# Cooperation with partners

- From technological side Terts Ltd offers to potential partners:
  - know-how for building and running horizontal trenches biogas collecting system and system monitoring
- From management side Terts Ltd offers to potential partners assistance to communicate with local authorities



# Cooperation with partners

- We are looking for new partners and financial assistance:
  - new potential biogas (CHP) projects,
  - know-how for energy production on the base of animal waste rendering plant
- Terts Ltd is open to cooperation through all forms of joint venture, among these is ready to sell the shares.

