Chapter:	Introduction to SDH – from idea to operating system
Date:	April 2012
Size:	4 pages
Description:	Overview of both the preliminary topics to be addressed when considering a solar district heating plant, what needs to be done in terms of permissions, tendering and contract(s) when the preliminary investigations turned out positive, and what to remember when it is decided to built the plant.
Author:	Per Alex Sørensen, PlanEnergi – pas@planenergi.dk
Co-author(s):	-
Available languages:	English
Version id:	1.1-2
Download possible at:	www.solar-district-heating.eu

Contents

Introduction 2
Overview of preliminary investigations 2
Solar heat combined with other fuels 2
Where to place the solar collectors 2
Feasibility study 3
Who shall be owner and who shall operate the plant? 3
Overview of permissions and tendering 3
Planning and environmental permissions 3
Detailed design 3
Tendering and contract(s) 4
Implementation 4
The building process 4
Commissioning 4

Introduction

The steps from the idea of a solar district heating plant to an implemented and full functioning plant are described briefly in this fact sheet to give an overview of the topics to be addressed. The description indicates that the process is linear and first one step is taken, then the next step is taken and so on. That is not the reality because steps can be taken in parallel and during the implementation process new information and new possibilities will mean that some steps might have to be taken again.

The steps in this fact sheet are divided in 3 phases: "Preliminary investigations", "Permissions and tendering" (including contracts) and "Implementation".

Overview of preliminary investigations

Solar heat combined with other fuels

Solar heat can be combined with all other fuels, but in some cases the idea of solar heat production can be eliminated because the summer load in the district heating system comes from waste incineration, waste heat from industries or from combined heat and power plants producing cheap heat which would be expensive/difficult to close down. Normally solar heat cannot compete with heat production prices lower than 3 € cents/kWh in Northern Europe and 2 € cents/kWh in Southern Europe. But for instance natural gas fired combined heat and power plants are in Denmark combined with solar heat in several district heating plants. So don't give up beforehand. – *Use fact sheet 2.1 "Solar heat combined with other fuels".*

Where to place the solar collectors

Solar collectors can a.o. be placed on ground, on roofs, beside roads, as shadowing element above parking places. The collector areas can be connected directly to the district heating plant or to the distribution system.

Ground mounted solar collectors is the cheapest solution unless the price for land is very high (> 50 €/m^2). Farm land might be used if costs for the transmission pipe don't spoil the economy.

Roof mounted solar collectors are interesting solutions on large new buildings or large buildings that needs new roof or have large flat roof areas.

– Use fact sheet 2.2 "Where to place the solar collectors" to estimate the areas available on ground, roofs etc.

Feasibility study

Knowing that the summer load is not engaged by very cheap heat and that areas for solar collectors can be found, a feasibility study can be made to have a first idea about the economical feasibility for solar plants of different sizes. – *Use fact sheet 2.3. "Feasibility study".*

Who shall be owner and who shall operate the plant?

If the economical feasibility is satisfying the district heating company often will decide to invest in the plant and operate it, but financial circumstances might change this so that investors from outside might be invited. Also ownership of solar collectors being the roof of a house not owned by the district heating company might be complicated and finally the district heating company might be interested in involving consumers also economically in the project. – *Use fact sheet 2.4 "Ownership and financing" to find solutions.*

Overview of permissions and tendering

If the result of the preliminary investigations is positive, next steps will be to get permissions and to make tendering and contracts with entrepreneurs. But before starting these steps the coming plant owners have to have access to space for the solar collectors. If land is needed the land owner should sign a contract, where he offers to sell/let the area for a certain price. The offer must have a time limit of for instance one year.

Planning and environmental permissions

When the owner(s) know where to place the solar district heating plant authorities permissions have to be applied for. If collectors are ground mounted a planning permission for the area (local plan) might be needed and also solar collectors placed on roofs, as shadows for park places etc. might need planning permission.

The risk for environmental damage from solar collectors is very low. There can be leakages from collector fluids to the ground or as steam, reflections from the solar collectors or esthetical "damages". These problems are normally handled in the planning permission, so that a special environmental permission can be avoided. – *Use fact sheet 3.1 "Permissions from authorities".*

Detailed design

Before tendering the plant owner has to decide if he will make a detailed design study and maybe make different tenders for solar collectors, piping, control system etc. or he will just decide the functions of the

plant and let a total contractor make the detailed design. – *Use the guidelines in chapter 6, 7 and 8 if detailed design is carried out by the plant owner.*

Tendering and contract(s)

A call for tender is necessary to get the best price per produced kWh for the solar district heating plant. In the tender document as a minimum requirement for thermal output, quality of components and work, guarantees for the efficiency of the plant and how to compare the bids has to be defined. If the district heating company is the plant owner EU´s directive coordinating procurement procedures of entities in the water, energy, transport and postal service sectors (Directive 2004/17/EC of 31. March 2004) has to be followed for implementation projects larger than 4.845 million €.

If the plant is delivered by a total contractor guarantees are easier to define and enforce because the contractor can give guarantees for the total plant.

– *Use fact sheet 3.2 "Tendering and contracts" and fact sheet 3.3 "Guarantees" for the tendering process and the fact sheets in chapter 7 for requirements for components etc.*

Implementation

The building process

When contracts and authorities permissions are ready the implementation process can start. During the implementation the plant owner (and/or his consultant) has to follow the process and to gather all contractors in a meeting at least every second week to discuss state of the art of the implementation, unsolved problems and the work in the coming weeks. Especially the plant owner shall be aware of the time table for installation of the control system. – *Use fact sheet 4.1 "Supervision of construction and commissioning" as help.*

Commissioning

After implementation the contractors has to show, that the plant works as promised. At the delivery day the plant owner and the contractors have to agree upon that work is OK and from that point guarantees are in function. – *Use fact sheet 4.1 "Supervision of construction and commissioning" as help.*

The SDH fact sheets addresses both technical and non-technical issues, and provide state-of-the-art industry guidelines to which utilities can refer when considering/realizing SDH plants. For further information on Solar District Heating and the SDHtake-off project please visit www.solar-district-heating.eu.

Supported by INTELLIGENT ENERGY EUROPE