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Intelligent Energy  Europe

Solar Energy Use in Outdoor Swimming Pools SOLPOOL

**Common Approach for the Implementation of
Solar Heating Systems for Outdoor Swimming Pools in Europe**

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1 Introduction

The main objective of the SOLPOOL project is to develop and implement campaigns for the increased use of solar thermal systems for the heating of outdoor swimming pools. The first campaign will target the owners and operators of these pools, while the second will concern installers of heating and solar systems. The project targets the countries Germany, Greece, Slovenia, Hungary and the Czech Republic as well as the French region of Lyon and the Italian region of Lecce.

In order to develop the campaigns, first a common approach for the Implementation of Solar Heating Systems for Outdoor Swimming Pools in Europe has to be developed. The first step for the development and establishment of a promotion methodology is to collect data about the existing conditions in this field. Very important is to get information about the state of the art. A detailed overview about technology in use for pool heating and available solar thermal systems in every participating country is essential for the development of a successful promotion campaign. Also important are reliable information about national and regional boundary conditions and barriers, which hinder an increase of the application of solar thermal systems. With the focussed promotion campaign these barriers shall be overcome.

Another aspect in this report is a description of the expected markets for solar thermal pool heating systems. Therefore the data from bigger outdoor swimming pools was collected and analysed to get an estimation of the number of potential users in the participating countries. Small private pools are not listed, so the potential of private owners is not considered in the estimation.

Additional in a short report the situation of the solar market and the existing funding schemes are described. An overview about existing financial supports for the installation of renewable energy systems in the participating countries is given. The examples show present funding schemes and could be transferred on the situation in Europe.

With the information of the data collection a strategy of a common European approach for the promotion of solar energy is developed. The common approach should focus on the defined barriers and help to coordinate the development of successful promotion campaigns. In the common approach the target groups for the promotion campaign are determined and the necessary information for the promotion material is named. In SOLPOOL not only a promotion campaign will be done also the success of the campaign will be evaluated. With a common approach the evaluation of the campaign will be simplified and the results are comparable.

2 European State-of-the-Art

This chapter describes the presently state of the art in solar thermal pool heating, funding conditions for those applications and the boundary conditions which hinder the extended application of solar thermal devices. The base for this chapter is the data gained from the data collection done by all partners of the SOLPOOL project. In the data collection several information about national and regional characteristics in the application of solar thermal systems were asked. The data collection gives an overview about the state of the art, boundary conditions, size of the expected market, best practice methods for solar thermal use, best available technology and existing funding schemes.

2.1 State of the art of the energy supply for outdoor pools

In Europe many outdoor pools are heated to extend the opening period and offer convenient swimming experience. The data collection of the SOLPOOL project asked about the present technology used for the heating systems of outdoor pools. In the participating countries the most common way to heat a pool is the combustion of a fossil fuel and a boiler. The usually used fuels are gas and oil. The Czech Republic is an exception, because they have a high use of heat pump systems, caused by a subsidy policy of the Czech government.

Other methods for pool heating are district heating, heat pumps, solar thermal systems and geothermal systems. Solar thermal systems are sometimes combined with conventional gas boilers. Also there are electric heating systems in use. Most of the pools are using boilers and heat exchanger for the heating. The normally used chlorine pool water is not directly heated, because it is aggressive and can harm pipes and conductions.

