

Integration of SDH plants in district heating networks of large cities

Subject:	Integration of SDH plants in district heating networks of large cities
Description:	This document describes the measure implemented in WP3 regarding the study for integrating SDH plants in the district heating networks of the large cities in the Region of Veneto.
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Summary description of the instrument

Region: Veneto

Partners involved: Ambiente Italia (SDHp2m partner), Region Veneto, AGSM, AIM (local actors), Politecnico di Milano University (technical consultant).

Short description of the measure.

The district heating networks of large cities are a perfect showcase for solar thermal to be implemented. Therefore, the utilities managing such networks in the region have been approached to study the viability of solar district heating.



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Initial situation

District heating in Italy is not widely diffused due to the massive use of individual heating plants and the mild climate in several areas of the country. This technology is therefore limited only to the regions of the Northern zones with some exceptions in the central area of the country.

In Veneto, only two of the medium and large cities have a district heating network: Verona and Vicenza. One of the main barriers for a larger diffusion of solar district heating in Italy is the lack of knowledge and trust in the technology and its possibility to be applied in real systems. It is, therefore, crucial to have showcases in large cities that can demonstrate the viability of this solution.

That is the main reason why the development of pilot SDH plants in these cities could be regarded as a best-practice policy to spread the use of solar thermal in district heating plants.

Another relevant pre-requisite is that usually such large utilities have the financial capacity to manage a small investment such the one needed for the implementation of a solar district heating plant.

Objectives

The final objective of this measure is to start to develop a process for the implementation of solar thermal plants into the existing district heating networks of large cities in Veneto.

Secondary objectives of this measure are:

- Increase the visibility of solar district heating among Local and Regional Authorities, other utilities, professionals.
- Increase the acceptance of district heating among final users.
- Create a showcase that, given some preliminary requirements, could be easily replicated in other cities and in other regions.



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Measures and actions

The main steps and actions foreseen for reaching the above described objectives of this policy measure are the following:

- Find the interested utilities through informative workshops or bilateral meetings; In the case of Veneto, this step was straightforward since there are only two DH networks and the local utilities already know about SDH from previous projects.
- Discuss with the utilities their potential interest in assessing the viability of SDH in their network: In these steps, the SDH partners clearly showed the benefits of integrating solar thermal in the DH system, also highlighting the opportunity of the national incentive foreseen by the 'Conto Termico 2.0' scheme.
- In case the utilities are interested, then some preliminary requirements are checked, such as the availability of areas for the installation of collectors, the willingness to invest, the network temperatures and their compatibility with efficient operation of the solar plant.
- If the previous step gives a green light, then a feasibility study is performed, with different level of details according to the budget and the needs.

Barriers and opportunities

The main opportunities could be summarised as follows:

- Utilities managing large DH networks usually have the financial capability of investing in medium-scale solar thermal plants.
- The national incentive scheme of 'Conto Termico 2.0' provides relevant support for the implementation of solar district heating.
- From a technical point of view, the expected solar thermal contribution in such a large network is quite small and, therefore, the integration is not a sensitive issue.
- Involving such large utilities is very interesting also from the point of view of communication, since these SDH plants could really act as showcases of the technology.

On the other hand, some barriers should be faced, namely:

- The heat production cost in these networks is usually very low and, therefore, the economic viability and competitiveness of solar thermal is a challenge.



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- Only one medium-scale SDH plant is in operation in Italy at the moment, thus leading to a lack of on-field experience that can reassure the utilities of the reliability of the technology.

Results

After a first interaction with the involved actors, the utility of Verona showed interest in assessing the viability of an SDH plant in its grid, while the utility of Vicenza decided not to go on with the evaluation of the potential.

A preliminary investigation showed the availability of a large area close to the central heat production plant and, despite some shadowing from the plant buildings, the expected yield was considered satisfactory.

Therefore, a detailed simulation study, with the support of the Politecnico di Milano University, was carried out, with the aim of evaluating solar heat production, expected economic savings and payback time.

The study showed that the cost of a 2,500 m² solar thermal system could be covered at almost 65% by the existing 'Conto Termico 2.0' incentive. The system would produce more than 1 GWh/year covering a solar fraction smaller than 1%, given the large size of the district heating network.

The main barrier is still the low-cost natural gas used by many utilities for producing heat, thanks to the reduced taxes for cogeneration, thus creating tough economic conditions for solar thermal to be competitive. A key point, therefore, was to stimulate competition among solar thermal service providers to obtain a low turnkey price for the system. Several offers, therefore, were requested to service providers, some of them with really low price for such a system size and are, at the moment, under evaluation by the local utility.

Lessons learned

Even when the available area is not an issue, as is the case for the potential plant in the district heating network in Verona, there are still relevant barriers to be faced, above all the low heat production cost through natural gas.

It is crucial, therefore, that utilities are convinced that solar thermal is one of the key solutions for increasing the network efficiency, improving its economic performance in the medium term and, last but not least, reaching a better image of district heating as a low-emission solution for heat supply.



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