YTV Waste Treatment

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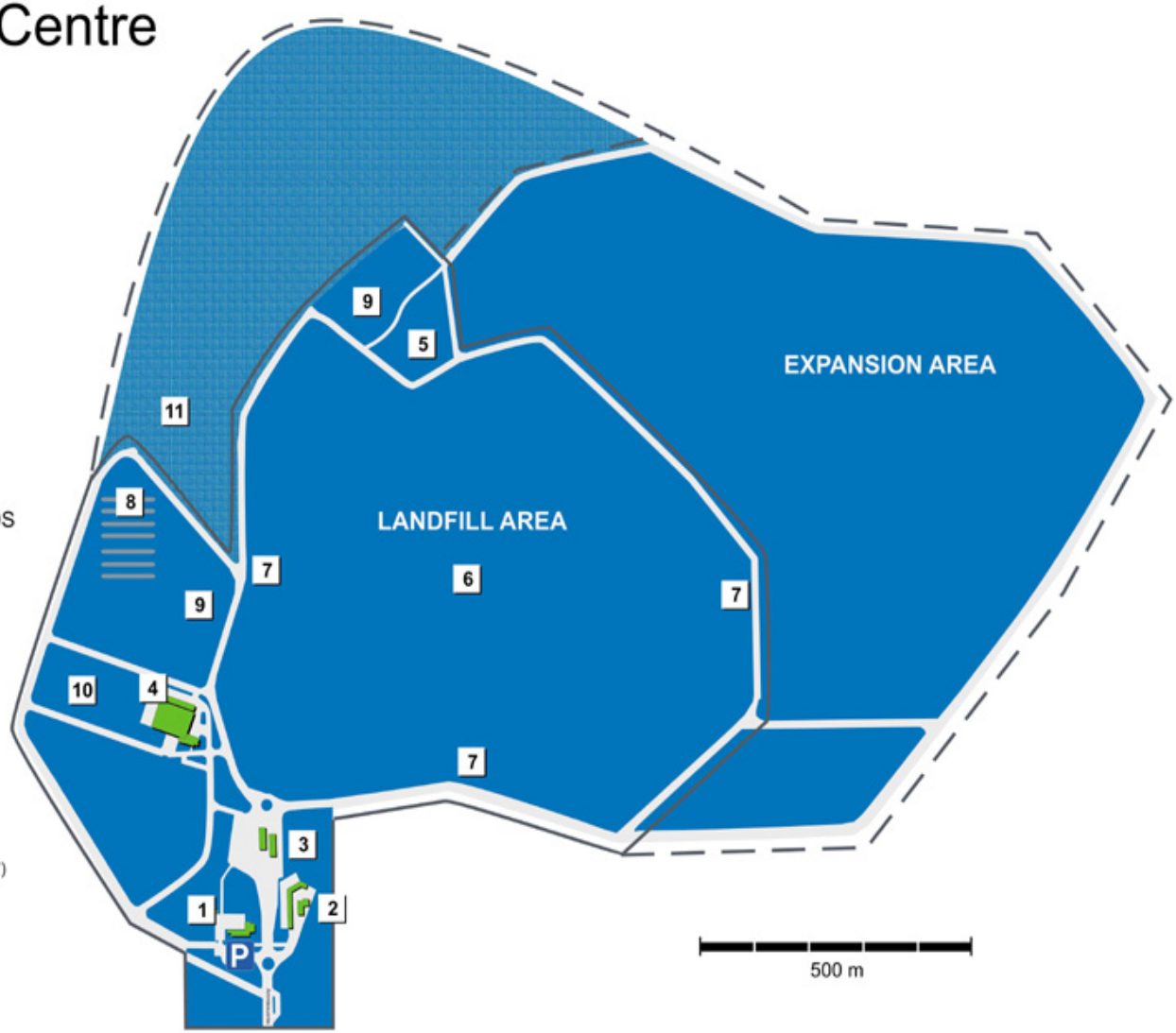
YTV Waste Management Centre

The Waste Treatment Center

- **is located on the western boundary of Espoo**
- **The operations were started in 1987 and will continue at least until 2040-2050**
- **The total area is approximately 190 hectares: at the moment 50 hectares as the actual landfill area**

