SDH solar district heating

SDHplus

Solar District Heating in Europe

WP2 – SDH enabling buildings with high energy performance
Task 2.1 – Survey and horizontal review of the existing models

D2.2 – Information sheet on building legislation and district heating

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1. *How DH is accounted for in the calculation of energy performance of buildings according to national laws, with specific attention to SDH.*

Through the *Ordinance on energy audits and energy certification of buildings* from 2012, the required calculations of energy demand of buildings are set to be carried through in compliance with the *Methodology for energy audits of buildings*, issued by the Ministry of Construction and Physical Planning. This methodology is defined as the set of activities for performing of the energy audits, comprising the algorithm for the calculation of building's energy properties.

This *Algorithm for determination of energy requirements and efficiency of thermal engineering systems in buildings* is based on norms stated in the above mentioned ordinance. In these calculations, the district heating systems are also regarded, as the alternative heat sources that should be considered when new buildings are built or existing ones are significantly reconstructed. The norm that relates itself to the district heating is HRN EN 15316-4-5:2008 *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-5: Space heating generation systems, the performance and quality of district heating and large volume systems.* In this norm, the calculation of the primary energy factor is given, i.e. the calculation of the primary fuel needed for one unit of useful heat in a district heating system. For the existing DH systems, the data needed for the primary energy factor calculation are based on the results of operating metering. For the new DH systems, the calculation of the primary energy factor is based on design data.

2. *Practical example of calculation.*

The heated area is 647,3 m^2, out of which 165,3 m^2 are in office area (Zone I ground), and 482 m^2 in dwelling area (Zone II, 1.-3. floor).

The primary energy factor is defined in the ordinance related to the energy certification of the buildings; when the used heat is delivered from the fossil-fired cogeneration plant the factor is $f_{p,dh}$= 0,7 while for the renewable sources $f_{p,dh}$ = 0,1.

For a detailed calculation, data on delivered heat, produced power and fuel consumed in cogeneration or heat plant is required.

- Energy requirements for a heating substation:

The installation of a 50 kW compact heating substation is supposed (hot water, low temperature type)

$\theta_{dh,gen,in}$= 105 °C, average temperature of forward primary media,

$\theta_{dh,gen,out}$= 50 °C, average temperature of secondary media, according to the HRN EN 15316-2-3 and to the algorithm for heating and hot water systems

According to the table 2.2, for $\theta_{dh,gen,in}$= 105 °C, $D_{dh,gen}$= 0,6.

Average substation temperature:

$\theta_{dh,gen} = D_{dh,gen}\ \theta_{dh,gen,in}+(1-D_{dh,gen})\ \theta_{dh,gen,out}$= 83 °C

Coefficient $B_{dh,gen}$=4,0 chosen for insulating class 3-4 in table 2.1.

Heat exchange coefficient $H_{dh,gen}$:

$H_{dh,gen}=B_{dh,gen}\ \Phi_{dh,gen}^{1/3}$=14.7361 kWh/Ka

With supposed ambient temperature on substation's location of θ_{amb}=11 °C, annual heat loss of the heating substation is:

$Q_{dh,gen,ls} =H_{dh,gen}\ (\theta_{dh,gen}-\theta_{amb})$=1061 kWh.

Calculated output values, provided that the heating substation is situated in a heated part of building:

	kWh
$Q_{dh,gen,ls}$	1061
$Q_{dh,gen,ls,rbl}$	1061

3. Standard methods and software tools usually used for such normative calculations.

The issuing of these methods and tools is expected in the near future

4. Limits and opportunities for SDH according to the existing methodology.

According to the *Technical ordinance for energy savings and energy insulation in buildings* (NN 110/08, 89/09), the carrying out of the study of applicability of alternative systems for buildings with useful area above 1000 m2 is mandatory, but the implementation of the study results is not obligatory for the investor, just informative.

This study contains the elaborate on technical, ecological and economical feasibility of alternative heat supply systems, particularly regarding decentralized energy supply systems that use renewable sources, cogeneration, district heating, heat pumps or fuel cells.

5. Possible improvements for the methodology and for the current legislation.

Amendments of the methodology and changes of the regulation, aimed to facilitate the implementation, are ongoing.