

Solar District Heating in Piaseczno – preliminary case study

Subject:	Solar District Heating (SDH) in District Heating Company in Piaseczno – preliminary case study
Description:	Preliminary case study prepared for district heating company is a first step to creating efficient district heating systems with solar collectors and seasonal heat storage.
Date:	06.02.2018
Authors:	Aneta Więcka, Justyna Zarzeczna - Institute for Renewable Energy
Document download:	www.solar-district-heating.eu/en/knowledge-database/

Summary description of the instrument

Region: Poland, provinces: Masovia

Partners involved:

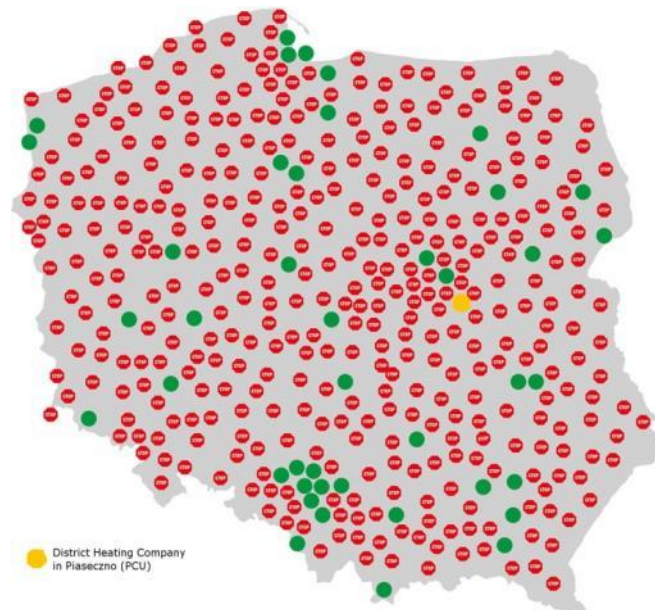
- Institute for Renewable Energy

Short description of the measure.

Preliminary case study prepared for PCU is a first step to creating efficient district heating system in DH company through the use of solar collectors and heat storage by Institute for Renewable Energy. The preliminary case study indicates how to use the surface available on the roof and in the area near to the companies to build solar collectors systems.

Initial situation

Currently, 85% of existing district heating systems in Poland doesn't have the requirements of the Directive 2012/27/UE and there is a need to modernize them in order to obtain support from existing assistance programs (red color – inefficient district heating system, green – efficient district heating system). The District Heating Company in Piaseczno (**PCU**) does not qualify to requirements of the efficient district heating system, even if over last decade coal fired boilers were already replaced by gas boilers. The total capacity in PCU Piaseczno is 24 MW (and 12 MW in preparation). There is no any renewable energy source. However



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691624

Solar District Heating in Piaseczno – preliminary case study

the city of Piaseczno within new Local Program of Revitalization proposed actions aimed at improving the efficiency of this system. The possibility of using large-scale solar collector systems (solar assisted district heating) were not mentioned clearly there but such option is open and fully eligible.

Objectives

The objectives of preparation the preliminary case study was to define the possibilities of transforming inefficient district heating system to efficient one through using large-scale solar collector systems and seasonal heat storage system. The case study indicates how large area they need to produce 50% of energy from solar energy. In the case study included area on the DH company roof and other possibilities, (because the roof wasn't big enough). The main objective of the analysis was to interest the DH company in finding solution and help in its implementation in the next stage and take into account in theirs Local Program of Revitalization. An additional positive effect of the conducted analysis is the extension of knowledge about the use of renewable energy in DH company.

Measures and actions

The analysis was based on public available information, including an orthophotomap, thanks to which the available space was determined. The data provided by DH company via e-mails and direct talks were also used. Detailed analyses performed in the next stage were carried out on the basis of detailed data provided by the company after the meeting. In addition, the company started talks with the local government and its only shareholder in order to find a suitable location for the implementation of solar collector installations.