YTV Waste Treatment Centre

1. OFFICE
2. SORTTI RECYCLING STATION
3. WEIGH BRIDGES
4. COMPOSTING PLANT
5. LANDFILL GAS PUMPING STATION AND FLARES
6. UNLOADING AND CONTROLLING OF WASTE LOADS
7. COLLECTION OF LANDFILL GAS
8. COMPOST
9. EQUALIZING BASINS
10. POST COMPOSTING HALL (in production in 2004)
11. MIXED WASTE TREATMENT PLANT (in production in 2007)



The Main Functions

- **The landfill area:**
  - **the reception of the mixed waste**
  - **quality control of groundwater, surface water and leachate**
  - **a gas collection system**

- **The reception of different recyclable waste**

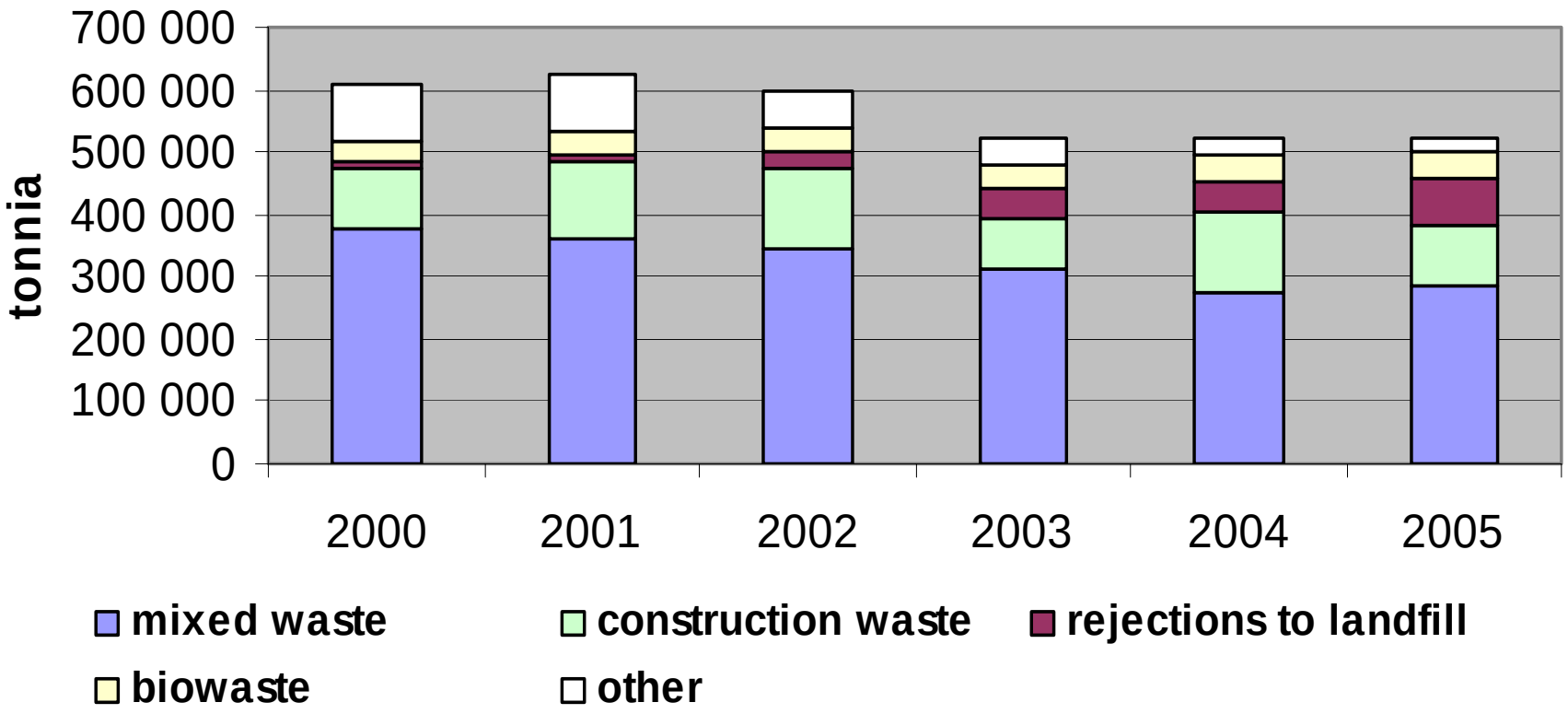
- **The composting plant: preparation and storage of compost**

