




EIE-06-085 SOLPOOL

Intelligent Energy  Europe

## **Deliverable 3 and 8: Strategy for a common approach and list of grant schemes**

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## 1. Introduction

Solar thermal systems are predominantly used to generate hot water and to augment the heating system in private households. The European market leaders, i.e. Greece, Austria and Germany, have implemented public policies, particularly in the starting phase of the market, which have been the key to their success. In the 1980s, the **Greek Government** offered financial incentives, combined with awareness raising activities. Several years after the main support programmes, the market per capita is 16 times bigger than in Italy. **Austria** is the leading continental Europe country in solar thermal. The success is based on stable, long term public support schemes in several federal states, including awareness raising, financial incentives, training of professionals, R&D funds and demonstration projects. **Germany** is the largest market in Europe built up with the help of sustainable policies. The financial incentive scheme "MAP" now enters its 8<sup>th</sup> year. Awareness raising campaigns at federal and local level have been implemented. In Germany, the internet platform "RegioSolar" supports numerous and diverse initiatives such as proKlima-fund, solar festival in Hannover and solar region in Freiburg.

Solar thermal systems are increasingly being used in both small private pools as well as in larger community facilities and open air swimming pools. However, in every country this particular application of solar thermal energy is far from reaching its full potential. The implementation degree within the different participating regions/countries varies greatly. In order to achieve the SOLPOOL objective of increasing 10% of the outdoor swimming pools equipped with solar thermal systems in the participating regions/countries, it is necessary to define a strategy to implement a series of actions that lead not only up to the target point but also to pave the way for a full deployment of the solar thermal technology for this particular application.

## 2. Status of each participating country/region

Before defining any strategy it is of utmost importance to have an overview of the current status of the participating regions/countries, in terms of the number of existing outdoor swimming pools, and pools equipped with solar thermal system.

### Germany

According to the general manager of „Deutsche Gesellschaft für das Badewesen e.V.“, there are around 6700 public swimming pools all over Germany. Out of those 6700 there are 3200 outdoor swimming pools. The rest are indoor pools and combined outdoor & indoor facilities (~1800), aqua parks (~300), and school/learning pools (~1400).

The company ZFS-Rationelle energietechnik GmbH made a study on public pools with implemented solar thermal systems. At the end of the year 2007, a total of 799 public swimming pools in Germany were equipped with a solar heating system, according to the named study. In most of the cases they are outdoor pools and in rare cases a combination of outdoor and indoor pool facilities. Fifteen of the listed swimming pools have exclusively indoor facilities. Another important fact to point out is that 98.5% of the total outdoor pools

and outdoor in combination with indoor pool facilities, use absorbers as a pool heating system. The remaining 1.5% use collectors.

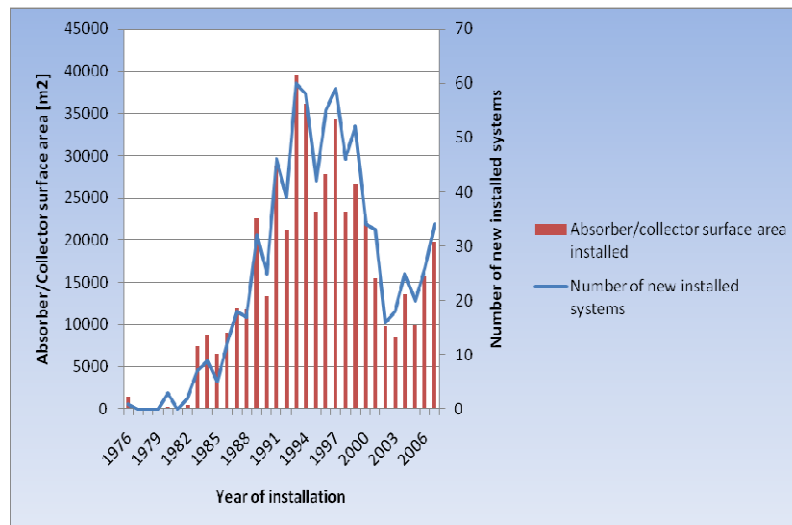


Figure 1: Yearly installed solar systems and surface area of absorbers/collectors in public swimming pools in Germany

Figure 1 shows the breakdown in number of systems installed and surface area in relation to their year of installation. It can be seen that the years 1993 and 1994 were the peak years in terms of surface area of absorber/collector installed, which were followed by almost a continuous decrease in the following years. In the last two years the tendency is changing again to higher levels, but even though those levels are still far behind those of the peak years. Since there are approximately 3200 outdoor public swimming pools, more than 2400 pools are potential clients of the solar thermal market.

