Energy Efficiency and Environmental Protection in Wastewater Treatment at the Marselisborg Wastewater Treatment Plant

Sustainable Development Goals Addressed

Organization, Institution or Company

Aarhus Vand A/S (Aarhus Water Ltd.) is a public limited company owned by the City of Aarhus, Denmark, which provides water supply and sewerage treatment services.

Location of project site, Country

Mareslisborg, Aarhus, Demark

Brief narrative description of objective/project/activity/initiative

In 2005, the Aarhus City Council decided to upgrade and consolidate its municipal wastewater treatment system which at that time comprised of smaller facilities at seventeen different locations. Today, the newly built Marselisborg Wastewater Treatment Plant (WWTP) is the largest in Aarhus, and one of the most modern WWTPs in Denmark, treating an estimated 32 million cubic metres of wastewater annually.

Operations at the Marselisborg WWTP have been optimised over the years by the installation of several components, including a supervisory control and data acquisition (SCADA) system, which controls the levels of ammonium, nitrate and phosphor, and which optimizes the nitrification/denitrification process. New equipment has also been installed to improve efficiency and reduce the cost of aeration in secondary wastewater treatment. In addition, the new on-site combined heat and power station was equipped with three new biogas engines (CHP).

Economic, environmental and climate benefits, challenges and lessons learned

By optimising its systems, Marselisborg WWTP became a net power and heat producer. Its annual production of electricity from biogas reached 9,628 MWh in 2015, whilst its own consumption amounted to only 6,311 MWh during the same year.

Today, Marselisborg WWTP produces more than 50 per cent more electricity than its own consumption. It also produces some 2.5 GW of heat for the Aarhus district heating system annually, generates CO_2 emissions savings of more than 150 tons per year, whilst recurrent operating costs are an estimated 40 percent lower than in other WWTP facilities.

The Marselisborg Wastewater Treatment Plant was referenced in the IEA World Energy Outlook 2016 and is widely seen as a best practice model.

The plant has received many visiting delegations as part of international information exchange and capacity building programmes and offer capacity building opportunities for delegations from other countries.

Additional information: website addresses and contacts

Aarhus Vand website: https://www.aarhusvand.dk/en/international/solutions/tomorrow/
and
https://www.nordregio.org/sustainable_cities/marselisborg-wastewater-treatment-plant/

Photos by Danfoss