Solar Heat Europe ESTIF

Solar Heat Markets in Europe

Trends and Market Statistics 2021
Summary (December 2022)

Installed capacity in operation:
37.8 GW_{th}

Additional capacity installed in 2021:
1.45 GW_{th}

Annual energy generation (estimated):
27 TWh_{th}

Sector turnover (estimated)
1.79 EUR billion

Numbers of jobs (estimated):
18 400

Estimated annual CO_2 emissions savings:
9.6 Mt CO_2

Total number of solar thermal systems in operation:
10.7 million

Estimated energy storage capacity:
188.8 GWh
(connected with solar heat systems)

Building momentum to solarise heat in Europe

In 2021, the European solar heat market started recovering from the pandemic, leading to an increase of newly installed capacity in Europe of around 8%, with an additional 1.45 GW_{th} of solar collectors installed. The overall installed capacity continued to grow reaching 37.8 GW_{th} in Europe, which corresponds to over 53.9 million m^2 of solar thermal collectors, 1% more than in 2020. Such total capacity results in an estimated energy generation capacity of 27 TWh. This record level of energy generation is nevertheless still distant from the indicative targets set by Member States for solar heat in 2020, totalling 78 TWh. This confirms that the potential of solar thermal in Europe remains clearly untapped.

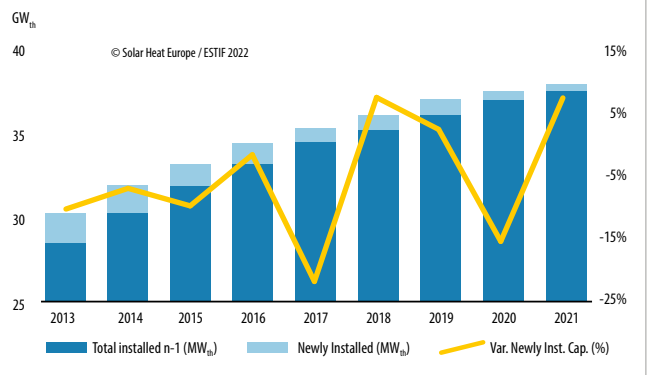
Solar heating and cooling market behaviour in 2021

For solar heating and cooling, 2021 represents the year where the sector was able to resume the growth cycle started in 2018 and interrupted by the pandemic. The newly installed capacity increased by +8%. This installed capacity generates an estimated 27 TWh of solar heat in Europe, a record-high level for solar thermal. This also makes solar thermal one of the main renewable energy sources in Europe in terms of energy generation and the leading one in terms of storage capacity, with a total estimated storage capacity over 188.9 GWh.

The evolution of the installed capacity was far from homogeneous across countries or market segments. The most positive development happened in France, where the yearly sales grew by 3 digits (+130%). Another robust growth happened in Italy, +84.4%. This remarkable increase contributed to make Italy the third largest European market for solar thermal. The second largest market, Greece, recovered from the previous year and increased sales by +17.9%. The largest market, Germany, maintained a similar level of sales in 2021. Several markets have faced a decrease during this period, as for instance Sweden, partially due to the lack of new large-scale projects, as well as the lack of political support for solar thermal. Nevertheless, there is an immense potential for large-scale solar thermal systems in the upcoming years, which should reverse this negative trend in this Nordic country.

Overall, the annual sales totalled 1.45 GW_{th} (over 2 million m^2). The total capacity in operation increased to 37.8 GW_{th} (53.96 million m^2), adding 1% to the total installed capacity by the end of 2021. This installed capacity in operation contributes to saving an equivalent of 2.1 million toe and avoiding 9.6 Mt of CO2 emissions. In terms of economic significance, the solar heating and cooling sector reached a combined turnover of 1.8 billion EUR in 2021, employing over 18 000 people.

Solar thermal market in EU27 + Switzerland + UK
Total and Newly Installed Capacity (glazed collectors)



The Italian market shines

The market with the largest increase in absolute terms is Italy, where an outstanding push made it the third biggest market in Europe. The newly installed capacity reached its highest historical % growth. The sales of solar thermal collectors, in terms of capacity (MW_{th}) increased by 85%, surpassing 158 MW_{th}, corresponding to 225 000 m^2 of new solar thermal panels installed. This brings the total solar thermal capacity installed in the country to around 5 million m^2 (3.5 GW_{th}).

The main reason for the positive growth trend has been the new "Super Bonus 110%", a subsidy program that came into force at the start of 2020 as part of the climate package. The program promotes, among other things, house and building energy renovations, and covers the full cost of the works. The subsidy program is a complete success for the energy transition in Italy and it shall serve as a benchmark/example for future support schemes tackling the energy transition across Europe.