The absorber surface area of implemented thermal systems is mainly medium and large-size, as it can be expected from public pool facilities, according to the division performed in SOLPOOL. Out of a total of 784 outdoor public solar heated pool facilities, only 35 lie within the small-size absorber surface area category, and therefore small pool. A total of 345 lie within an absorber area between 100 and 500 m<sup>2</sup>, and the rest, i.e. 404, belong to the largest absorber area and thus largest pool category.

There are two of the top solar thermal companies specialised in swimming pools providing relevant data on the number and size of their installed systems.

The company Solar Ripp has installed already a total of 407 absorber solar pool heating systems in Germany. As it can be seen in Fig. 2, most of the systems, i.e. a 95,3%, have an absorber surface area smaller than 100 m<sup>2</sup>. Therefore, it indicates that they have been mainly focused on small-size swimming pools either from hotels or private owners. The „Deutsche Gesellschaft für das Badewesen e.V.“ provides a figure of 625.000 swimming pools in private houses and gardens, which fall in most of the cases within the small-size pool category. Although at present there is no available information regarding the total number of small pools in Germany equipped with solar thermal systems, the number of already existing small pools gives an idea of the market potential for this sector.

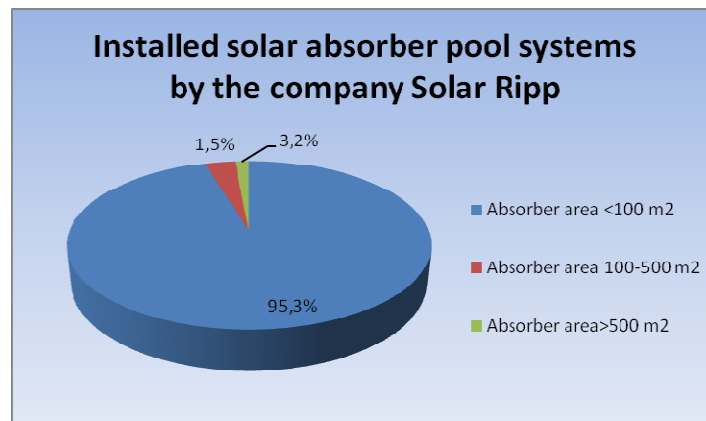


Figure 2: Solar pool thermal systems installed by Solar Ripp according to three different surface area subdivisions

In the case of the company Solar-Anlagen Lange GmbH, they have been involved in the solar pool heating business since 1986. In their case, a total of 190 pool heating systems have been implemented until the end of 2007. In their case, as it can be seen in Fig. 3, they have focused both on medium and large solar swimming pool heating systems.

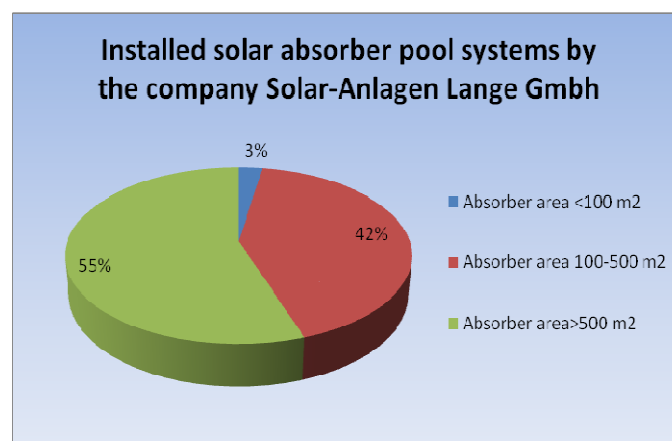


Figure 3: Solar pool thermal systems installed by Solar-Anlagen Lange GmbH according to three different surface area subdivisions