- **The Sortti Recycling Centre**

The Landfilling of Waste

- **The reception of waste is completely controlled**
- **All incoming waste is weighed**
- **The quantities and qualities of waste are registered**
- **The load inspectors check the quality of waste to disclose any hazardous or usable waste**
- **The waste is crushed, compressed and covered daily with a landfill roller**

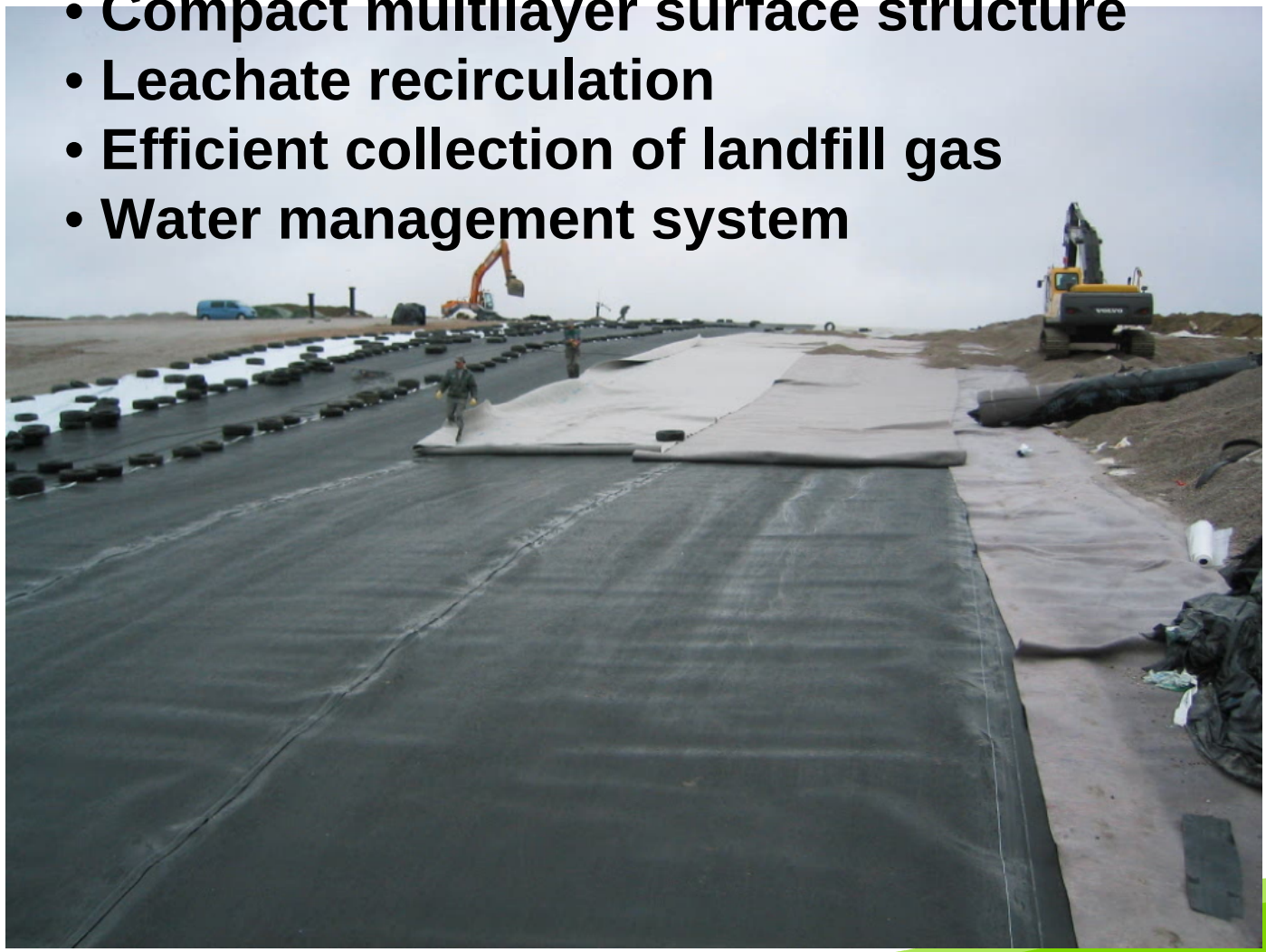
Amounts of waste received in Ämmässuo (without soils and hazardous waste)