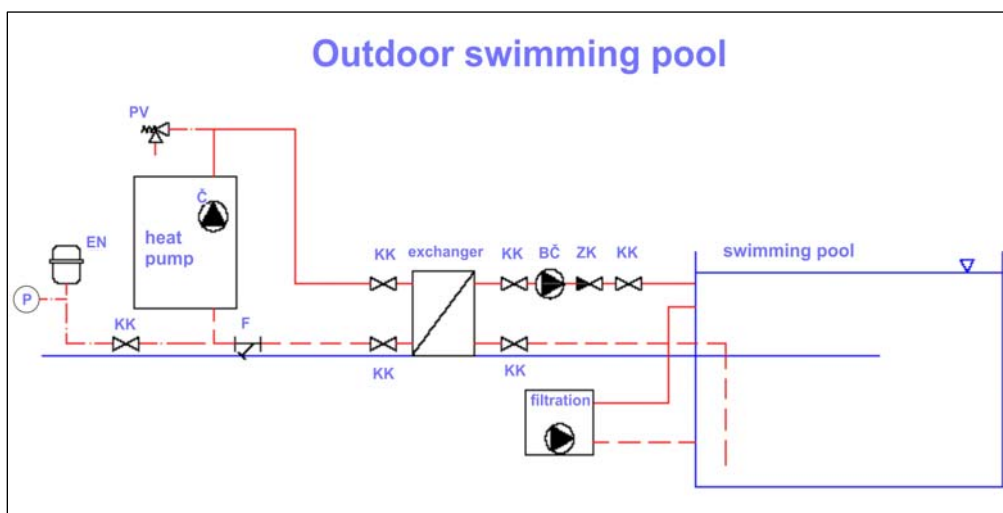


Figure 1: Plan of a pool heating system with heat pump

Figure 1 shows a plan of a pool heating system with heat pump. However the heating systems are working normally on the same principle, so it is possible to change the heat pump with another heat source, like a boiler or solar collector.

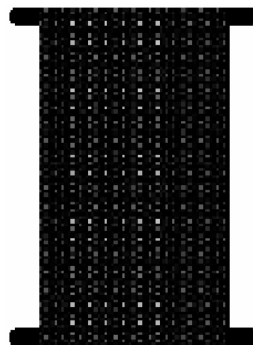
Detailed data about installation and operation costs are not available. However the installation costs for solar systems are higher than the conventional heating systems costs, but the solar system saves money in the operation. The number of solar thermal systems used for pool heating differs quiet a lot in Europe, from 20 % in Germany down to 1% in Greece.

For the use of solar thermal heating presently two systems are the state of the art. When only the pool water should be heated unglazed solar absorber are used. But when also water for sanitary is needed flat plate collectors are used. The commonly used collector types are unglazed collectors called absorber. The absorber material is highly UV- and weather resistant and rather cheap compared with flat plate collectors. This type of collectors is always the best choice if enough surface area is available and if the temperature of the water has to be increased only by a few degrees centigrade. Different designs of unglazed absorbers are shown in the figure below.

Flexible unglazed thermal solar collector



(Source: Giordano)



(Source: Zénit France)

Figure 2: Unglazed and glazed thermal solar collectors

The absorbers are also non sensitive against chlorine water, so the pool water can be heated directly in the absorber and given back in the pool. A heat exchange is not necessary and so the system has low installation costs. A disadvantage of the system is the high space requirement of an absorber field. For a good temperature gain for 1m² pool area 1m² absorber is necessary.

Higher temperatures are gained with flat plate collectors. A typical flat-plate collector is a metal box with a glass or plastic cover (called glazing) on top and a dark-colored absorber plate on the bottom. The sides and bottom of the collector are usually insulated to minimize heat loss.

Sunlight passes through the glazing and strikes the absorber plate, which heats up, changing solar energy into heat energy. The heat is transferred to liquid passing through pipes attached to the absorber plate. Absorber plates are usually made of metal—typically copper or aluminium—because the metal is a good heat conductor.