### Slovenia

In Slovenia there are only five implemented solar thermal systems for the heating of swimming pools. Most of the implemented systems for heating the swimming pool water are combined with sanitary water heating and space heating. The Statistical Office of the Republic of Slovenia, which is the main institution in charge for carrying out programs of statistical surveys, is not recording data about the number of swimming pools neither their heating systems. The only institution in Slovenia collecting some data about swimming pools is the Slovenian Health Protection Institute, which monitors the quality of the pool water. According to them, there are 174 swimming pool facilities

According to Slovenian Health Protection institute, there were 174 swimming facilities with 581 swimming pools in Slovenia in 2007, from which **191** are **outdoor swimming pools**.

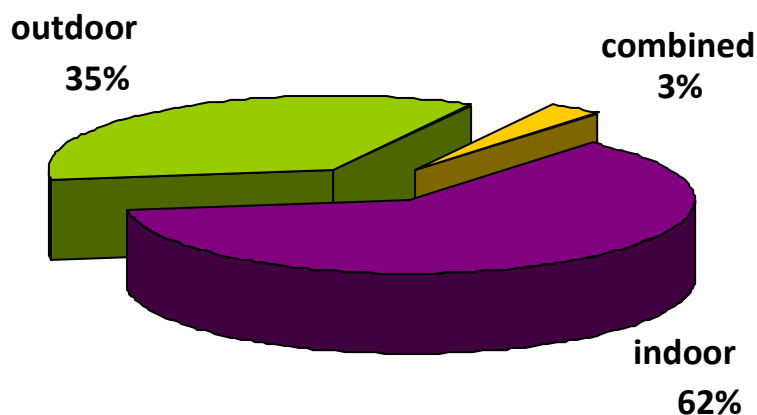


Figure 3: Percentage of types of swimming pools, Slovenia, 2007 (Source: IVZ, 2008)

The potential for the use of solar heating in swimming pools in Slovenia is quite big due to high solar irradiation. The majority of swimming pools are suitable for solar thermal applications. The potential varies with the source of existing heating, heat demand and period of opening. Only swimming pools which are using geothermal energy are excluded. The most appropriate are swimming pools with longer period of opening and higher heat demand, while potential in swimming pools which are open only in short summer period is limited and should be further estimated from case to case. A smaller potential exists in the private houses.

### Greece

In the case of Greece, there has not been any official administrative body for land property registration until recently. This suggests that private swimming pool (belonging to private buildings, houses, etc) cannot be extracted by any official source, a fact that makes it almost impossible to estimate or even consider their total number and by no means imply the existence of a heating system. An assumption towards the resolution of such an obstacle would be that it is rather uncommon to use a heating system of pools in private buildings and houses, as they are rarely used during the colder days of the year.

Another division of the private sector in Greece refers to hotels and other resorts. A heating system for a swimming pool belonging to hotels and resorts is practically desirable, as it may extend the swimming pool usage period to approximately two months before and after summer. Therefore, assuming that most of the big hotels and resorts have indeed installed a heating system for their pools, it is still quite hard to consider and contact all of the owners, as well as extract the required technical data. This may happen either because of their unawareness of technical and economical characteristics or a general distrust regarding economical data of their enterprise.

What seems significant for this project are the athletic or swimming centres, which mainly belong to the public sector and are characterized by high density of attendance (large number of visitors, independent of weather conditions). This makes it almost certain that a heating system is installed. A number of interviews were held with companies that manufacture and/or install swimming pools and heating systems (both conventional and solar).

By interviewing three major companies that share 70% of the Greek market, a general image of the market was established and an estimation of the situation was relatively easier accomplished. According to those interviews carried out with manufacturers – installers of swimming pools and heating systems in Greece, approximately 1500 swimming pools are installed every year, out of which only 5 -7% are outdoor pools with an installed heating system. Each of those companies installs 150 – 200 swimming pools per year and mostly for private customers.

An estimation based on online surveys and interviews with tourist organizations, hotel chambers and swimming pool installers reveals that there are about 150.000 outdoor swimming pools installed.

