

Accompanying Project Owners and Professionals All the Way to Secure Solar Thermal Plants

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Abstract

SOCOL is a collaborative platform gathering specialists, professionals and institutions operating within the solar thermal market in France. Dedicated to promoting multi-family and commercial solar thermal systems, SOCOL is fully representative of the industry. Operationally, SOCOL consists of working groups manned by solar thermal specialists, who regularly produce documents and other tools (such as software) and make them freely available online.

For nine years, French experts working with SOCOL have been providing free access to technical and pedagogical tools, addressing ST experts and project-owners alike, targeting medium to large solar thermal installations in the residential sector. These tools now cover every step in solar thermal projects, from conception to daily maintenance, ensuring peace of mind for project-owners and performance in the long run for solar thermal systems.

Key words: solar thermal, secure projects, performance, free tools

What Is SOCOL?

SOCOL stands for «_Solar (thermal) and COLlective (distributed) »: initiated by ENERPLAN (French Trade Association of Solar Professionals) in 2009, it remains a unique service desk for the solar thermal community to this day.

The SOCOL community gathers almost 3,000 members and addresses ST experts (manufacturers, engineers, installers, maintainers...) and project-owners as well as institutional actors: it is therefore fully representative of the industry. Solar thermal specialists within SOCOL initiate working groups, who meet and speak together regularly to work on documents and other tools (such as software) to fit the needs of the solar thermal industry.

SOCOL's set of actions can be summarized as follows:

- National tasks: technical and communication actions
- Regional tasks

All the tools produced are freely available online. Some leaflets also exist as printed documents and can be sent free of charge.

The SOCOL team within Enerplan are also dedicated to disseminating good practice guidelines and tools for «zero default» installations, as widely as possible and collaborating with numerous partners both nationally and in each French region. Market data is gathered at national level to provide all relevant information and advice, including financial aspects: not only is it possible to download material on eligible grants and subsidies, but SOCOL also offers free use of a dedicated software named OUTISOL.

Project owners and professionals involved within the French speaking solar thermal market can become SOCOL members free of charge, and therefore receive regular information; however, non-members also full have access to the public website.

The SOCOL Toolkit

Over the years, SOCOL experts have developed a whole set of tools that now cover every step in solar thermal projects, from conception to daily maintenance and monitoring, ensuring peace of mind for project-owners and performance in the long run for solar thermal systems.

Along with these tools, relevant data on the solar thermal market and solar heat technologies can be [found on the](#)

[SOCOL website](#), such as information on specific [training and qualification](#), but also answers to the following questions: what is solar thermal, which various technologies are available and how to choose between them, could solar thermal be an appropriate solution for a particular project, what is provided on the website to help with a successful solar thermal project...

The tabs at the top of the home page enable access to information on how SOCOL works, on solar heat and its uses to provide hot water for multi-family housing and in the industrial and tertiary sectors, as well as its integration in district heating and industrial applications. Users can also use the top tabs to find out more on different technologies (drain-back systems, solar cooling...), technical data sheets and videos detailing the design and monitored performance of active solar heat systems (housing, hotel industry, factories, medical sector...) as well as SOCOL publications (leaflets, brochures, flyers...).

Browsers interested in the solar thermal market will also find current information in the news section to keep up to date with national and international matters relating to the industry.

Besides, specific data and advice relevant to each French region can be accessed by clicking on the desired area on the map:



Fig. 1: Information on each specific region can be accessed by clicking on the map

As well as this general market and technological information, SOCOL offers a specific project toolkit, to accompany professionals and project-owners all the way. To ease navigation on the website, the SOCOL toolkit can be accessed via dedicated buttons, depending on which step of the project is being considered : before the actual project is decided on ("before you start"), during the design and engineering phase, while implementing the project, as works are being completed or handed over, as well as during the system's lifetime (monitoring, maintenance).



Fig. 2: SOCOL tools cover every step in solar thermal projects

Each button leads to the set of tools relevant to the chosen section.

2.1. Before You Start

SOCOL experts have developed a tailor-made software named [OUTISOL](#), aiming at giving project-owners and technical advisers / prescribing engineers, indications on the technical and financial implications of their projects. No prior knowledge of the solar thermal technology is required to get quick results from this user-friendly software as far as sizing, budget, grants available, return on investment are concerned.

The user starts with choosing the location of the project and will then be led through the actual specifications (building's typology and features, users...) before accessing the detailed result page,



Fig. 3: Simulation results from the OUTISOL software calculations on the SOCOL website

Also to be found on the “Before You Start” page is a set of documents advising on [commissioning](#) (a pedagogical document as well as four technical booklets, complete with checklists to take all professionals through the various stages of the projects).

Information provided in this section includes data on the [financing](#) of the solar thermal systems as well as advice and technical tools to help with the [current buildings regulation](#) in France.

2.2. Design and Engineering

Designers and engineers working on a medium to large solar thermal project can refer to all SOCOL guidelines and technical information online.