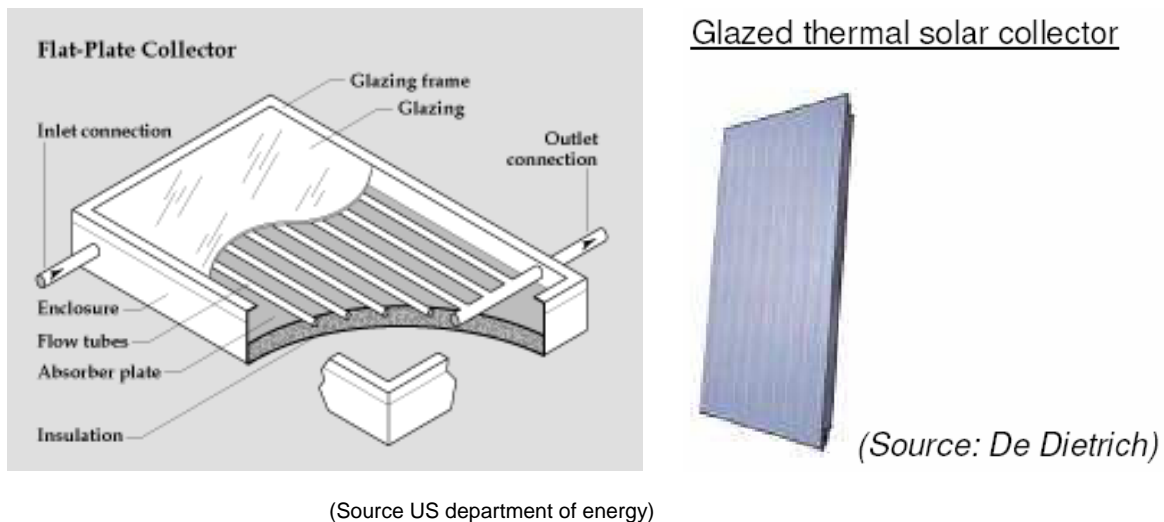


Figure 3: Solar thermal collectors

A flat plate collector reaches higher temperatures and so the water can also be used for sanitary applications. Often the pool heating and the sanitary system are combined. Because of sensibility to the pool water additives flat plate collectors can't heat the pool water directly, so heat exchangers are necessary. This increases the costs of this system.

This both systems are used normally for pool heating systems, there are also some other solar collector types, like vacuum tube collectors, but there are more complex and more expensive.

The participating partners also were asked to name the best practice and the best available technology. In the answers both systems are named. The flat plate collector was named as best available technology, because of the effective conversion of solar radiation and the high heat gain of the system. As the best practice for the solar heating of swimming pools the absorber mat was named. The best practice describes in this case the best combination of end users demands and available technology. Not the most effective solution was chosen, but the most simple and not least the cheapest technique.

An absorber is easy to implement in existing systems, the pool water could be heated directly and besides some pumps no extra equipment is necessary. Thereby the absorber system will be cheaper than the other solar thermal systems. And because of the simple technology, the maintenance is also very low. A problem of the absorbers is the high space requirement. Pools with low space reserve the system is not recommendable.

2.2 Estimation of the market potential

The participating countries were asked about the market potential of solar thermal systems in their country or region. So a rough estimation about the existing potential for solar thermal systems can be given. The numbers in the single countries differs extremely, because of the available data and different counting methods in the country. Also the number of outdoor pools is in warmer regions higher than in colder, like Greece and Germany. All countries are

listed below, with the given numbers and a short description of the calculation base and method.

- **Czech republic:** Number of out door pools 89, with 50 non heated. The other mainly heated by gas or district heating. About 15 are using solar thermal heating systems, sometimes in combination with other systems. The potential for the SOLPOOL campaign is by 66 pools. The number of pools is for a whole country very low. This could be caused by a lack of information and the fact, that in colder countries more inside pools are used.
- **France:** France is one of the first markets for private pools, the number of existing pools is given with over 1.000.000. The French partner ALE made a data collection only in the region Lyon and only for bigger pools. So they got a total number of 47 in the agglomeration of Lyon. Thereof are 35 are not using solar thermal heating systems.
- **Germany:** in Germany 3550 bigger outdoor pools was counted. At least 20% are using solar thermal systems for heating. So a number of 2800 pools are potential targets for the SOLPOOL campaign.
- **Greece:** The Number of existing pools is given with 150.000, but in this number also small private pools are included. In Greece only 5% to 10% of the pools are heated. Here a high market potential is given, because with a heating system the swimming period is extended about three month.
- **Hungary:** There are about 215 bigger outdoor pools in Hungary and only one was found, which uses a solar thermal heating.
- **Italy:** The Italian partner gave only numbers from the province of Lecce. There 93 pools are listed in the region, with 2 solar heated. About 90 have are potential solar thermal end users. The Italian partners found another interesting number. 26 of the owners are planning a renewing of the heating system in the next time.
- **Slovenia:** Slovenia has no official data about the numbers of existing pools. So the information from the Slovenia Health protection, which is monitoring the hygiene of pools, was used to calculate the number of pools. They gave a number of 161 swimming facilities.

The SOLPOOL project is addressed to bigger swimming pools, small private pools should not be regarded. Anyway the list shows a high number of potential end users in the considered countries and regions.

