

## SOLAR THERMAL

### Definition

Solar energy utilization is used in applications associated with covering the heating and/or cooling requirements of buildings. These applications require low or medium temperature heat and include water heating, for either domestic hot water systems or swimming pools, space heating, and possibly also for space cooling. The main component is the solar thermal collector. The collector typically consists of a black absorber in which the absorbed solar radiation is converted to heat, which in turn is conducted to a fluid. The back and sides of the absorber are insulated and the front side is covered by a transparent cover that allows solar radiation to reach the absorber but reduces heat losses to the atmosphere. All the above, are encased in a metal housing that provides weather protection and offers structural support. Storage tanks are used to store heat in order to cover the loads when solar potential is low. The systems can be of two types:

- a) In/on building-mounted solar thermal
- b) On ground-mounted solar thermal

To a) *In/on building-mounted solar heating systems* for hot water production for sanitary use are the most common ones. Typical systems consist mainly of flat plate solar collectors, a storage tank, a mounding base and the necessary piping. Average annual system efficiency for the conversion of solar radiation to energy in form of hot water varies between 30–40%, depending mainly on the type of solar collector used and the location. Larger systems can be used in order to cover space heating needs or/and air conditioning of buildings.

To b) The technical principles of the *on ground-mounted solar thermal* are the same as under a), but the number of units requires a larger solar field that cannot be accommodated on the roof of buildings.

### Related terms

Photovoltaic, Thermoelectric

### Keywords

Domestic solar thermal systems, Hot water, Roof-top solar, Solar combi systems, Solar energy, Sun energy



Figure 26a Type a) Domestic Solar Hot Water System on the roof of a building. (Photo: Solahart/ESTIF 2016)



Figure 26b Type b) Solar Thermal Collector field on the ground. (Photo: ARCON/ESTIF 2016)

### Source

Martinopoulos G. 2016: Solar Energy in Buildings. In: Elias S. A. (ed.) Reference Module in Earth Systems and Environmental Sciences, Elsevier, Amsterdam.

<p><b>Translations: Solar thermal ground-mounted power</b></p> <p>Bosnia and Herzegovina Solarne termoelektrane-samostojeće</p> <p>Bulgarian Соларно-топлинна централа монтирана земно</p> <p>Croatian Ugrađeni solarni paneli</p> <p>Czech Sluneční tepelná pozemní energie</p> <p>Danish Solvarme jordmonteret</p> <p>Dutch Thermische zonne-energie op de grond</p> <p>Esperanto Suna surgrunde muntita varmizilo</p> <p>Estonian Päikeseküte (<i>maapinnal</i>)</p> <p>Finish Aurinkokeräin maassa (<i>closest match</i>)</p> <p>French Energie thermique solaire terrestre</p> <p>German Solarthermie</p> <p>Greek Ηλιακά θερμικά συστήματα παραγωγής ηλεκτρισμού</p>	<p>Hebrew הקרקע על תרמית אנרגיה</p> <p>Hungarian Földre telepített napkollektor</p> <p>Italian Impianto solare termico a terra</p> <p>Islandic Sólárhitasöfnunarkerfi á jörðu</p> <p>Latvian Saules termālie paneļi uz zemes</p> <p>Lithuanian Antžeminės saulės šiluminės jėgainės</p> <p>Montenegrin Solarne termalne elektrane na zemljištu</p> <p>Polish Naziemne panele słoneczne</p> <p>Portuguese Termoeléctrica solar no solo</p> <p>Romanian Energie termică solară terestră</p> <p>Russian Солнечные термальные системы смонтированные наземно</p> <p>Slovenian Sončne termalne naprave na tleh</p> <p>Serbian Соларне термоелектране</p> <p>Spanish Energía termo-solar sobre suelo</p> <p>Swedish Sol termisk markmonterad kraft</p>
<p><b>Translations: Solar thermal on-roof power</b></p> <p>Bosnia and Herzegovina Solarne termalne elektrane na krovovima</p> <p>Bulgarian Соларно-топлинна централа монтирана върху покривите</p> <p>Croatian Krovni solarni paneli</p> <p>Czech Sluneční tepelná střešní energie</p> <p>Danish solvarme tagmonteret</p> <p>Dutch thermische zonne-energie op het dak</p> <p>Esperanto Suna surtegmenta varmizilo</p> <p>Estonian päikeseküte (<i>katusel</i>)</p> <p>Finish 'Aurinkokeräin katolla (<i>closest match</i>)</p> <p>French Energie thermique solaire sur des toits</p> <p>German Thermische Solarkollektoren (<i>Sonnenkollektoren</i>) auf dem Dach</p> <p>Greek Ηλιακά θερμικά συστήματα σε κτίρια</p>	<p>Hebrew גגות על תרמית אנרגיה</p> <p>Hungarian Tetőre telepített napkollektor</p> <p>Italian Impianto solare termico su edificio</p> <p>Islandic Sólárhitasöfnunarkerfi á þaki</p> <p>Latvian Saules termālie paneļi uz jumta</p> <p>Lithuanian Stogų saulės šiluminės jėgainės</p> <p>Montenegrin Solarne termalne elektrane na krovu</p> <p>Polish Dachowe panele słoneczne</p> <p>Portuguese Termoeléctrica solar montada em telhados</p> <p>Romanian Energie termică solară pe acoperiş</p> <p>Russian Солнечные термальные системы смонтированные на здании</p> <p>Slovenian Sončne termalne strešne naprave</p> <p>Serbian Соларне термоелектране - кровне</p> <p>Spanish Energía termo-solar sobre cubierta/techo</p> <p>Swedish Sol termisk takmonterad kraft</p>