



Needs and requirements for successful solar thermal contracting

**Region: Upper Austria
Partner: ESV**

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 states 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

Attractive as this in theory, there are not many countries in Europe that have managed to set up a functioning market for solar contracting.

In some countries, markets for energy efficiency contracting, CHP biomass, biomass heating have 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 other contracting markets, solar thermal contracting projects are very rare.



Solar thermal contracting market and potential in Upper Austria

In Upper Austria the use of solar thermal systems is well established. Presently about 0.7m² solar collectors per inhabitant are installed, which is European wide leading value. However, so far market development mostly focused on small scale installations for single family homes. In the last years, more and more installations for apartment buildings were built. Moreover, there is a large potential for solar thermal collectors in companies which still has to be exploited.

In addition, Upper Austria has a well established market for energy contracting. This is mostly due to a specific funding regional funding programme for this financing and operation model started already more than 10 years ago. At the beginning, the target group of the support programme were municipalities and only performance contracting projects were supported. In a second step the programme was extended to companies and also projects where renewable energy installations are implemented, are now supported. In total, more than 50 projects were supported by the programme

More than 100 energy contracting projects were realised in Upper Austria, the majority of them energy efficiency contracting and in recent years, an increasing number of biomass heating contracting projects were realised. One major bottleneck in significantly increasing the number of contracting projects is the number of qualified and active ESCOs.

So far, only a few projects were realised (mostly for public buildings) where solar thermal installations were included in contracting projects.

The potential for solar contracting in general could be quite large if this instrument could be applied in the apartment building (which is difficult under the current funding and legal framework). Also in the field of public and commercial service, it could become rather significant (e.g. in hotels, sports facilities). In industry, it will strongly depend how the market uptake of solar thermal will develop in the coming years. Given the number of industrial companies, the realisation of 5 solar contracting projects in industry in the coming years does not seem impossible if the So-Pro activities in Upper Austria and the following actions are successful. Clearly, the general economic environment for industry will also have a strong impact. During an general industrial crisis, it is rather unlikely that solar installations - a relatively costly technology with longer payment periods - will be realised in industries whereas in periods of booming economies this seems more likely.

Experience from many years of working with contracting has shown that contracting is often a "door-opener": companies hear about the instrument and thereby become interested in a project. In the end, they often decide to implement the project themselves without an ESCO, which means that the overarching objective of realising a renewable energy or energy efficiency project has been achieved.



Barriers for solar thermal contracting

Solar contracting for industrial process heat has to overcome the 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, for the reasons outlined above, it seems worthwhile at least to try it.

One main barrier is the barrier is the "chicken-and-egg" problem: as solar thermal in industry as well as contracting are 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.

There are also some solar thermal specific barriers in industry:

- 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
- higher investment costs for the costumers/companies (compared to very low operational costs)
- often very low prices for fossil fuels, electricity in industry



Main benefits & barriers (or perceived barriers) for solar thermal contracting

| Solar contracting | main benefits of solar contracting | main barriers & arguments against solar contracting |
|--|--|---|
| client (company that buys heat from the ESCO) | <ul style="list-style-type: none"> - comprehensive energy service from planning to installation and maintenance provided by one company (the ESCO) - more time and money for core process (production) – no investment costs - stable heat price over the contract period - guaranteed solar yields (maximal output is in the ESCOs interest) - guarantee of state-of-the-art technical and economic solution - positive image, CO₂ reduction | <ul style="list-style-type: none"> - long contract period - loss of control - services of the ESCO have to be paid - solar energy heat price is probably higher than heat price from fossil fuels |
| ESCO | <ul style="list-style-type: none"> - new business field (increased competitiveness), additional profit | <ul style="list-style-type: none"> - probably new technology (risk when doing the first few projects), planning risks |
| Bank | <ul style="list-style-type: none"> - new business field - physical securities | <ul style="list-style-type: none"> - unknown and therefore very often sceptical |
| Government | <ul style="list-style-type: none"> - CO₂ emission reduction - renewable energy projects | <ul style="list-style-type: none"> - unknown and therefore very often sceptical |

