



## **WP6 – Summary report on the findings from the market development activities in the field of contracting for solar process heat**

This report summarises the findings of the market development activities for contracting and solar process heat carried out in the framework of WP6 "new services".

### **What is solar thermal contracting?**

One approach to overcome the challenge of high upfront investments (compared to lower operation costs) of renewable energy installations is the instrument of energy contracting. Here an ESCO (energy service company) invests in and operates a renewable energy installation located within the premises of a company or a public body and sells energy (heat, including process heat, and possibly also electricity and cooling) to the owners/users of the buildings at an agreed price.

The basis of a solar thermal contracting project is a contract between the ESCO which defines the main conditions and rules for a longer-lasting partnership. Contract duration can be 5-15 years (for solar thermal, possibly on the longer side).

The principle split of tasks and responsibilities is the following:

The ESCO:

- plans, installs, maintains and finances the solar thermal plant
- guarantees a certain heat price over the contract period

The client:

- provides the (roof) area for the solar thermal collectors and space for the buffer storage
- buys heat (for hot water, space heating, process heat) and/or cold (for cooling) from the ESCO

## **Solar contracting market development**

Attractive as this in theory, there are (practically) no countries in Europe that have managed to set up fully functioning markets for solar contracting.

In some countries, markets for energy efficiency contracting, CHP biomass, biomass heating have successfully developed. Also, in some countries, a large number of PV contracting projects were realised. PV contracting can be economically attractive if an appropriate feed-in tariff (or investment subsidy) for the plant is granted.

Even in countries that have developed contracting markets and implemented a number of contract projects, solar thermal contracting projects are very rare.

The market development levels for different forms of contracting vary between the project regions: for example, Upper Austria and North-Rhine Westphalia have well developed markets for contracting whereas in South-Bohemia and the Podravje region, no contracting market was established yet.

## **Main barriers for solar process heat contracting**

Solar contracting for industrial process heat has to overcome the combined market barriers for solar thermal process heat, for contracting in general and specifically for solar thermal contracting. Therefore, market introduction of this instrument represent a real challenge, even in countries with well-developed solar markets as well as contracting markets. However, it seems worthwhile at least to try it.

One main barrier is the "chicken-and-egg" problem: as contracting is often relatively unknown, there is no demand for it from potential customers, and as there is no demand, not many are interested in offering the services, especially as a lot of general promotion of the instrument is required before any business can be done. Also, specific skills and access to capital are necessary for the ESCOs.

Therefore, in many countries the number of ESCOs is low.

Discussions with the stakeholders in the project regions made it clear that there are also specific barriers in industry for solar thermal installations:

- it often is a "new technology" for planners active in industry and therefore, they lack the know-how about subsidies, solar systems/technologies, pilot projects.
- potential customers do not believe that the simulated (projected) solar results will be realised

- both planners and customers have doubts about system and installation quality and they fear that the integration of a solar thermal system in the existing heat supply might interfere with the existing heat distribution system and possibly even with the industrial process itself
- often very low prices for fossil fuels, electricity in industry

The main benefits & (perceived or real) barriers for solar thermal contracting can be summarised as follows.

Solar contracting	main benefits of solar contracting	main barriers & arguments against solar contracting
<b>client</b> (company that buys heat from the ESCO)	<ul style="list-style-type: none"> <li>- ESCO provides comprehensive energy service - from planning to installation and maintenance</li> <li>- ESCO - guarantees solar yields (maximum output is in the ESCOs interest) and state-of-the-art technical and economic solution</li> <li>- no capital needed for the investment</li> <li>- more heat price stability over the contract period</li> <li>- positive image, CO<sub>2</sub> reduction</li> </ul>	<ul style="list-style-type: none"> <li>- long contract period</li> <li>- loss of control and the fear that the ESCO might interfere with other parts of the industrial process</li> <li>- services provided by the ESCO have to be paid (which in the past were possible provided by in-house staff)</li> <li>- solar energy heat price is probably higher than heat price from fossil fuels</li> </ul>
<b>ESCO</b>	<ul style="list-style-type: none"> <li>- new business field (increased competitiveness)</li> </ul>	<ul style="list-style-type: none"> <li>- probably new technology (risk when doing the first few projects), planning risks</li> </ul>

### Important technical aspects (relating to quality and measurement)

#### Solar Keymark

Especially in industry and in contracting, only quality solar systems should be used. That can for example be ensured by agreeing in the contract that only solar collectors with the quality label of "Solar Keymark" are to be installed.

Solar Keymark is the first internationally recognised quality mark for solar thermal products. It is based on three aspects:

- initial type testing to EN 12975 or 12976
- an implemented manufacturing Quality Management System
- annual review of QMS and bi-annual product inspection

By obtaining the Solar Keymark, a consistent production quality of solar collectors can be demonstrated. The Solar Keymark can only be issued by an accredited "certification body" after the product has been tested by an accredited testing laboratory. In an increasing number of regions and countries, the Solar Keymark has become a programme requirement for regulatory and financial incentive schemes.

### Solar heat meters

Solar heat meters are an essential component in any solar thermal systems in order to measure its output. Solar heat meters consist of the following components:

- flow meter (water is used almost exclusively as heat transfer medium)
- temperature sensors (to measure the temperature difference)
- processor (often also called integrator)
- for larger installations, generally, a remote reading service (M-bus and modem / radio) will usually be added.

