

The share of renewable energy in total electricity balance in 2002 has been approximately 0.3-0.4% of the total net generation. In its position Estonia has undertaken to increase the share of electricity production from renewable energy sources to 5.1 % from its annual consumption by 2010. The national indicative target of 12 % of gross national energy consumption by 2010 given in the Directive of renewable energy sources is already achieved as the usage of wood and wood waste for heat production has relatively high share in Estonia.

To support the increase of the electricity production from renewable sources the Electricity Market Act provides a support scheme through the obligation of distribution companies to buy the electricity produced from renewable sources with the price of 1.8-fold average sales price of Narva Power Plants. Besides, the secondary legislation is in preparation for the production of electricity from the renewable energy and other sources in one production unit. The Electricity Market Act includes also other provisions, which promote the operation of electricity producers utilizing the renewable energy sources.

Concerning the new Directive 2003/30/EC of the European Parliament and of the Council from May 8, 2003 on the promotion of the use of biofuels or other renewable fuels for transport, Estonia has committed itself to achieve the targets set in the Directive.

### Potential of Biogas in Agriculture

Based on the data of Statistical Office of Estonia, the number of poultry is 2.26 million, cows and cattle 0.41 million, sows and fatling pigs 0.33 million and taking into consideration, that 60 % of total amount of animal manure could be handled at biogas stations in future, the potential of primary energy from biogas is ~0,4 TWh/y.

### Landfill gas

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

### Landfill Gas Project: Yesterday's waste today's energy

- In 1994 the gas company Eesti Gaas Ltd and some private investors started to carry out a biogas-producing project in Pääsküla. A new company Terts Ltd was founded in 1993.
- In 1994 - 3 000 meters of gas filters and 1 000 meters of connection pipes were installed. Today these numbers are 7 200 m and 3 100 m respectively.

Estimated biogas output (actual output)	1 000 nm <sup>3</sup> /hour (700 nm <sup>3</sup> /hour)
Estimated heat production (actual production)	5 MW/h (4 MW/h)
Methane content in biogas	CH <sub>4</sub> content about 65 % (presumed - 50 %)
Total production of heat energy	12-20 GWh/year (depends on the year)
Investment cost in 1994 All investments till 2003	5 million EEK (0,32 M€) 15 million EEK (0,96 M€)
Production of energy, 2002	Sold biogas → 5 285 MWh Heat → 5 700 MWh Power (electricity) → 6 888 MWh
Turnover, 2002	7,4 MEEK (0,47 M€)

### Cogeneration heat and power station (CHP)

- Cogeneration heat and power station (CHP), owned by Terts Ltd, was commissioned in December 5, 2001.
- Installed ordinary Otto gas engine from company Jenbacher (Austria)
- CHP electrical output is 836 kW and thermal output is 1 050 kW

### Environmental benefits of CHP

- Emission reduction:
- - Annual basis ? 36 387 tons CO<sub>2</sub> eq/year
- - During project lifetime (15 years) ? 618 195 tons CO<sub>2</sub> eq/year
- 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 1 521 tons of CH<sub>4</sub>

### Future trends and goals

- Pääsküla landfill will be closed in 2005
- Biogas amount will increase up to 1 800 nm<sup>3</sup>/h
- Installation of new CHP unit to Pääsküla, ~ 1 MWe (2004)
- Installation of new CHP plant to the new landfill of Tallinn (Jõelähtme). Estimated start of project after the 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.

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