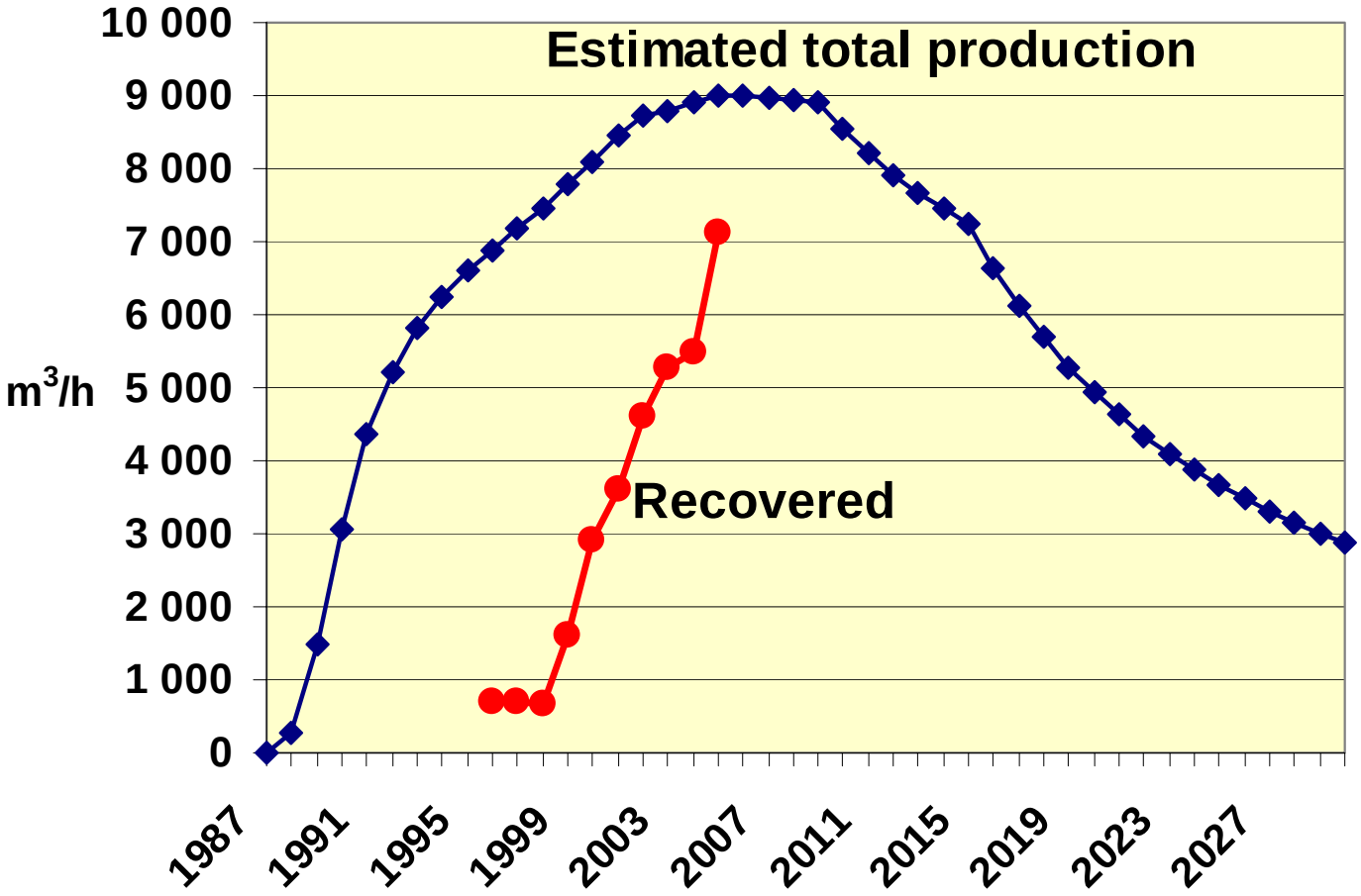

PREP
PRO

Closing and covering of the current landfill

- Compact multilayer surface structure
- Leachate recirculation
- Efficient collection of landfill gas
- Water management system



