



**Solar Heat
Europe**
ESTIF

Solar Heat Markets in Europe

Trends and Market Statistics 2020
Summary (December 2021)



Installed capacity
in operation:

37.5 GW_{th}



Installed
capacity in 2020:

1.35 GW_{th}



Annual energy
generation (estimated):

26.8 TWh_{th}



Sector turnover
(estimated)

1.7 EUR billion



Numbers of jobs
(estimated):

17 000



Estimated Annual CO₂
emissions savings:

9 Mt CO₂



Total number of solar thermal
systems in operation:

10.6 million



Estimated energy
storage capacity:

187 GWh

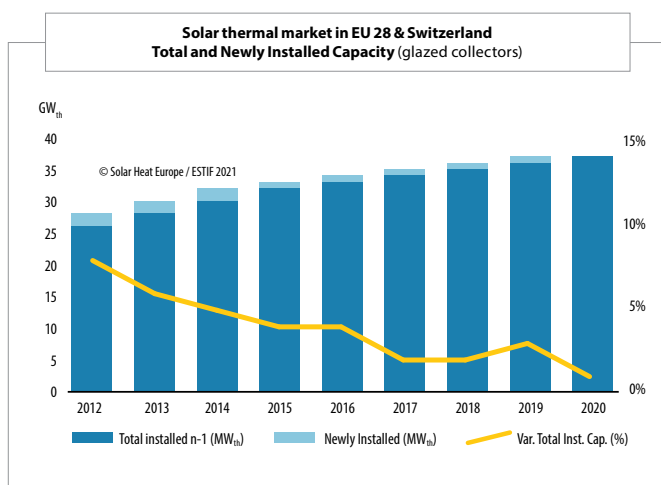
(connected with solar heat systems)

Sparse sunshine brightening a pandemic year

In 2020, the European solar heat market has been affected by the pandemic, leading to a decrease of newly installed capacity in Europe of around 15%. In spite of this situation, the overall installed capacity continued to grow **reaching 37.5 GW_{th} of total installed capacity in Europe**, which corresponds to an area **over 53.5 million m² of solar thermal collectors** and an annual increase of 1.3%. This increase corresponds to an **additional 1.35 GW_{th} of solar collectors installed**, bringing the total energy generation capacity to 26.8 TWh. This record level of energy generation is nevertheless still distant from the indicative targets set by Member States for solar heat in 2020, an estimated 78 TWh. This reiterates that the potential of solar thermal in Europe remains clearly untapped.

Solar heating and cooling market behaviour in 2020

The year 2020 will remain in the history books as the year of the COVID pandemic. For the solar heating and cooling sector, it represents a year where numerous companies suspended operations, while some helped in the pandemic related efforts. It also represents the interruption of a growth cycle, expected to resume in 2021. In spite of this situation, the total generation capacity continued to increase (+1.3%). The installed capacity, of 37.5 GW_{th}, generates an estimated 26.8 TWh of heat in Europe. Such level of energy generation is a record for solar thermal, placing it as 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 187 GWh_{th}.



The evolution of the installed capacity was far from homogeneous across countries or market segments. The most positive development happened in Germany, where the yearly sales grew 26%. This sizeable increase, in particular in a year where the overall sales in Europe contracted, contributed to an increase of the German share of the European solar thermal market to 33.1%. The second largest market, Greece, was one of the most affected by the pandemic, aggravated by logistical issues in terms of transport and supply towards the end of the year. The annual sales in the Greek market diminished by 15.7% in comparison with 2019. The most dramatic fall in 2020 comes from Denmark, where the changing policies have affected severely the solar thermal sector, with an almost complete stagnation on the solar district heating segment, which represented over 130 MW_{th} of newly installed capacity in 2019.

Overall, the annual sales totalled 1.35 GW_{th} (over 1.9 million m²). The total capacity in operation increased to 37.5 GW_{th} (53.5 mio m²), adding 0.48 GW_{th} to the total installed capacity by the end of 2020. The installed capacity in operation contributes to saving an equivalent of 2.1 Mio toe and avoids 9.6 Mt of CO₂ emissions. In terms of economic significance, the solar heating and cooling sector reached a combined turnover of 1.7 billion Euros in 2020, employing over 17 000 people.

The German powerhouse shines

The newly installed capacity in Germany reached its highest growth since the spectacular increase of 2008. The sales of solar thermal collectors, in terms of capacity (MW_{th}) increased by 26%, surpassing 450 MW_{th}. In terms of systems installed, the increase was 17%, with 83 000 new solar thermal heat systems installed. This brings the total number of solar thermal systems installed in Germany to around 2.5 million, according to BDH and BSW.

The two associations see the main reason for the positive trend as being the significantly improved "Heating with Renewable Energies" subsidy program that came into force at the start of 2020 as part of the climate package. The program promotes, among other things, the combination of gas condensing boiler technology and a solar thermal system with a maximum rate of 45 percent. "The subsidy program is a complete success for climate protection," emphasized BDH President Uwe Glock.