SOCOL [schematic diagrams](#), first published in 2013 and regularly updated, have now become a reference in France. Six of the diagrams have been selected by the ADEME (French Environment and Energy Management Agency) as mandatory: solar thermal projects have to comply with these in order to be eligible to the Fonds Chaleur (Heat Fund) subsidies.

Dedicated [ratios](#) for a proper evaluation of hot domestic water requirements are also available online: these ratios indicate the correct amount of sanitary water needed for a correct sizing of solar thermal installations. The figures are based on monitoring and also aim at avoiding an oversizing of the systems.

The SOCOL website also access to [free dimensioning software](#). The SOLO sizing software has just been updated and is now available in its SOLO2018 version, offering new features such as calculation options for hot water recirculation loops and utility water storages. The SCHEFF software is dedicated to sizing medium and large solar thermal systems for multi-family buildings equipped with individual water heaters.

A technical sheet advising on specific [sizing of expansion vessels](#) in solar thermal systems was also updated in 2018 to offer two different sizing methods.

Another add-on this year was the creation of a technical document explaining how to take into account [the hot water recirculation loop](#) when sizing a solar thermal system.

SOCOL advises to choose the right monitoring level and system very early on, at the start of the project. Indeed, this point is essential to ensure cost effectiveness as well as long term performance of solar systems. For this reason, data regarding the questions of monitoring is also to be found in the “Design and Engineering” section. A recent database produced by SOCOL provides a listing of tele-monitoring services available in France. This database sorts monitoring products and services according to the requested level requirements (alert, simple monitoring, detailed

monitoring), thus helping owners to choose the right monitoring for their personal needs. A user guide can also be downloaded to help choosing the right level of monitoring to suit each particular project according to its size and the project-owner's preferences.

2.3. Implementation

Technical data and guides as well as information on required training, qualification and insurance are to be found in [this section](#), aimed at accompanying solar thermal installers in their medium and large size projects.

For example, a set of tools regarding the specific technology of drain-back systems can be found on this page.

2.4. Completion and Handover Process

[This section](#) aims at explaining what happens during the handover process and at stressing the importance of starting a dynamic commissioning procedure after this stage and as soon as there is enough hot water usage to justify starting placing the installation in service.

2.5. Dynamic Commissioning

The SOCOL Dynamic Commissioning toolkit includes a complete (technical and legal) set of guidelines regarding the specific requirements for solar thermal installations running after the placed-in-service date and how to ascertain their performance before the maintainer takes over.

This method has been developed by SOCOL and can be referred to as Dynamic Commissioning ("Mise en Service Dynamique" in French). It aims at providing an accurate definition and a precise log of all technical steps along the project, from design and engineering to the start of maintenance. It includes checking the installation has been made according to requirements, and a surveyed period of three to six months after the initial system run, thus ensuring performance levels match the expected forecasts.

During the dynamic commissioning process of the installation (Fig 4), all the actors must remain implicated in order to check the conformity of the installation according to the specifications, as well as a smooth run of the operation.

The operator who has been designated to provide maintenance services will therefore receive all the necessary elements to take immediate charge of the solar installation. The implementation of a monitoring will be done simultaneously at the start of operation.

To target this goal, the SOCOL process recommends formalizing and documenting dynamic commissioning through the following set of documents managed by the project owner and consisting of a logbook of the installation:

- 1) the acceptance report (static), which marks the beginning of the guarantee of perfect completion, with a reservation concerning the attainment of optimal performance that can be lifted with the dynamic commissioning, and other reserves as appropriate. Upon reception of the installation, it may be anticipated that the dynamic commissioning procedure cannot be completed before the end of the guarantee period (perfect completion guarantee). In this case, it is possible to consider a temporary technical procedure (filling / emptying the primary) to verify that the installation works, without prejudicing the actual performance.
- 2) the elements relating to dynamic commissioning i.e. the elements included in the technical study (sizing ratios, schematic diagram, reminder of the main adjustment elements, measurement points, calculation of the theoretical performance...), the list of control and measurement points during dynamic commissioning, the actual performance data (useful solar energy compared to a performance calculated according to the parameters of sunshine and withdrawal), and description of any tasks implemented to achieve the nominal performance where appropriate.
- 3) technical documents (installation and maintenance leaflets) from the relevant manufacturers regarding at least panels, sensors, solar water tank(s) and regulation.
- 4) the contractual elements relating to the monitoring of performance over time, including the "guarantee of proper functioning" or the "solar result guarantee" where appropriate, as well as operational backlog.