2.3 Description of the boundary conditions in Europe

The application of solar thermal heating systems for outdoor swimming pools is hindered by several boundary conditions or barriers in the European countries. In the SOLPOOL project these barriers will be identified and a strategy to overcome these barriers will be developed.

The first step is to identify the boundary conditions, limiting the usage of solar thermal applications. Therefore all participating countries were asked in the data collection to name limiting conditions. The boundary conditions were divided in four categories:

Technical barriers

Here technical reasons for a low usage of solar thermal devices in the country or region should be identified. All technical aspects hindering a successful use of solar thermal pool heating system should be listed here. This could be technical problems with material or systems, unqualified installers and also complicated implementation in existing heating systems.

Financial barriers

An important point, because many pool operators are not in the position to spend much money in the renewing of the heating system. Solar thermal systems are at the moment more expensive than conventional systems, so there are in direct competition. Often a funding for the financing is needed. These conditions should be listed here.

Political barriers

The usage of regenerative energy sources is wanted in every European country. But there are also local standards and rules, which has to be fulfilled by a pool heating system. Permission processes or strict rules can constrict the installation of solar thermal devices. Such hindering rules should be named in this point. Also the total absence of political support can be a boundary condition for the implementation of the solar thermal technology.

Social barriers

The awareness and acceptance of solar thermal devices by all concerned groups was asked in the part. New technologies have to overcome resistance in public. Often traditional methods will not be so easily replaced by new techniques. Also aesthetic aspects are given as reason to oppose new systems, like it happened by wind turbines. The barriers from the concerned groups, like operator's, owners, users, etc., but also from the public should be named here.

All answers were compared and listed. Some barriers are only named for one country others are present in all countries. In the following description of the boundary conditions the barriers are listed after the number of nominations. Not by the impact of the limitation.

All participating countries, Czech Republic, Greece, France, Hungary, Slovenia, Italy, Germany, named as social barrier the lack of awareness of the technology of solar thermal heating systems in the public. So all concerned groups are not aware of the advantages of a solar thermal energy. Especially the SOLPOOL target groups, the operators and owners, the planners, installers and manufacturer and at least the end users in the pool are named by

the partners. The lack of awareness regards all kind of information about solar thermal heating. The technology is not known, also not the possibilities of funding or the ecological advantages. This is especially named in France Germany and Greece.

In the Czech Republic and Slovenia the lack of an administration of the existing information and also wrong information is a reason for the low acceptance of solar thermal systems.

Often financial reasons are given as boundary condition. In Slovenia, France, Germany and Italy funding schemes for solar thermal applications exist, but they are only for small systems for private house holds. Here the barrier is the lack of funding outdoor swimming pool applications. Slovenia, Hungary, Italy, France and Czech Republic listed the high system costs, they are higher than conventional heating systems, as barrier. Only Germany doesn't name the costs as a problem, because of the fast payback time of a solar absorber system. Otherwise in Slovenia the solar system is not competitive to boiler systems, because of the low costs of fossil fuels. Another barrier in Slovenia and Italy is the fact, that the expensive system only operates a few months in the year and potential customers avoid the investment.

As technical barriers Czech Republic, France and Slovenia listed the lack of well qualified installers, planers and manufacturers. This leads to solar systems with poor quality and a bad reputation and in the countries it is hard to get a well performed realisation of solar thermal systems. In the Czech Republic are materials and systems of low quality used. France also mentioned that as well trained service personnel and as also qualified education facilities not present. A technical boundary condition in France, Greece, Slovenia and Germany is the high demand on space needed for effective solar absorber systems. The existing pools do not have enough room left for the absorbers. In the planning such heating systems was not regarded. And Slovenia also named that the existing boiler rooms are not suitable for the solar thermal equipment.

The political barriers are more specific to the single countries. Hungary and the Czech Republic named the permission process, but this is only a small barrier, the permissions are easy to get. In France and Germany the lack of governmental support for this special application was given. And only in France they mentioned problems for the permission of the systems, the lack of standards and low interest of communities to participate in solar thermal projects.

Slovenia named another national boundary condition. A strong oil lobby is hindering the extend use of solar thermal pool heating. And in Italy they listed the lack of demand for ecological pool heating systems by the end user, like tourists.