It is important that the measures that have been put in place to reach the ambitious European climate targets are kept and reinforced, in order to promote renewable heat solutions such as solar thermal. The Italian government will continue financing the manoeuvre for 2 years, and we expect that the newly established government will also support the energy transition for the next years. Other support schemes, already running for several years, like "Conto Termico" also drove and will continue driving the increase of renewable heat.

Cover images: Savosolar, SHE Leuven, TVP Solar.

These support scheme examples shall be considered by other countries, which have been lagging behind in terms of support to solar thermal heat, in particular when compared to other renewable solutions, such as solar photovoltaics, which has created an unlevelled playing field between different renewable solutions. In addition to the positive results in 2021, the expectations for 2022 in Italy are also positive. This is surely good news from a country that was losing traction in the deployment of solar thermal heat and now it seems to be again in the front seat driving renewable heat deployment.

A temporary step back for Spain

The country that got demoted from the podium, Spain, has been one of the most stable solar thermal markets in recent years. The aftereffects of the pandemic and the weak policies for buildings and small-scale systems were felt in the sector and the year-on-year sales decreased by 18.5%, even if the total installed capacity increased by 3.3%.

In fact, the sales in 2021 started at a good pace, leading to positive expectations. On the other hand, thanks to the growth of the market for new construction of buildings and the important grants for thermal renewables, the prospects for 2022 are for a recovery. These grants emanate from the Recovery, Transformation and Resilience Plan (Next Generation) grants and have are already being deployed by the Spanish Autonomous Regions. The funding rate for these grants can reach more than 70% in some solar thermal installations. In addition to these lines of grants to the residential sector, grants for thermal renewables in the tertiary and industrial sectors will also be published, with grants between 35%- 45% for industry and 70% for public installations.

Solar heat and the energy crisis

With Europe facing an unprecedented energy crisis, one of the questions is if the solar thermal sales will be boosted given the context and, more prominently, if the sector is ready to play a role in the efforts to swiftly move away from Russian gas.

The signals are mixed, with the current crisis on energy prices and security of supply having varied (and sometimes counteracting) effects. We point out some of these hereunder.

Drive for alternative solutions

In 2022 there has been a clear increase in demand for heat, in different market segments. These have been the result of the general concern about rising gas and electricity prices, in combination with worries about security of supply. This has made more energy users look into solar thermal. Despite receiving almost no media coverage compared to solutions like solar PV or heat pumps, many potential clients are interested in solar thermal as an alternative for their houses or companies.

Logistical bottlenecks

Logistical problems regarding the supply of components existed prior to the current crisis, having grown particularly during the pandemic. The situation had not yet stabilised when Russia invaded Ukraine, creating additional hurdles. For instance, the supply of glass for solar thermal collectors was affected by the end of operations of an important supplier based in Ukraine. As for other sectors, limitations regarding transport (availability and costs) are also affecting the solar thermal sector, in particular smaller manufactures, with some having to halt or reduce their production to face shortages in some components.

Cost increase

The inflationary pressure caused by the increase in energy prices affects different economic sectors, including solar thermal. The production of solar thermal systems is not energy intensive, still the increase in components' costs leads to an increase of solar systems' prices. This brings some uncertainty when negotiating new deals, for supplying solar thermal systems or for the construction of larger plants and requires an extra effort in renegotiations with suppliers and/or clients.

Energy price uncertainty

Larger energy consumers are facing uncertainty regarding energy prices. This has strangely a counterintuitive effect. While the expectation is that higher gas and electricity prices would speed up the decision to use alternatives, the fact is that uncertainty on how prices shall evolve, combined with some speculations around a steep reduction in gas prices in the future, lead to delays and impasse in giving the green light to new investments.

Higher financing costs

The current increase in inflation and consequently in interest rates has a strong impact on solar thermal investments. As for other renewables such as solar PV and wind, solar thermal has high CAPEX and extremely low OPEX. As such, the financing costs have a massive impact on the business case for large solar thermal systems. In addition, some potential clients (ex.: energy utilities, energy intensive industries) have seen the increase in energy costs affecting their competitiveness and their financial situation, and consequently their credit rating, leading many to put new investment decisions on-hold.