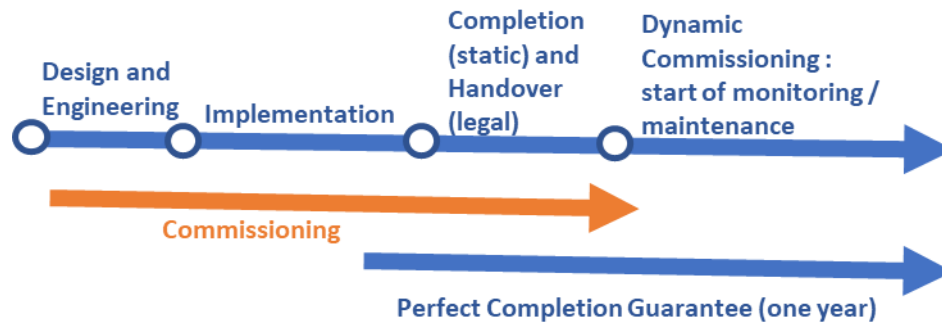


Fig. 4: Complete process diagram of Dynamic Commissioning according SOCOL

The dynamic commissioning procedure marks the beginning of the installation's operation and monitoring.

It is interesting to point out that this procedure will soon have to be implemented by project-owners wishing to benefit from the state subsidies granted via the French "Heat Fund" system (Fonds Chaleur): this official requirement represents a major recognition of the important added value provided by the SOCOL method, to ensure quality all the way through the project

2.5. Monitoring and Maintenance

A well designed and dimensioned installation, implemented by a qualified professional with a documented dynamic commissioning procedure, is set to produce efficient and sustainable collective solar heat for decades, if it is maintained by a competent professional.

However, to mitigate the unforeseen hazards during the life of the installation (failure of a pump, inappropriate intervention on the control, etc ...) which will not alter the comfort, but will affect the performance (less economy, more CO₂ emission), it is imperative to set up a solar heat production monitoring system and the relevant associated service, for each installation.

This investment in monitoring enables a long term, high performance. It makes it possible to choose a mainly curative maintenance contract and therefore reduce operating costs.

Production monitoring is essential to ensure the effective operation of a solar DHW installation in the long run and to optimize maintenance services.

Several types of devices and associated services are available according to the size of the installation and the expectations of the owner. It can be entrusted to an external service provider, or performed internally by the client as the case may be. SOCOL provides information on [a set of available solutions and services for France](#), to be downloaded on the website.

Although many plants are equipped with a useful energy meter, it is acknowledged that the meter is seldom used to monitor the installation (real-time malfunction, alert and curative maintenance). Only the proper production monitoring can ensure correct operation and reduce hazards.

SOCOL therefore recommends the implementation of an operational follow-up service, which offers a 100% reliable and optimal productive capacity and enables to produce an annual performance report and send it to the ADEME agency as required when receiving subsidies via the Heat Fund.

Also to be found on [this section of the SOCOL website](#) are a set of technical sheets helping with maintenance procedures and legal models for monitoring and maintenance contracts.

3. Ground Action

The SOCOL team work close to all involved in solar thermal activities and promotion: council housing associations, professional trade associations (installers, maintainers...), state-financed local agencies dedicated to promoting renewable energy, French regional authorities, and all partners working on developing cleaner energy systems.

Actions include technical and informative meetings locally to present professionals and project-owners with all positive impacts and advantages of using and developing the solar thermal technology and how SOCOL can help with the fluidity and secure unfolding of the projects, for durable performance of the systems. SOCOL actions and tools are therefore the subject of regular presentations at conferences both at national and regional levels. These

conferences can be organized by or with SOCOL and can be dedicated to solar thermal subjects or address a wider scope such as renewable energies or sustainable building. These conferences can also take place as side-events during trade fairs.

SOCOL is also involved in the annual conference dedicated to solar thermal in France: les Etats Généraux de la Chaleur Solaire. This event gathers around 150 part-takers, involved in the French solar thermal industry.

To complete this set of actions, SOCOL webinars are widely and regularly offered to gather a larger audience and communicate on specific items concerning technical, legal or pedagogical aspects impacting the solar thermal industry. The webinars are free to all participants. Some of the webinars are developed jointly with other partners and target relevant topics such as the dynamic commissioning procedure, monitoring, positioning of solar thermal technologies in the frame of building regulations and so on. Some of [the webinars can be replayed](#) on the SOCOL website.

4. What Next?

In the coming years, SOCOL are committed to continue their actions to secure, promote and develop solar thermal technologies on the French market.

The technical working groups are still gathering regularly to initiate proper actions, tools and guidelines to further accompany professionals and project-owners, collaborating with other associations to identify appropriate needs and disseminate information widely.

One of the current tasks is dedicated to pinpointing the main subjects to be addressed when advising installers on good practices regarding implementation. This work will also point out which common mistakes are to be avoided when replacing existing solar thermal material. As a result, some of the existing SOCOL tools and guideline will be updated and some more sheets will be created if necessary.

However, the most important set of actions will certainly lie within the communication scope: improving community management, using social networks and media more efficiently, informing in a timely manner... SOCOL is evolving to target all potentially interested in energy efficiency, aiming at making solar thermal an option to always have in mind when renovating or conceiving a building, a plant or a district.

SOCOL is a French-speaking website however, it would also be a reward for all the team's work if foreign entities were to use some of the free online data to also help promote solar thermal on an international level.