All boundary conditions were described by the experience of the partners in their countries. In the project the next step is to develop strategies to overcome the named barriers. In the planed promotion campaigns as much as possible boundary conditions should be addressed.

Table 1: Overview list of boundary conditions in the participating countries/regions

Technical Barriers	
A lack of well trained and well informed planners and installers, specialized on this application	Czech Republic, France, Slovenia
Using of low quality systems and materials, because of low costs	Czech Republic
A lack of education and training possibilities, especially for application in pool heating systems	France
A lack of well trained service people	France
Often not enough room for adequate solar thermal installations available	France, Germany, Greece
A lack of usable surfaces, ST not regarded during the planning	Slovenia
Existing boiler rooms are not suited for ST equipment	Slovenia
Financial Barriers	
Financial grants only for small or special solar systems	Slovenia, France, Germany, Italy
Low price of fossil fuels, low competitiveness of ST	Slovenia
High investment costs, higher than conventional systems	Slovenia, Italy, Hungary, France, Czech Republic
Not used the whole year	Slovenia, Italy
Financial grants needed, low information about grant schemes	Hungary, Czech Republic
Political Barriers	
Low barriers, easy permission process	Czech Republic, Hungary
Lack of governmental supporting of ST in this application	France, Germany
Lack of standards for St systems	France
Complicated permission process for ST systems	France
Low interest of stakeholders or communities in participating ST projects	France
Social Barriers	
Low awareness of End users, installers and decision makers	Slovenia, Italy, Hungary, Greece, Germany, France, Czech Republic
Low or wrong information available	Slovenia
Strong oil lobby	Slovenia
Low demand on ecological tourism	Italy
Poor perception of ST System aesthetics	France, Germany, Greece
Low awareness of ST impact on the environment, like air quality, CO2 Reduction	France, Greece, Germany
No targeted information available	Czech Republic

2.4 European Summary Report on funding conditions

Because of the limited financial situation of many swimming pools operators, the investment in the renewing or installing of a solar thermal pool heating system has to be supported. In many countries several programmes and funding schemes, for the support of renewable energy exist. In the data collection of the SOLPOOL project the information about national grant schemes was requested and all partners named the existing schemes. In nearly every country a funding scheme for renewable energy and especially solar energy exists. But sometimes only private households are profit from this financial aid. In these cases Swimming pool heat systems are not supported.

In the following a short overview about the solar market and financial funding is given

Czech Republic

In the Czech Republic a National Programme for the Energy Effective Management and the Utilisation of Renewable and Secondary Sources of Energy is elaborated by the Ministry of Industry and Trade according to the agreement with the Ministry of the Environment. Concrete conditions of Programme are announced every year and for this year (2007) in the part B of the Programme administrated by the Ministry of the Environment there are investment subsidies for plants for Utilization of Renewable Sources of Energy. Among them are subsidies also for solar thermal applications used for heating water in functional buildings – part 8.A (public pools, sports facilities, hotels etc.). Investment costs must not be higher than 5 mio CZK. Other financial subsidies could be available in the frame of Operational programmes. The concrete conditions are prepared presently

The solar market in Czech republic is still in development stage. There are about 200 firms active on the field of solar thermal. But regarding to pools equipped with collectors there is a visible positive progress and this could be even highlighted because of generous subsidies from Operational Programmes.

France

In France the market for solar energy is increasing constantly: the annual thermal collectors surfaces installed in 2005 is more than 164 000 m², the equivalent power is 115.5 MWth. The cumulated capacity of thermal solar collectors installed in France at the end of the year 2005 is around 914 000 m² and around 640 MWth.

Since 1999, European Union (for specific projects), French state, ADEME, Regions, some departments and several municipalities give grants to develop sustainable energies. The department of Rhône, where the agglomeration of Lyon is, gives grants only since the beginning of aril, 2007. The French State gives subsidies up to 50% of the price of the solar equipment for specific private people and 20% for summer swimming pools.