Short-sighted emergency measures

The need to ensure alternative supply options for this and the following winter have led utilities and industrial companies to rush into new short-term supply contracts, which affects their plans and capacity to go into new renewable energy supply options. This is also valid at political level where the drive for immediate and large-scale options strongly affects the capacity of renewable technologies to be part of the solution. And it includes those solutions that have ambitious short-term targets in REPowerEU, such as solar photovoltaics and heat pumps, but affects even more other technologies for which such clear targets have not been set.

Improved competitiveness

Solar heat was already more competitive than electricity from the grid prior to the crisis. It was also competitive with other renewables and, in some applications, with natural gas. The increase in the prices of gas and electricity has clearly improved the competitiveness of solar heat. The fact that solar heat has low operating costs, also provides an added advantage in comparison with other renewable heat options such as heat pumps and bioenergy, due to the increase in the cost of electricity or biomass (pellets, woodchips, etc.).

Varied supply chain options

Solar thermal does not require critical materials, such as rare-earth minerals. The manufacturing of solar heat systems requires materials that are widely available, from a broad number of suppliers. While most of the supplied components are coming from within Europe, it is also possible to have such components supplied from a diversity of sources (countries/companies). This is particularly important considering the expected increase in demand due to accelerated deployment of solar thermal systems and the need to quickly boost the production of these solar thermal systems in Europe.

EU based manufacturing capacity

90% of the solar thermal systems sold in Europe are manufactured in Europe. As EU demand for renewable energy systems rises, it is essential to provide a sustainable solution, based on domestic (EU-based) production with, what is by large, an EU based supply chain. The solar thermal sector has idle manufacturing capacity that can be activated, to increase the production capacity by a factor of three in the next six months. Furthermore, new production lines can be set up in relatively short timeframes, from 3 to 18 months depending on the solar collector type and pre-existing conditions.

Sustainability and circularity

Besides the savings on carbon emissions, solar thermal presents other advantages, being environmentally friendly. It is an excellent solution in what concerns circularity. The recyclability rate of a solar thermal systems exceeds 95%, including both the solar panel and storage (thermal energy). The collection process does not require special recycling means or channels .

For instance, one of the main components of solar thermal systems, copper, is 100% recyclable. It can be used over and over with no loss of properties. Furthermore, around 50% of EU demand for copper is met through recycling. In addition, the energy payback time of solar thermal systems is 1 year, on average, considering gas as a reference. This means that a solar thermal system generates in one year the equivalent energy required to produce such system.

LCOE (Levelised Cost of Energy) € cent per kWh for different Energy Sources

Solar thermal is the most competitive renewable energy source, being EU made and not dependent on critical materials. In a period when we need a fast transition to renewables while reducing energy costs and our dependency on energy imports, solar heat must be a priority.

Solar Heat Europe Members

Market size in terms of Solar Thermal Capacity (KW_{th}) and in terms of Collector Area (m^2)