Gas Production and Recovery



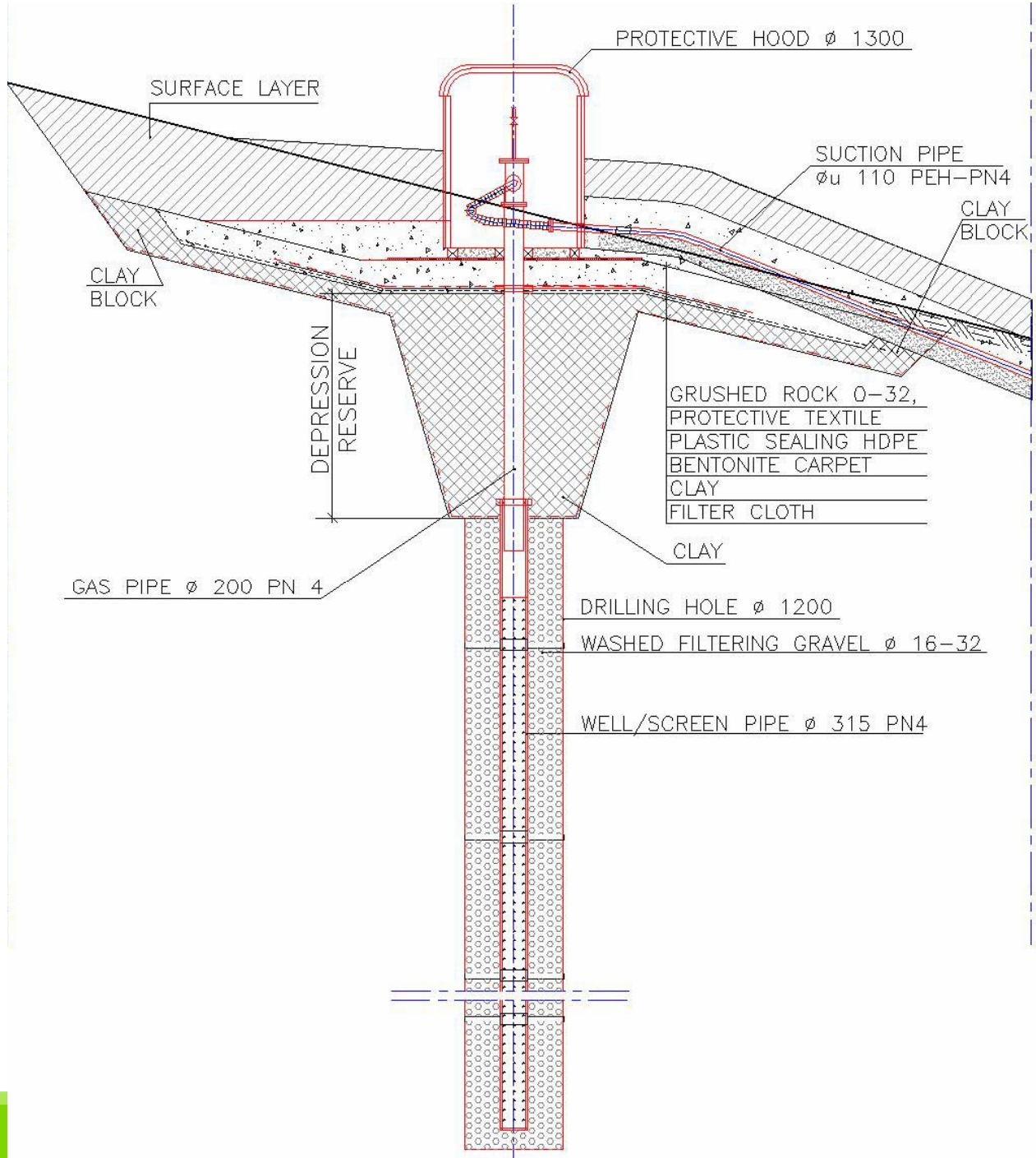
Landfill Gas for Heating

- **The decay of the waste produces landfill gas**
- **It consists of methane, carbon dioxide, aqueous steam and small amounts of odour-causing sulphur compounds**
- **Landfill gas is collected with drainage and suction well systems**
- **From Ämmässuo it goes through the pipe to the electricity plant in Kivenlahti**
- **The power plant produces district heating from landfill gas equivalent to the heating requirement of about 10 000 detached houses**