What has been suggested by many companies is that, because of the climate of Greece, the heating systems for outdoor swimming pools are not required during July and August. For that reason, when solar heating systems are installed, the produced heat during that period is employed exclusively for domestic water heating.

### **Czech Republic**

In the Czech Republic approximately 10 % of the outdoor swimming pools are equipped with a solar thermal system. Some swimming pools are heated with fossil fuels, either coal or natural gas. In the eighties some pools were equipped with flat plate collectors and more recently heat pumps and cogeneration units have been installed thanks to the subsidy policy of the Czech government. According to the collected information from the Czech pool and sauna association there are 567 public outdoor swimming pools in the Czech Republic. According to a survey carried out for this project among those listed pools, 58 outdoor pools are heated using solar energy and 65 are heated through the means of other sources.

### **Lyon, France**

In the region of Lyon, there are 57 municipalities (1 300 000 inhabitants) with a total of 47 outdoor swimming pools or a combination of outdoor and indoor swimming pools. France is one of the first European markets for swimming pools, with more than 1 million of private swimming pools. At present, more than 3000 firms work in the swimming pool sector: around 200 manufacturers and more than 2500 installers.

Most of the public swimming pools use gas boilers as heating system. There is no official recording of the swimming pool installations. The following figures for Lyon are a result of a survey performed for the present project: 6 swimming pools are solar thermal heated, 5 have a solar system with gas as auxiliary heating, 1 cogeneration heated with solar and 1 heat pump with solar and gas, the rest are not heated. For the swimming heated with solar panels (basin and sanitary hot water), this system is always combined with another heating system, usually gas

### **Province of Lecce, Italy**

In the Province of Lecce there are no available statistical data about the number of swimming pools and their heating systems. The only available data has been produced by the tourist office of the Province of Lecce (Hotel, Camping, etc.). According to their information there are about 100 swimming pools and six hotels are equipped with a solar system for the heating of sanitary water.

In Lecce there are about 10 public outdoor swimming pools but at present none of them have an implemented solar thermal heating system. The 10 indoor identified pools use a conventional heating system.

same solar thermal installation for the pools water.

### **3. Grant schemes**

Although the operating costs of solar thermal systems for outdoor swimming pools are clearly lower than those of conventional systems, the initial investment costs of the former are relatively higher. Therefore, it is necessary to support the implementation of such systems with regional or national grant schemes. The participating regions and countries have identified the following schemes accordingly:

#### **Germany**

In Germany a grant scheme from „Kreditanstalt für Wiederaufbau (kfw)“ in Frankfurt, has been identified. The programme started on 2007 and it offers a credit with reduced redemption to local authorities, owners and operators of swimming pools to implement solar thermal systems. Local authorities can apply directly to KFW, however the rest of the applicants must apply via their home bank. The solar thermal system must have a collector area greater than 40 m<sup>2</sup>. For outdoor swimming pools 80% of investment costs are financed by credit, whereas 30% of the redemption amount is to be remitted.

More information can be found at [www.kfw.de](http://www.kfw.de)

#### **Slovenia**

There are currently two identified subsidies for solar thermal systems. The first one comes from the “Slovenian Environmental Public Fund”. The scheme supports the implementation of solar thermal systems in residential buildings for owners up to a 25% of the investment but no more than 150€ per m<sup>2</sup> for flat plat collectors, 200€ per m<sup>2</sup> for vacuum collectors, and 75€ per m<sup>2</sup> for do it yourself collectors. An additional amount of 10€ per m<sup>2</sup> is granted for collectors with quality standard “Solar Keymark”.

The second type of subsidy is a soft loan from the “Slovenian Environmental Public Fund”. In this case, owners of residential buildings and their family members, as well as municipalities, firms and entrepreneurs can apply for it. In the last actual calls an annual interest rate of 3,9% for the credit for households was offered. In the case of legal entities, the granted credit was the EURIBOR+0.3%.