Germany

The solar thermal market in Germany is characterized by a continuous growth, in 2006 140.000 new systems had been installed. According to the National policy the German government has targeted a share of 12% within the heating sector by renewable energies until 2020. Up to 2050 half of the primary energy demand should be supplied by the renewable

energies. Within this frame the solar thermal small as well as large scale applications will play an important role. For outdoor swimming pools a special funding programme has been existing since 2006. The funding amounts 80% of investment costs will be financed by credit whereas 30% of the redemption amount will be remitted. There was no funding programme for absorbers available before the implementation of this programme.

Greece

Greece is the largest solar thermal market in South Europe. In 2005 the installed collector area was about 3.050.000 m². [ESTIF, 2005]. More than 95% is domestic hot water. About 1.200.000 households are avoiding 1.900.000 ton CO₂ each year by using a solar system which can provide up to 80% of the energy needed for hot water.

In the last years a significant number of large scale solar systems in hotels and industry were supported by the Operational Programme for Energy, by financing up to 50% of the capital cost. Other support mechanism for large scale systems is the National Development Law 3299/04 through various capital investment, and interest subsidies (up to 60%) and tax deduction (up to 100%).

Hungary

Currently no grants are available for the installation of solar thermal systems in swimming pools. For the households, the "NEP-2007" grant scheme supports the application of solar thermal energy, but not for heating pools. It is planned, that the EU regional funds will provide funds for self-governments and firms for an extensive use of renewable energies. However, these grant schemes have not been announced. The grants schemes are planned to be opened in the autumn of 2007.

Italy

In the last month, it was a significant growth of the initiatives dedicated to the diffusion of knowledge of alternative energy and the possibility offered about the solar thermal system. For example, the Province of Lecce issued a public notification to give forgivable loans to the family for the installation of solar thermal system.

So, after a period of retard, the market of the Province of Lecce is in development stage.

The national "Account Energy" is issued from the Ministry of Economical Environment according to the agreement with the Ministry of Ambient and Protection of Territory and Sea.

It is finalized to the promotion of the use of renewable energy sources toward the concession of economical incentives.

Slovenia

In 2006 the installed glazed collector area in Slovenia was about 109.300 m² (ESTIF, 2006). The Market growth in 2005/06 was 44 % (ESTIF, 2006). In Slovenia financial support for solar thermal installations in households is provided by Ministry of the environment and spatial planning. The number of supported installed solar thermal systems is increasing from year to year. The funding programmes are addressed to private house holds and companies. The households' gets up to 40% of the investment, companies can get up to 50 % of the investment costs under certain conditions. The programmes were started by the Ministry

of the Environment and Spatial Planning, Department for energy efficiency and renewable energy. In 2005 584 ST systems in households were supported with subsidies, installing about 3.772 m² solar absorbers.

The funding of renewable energy is present everywhere. The examples of the participating countries shows, that there are a lot of funding schemes existing. But only a few will fund the installing of solar thermal pool heating. In the fact sheet of funding detailed information from every country is listed.

3 Strategy for a common approach on the implementation of solar heating systems for outdoor swimming pools

In SOLPOOL the use of solar thermal energy for the heating of outdoor swimming pools should be strengthened. Solar energy is one of the best and most cost-effective methods to heat swimming pools.

The extended application is limited by several boundary conditions. These limitations must be overcome to establish solar energy as a common power supply for pool heating systems. The solar energy use will replace the conventional combustion system with fossil fuels. This will lead to a significant reduction in CO₂ emission. But the heating of pools is still a niche application. Although in France, one of the first markets for swimming pools, the number of pools is given with more than a million. Therefore, not every single one is heated.

But case studies have shown, that there is an enormous potential of reducing emissions and fuel costs, for example a pool in France (Villeurbanne) saved with a collector area of 1100m² 91 t CO₂ and 12.000 € costs for gas per year. So the use of solar energy will not only have an ecologic impact, but also the running cost will be reduced. Despite of these obviously advantages, solar thermal pool heating systems are not widely-spread.

The first step in the project was to accomplish a data collection to get an overview about the present state of solar thermal use in the participating countries and to identify barriers and boundary conditions hindering the broad application of this technology. With the knowledge about the barriers a strategy for targeted promotion campaigns can be developed.

3.1 Boundary conditions

All partners named several barriers and boundary conditions. In the questionnaire the barriers were divided in four categories: technical, financial, political and social.