It is important that the measures that have been put in place to reach the ambitious climate target are reinforced, in order to promote the faster uptake of renewable heat solutions such as solar thermal. Since January 2021, the German government has combined all subsidies for energy-efficient buildings and climate-friendly heating systems in the new Federal Subsidy for Efficient Buildings (BEG). This support allows, for example, to retrofit an existing heating system with a solar thermal heat system benefiting from a subsidy of 30 percent of the eligible costs. This can increase to 40% if an old gas boiler is replaced by a more efficient option. And it must be highlighted that other important measures are in place, in particular the CO₂ charges, which are set to rise annually, leading to the increase of the costs associated with the use of fossil fuels.

This example shall also be considered by other countries, which have been lagging in terms of support to solar thermal heat, in particular when compared to other renewable technologies, such as solar photovoltaics, which have been creating an unlevel playing field between different renewable solutions. Regarding the expectations for 2021 in Germany, they are extremely positive. According to BSW's CEO Carsten Körnig, "The signs continue to point to growth. The business climate in the solar industry is at its highest level in over ten years." These are good news from a country that has been historically in the solar thermal heat industry and in promoting renewable solutions.

A passing cloud over Greece

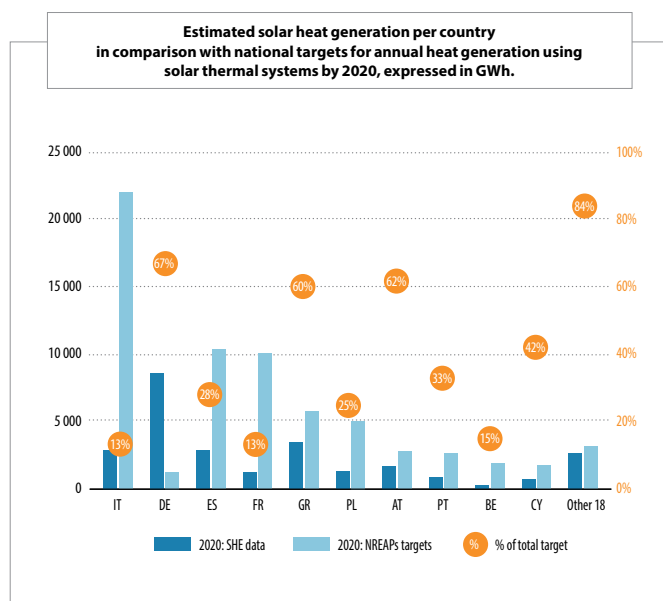
Greece is the second largest solar thermal heat market and has had over the years a remarkable market evolution, setting an enviable record of steady growth over the last decade. The effects of the pandemic were felt in the sector and the year-on-year sales decreased by 15.7%, even if the total installed capacity increased by 2.5%.

In fact, the sales in 2020 started at a good pace, leading to positive expectations. The decrease was mostly the result of the first lockdown, reaching 50% in April and May 2020. Sales were also affected in other months, to a lesser degree. This contraction reflects the specificities of the Greek market, where sales in specialised commerce, namely wholesalers, are quite relevant. As such, those sales cannot be fully replaced by other channels, including online sales. Furthermore, the effects of the pandemic in economic activities overall meant that the sales to the hospitality sector in general (hotels, restaurants) were strongly affected. On the other hand, initial numbers indicate that exports were stable, with a minor increase in solar collectors' sales and a larger increase for storage tanks.

The expectations for 2021 are positive, with the market players expecting a significant increase. Additionally, the Greek Government has been developing measures to promote the uptake of solar thermal heat systems, as part of their plans to address climate targets, hopefully giving more attention to a sector where Greek companies and products are a reference in Europe and worldwide.

After a lost decade for heating , increased urgency

The year 2020 represented a milestone for the renewable energy sector, as it was the deadline for reaching the targets agreed in the Renewable Energy Directive of 2009¹. As expected, based on the slow evolution over the last years, most countries fell short of reaching their indicative targets for solar heating and cooling. The total energy generation from solar thermal systems reached in 2020 (26.8 TWh_{th}) is below the indicative targets of Italy and Poland combined. Germany, Austria and Greece were the countries closer to reaching their target (among the main markets), reaching respectively 67%, 62% and 60% of the target. These countries have well established solar thermal markets and were able to set more pragmatic targets, though it is disappointing that all have failed short of the indicative targets they have set in their National Renewable Energy Action Plans.



The past decade has been a lost opportunity in what concerns the decarbonisation of the heating and cooling sector. While there were substantial achievements in the renewable power sector, in what concerns renewable heat the action from Member States has been extremely limited. It has been often referred in international reports² that countries were lagging in terms of policies addressing renewable heating and cooling.

