BEST PRACTICE

RENEWABLES NETWORKING PLATFORM

Electricity production from landfill biogas

Vila Nova de Gaia, Portugal - 302 295 inhabitants

Energy efficiency –heating & cooling

A landfill site in Vila Nova de Gaia, the most populous city in the Porto district in Northern Portugal, values the biogas produced by its wastes to generate electricity and heat through a cogeneration unit. While contributing to the national and local CO_2 emissions reduction goal, it also helped to improve the quality of life and fostered local economy.

Picture: Energaia

Project in a Nutshell

Vila Nova de Gaia was one of the first municipalities to sign the Covenant of Mayors in 2008 and to commit to reduce its CO2 emissions of 20% by 2020. Its energy agency, Energaia, created in 1999, is in charge of implementing the measures to fulfil this goal. Suldouro S.A., the company responsible for the landfill site in Sermonde, treats the wastes from Vila Nova de Gaia and nearby city Santa Maria da Feira. Since they are bound by law to manage the biogas produced by anaerobic digestion so that it is not released into the atmosphere, they have decided, with the technical support of Energaia, to use this biogas to produce electricity through the installation of a plant for energy valorisation in 2004.

The first generator was built in 2004, co-financed by EU funds. Biogas is collected by drilling wells into the waste and conducted through pipes into a cogeneration unit to produce electricity and heat. Heat is then used for air conditioning in Suldouro's buildings and in its waste sorting plant, while electricity is sold to the grid and thus generates profits. Since 2004, the process has been optimized to maximize gas capture and electricity production, as well as to reduce maintenance work. Two more units have been built in 2007 and 2008 with Suldouro's own funds. Now the plant works with 7 generators of 1 MWh each and 2 Organic Rankine Cycle of 165 kWe each.

Impact & Next steps

This plant enabled to reduce both GHG and smell emissions, and contributed to fulfil Vila Nova de Gaia's energy commitment while improving the quality of life. In 2005, one year after the first generator's construction, it produced 8 708 532 kWh of electricity, thus exceeding the foreseen 8 GWh, and it helped to avoid the equivalent of 4 093 ton CO_2. In 2017, it produced 28 585 072 kWh of energy, and helped to avoid 13 758 ton CO_{2eq}. Thanks to the plant's profitability, Suldouro was able to finance with its own fund the 2nd and 3rd generator.

Replicability: Challenges & Success Factors

Having public and private sectors joining forces for local development is the recipe for this project's success: while Suldouro S.A. was the implementer, Energaia as a technical partner, carried out technical and market studies to measure the project's feasibility. Beside its input in reducing CO_2 emissions, this project allows to value biogas in a process which would otherwise not only waste it but also imply treatment costs. It promotes the use of local energy and fosters local economy by investing in local companies and internal training.

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