For most meters, the accuracy is defined for a period of time. To keep this guaranteed, accuracy calibration is necessary every 3-6 years.

### **Recommendations for a solar contracting agreement**

A solar contracting agreement defines roles and responsibilities of ESCOs and clients. As each project is unique and the partners need to arrive at a joint understanding of their respective obligations, "standard contracts" which are just copied have not proven to be the right approach.

However, the following list of minimum content of a solar contracting agreement can provide guidance in the process of developing the agreement (especially not to forget an important aspect). The list was developed by the project partners based on their own experiences with contracting project and discussed with the stakeholders in their regions:

- scope of services provided by the ESCO
- contract duration
- delivery guarantee (xy MWh/year)
- price, price structure, price index
- invoicing and payment schedule
- minimum consumption by the client
- compensation if heat is not delivered
- main technical features of the solar installation
- right to install solar system and access to the site
- ownership during and after the contract
- measurement method and point
- maintenance measures (extent, frequency, costs), technical auditing

- liability, insurance and warranties in case of damages
- provisions in case of bankruptcy and/or change of ownership of the ESCO or the client
- subcontracting
- confidentiality issues, conflicts of interest
- reasons to terminate the contract, settlement of disputes
- appendix: technical part, scope of supply and services

Critical aspects that are to be taken into account in the case of solar contracting are among others:

- how to calculate the solar gains?
- how to guarantee solar earnings?
- not only solar yield metered in kWh are important, but it is necessary to take temperature levels and amounts of heat needed into account
- exact definition of properties - which parts of the solar installation are owned by the contractor and which are owned by the clients (e.g. who owns pumps?)
- exact definition of the time when the property passes on to the client
- financing costs and insurance issues

### **Strategies to overcome the barriers and to trigger market development**

The following activities could be useful in achieving this goal:

- Information and awareness raising for contracting:  
very often contracting is not known and therefore not considered as an option to implement and finance solar thermal systems. Information and awareness raising is therefore crucial.
- Promoting existing projects:  
Existing (and well-functioning) installations can help to make the instrument known and to establish confidence, both by the clients and the ESCOs.
- Identify companies that could become "Solar ESCOs". These could be, for example:
  - existing, active ESCOs which add this technology to their current portfolio
  - large solar thermal companies which develop solar contracting as a new business field
  - larger maintenance and facility management companies that are active in industry

- **Training:**  
Very often the lack of qualified ESCOs hampers further market penetration of solar thermal contracting. A training programme can help to inform about solar thermal contracting and to make the topic more attractive for ESCOs.
- **FAQ – List of frequently asked questions:**  
Very often similar questions are asked concerning contracting projects. A list of frequently asked questions with answers can clarify first uncertainties.

The project partners developed roadmaps which included - among others - the following activities to increase visibility of solar contracting, to encourage ESCOs to consider solar thermal and to support the development of projects:

- **FAQs on solar contracting:**  
FAQs were developed by the project partners and disseminated, taking into account stakeholder inputs
- include information on solar thermal contracting on existing websites on contracting managed by some of the partners
- give advice and technical support to all projects identified as potential pilot projects:  
contracting as option was included in all activities related to pilot projects
- include the solar contracting option in business advice activities:  
those partners which manage business advice programmes in the field of energy informed their advisers of the findings relating to solar thermal contracting
- inform relevant ESCOs about potential contracting projects.

Valuable input in the development of a roadmap comes also from stakeholders. Among others, the following ideas could be included in daily work in the future:

Idea/activity	Description	How could this be done?
motivate "leading" companies	put the focus on companies that are already ahead in terms of energy efficiency and use of renewables	approach them and inform them about solar process heat
solar marketing for industry	use new approaches and different ways of solar marketing	consider how to integrate this in daily promotion activities for companies
"oil price argument"	communicate the development of the oil price in recent years as an argument for instable price development of fossil fuels	prepare information and slides on that topic and use this in coming energy advice sessions

highlighting the strengths of solar thermal	communicate what solar thermal installations can achieve (very often the benefits of solar thermal are not known)	prepare information and slides on that topic and use this in coming energy advice sessions. The information could also be placed on the website
use "solar thermal" as a "sales arguments" for contracting projects	in many cases, potential clients will be pleased to see a solar thermal installation included in a contracting project as it has a very positive image	contract duration will be prolonged by a few months in larger contracting projects (and smaller solar thermal systems)
especially targeting saw mills, district heating and pre-heating	a high potential for the use of solar process heat for these fields was highlighted	develop ways to approach these sectors

## Results from stakeholder feedback process & conclusions

In all project regions, stakeholders from the solar, the industry and ESCO sectors met for the first time to discuss solar process heat and in all regions, the level of knowledge about solar process heat both in the solar sector and in the industry was even lower than expected. Also, market for solar contracting proven to be either non-existent or in their infancies in the project regions.

Building up markets for solar process heat contracting in the partner regions (and beyond) will need more time and efforts than can be provided in the framework of the So-Pro project. The most likely candidates for a successful development are regions which:

- manage to develop a sustainable and stable market for solar process heat in the framework of which "solar process heat contracting" can find its niche.
- have an active contracting market and therefore experienced ESCOs which can be interested in this business field