Landfillgas recovery

- Amount and quality
  - 7 000 m^3/h, 46 Mm^3/a
  - CH_4 concentration ca. 52 %
- Recovery
  - Old horizontal and vertical gas wells (80)
  - 170 new vertical wells
  - 4 pumping stations, 7 regulating stations
- Treatment
  - Currently flared at 1200 ^oC
  - From autumn 2004 energy utilisation by Espoo

Landfill Gas Collection Well



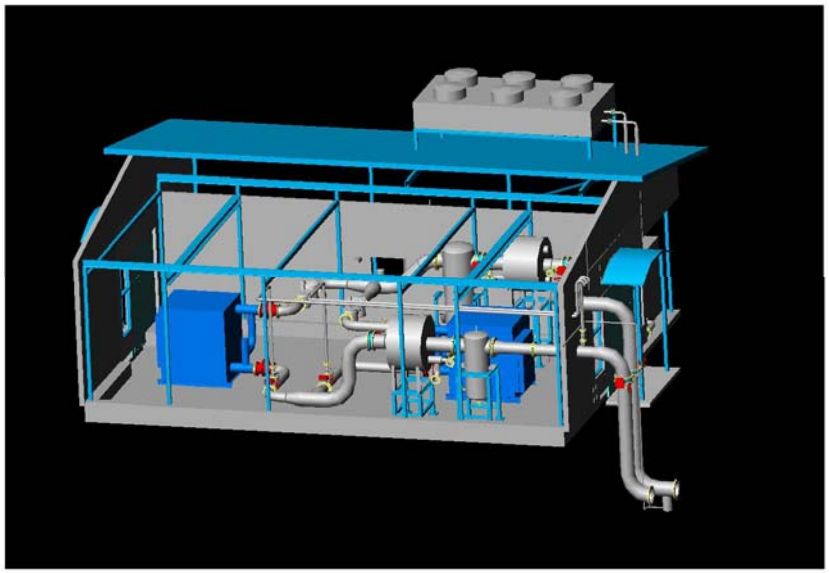
Drilling of a landfill gas well

Treatment of the Landfill Gas

- **Utilisation**

  - Since autumn 2004 as fuel for a district heating plant in Espoo

  - Drying and compressionfacility (2 °C, 1 bar)



- 11 km long pipeline

Not needed gas is burned in flares (1200 °C)

Pumping Station & Flares

Collection of Landfill Gas

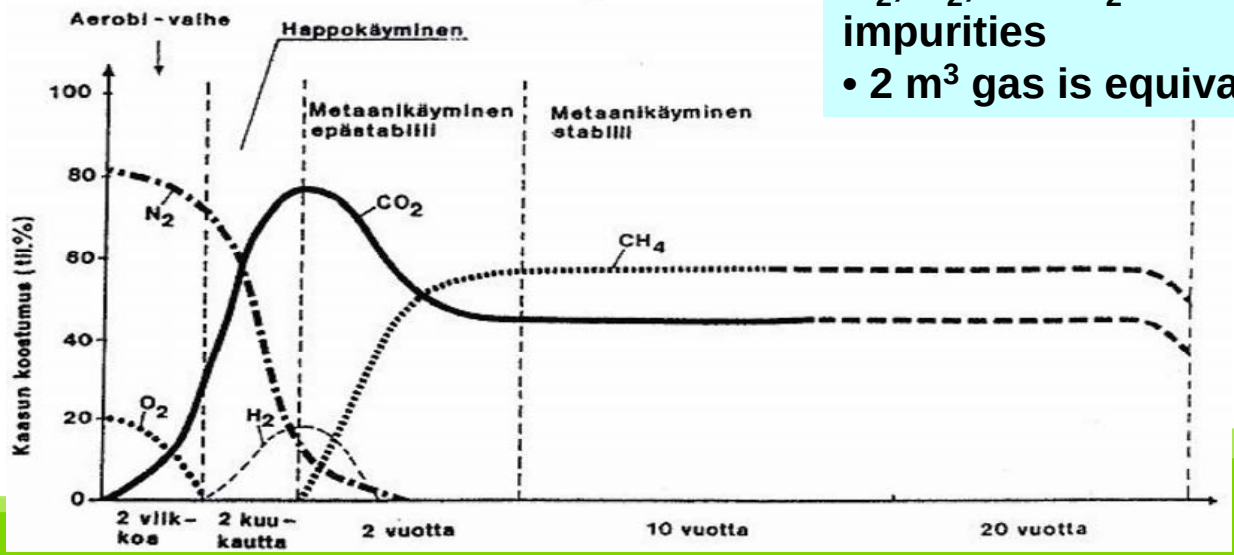
Aims:

