




EIE-06-085 SOLPOOL

Intelligent Energy  Europe

Solar Energy Use in Outdoor Swimming Pools SOLPOOL

Fact Sheets Italy

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List of Acronymes

UNI	Ente nazionale italiano di unificazione
Norma UNI	Norma emessa dall'UNI
Norma UNI EN	Norma emessa dall'UNI in recepimento di una norma europea

1 National Fact sheet Italy

The national fact sheets will provide an overview about the situation of the usage of solar thermal heating for outdoor pools. This information will be used to show the state of the art, regarding the special regional conditions and to develop a common approach for the supporting solar thermal systems in this special application. The information was requested by every participating country in the project.

1.1 State of the art of conventional heating systems for outdoor pools

The present common heating systems for outdoor swimming pools and the used fuels are listed.

Used techniques:

- conventional and glazed solar thermal collectors.
- boiler, with a heat exchanger.

Used fuels

- oil
- gas

1.2 State of the art of solar thermal applications for outdoor pool heating

A list of present available and used solar thermal technology, especially for pool heating, is provided. This will provide the state of the distribution and the acceptance of solar thermal systems.

Collectortype:

- Glazed solar thermal collectors with heat exchanger.

System details:

- The most common system is solar thermal collector with conventional system.

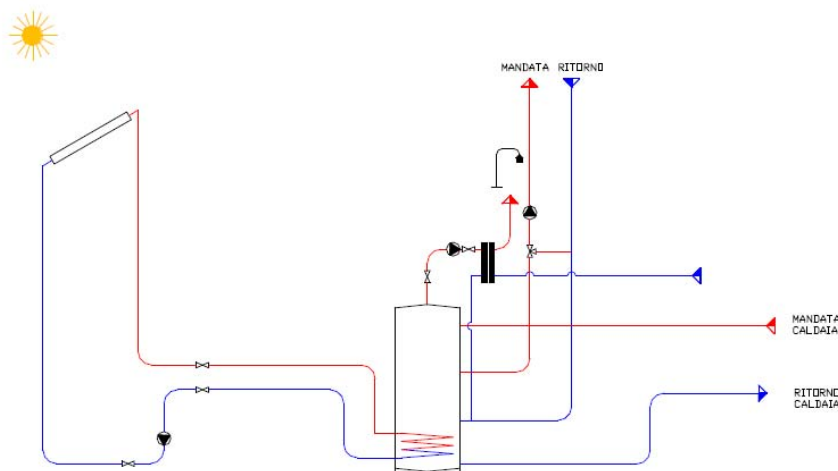


Figura 5 – Esempio di schema d’impianto con l’utilizzo di uno scambiatore

Figure 1: Esempio di schema di impianto con l’utilizzo di uno scambiatore

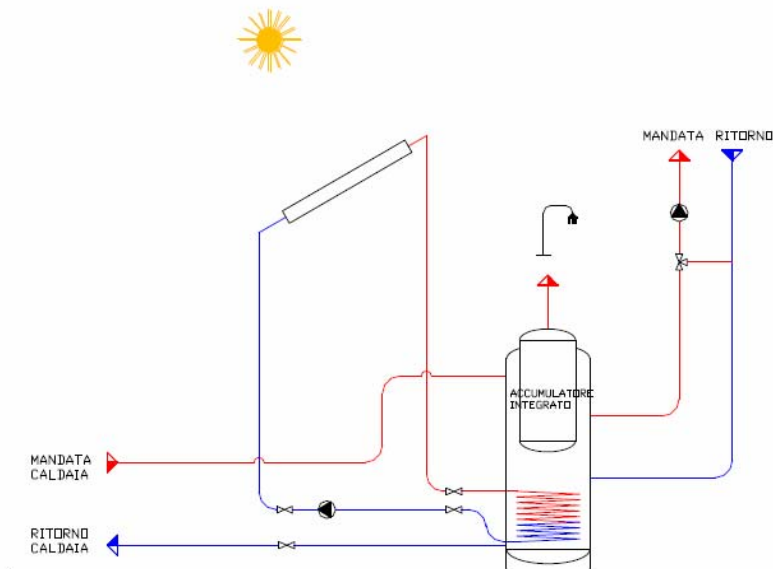


Figura 8 – Esempio di impianto con bollitore integrato in accumulatore a circolazione forzata

Figure 2: Esempio di impianto con bollitore integrato in accumulatore a circolazione forzata

1.3 Best available technology and best practice for solar thermal outdoor pool heating

The best technical approaches, regarding the national and regional conditions, are listed here. Every participating country will give the best practice for the installation of solar thermal pool heating systems according to the special national conditions. This information will be used in the national campaigns.

