

T@W Good Practice Form

Setting

Title: Landfill biogas to produce electricity and heat
Country: Portugal
Location: Sermonde
Start date:
End date:
Technology keyword(s): Landfill gas
Host sector:

General description

Summary:

The Sermonde landfill receives municipal solid waste (MSW) from Vila Nova de Gaia and Santa Maria da Feira municipalities. The landfill exists since 1999, with a capacity to accept around 1.5 million tonnes of MSW and it is managed by SULDOURO SA. The use of biogas, which is a natural result of the decomposition of organic matter, to produce electricity and heat, was not considered since the beginning, but implemented after an assessment made by ENERGAIA (Gaia Municipal Energy Agency). This assessment was focused on the evaluation of the energy potential of the biogas and on the economic feasibility of the process. Due to the results obtained, SULDOURO decided to start with the design and the implementation of an energy production central that converts the biogas produced in the landfill to electricity and heat.

The electricity produced is sold to the national electricity grid and the heat generated is used to space and water heating.

This project offers the landfill management huge economic benefits and increases the environmental quality of the installation, due to the more efficient extraction of the biogas and due to the reduction of local greenhouse gases emissions.

Aims:

A municipal solid waste landfill is an opportunity to increase the rates of decentralized energy production from renewable energies, contributing, also, to the goals of greenhouse gases reduction. Another important goal achieved with the installation of this system was the decrease of the energy invoice, due to the use of the biogas to produce heat used in the installations. It is important to refer that all of the electricity produced is sold to the national electricity grid because the selling price is higher than the purchase price.

Summary of Results:

The use of biogas, which is a natural result of the decomposition of organic matter of the landfill, to produce heat and electricity has many advantages at environmental and economical level. For the environment, this system contributes to the reduction of greenhouse gases emissions and of the consumption of fossil

fuels. The production and use of energy in the same place results in an improvement of the energy efficiency.

Regarding the economic side, the use of biogas to produce heat and electricity reduces the energetic invoice and because the electricity produced is sold to the national grid, the plant earns some money since this electricity is sold at a higher price that it is bought.

At environmental level, besides the reduction of the use of fossil fuels, the use of biogas results in a decrease of greenhouse gases emissions, due to the non emission of methane and also due to the use of biogas in opposition of natural gas to produce heat.

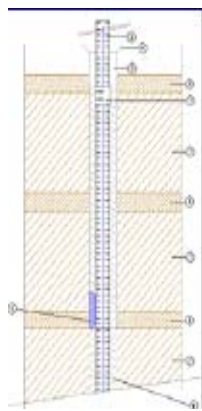
Technical details

Technical details:



Biogas Extraction

- Total waste dumped - 1 600 000 ton
- Extraction with burning of the gas started in January 2000;
- Second burner installed in 2002;
- Total Flow approx. 500 m³/h



Biogas Extraction



Rede drenagem de BG
 Drain pipe network



Engine Jenbacher

- Licensing process in DGGE for 1 000 KW
- International public process to purchase the technology
- Engine Jenbacher 20cil. of 1 000 KW power
- Start-up in September 2004
- Production full time in 2005
- Installation of a 2nd engine in April 2007

Electrical Capacity - 2 112 kW

Heat Capacity - 618 kW

Energy data

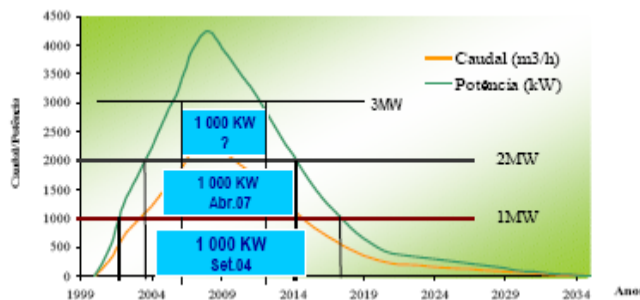
Energy data:

Electricity Production:

- 2005 - 8 709 MWh
- 2006 - 8 474 MWh
- 2007 - 14 000 MWh

For 6 000 households

4% of the domestic consumption of Vila Nova de Gaia



Flow and Power of biogas over the years

The production model pointed to a potential of:

- 1 000 KW from 2002 for 15 years;
- 2 000 KW from 2004 for 10 years;
- 3 000 KW from 2006 during 5 years

Environmental data

Environmental data:

Regarding the environmental side, the system contributes to the diminution of GHG and also to reduce the consumption of fossil fuels.

GHG-emission reductions: 5000 tonnes CO₂equivalent/year

Contribution to Sustainable Development:

This project contributes to sustainable development because it connects economical development with environment protection. With the installation of this system the landfill benefits at economic and environmental level, as mentioned above.

The installation of this system, with positive results at an environmental and economic level can sensitize local authorities and industries and the all community to the advantages of the use of biogas.

Economic data:

Economic data:

As described in the previous paragraph, the installation of a system to use the biogas that results from MSW to produce heat and electricity gives economical profits to the manager, due to the energy invoice reduction and also due to the "in house" energy production. Another benefit is that all the electricity produced is sold to the national grid and Suldouro makes some money since this electricity is sold at a higher price that it is bought for the needs of the landfill structures.

Financing: European Cohesion Fund
Capital cost: 1.3 M€

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