The main barrier identified by all participating partners is a lack in the awareness of the solar energy. All partners mentioned that in all concerned groups, like owners and operators of pools, installers and manufacturers and the public the advantages and even the possibility of solar energy use are not present. Also the existences of funding and financial support programmes for the installing of solar energy systems are not known. Other social barriers are the poor aesthetic acceptance of solar thermal devices or a low demand on ecologic methods for pool heating, strengthened by a strong oil lobby and low prices for fossil fuels.

The tense financial situation of the owners and operators is the second most named barrier. The solar energy systems are more expensive than conventional systems. In some countries a funding is possible, but the schemes are not well known. In other countries the funding is not including swimming pool systems. So a promotion campaign also must content detailed information about national funding schemes.

Only in one country the permission process was listed as a barrier for solar energy in all other countries the necessary permissions are easily to get. But many pool operators are

local authorities and they often avoid high investments in their swimming facilities. Here more support from the politic could help to increase the motivation of the authorities to participate in ecologic projects like SOLPOOL.

The technical barriers are mainly a lack of qualified installers and service personnel and the high space requirement of the absorbers. The pure technical problems can not be solved by a promotion campaign, they can only give alternatives, but the SOLPOOL will help to find qualified partners and installers in the region. A data bank with the contacts to local companies for every country is also planned in SOLPOOL.

3.2 Common Approach

The strategy of a common European approach for the promotion of solar energy pool heating system will focus on existing barriers, which are concerning many countries. The main focus is on the raise of awareness of solar energy systems. Therefore all advantages, all technical information and the whole potential of solar thermal systems must be presented in a promotion campaign. The promotion campaign must be addressed to all important target groups which are involved in the planning and installing of outdoor swimming pools. Therefore two campaigns are planned. One campaigns for the distribution of the information of solar thermal heating systems to all groups, which are involved in planning and decision making of swimming pools. The other one is to inform all groups, which are working directly with the solar energy equipment.

Besides some more help for the decision makers is planned in SOLPOOL. A software tool will be developed for the calculation of the amount of saving fossil fuels by using solar energy for a pool. Within a web based information and data portal all important information about solar energy especially for the planned application is given including a data base with addresses of national installers and manufactures for each participating country.

The common European approach will also present a short description of the best practice, regarding the different conditions in all countries.

Because of the lack of awareness it is necessary to provide detailed information about solar energy systems in the promotion campaigns. The given information should include all important information for the addressed groups. Therefore the groups addressed in the campaigns will be defined as following.

3.2.1 Target groups of the promotion campaigns

The first campaign "**the owner's campaign**" is addressed to all groups involved in the decision process of the pool heating system.

Owners, Operators

This group contents the people, which will make the direct decision about the installing of a pool heating system, e.g. municipalities, local authorities, private owners, hotels and some times sport clubs.

Planners, Consultants, Architects

This group will be strongly involved in the decision process of the system for a pool heating. Here the decision makers will first be asked for information about the pool heating system. So they are very important for the good promotion of solar energy.

Manufacturer, Installers

This group will provide the basic information for the both other groups. Detailed information about system technique and different heating concepts will be asked. The target groups for the promotion campaign are mainly the manufacturers and installers of pools and pool technology, the installers and manufacturer of solar thermal equipment know their products very well.

Local/national energy agencies

This also a source of information for the decision makers, they should be able to provide information about national standards and funding schemes.

End user

With end users all groups and people are addressed, which uses the pools for swimming or be related to swimming pools in other ways, this includes sport and tourism associations, tour managers and swimming pool guests. The promotion of information to the end users will help to increase the awareness of ecologic use of solar energy in the public and strengthen the acceptance of this technology.

The second campaign “**installer campaign**” is targeted to the group’s campaigns which are working directly with solar energy systems.

Installers

The installers and service technicians of pool heating systems are addressed here.

Manufacturer

Manufacturer of solar thermal equipment

Maintenance technicians

The maintenance technicians of the pool operators must get the information about the best practice in maintenance and operation of the solar energy system.

3.2.2 Needed Information material

In the campaigns detailed information must be provided. The type of information differs between the both campaigns. Also the differences in the single countries must be taken into account by choosing the suitable data used for the promotion campaigns.