Barriers and opportunities

During the preparation of the preliminary case study, and then during the meeting with the company, at which the analysis was presented, it turned out that the main barrier of the implementation investments in large-scale solar collectors systems is the lack of financing for this type of investments. Another barrier is the available space. DH companies usually doesn't have enough free space that would allow to build a solar collectors installation with an heat storage. For technical reason (safety issues), same part of the roof are excluded from any installations so the available roof area is smaller than expected. But the problem can be solved by established cooperation with local governments to need suitable area. In the case of DH company in Piaseczno, there is a possibility to use roof at the skate park near PCU, where the solar instalation could be possible to built.

Institute for Renewable Energy is working on preparing the national SDH support program, what will be a great opportunity for financing some demonstrations sites with high share of renewable energy (eg. PCU) and creating the replication potencial for other district heating companies with lower financial support.

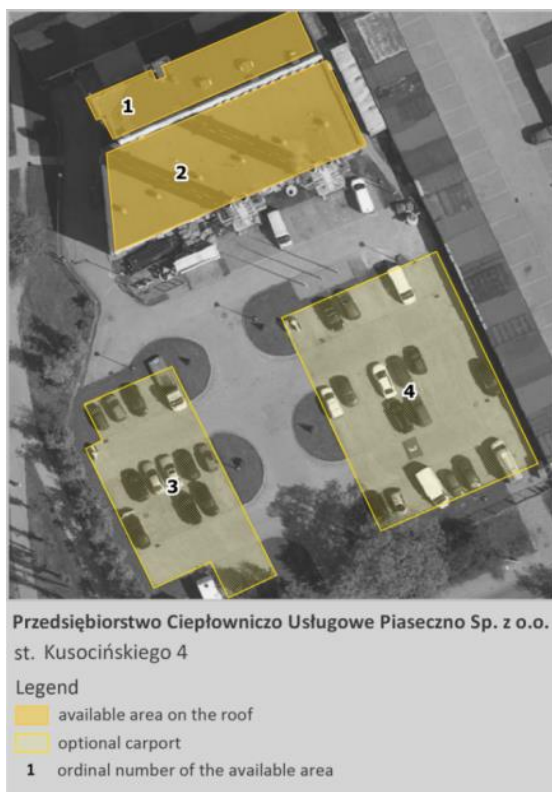
Results



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691624

Solar District Heating in Piaseczno – preliminary case study

Based on the analysis of the orthophotomap, it was found that the company has about 600 m² of roof area, where it is possible to install solar collectors. In addition, thanks to the construction of the assembly in the car park, this area could increase by more than 1 100 m², which gives a total of 1700 m² (map 1) which would allow to install approx. 560 m² of solar collectors, which can generate about 920 GJ of thermal energy annually. Considering the amount of annual energy sales by DH company in Piaseczno (about 120000 GJ), the share of thermal energy from solar collectors installed on the available surface in energy sales by the plant would be 0.8% only. In order to increase this share to 50%, the plant would have to install solar collectors on the area of approx. 11.1 ha (on map 2, 11.1 ha were marked on undeveloped land that would have to be covered with solar collectors so that the share of heat from solar collectors would be as much as 50%).



Map 1. Space available on the PCU area



Map 2. Area required to achieve 50% of thermal energy production from solar collectors.

Lessons learned

Heating companies needed support program to finance the SDH systems because to total cost of the investment is too big.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691624

Solar District Heating in Piaseczno – preliminary case study

All undertaken activities lead to an increase in the interest of the National Fund for Environmental Protection and Water Management with SDH systems, which can result in creation of a dedicated program, which the IEO is currently working on.

In addition to high costs and lack of financing, the problem is the available space in the city, which is why sometimes it may be a good solution to use electrical energy from wind energy farms to heat the water – power to heat. Gas heating combines with "green power to heat" (electric heating) with common storage with solar collectors are considered as attractive option reducing both space requirements for solar and cost.

└ The sole responsibility for the contents of this publication lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the European Commission nor the authors are responsible for any use that may be made of the information contained therein. ┘



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691624