	Market (=Newly Installed) Glazed Collectors				In Operation[2] Glazed Collectors			
	2020	2021		Annual Evolution of the Market	2020	2021		Annual Evolution of the Total Installed Capacity
	m^2	m^2	**kW_{th}**[1]	%	m^2	m^2	**kW_{th}**	%
Austria	76 060	70 736	**49 515**	-7.0%	3 853 625	3 764 281	**2 634 997**	9.3%
Belgium	22 500	16 600	**11 620**	-26.2%	690 305	702 424	**491 696**	2.0%
Bulgaria †	24 000	25 184	**17 628**	4.9%	177 977	199 661	**139 762**	4.4%
Croatia	15 887	12 912	**9 038**	-18.7%	268 353	279 201	**195 441**	3.0%
Cyprus	74 613	70 360	**49 252**	-5.7%	880 850	921 210	**644 847**	7.0%
Czech Republic †	22 000	17 113	**11 979**	-22.2%	628 524	638 503	**446 952**	2.9%
Denmark †	17 613	8 013	**5 609**	-54.5%	1 829 926	1 811 789	**1 268 252**	1.8%
Estonia *	1 425	1 468	**1 027**	-	20 300	21 718	**15 202**	-
Finland †	7 000	3 523	**2 466**	-49.7%	68 513	70 786	**49 550**	4.4%
France [3]	34 000	78 280	**54 796**	130.2%	2 648 300	2 714 580	**1 900 206**	2.5%
Germany	643 500	640 000	**448 000**	-0.5%	19 413 000	19 153 000	**13 407 100**	7.0%
Greece	304 500	359 000	**251 300**	17.9%	4 989 550	5 173 550	**3 621 485**	6.4%
Hungary *	21 000	22 050	**15 435**	-	347 034	366 144	**256 301**	-
Ireland †	11 114	3 898	**2 729**	-64.9%	413 665	417 293	**292 105**	0.5%
Italy	122 000	225 000	**157 500**	84.4%	4 869 965	5 040 666	**3 528 466**	2.9%
Latvia *	1 600	1 648	**1 154**	-	40 012	41 540	**29 078**	-
Lithuania *	1 700	1 751	**1 226**	-	22 230	23 861	**16 703**	-
Luxembourg †	4 469	3 574	**2 502**	-20.0%	70 732	72 606	**50 824**	3.9%
Malta †	681	1 314	**920**	93.0%	53 688	53 002	**37 101**	11.6%
Netherlands	32 750	34 393	**24 075**	5.0%	620 287	624 143	**436 900**	10.2%
Poland	161 100	189 100	**132 370**	17.4%	2 994 703	3 170 803	**2 219 562**	1.4%
Portugal	69 700	77 045	**53 932**	10.5%	1 243 589	1 314 634	**920 244**	1.1%
Romania *	15 960	16 439	**11 507**	-	233 670	249 109	**174 376**	-
Slovakia *	13 000	13 390	**9 373**	-	184 820	193 810	**135 667**	-
Slovenia	1 400	1 439	**1 007**	2.8%	132 773	132 712	**92 898**	1.8%
Spain	184 612	150 500	**105 350**	-18.5%	4 178 296	4 282 439	**2 997 707**	3.3%
Sweden	4 898	1 955	**1 368**	-60.1%	290 196	270 181	**189 127**	14.6%
Switzerland	32 120	27 100	**18 970**	-15.6%	1 533 293	1 533 817	**1 073 672**	3.6%
United Kingdom	4 767	5 608	**3 926**	17.6%	729 760	720 138	**504 096**	5.8%
EU27 + Switzerland + UK	1 925 969	2 079 391	**1 455 574**	8.0%	53 427 934	53 957 598	**37 770 318**	1.0%

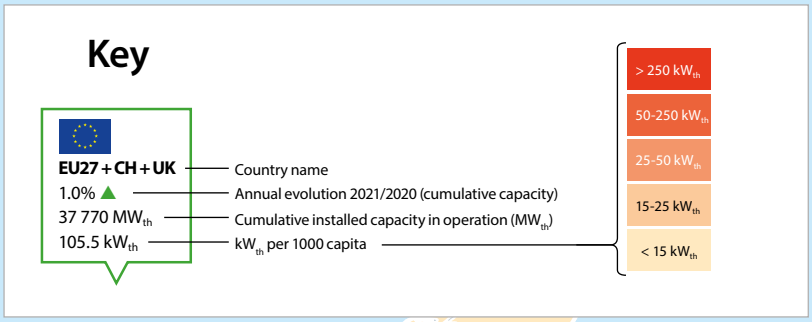
Solar Heat Europe/ESTIF would like to thank the solar thermal associations and other national sources for providing the data for these statistics, in particular:

Absolicon; AEE Intec; Asociación Solar de la Industria Térmica (ASIT); Association pour Techniques Thermiques de Belgique (ATTB/Belsolar); Assotermica; Bundesverband Solarwirtschaft (BSW-Solar); Centraal Bureau voor de Statistiek (CBS); Chalmers University of Technology; Cyprus Union of Solar Thermal Industrialists (EBHEK); Energy Transition UK; Greek Solar Industry Association (EBHE); Energy Institute Hrvoje Požar (EIHP); Holland Solar; Polish Association of Manufacturers and Importers of Heating Appliances (SPIUG); Solar Energy UK; Swissolar; Syndicat des professionnels de l'énergie solaire (ENERPLAN); Uniclima.

Figures for countries marked with an * are Solar Heat Europe/ESTIF estimations and, therefore, these are not sufficiently accurate to be used for percentual change reference in these markets. For some of the cases, the total sales or distribution between collector type combines historical data and information received regarding the market evolution. In the case of countries marked with an +, the 2021 figures are based on the EurObserv'ER "Solar thermal and CSP Barometer" (2022).

1) The relation between collector area and capacity is $1m^2 = 0.7kW_{th}$ (kilowatt-thermal).
2) Capacity "in operation" refers to the solar thermal capacity built in the past and deemed to be still in use. Solar Heat Europe/ESTIF assumes a 20 year product life for all systems installed since 1990. Most products today would last considerably longer, but they often cease to be used earlier, e.g. because the building was demolished, or there has been a change of building use.
3) The figures shown here relate to Metropolitan France (mainland). As a reference, in 2021 the newly installed capacity in overseas departments is estimated to be around 60 MW_{th} (86 000 m^2).