More information can be found at [www.ekosklad.si](http://www.ekosklad.si)

#### **Greece**

Three different support schemes have been identified in Greece. The first is granted by the “Special Secretariat for Competitiveness Innovation” (EPAN II) to the terrestrial sector. It involves renewable energy sources, energy saving and modernization of enterprises targeting hotels, industries, enterprises and professionals. Up to 60% of the investment costs are subsidized and up to 100% of the taxes are deducted (depending on the region).

More information can be found at [www.antagonistikotita.gr](http://www.antagonistikotita.gr) [www.ypan.gr](http://www.ypan.gr)

The second scheme is the investment incentive law 3299/2004 as modified by law 3522/2006, Article 37, Government Gazette 276 A, December 22, 2006, given by the “Greek Ministry for Economy and Finance”. It offers different types of support such as: cash grant, covering part of the expense for the investment project by the State; and/or leasing subsidy, covering parts for the payable installments by the State relating to a lease which has been entered into for the use of new mechanical and other equipment; or a wage subsidy for employment created by the investment; or tax allowance. The investment incentives law is applicable to enterprises having business activities in the primary, secondary and tertiary sectors, i.e., all sectors of the economic activity. Among the eligible categories for incentives under the Development law, the energy production from renewable, and specially wind and solar, hydroelectric, geothermal energy and biomass, is included.

More information can be found at [www.elke.gr](http://www.elke.gr) , [www.mnec.gr](http://www.mnec.gr)

The third and last scheme is the tax deduction law 3522/06, also granted by the “Greek Ministry for Economy and Finance”. It is applicable for end users and householders. Within the law 3522/06 there is an article that refers to a 20% tax deduction for a series of equipment including off-grid RES systems, thermal solar heating & natural gas systems, thermal insulation retrofits with a maximum absolute deduction of 700€, mainly targeting private individuals for the installation of such systems in the household sector.

More information can be found at [http://www.cres.gr/kape/epixeiriseis\\_ependites\\_uk.htm](http://www.cres.gr/kape/epixeiriseis_ependites_uk.htm)

### **Czech Republic**

In the case of Czech Republic a total of 5 different support schemes have been identified. The first coming from the “State Fund of Environment of Czech Republic,” belongs to the national programme for the effective energy management and the utilisation of renewable and secondary energy sources. Local authorities, owners and operators of swimming pools can apply for it.

More information can be found at <http://www.sfzp.cz/>

The second scheme is also granted by the “State Fund of Environment of Czech Republic”. This is an operational programme for the environment. The targeted areas are renewable energy sources including solar thermal applications. Municipalities, regions, allowance organizations and non-profit organizations can apply for it.

More information can be found at <http://www.sfzp.cz/>

The third scheme belongs to the Regional Operational Programmes (ROP) and it is granted by the “Regional board of NUTS II according to the specific ROP. Regional operational programs are focused on the development of given regions, mainly in the area of traffic and tourism.

More information can be found at <http://www.rr-moravskoslezsko.cz/>

The fourth scheme is granted by the municipal authorities of Praha, Plzeň, Litoměřice and Náchod. It is a financial subsidy for individual and non-profit organisations, covering 500 to 2000 CZK/m<sup>2</sup> of absorber area. The solar thermal and photovoltaic systems are the targeted areas.

The last available supporting scheme in the Czech Republic is called EFEKT 2008. It is a financial subsidy granted by the “Ministry of Industry and Trade”. Municipalities, schools and entrepreneurs can apply for it. It is part of the national programme for the effective management of energy and the utilization of renewable and secondary energy sources.

More information can be found at

<http://www.mpo.cz/cz/energetika-a-suroviny/programy-podpory-v-energetice>

### **Lyon, France**

In the region of Lyon, one supporting scheme is currently available. It comes from ADEME “The national energy saving and environmental agency”. Local authorities and private collective pool owners can apply for this scheme. In 2007-2008, up to 30% of the global investment for specific collective projects was granted.

More information can be found at [www.ademe.fr](http://www.ademe.fr)

There is another available scheme in the Rhône-Alpes Region. It is aimed for local authorities and private collective pool owners. In 2007-2008, 20% of the global investment for specific collectives projects for outdoor swimming pools.