Best available technology:

- flat plate collectors
- pipe water collector

Best practice:

- Flat plate collectors.

Building	
Type of building	Sports centre
Number of dwellings, floors	90,000 users/year
Year of construction	1983
Total effective area (heated)	./.
Hot tap water consumption (measured/estimated)	not available
Whole energy consumption for heating purpose after CSTS implementation	112,000 kWh/a

System engineering	
Year of construction of CSTS	1999
Type of collectors	Flat plate collectors
Thermal power	130 kW _{therm.}
Aperture area of collectors*)	184 m ²
Buffer storage	./.
Hot tap water storage	12.0 m ³
Total capacity of boilers with energy source	350 kW, natural gas
Type of hot tap water heating	Centralised
Type of heating system	./.
Costs	
Total cost solar system	110,000 Euro
Cost of the CSTS/gross area of collectors	550 Euro/m ²
Subsidies	40 %
Output	
Output of solar heat**)	123,000 kWh/a
Reduction of final energy***)	164,000 kWh/a
CO ₂ -emissions avoided	37.7 t CO ₂ /a
Solar performance guarantee	Yes
<p>*) Aperture area = light transmitting area of the front glass **) measured, between storage and piping to taps (solar system output) ***) related to the measured output mentioned before</p>	

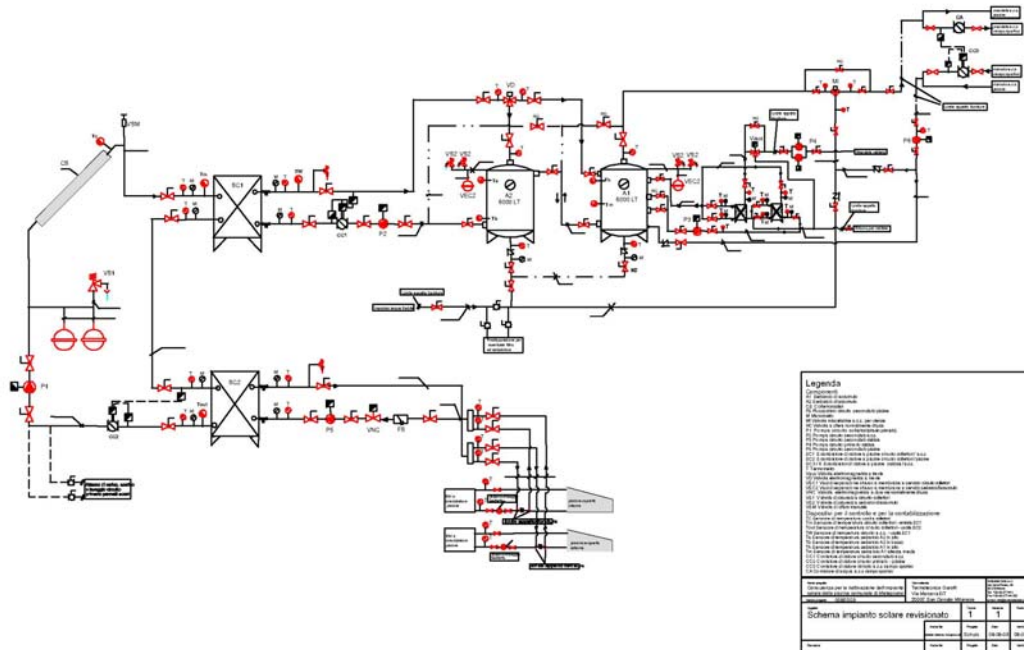


Figure 3: Schema impiantistico Melegnano

1.4 Boundary conditions

The list should show the national and regional barriers, which must be overcome to improve the awareness of the end users and the implementation of solar thermal heating systems. This includes technical or climate barriers but also as governmental, financial and societal boundary conditions.

Technical or climatic barriers:

The lack in awareness of this technology from the operators.

