Increasing energy independency in a rural municipality: case Barciany

The municipality of Barciany is one of northern Poland's municipalities lying on the border of Poland and Russia. It is a rural municipality with a relatively low population density rate of 23 people per 1 km^2, and the dominance of farmland (83% of all land) in the land-use structure. Practically, all the municipality's area is covered by the Natura 2000 environmental protection programme, which limits the possibility of constructing large wind and photovoltaic farms.

The municipality of Barciany has been steadily developing its energy independence based on renewable energy resources in a system consisting of energy producers and consumers (prosumers). In the first stage, in 2009, two municipal biomass-fed district heating plants with the capacity of 1.3 MW and 0.3 MW were created through the natural conversion of fossil fuel powered municipal boiler plants which were used until then. The heating plants operate during the heating season and supply heat to households and public buildings (56 clients), including the Municipal Office building, a sports hall, schools and the Roads and Green Areas Authority facilities. The fuel used in the heating plant are wooden chips from trimming roadside shrubs and from other sources of waste lignocellulosic biomass such as forest and garden residues. The length of the district heating network transmission pipes, including connection pipes to the buildings, is 2,073 m, and the total area heated is 13.5 thousand m^2, while the contracted heat energy is around 1,000 kW. The next stage, carried out since 2013, includes the installation of heat pumps powered by electricity from the electricity grid in two municipal schools: two geothermal heat pumps of the capacity 100 and 130 kW (41 vertical boreholes to a depth of 100 m) were installed in the Drogosze school, while three heat pumps of the total capacity of 160 kW (28 vertical boreholes to a depth of 100 m) were installed in the school in Mołtajny.

As a result, the cost of supplying these schools with heat in the municipal's budget was reduced by 70%. In the next stage, in 2017, a small photovoltaic farm with a capacity of 29 kW$_e$ was installed on the premises of the Municipal Office and the municipality's office. Also, a workshop building was fitted with a geothermal heat pump with the capacity of 57.6 kW (5 boreholes down to a depth of 200 m) and a photovoltaic installation with the capacity of 8.5 kW. The generated electricity is sold to an electricity distributor and the profits added to the municipality's revenues.

KEY WORDS

Energy independence, heating plants, solar PV

COUNTRY

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ADDITIONAL INFORMATION

It is the municipality authorities' opinion that the further development of the district heating system in the municipality will be largely dependent on the availability of natural gas from the local gas distribution network currently under construction. The transition from biomass-based fuel to natural gas can entail the need to modernize the present system to extend the municipal heating system to other households and public buildings that currently use coal as heating fuel.

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Photo sources: Municipal Office Barciany

ABOUT BRANCHES

BRANCHES is a H2020 "Coordination Support Action" project, that brings together 12 partners from 5 different countries. The overall objective of **BRANCHES** is to foster knowledge transfer and innovation in rural areas (agriculture and forestry), enhancing the viability and competitiveness of biomass supply chains and promoting innovative technologies, rural bioeconomy solutions and sustainable agricultural and forest management.

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THE PARTNERSHIP

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