More information can be found at [www.rhonealpes.fr](http://www.rhonealpes.fr)

### **Province of Lecce, Italy**

In the province of Lecce a supporting scheme aimed for public administrations to implement solar thermal systems on public buildings, exists. The “Ministry of Environment and Protection of Territory and Sea” grants 50% of the implementation costs and 65% if the project is realized by ESCO. In order to be eligible for this scheme the collector surface must be bigger than 20 m<sup>2</sup>.

More information can be found at [www.minambiente.it](http://www.minambiente.it)

## **4. Strategy proposed by SOLPOOL**

Taking into consideration all the information generated and compiled during the course of the SOLPOOL project, it has become clear on a general basis that there is a need of a centralised register for both public and private swimming pools and their respective heating systems, if existing at all. In the case of Germany, there is a reference list with public swimming pools equipped with solar heating systems, however this list was produced for the development of a particular project, and most probably it will not be systematically updated. The SOLPOOL consortium will recommend for the future a joint collaboration among the regional/national energy agencies of the participating countries with swimming pool associations or bodies in charge of monitoring the hygienic conditions of the public swimming pools, in order to develop a database for monitoring the implementation development of solar systems in swimming pools.

In addition, the following points will be the pillars of the strategy to follow

### **4.1 Tailor-made campaigns and dissemination materials**

The swimming pool owners/operators and solar heating installers have to be informed of the benefits of the implementation of solar heating systems and of the market potential, respectively. Materials must be specifically prepared for both groups, with detailed

information of each participating region/country. For that reason, the best approach is to develop generic information materials in English and then each partner country/region has to adapt and translate them according to the specific information collected from the surveys and other project activities.

#### **4.2 Best Practice Examples**

The best practice examples are one of the most convincing tools for potential “clients”. Before taking any risks it is always good to see that something, in this case the solar heating systems, work properly and bring energy costs down on the long run. The best practice examples from each participating country/region will be included in the project website and will be presented in the campaigns for owners and operators.

#### **4.3 User-friendly software decision tool**

In order to show in a simple way the implications of the implementation of a solar pool heating system, it is necessary to develop a simple and user-friendly software tool to be used during the campaigns as well as to provide advice to anyone interested in equipping a pool with a solar heating system. In SOLPOOL an Excel based software tool called Impact Advisor has been developed. It offers owners/operators as well as installers and planners the main information for the preparation of a project. Input parameters such as location, energy consumption and costs, desired water temperature are given and output parameters such as estimated energy savings and investment costs, as well as payback time are obtained.

#### **4.4 Guideline to implement solar heating pool projects**

In order to facilitate the implementation of projects regarding solar pool heating, a five step guideline will be produced. The steps are as follows:

- 1st step: Collecting basic information
- 2nd step: Using a check list
- 3rd step: Calculating with the Impact Advisor
- 4<sup>th</sup> step: Asking for a quotation
- 5<sup>th</sup> step: Making the final decision

#### **4.5 Financial supporting schemes**

Based on previous initiatives for other applications of solar heating systems, public policies, such as financial incentives combined with awareness raising activities, have been the key to their success particularly in the starting phase of the market. Therefore, we also aim to follow this approach by not only informing the beneficiaries of those supporting financial schemes, but also by advising funding bodies to consider solar pool heating systems both for public and private swimming pool facilities as an important funding target. As already presented in this deliverable, there are very different funding schemes in all the participating regions/countries. It is therefore very important to present them very clearly to their target audiences.

#### **4.6 Networking**

The last strategic point identified is the necessity of building a strong network. Each consortium partner has been in contact with many key players during the execution of several project activities. Those contacts are now included in the project database for facilitating the identification of technology providers, pool owners, etc in a certain region/country.

#### **5. Conclusions**

The level of implementation of solar heating systems in outdoor swimming pools varies greatly among the participating countries/regions. In some cases several hundreds of pools are already equipped with the systems, whereas in other cases like the province of Lecce, there are not known cases of implemented solar thermal system for pool heating. All this differences must be carefully considered, especially during the implementation phase of the campaigns for owners and operators. Due to the favourable climatic conditions it might be difficult in some cases to convince owners and operators of the need of a solar pool heating system, when at present no heating system is being used at all.