Specific barriers for solar thermal contracting in Upper Austria

Discussions with the stakeholders in Upper Austria revealed the following specific barriers to explain the low number of solar thermal contracting projects in the region in Upper Austria:

- **Need for back-up systems:**
Under the climate conditions in Austria, solar thermal always needs a back-up system for the colder months. This makes "solar thermal only" projects comparatively complicated from a financial and organisational point of view as the solar system needs to function in combination with another heating system.
- **The limited offer:**
Biomass contracting is well established in the region. Compared to that, solar thermal systems have longer payback times which makes them a less interesting business field for ESCOs. The limited number of active ESCOs can find projects with better economic viability in the biomass heating field where also excellent supply chains are in place. The group that has the highest economic interest in solar thermal contracting, the solar contracting producers, in general do not have the



necessary capital for starting ESCOs businesses (they usually need all their capital for expanding their production business).

- Funding schemes and legal framework:
The main field for larger scale solar thermal installations are apartment buildings where - due to the existing funding schemes and legal framework - energy contracting projects are very rarely realised.
- Lack of awareness and knowledge:
So far, solar contracting is often not considered as an option when realising a heating installation in industry.

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 featuring "Solar Keymark" are to be installed.

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

- 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, the consistent factory made quality of solar collectors can be demonstrated and it is also a pre-requisite for regulatory and financial incentive schemes in many European markets.

A Solar Keymark can only be issued by an accredited and empowered "Certification Body" after the product has been tested by an accredited "Testing Laboratory".

Solar heat meters

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



Elements of a solar contracting agreement

A solar contracting agreement defines roles and responsibilities of ESCO and client could encompass the following element:

- scope of services and guarantee of the contractor
- 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

The Upper Austrian support programme for contracting requires the following criteria for granting financial support:

- the ESCO needs to proof that he/she has the necessary technical skills
- the investment has to be at least 50,000 Euro
- the financial reliability of the ESCO and the client have to be proven
- a detailed energetic analysis of the project has to be carried out including a list of possible measures and a cost-benefit calculation
- the project duration shall not exceed 10 years
- beneficiary of the financial support is the client. The support has to be used to reduce the payment of the client to the ESCO. A written agreement about this has to be delivered.

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

- how to calculate the solar gains?
- 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

- 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.
- 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 following main activities are implemented in Upper Austria to increase the number of solar contracting projects in the region:

- encourage ESCOs to include more solar thermal installations in their projects.
Generally, their clients will be pleased as solar thermal has a very positive image and could therefore accept that the contract duration will be prolonged by a few months.
- presenting existing projects on the website in order to inform stakeholders about this option
- increasing the efforts in triggering best practice examples, using the promotional activities foreseen in the project
- increasing the visibility of solar thermal in other contracting promotion activities carried out by ESV, e.g. existing training courses on energy contracting, the comprehensive contracting information on ESV's website and in information events.



Road map

The following road-map was developed and is implemented in Upper Austria including the following activities. It aims to increase visibility of solar contracting as an interesting option, to encourage ESCOs to consider solar thermal as an option. The activities will be based on the regional network established.

| what | when | who | how |
|--|------------------------|------------|---|
| FAQs on solar contracting | before the end of 2010 | ESV | taking into account stakeholder inputs from previous events (round-tables) and the questions continuously raised in training seminars |
| Update ESV website on contracting | before the end of 2010 | ESV | include existing solar contracting projects (non-industry) |
| Give advice and technical support to all project identified within the So-Pro activities as potential pilot projects | before the end of 2010 | ESV | The So-Pro work programme foresees that pilot projects will be identified and supported |
| Include the solar contracting option in business advice activities | ongoing | ESV | ESV manages a energy advice programme for businesses |
| Including solar contracting in "standard contracting promotion activities" | ongoing | ESV | ESV carries out a number of training courses, where general information on contracting is given. A special focus will be put on solar contracting issues |
| Inform relevant ESCOs about potential contracting projects | ongoing | ESV | ESV is often contacted by companies that are interested in renewable energy project |
| Consider a training course on solar contracting | 2011/2012 | ESV | based on the feedback of the planned So-Pro activities, a special training course could be planned in the course programme of ESV's "Energy Academy" in 2011/2012 |