Information for the owner’s campaign

- Description of the process of solar energy use
- Technical description of solar energy systems
- Overview on the state of the art
- Expected power gain by using regional solar irradiation
- Expected avoidance of CO₂

- Financial information
- Expected payback time of the investment
- National and regional funding schemes
- Contacts to funding organisations
- Saving amounts of fossil fuels
- Contacts to regional authorities responsible for the permission process
- Contacts to local qualified installers and manufactures
- Contacts and information about regional, national and international demonstration projects
- Information about planning and calculation of solar energy systems

Information for the installer's campaign

- Detailed technical description of the plants
- Detailed description about working procedure
- Information about the quality of solar energy materials and equipment
- Details about quality management during the installation
- Information about the best and most effective operation mode
- Information about best practice in maintenance
- Information about integration into existing systems
- Information about combined heating systems (solar/ heat pump, solar/combustion)
- Detailed information of local standards
- Information about local certification standards

The listed information must be provided to the addressed target groups. So it is important to define the way and the type of the information material for the both campaigns.

Owner's campaign

For the owner's campaign mainly information material is needed, which shows in an easy understandable way the important data. This information must be disseminated to the addressed groups, which are normally no technical experts. The information material should be prepared, that it is possible to provide it to other interested people. So the information will be spread broadly and the awareness of solar energy will be raised

Information material, which could be provided to interested groups or people

- Flyers
- Info panels
- Brochures
- CD Rom
- Logo
- Website
- Presentation on fairs
- Publications in related technical literature and Internet
- Database
- Conferences

- Workshops

Installer's campaign

The installer's campaign is a little bit different to the owner's campaign. Also normal promotion material is needed for the presentation of the technology to customers, but more special technical training material. A boundary condition was the lack of well qualified installers and caused by this installed solar systems of a poor quality. In the installers campaign several instruments must be provided to improve the installer's qualification. Therefore more detailed technical training material and workshops should be accomplished.

- Flyers
- Brochures
- CD Rom
- Special training material
- Guidelines
- Presentation on fairs
- Workshops

3.2.3 Special tools supporting the promotion campaigns

In order to provide useful information two special tools will be elaborated. First a software tool for the calculation of solar energy impacts and a web based data bank with important information and local contact base.

The software tool, called Impact Adviser, will be a calculation tool to estimate the impact of a solar energy heating system. With the data of the pool, dimensions and actual energy consumption, the Impact Adviser will be able to calculate the necessary area of the solar absorbers, the installation and operation costs, the economic gains, the saving amount of fossil fuel and the CO₂ savings. The tool should be adapted to all participating countries. This means a translation of the tool for every country and easy integration of national or local conditions, like solar irradiation, system costs or funding schemes.

The easy to use tool should be included in the information materials for free. By the calculation results the decision makers will get an estimation of the impacts of a solar thermal heating system for their swimming pool.

The second necessary tool is a good organized web based data base. Besides technical information the database will contain a contact data base with information about solar energy and swimming pool key personnel in every country in order to focus and coordinate the available information and providing easy way to the interested groups. So the data base should be the first information source for solar energy swimming pool heating.

3.2.4 Description of the best practice

For the definition of a strategy for a common European approach, also the best practice of solar thermal heating systems should be determined. In the data collection two systems

were named as best practice, unglazed solar absorber and flat plate collectors. The unglazed solar absorber heats up the pool water directly. The water is pumped through a system of dark tubes, mostly made of rubber, which will absorb the solar energy and heat the water. The absorbers have to be of a material, which is not sensitive to chlorine water. The main advantages of an unglazed absorber are low investment costs, easy to handle system and low operation costs. The flat plate collectors are heating the water indirectly. In an isolated glass box the solar irradiation will be converted into heat and transported by an external heat exchanger to the pool water. The installation costs are higher compared with solar absorbers, but with flat plate collectors a higher temperature is reachable. The advantages of the flat plate systems are the usage of the heat for the sanitary purposes, lower space demand and a higher efficiency.

The choice of the suitable system depends on available space, foreseen application, regional irradiation and financial potential. In the common approach the information and promotion work should be focussed on these two systems, which showed their practical use in lots of projects.