- minimizing emissions of greenhouse gas
- minimizing odour problems
- preventing fires or explosions
- utilising methane

Landfill Gas, development and composition:

- Gas is produced when organic matter decomposes in anaerobic conditions.
- A tonne of waste produces 100-200 m^3 gas.

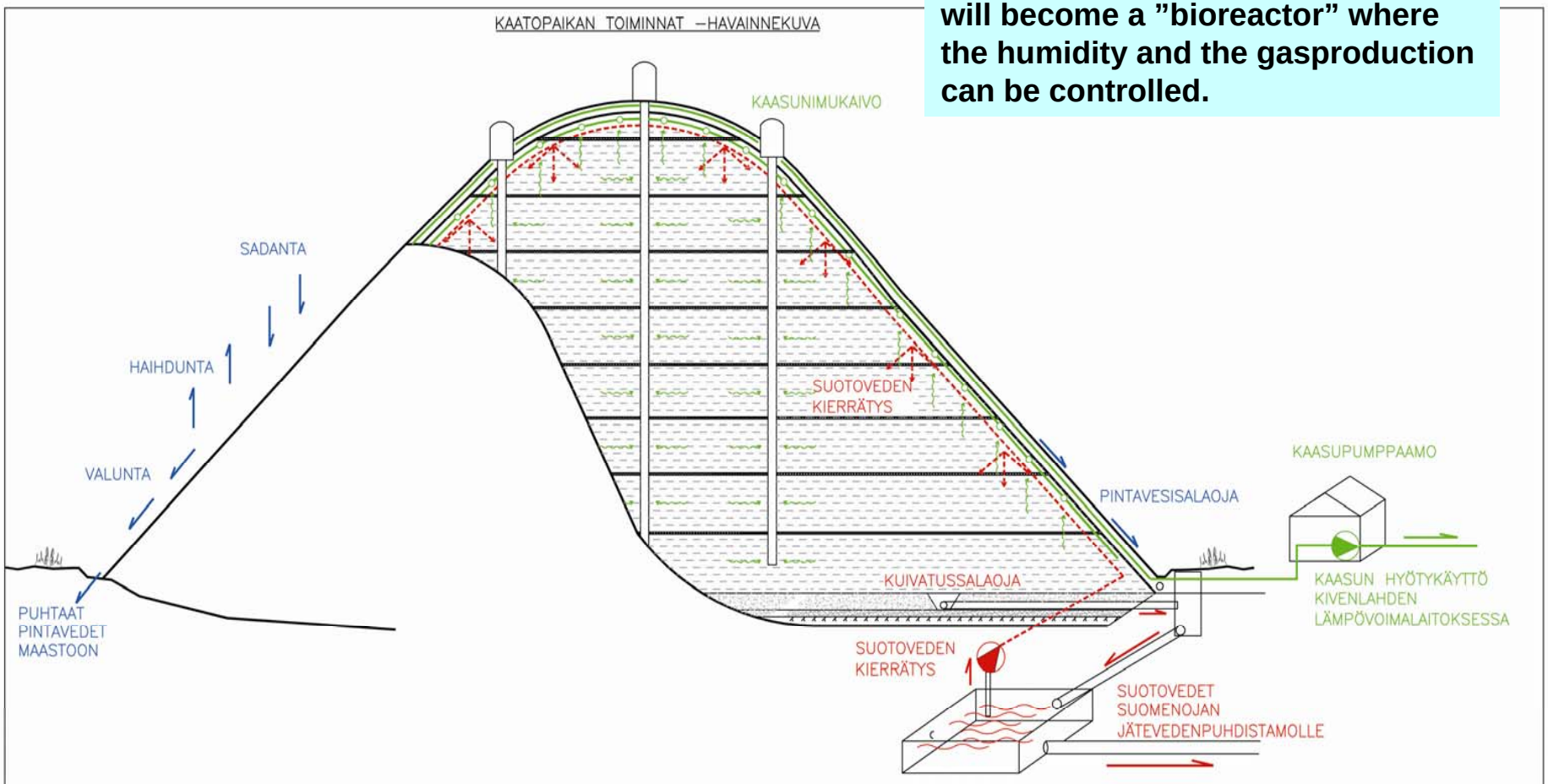
- The gas is mainly CH_4 and CO_2 ,some H_2O, O_2, H_2, and N_2 and small amounts of other impurities
- 2 m^3 gas is equivalent to n. 1 l fuel oil