Solar Thermal Markets in Europe
Data for 2021



Sweden
14.6% ▲
189 MWth
26.4 kWth

Denmark†
1.8% ▲
1 268 MWth
312.1 kWth

Ireland†
0.5% ▲
292 MWth
85.1 kWth

UK
5.8% ▲
504 MWth
10.8 kWth

Netherlands
10.2% ▲
437 MWth
36.1 kWth

Poland
1.4% ▲
2 220 MWth
83.5 kWth

Belgium
2.0% ▲
492 MWth
61.3 kWth

Germany
7.0% ▲
13 407 MWth
230.7 kWth

Luxembourg†
3.9% ▲
51 MWth
118.3 kWth

Czech Rep.†
2.9% ▲
447 MWth
60.0 kWth

France
2.5% ▲
1 900 MWth
40.5 kWth

Switzerland
3.6% ▲
1 074 MWth
179.5 kWth

Austria
9.3% ▲
2 635 MWth
424.9 kWth

Slovenia
1.8% ▲
93 MWth
63.8 kWth

Croatia
3.0% ▲
195 MWth
68.5 kWth

Italy
2.9% ▲
3 528 MWth
83.5 kWth

Portugal
1.1% ▲
920 MWth
127.9 kWth

Spain
3.3% ▲
2 998 MWth
91.2 kWth

Malta†
11.6% ▲
37 MWth
107.4 kWth

Finland†
4.4% ▲
50 MW_{th}
12.8 kW_{th}

Estonia*
15 MW_{th}
16.4 kW_{th}

tvia*
MW_{th}
.6 kW_{th}

Lithuania*
17 MW_{th}
8.5 kW_{th}

Slovakia*
136 MW_{th}
35.6 kW_{th}

Hungary*
256 MW_{th}
37.5 kW_{th}

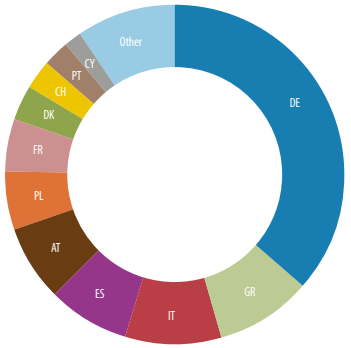
Romania*
174 MW_{th}
12.8 kW_{th}

Bulgaria†
4.4% ▲
140 MW_{th}
28.5 kW_{th}

Greece
6.4% ▲
3 621 MW_{th}
482.4 kW_{th}

Cyprus
7.0% ▲
645 MW_{th}
1 051.7 kW_{th}

Shares of the European Solar Thermal Market
(Newly Installed Capacity)



DE	36.0%
GR	9.2%
IT	9.0%
ES	7.7%
AT	7.1%
PL	5.5%
FR	4.9%
DK	3.4%
CH	2.8%
PT	2.3%
CY	1.6%
Other	9.3%

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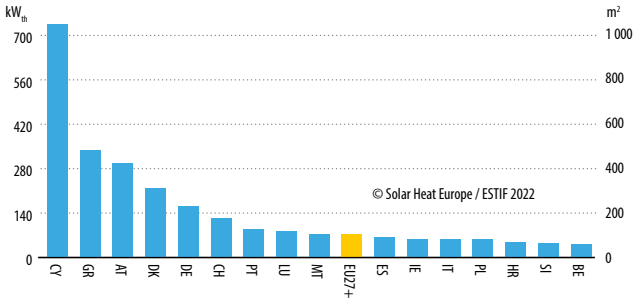
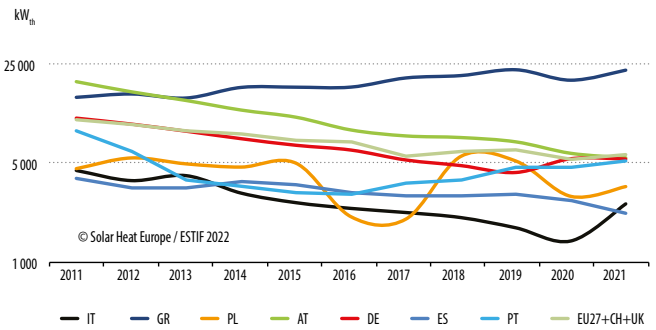
Solar Thermal Capacity in Operation
(per 1000 capita)



Development of Newly Installed Capacity in Main Markets per Capita (x1000)



Note: This graph features a logarithmic scale.