Financial Barriers:

The economical barrier depends from three factors:

- the first is the solar thermal collector's cost;
- the second is the prevalent use of the outdoor swimming pools in the summer, when don't need to heating the water
- the third is lack in information of the incentives from national or regional government are slight for solar swimming pool installation.

Social barriers:

- lack in demand of ecological tourism, even if, in the last years, there are more people who are sensitive towards these aspects.

1.5 Existing norms and standards

The existing standards and norms for the installation and use of solar thermal heating devices are stated here. Additional outdoor swimming pool norms and standards concerning solar thermal heating systems are listed. All important standards, which impacts the installation and usage of a solar thermal system are named and will be concerned by the development of the campaign strategies.

There aren't specific law for the installation of solar thermal system. It is only required a permit to construction by the municipality

Solar Thermal pool heating:

- Municipality of Melegnano (MI)
- Hotel Regina Palace Ischia (NA)

1.6 Cost benefit analysis and impact

An important fact for the end user is a cost benefit analysis. Here the common costs for Solar thermal systems, including system and installation costs per m², are stated. An estimation of the size of the national market is done, not including small private pools. And the gain of heating power per m² collector surface and the resulting savings of CO₂ are described.

Market size:

- 100 outdoor swimming pools

System costs per m² collector, whole costs with installation:

- Flat glazed panel from 500 to 900 €/m²
- Flat not glazed panel from 350 a 600 €/m²
- Vacuum panel from 800 a 1.500 €/m²

Heat gain in kWh per m² collector according to solar radiation and opening duration of the pool:

Lecce		Inclination	33
40,35		Azimut	0
		Albedo	0,25
		kWh/(m ² *d)	kWh/(m ² *month)
January	1	3,02	93,62 (other use)
February	2	3,80	106,40 (other use)
Mars	3	4,55	141,05
April	4	5,55	166,50
Mayo	5	6,25	193,75
June	6	6,56	196,80
July	7	6,98	216,38 (other use)
August	8	6,80	210,80 (other use)
September	9	5,80	174,00
October	10	4,66	144,46
November	11	3,15	94,50 (other use)
December	12	2,72	84,32 (other use)
Calcolo UNI 8477		Dati UNI 10349	

Energy and CO2 savings per m² collector:

Heating system	CO2 Emission in g/kWh	Saved CO2 in g/kWh per m ²
Electric	953	823.464
Oil	375	324.028
Natural gas	356	307.611
Heat pump Air	187	161.582
Heat pump Soil	167	144.300
Heat pump Water	146	126.155
Solar Thermal	30	
Data: Umweltbundesamt Germany		

2 Requirement Sheet Italy

In this sheet the requirements of a solar thermal system, regarding the needs of the end users

Requirements of the End Users	Very Important	Less Important
Power gain for heating system	X	
Saving of energy costs	X	
Cost benefit from installing ST system	X	
Long time durability of the system	X	
Low effort for installation		X
Low effort and costs for maintenance	X	
Low required space for collectors		X
Integration in existent heating systems	X	
No problems with the pool hygiene	X	
Plant safety, no risk for pool users	X	
Easy handling of the system		X
Availability of grants /subsidies	X	
Independency from increasing energy costs		X
Environmental protection	X	
Other		

3 Funding Sheet Italy

The table shows the information of national and regional available grant programmes. They mainly should list the programmes for solar thermal use for outdoor swimming pool heating, but also schemes, which will support the use of solar thermal systems

Funding sheet		
Contact information	Title	Ing.
	First name	Quintino
	Last name	Cavalera
	Position	Energy Manager of Province of Lecce
	Email	cavalera@provincia.le.it
	Telephone	+39 0832 683729
Financing Information	Organisation	Ministry of Ambient and Protection of Territory and Sea
	Type of Support	Financing of costs
	Available Money	€10.334.422,17
	Share of total budget	50% 65% if realized by ESCO
	Who can apply	Public Administration
	Requirements for application	Installation on public building Collector surface more than 20 m ²
	Targeted areas	Promotion of use solar thermal energy heating water
	Short description	"Il sole negli Enti pubblici", is destined to Public Administrations and Public Agency, finalized to realizing solar thermal system on public building (www.minambiente.it).
	Documents	Preliminary project
	Source of information	Ministry of Ambient and Protection of Territory and Sea
	Year of beginning	2007
	Information website	www.minambiente.it