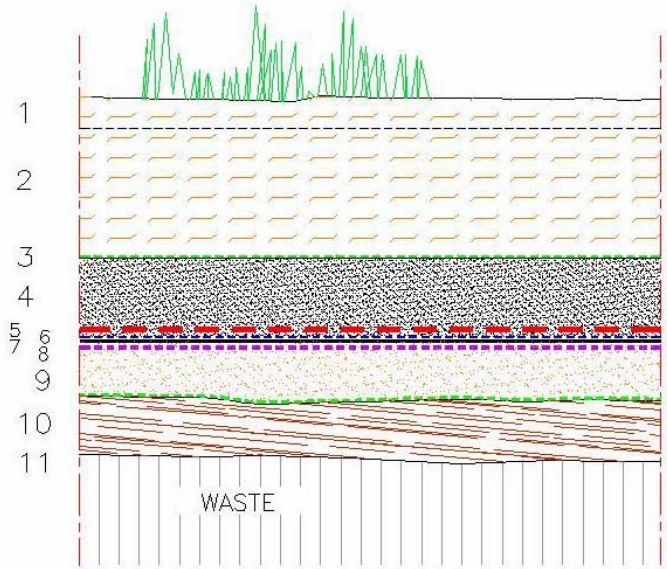
The Present Landfill

- Gas collection system
- Leachate control system
- Surface layers
- Roads for maintanance

When the landfill is closed down, it will become a ”bioreactor” where the humidity and the gasproduction can be controlled.



Standard cross-section of the surface structure



200 mm	1	GROWTH LAYER, UPPER PART
800 mm	2	GROWTH LAYER, LOWEST PART
	3	FILTER CLOTH N3 (NorGeospec)
500 mm	4	DRAINAGE LAYER, RUBBLE 6–16 mm
	5	REINFORCEMENT NET, IF NEEDED
	6	PROTECTIVE GEOTEXTILE ≥ 1200 g/m^2
	7	PLASTIC LINER LLDPE 2.5 mm (minimi) FIRCTION SURFACE ON BOTH SIDES
	8	BENTONITE SURFACE
300 mm	9	GAS COLLECTION LAYER, RUBBLE 6–32 mm
	10	FILTER CL[illegible])
	11	PRECOVEF

Water Management

- **There is the drainage system under the landfill to lead the water to an equalizing basin before leading water to a municipal waste water treatment plant in Suomenoja**

- **Clean surface water is led to an open ditch, from where it flows to a nearby lake**

- **More than twenty water measurement points in the area, which are used for regular sampling**

Environmental Measures of the YTV Waste Treatment Center

- Amounts of the disposed waste
- Water management system
  - measuring of the amounts and quality of the seepage
  - measuring the impacts to the surface and ground waters
  - including almost 50 measuring points
- Landfill gas collection and treatment
  - degree of recovery is now more than 75 % (2003: 46 million m^3n, 50 % CH_4)
  - after closing and constructing the final cover -> 100 %
- Odours
  - investigations made yearly by inhabitants or experts

Construction of Final Disposal Area for Pre-treated Waste

- The new final disposal area is 70 ha, enough space for about 30 years
- Separate cells for different categories of waste
- Completion of surface sealing structure 2045
- Estimated investment costs ca. 110 M€

Constructing the New Disposal Area

Treatment and monitoring

- Landfill gas
- Humidity changes
- Stability of the landfill