

Activities of the Polish Geological Institute – National Research Institute in mapping and monitoring of shallow geothermal energy

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Shallow geothermal energy (SGE) is a reliable source of energy used for space heating and cooling through application of ground source heat pumps (GSHP). It contributes to reduction of greenhouse gases and suspended dust emissions thus in effect to mitigation of smog in urban areas, especially when associated with the renewable electricity sources.

Use of SGE as well as the total number of GSHPs installations and their total installed capacity have been recently remarkably developing in Poland. As reported by the Polish Organization for Development of Heat Pump Technology, the growth of the GSHP market exceed 5% in 2017, compared to 2016. More dynamic development is expected in near future as the market will be stimulated by the governmental incentive programme "Clean Air" addressing the investors and end users. The use of RES in Poland is supported in order to comply with the national and international regulations providing for better state of natural environment as well as quality of life, human health and well-being.

PGI-NRI provides both scientific background and practical solutions for several issues regarding SGE use. At present its activities focus mainly on mapping of SGE potential as the resulting maps provide valuable tool for optimal location for GSHPs installations. Mapping methodology is based on conversion of geological parameters into the geothermal ones as well as spatial analyses and interpretation of borehole data with help of GIS software. The research also includes results of in-situ TRT measurements which enables assessing geothermal parameters of underground, such as geothermal conductivity and geothermal power unit, at the local scale. As a routine tests the measurements of geothermal conductivity for the rock and soil samples are completed by the PGI-NRI's laboratory. Using its scientific experience PGI-NRI assisted accomplishment of some investments in GSHP installations.

Recently, PGI-NRI started some new activities connected with monitoring of geothermal conditions and properties of underground. Five locations throughout the country have been chosen for drilling the observation boreholes, so called "thermopiezometers". Location of the boreholes was selected in a way to illustrate some typical climatic, geological and hydrogeological conditions of Poland. The observation wells will be equipped with single U-tube and thermo-activated cement filling enabling regular measurements of ambient rock-groundwater environment temperature. In addition the TRT measurements will be completed to measure the bulk geothermal conductivity at the borehole.