One could assume that the decade lost would have at least served as a learning lesson. This is unfortunately not the case! The European Commission has pointed out the gaps in terms of the measures proposed by Member States, in its assessment of the National Energy and Climate Plans (NECPs), as reflected in the annexes³ to the 2020 State of the Energy Union report⁴. For instance, it is repeatedly mentioned that the measures indicated in the plans will not be sufficient to achieve the indicative target of 1.3% (or 1.1%) laid-out in Article 23⁵ of the new Renewable Energy Directive⁶.

This decade is critical to achieve the decarbonisation of the heating and cooling sector. In Europe, the sector represents 51% of final energy consumption and approximately 27% of carbon emissions. In order to reach the CO₂ reduction targets by 2050, we must ensure that all new systems installed after 2030 are compatible with a carbon neutral future. Furthermore, we must not lose our focus by looking only at 2050. We need to step up the decarbonisation process, in order to remain within our carbon budget. And we have solutions available that can be ramped up until 2030, in order to ensure that we are on track.

Solar thermal provides competitive solutions for different applications in diverse locations, ranging, for instance, from a small, low-cost thermosiphon system (2.8 kW_{th}) with diurnal thermal storage (12.7 kW_{th}) that provides domestic hot water in a Mediterranean country for less than 2 €-cents per kWh, to a large solar district heating system (35 MW_{th}) with seasonal thermal storage (142 MWh_{th}) in Denmark, achieving remarkable generation costs of only 3.5 €-cents per kWh. Conversely, it is a well proven alternative in terms of its contribution to the reduction of CO₂ emissions, and among the most environmentally friendly renewable solutions, when considering the full product lifecycle, from manufacturing to decommissioning, and recycling.

Naturally, it faces several challenges, most of which are common to other renewable heating and cooling solutions in the market, such as the upfront investment. In the case of solar thermal, this effect is even stronger as the operating costs are extremely low and the gross of the investment is done at purchase, hence comparable to having a consumer paying their energy bill in advance. The combined effect of uncertain economic context and low fossil fuels prices contributes to making the upfront investment a harsher hurdle when planning to invest in a new heating system. And this leads to another important barrier: urgent replacement of space and/or water heating devices. The majority of system changes are unplanned, meaning that they are done when a consumer faces a problem with their heating system, either break-down or malfunction. When the issue is severe and a replacement is required, the fastest option is to opt for a similar solution, making it harder to integrate new efficient and renewable alternatives.

Promoting a level playing field for renewable heating and cooling solutions, assisting consumers in facing the upfront investment and facilitating a planned replacement of the space and water heating systems are low hanging fruits at the reach of any State, especially for those with lower shares of renewables covering their heating and cooling demand.

1 Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

2 This has been pointed out in successive editions of the Renewables Global Status Report of REN21, as well as in several other reports.

3 The EC included their assessment of the NECPs in 27 staff working documents published as annexes to the 2020 energy union report.

4 2020 report on the State of the energy union COM(2020)950.

5 Art. 23.1 "In order to promote the use of renewable energy in the heating and cooling sector, each Member State shall endeavour to increase the share of renewable energy in that sector by an indicative 1.3 percentage points [...]"

6 Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources.

Solar Heat Europe Members



Market size in terms of Solar Thermal Capacity (KW_{th}) and in terms of Collector Area (m²)

	Market (=Newly Installed) Glazed Collectors					In Operation ² Glazed Collectors			
	2019	2020		Annual Evolution of the Market		2019	2020		Annual Evolution of the Total Installed Capacity
	m ²	m ²	kW _{th} ¹	%		m ²	m ²	kW _{th}	%
Austria	91 580	76 060	53 242	-16.9%		3 930 509	3 853 625	2 697 538	-2.0%
Belgium	27 800	22 500	15 750	-19.1%		671 035	690 305	483 213	2.9%
Bulgaria †	23 980	24 000	16 800	0.1%		157 477	177 977	124 584	13.0%
Croatia *	20 027	17 023	11 916	-		254 146	269 489	188 642	-
Cyprus	69 945	74 613	52 229	6.7%		836 237	880 850	616 595	5.3%
Czech Republic †	23 000	22 000	15 400	-4.3%		616 899	632 015	44 411	2.5%
Denmark †	196 306	14 613	10 229	-92.6%		1 845 373	1 826 926	1 278 848	-1.0%
Estonia *	1 425	1 425	998	-		18 925	20 300	14 210	-
Finland †	7 855	7 855	5 499	0.0%		63 378	70 223	49 156	10.8%
France (3)	42 500	34 000	23 800	-20.0%		2 720 676	2 749 676	1 924 773	1.1%
Germany	511 000	643 500	450 450	25.9%		19 389 500	19 413 000	13 589 100	0.1%
Greece	361 350	304 500	213 150	-15.7%		4 866 050	4 989 550	3 492 685	2.5%
Hungary *	25 750	25 038	17 526	-		345 784	355 822	249 075	-
Ireland †	7 000	11 114	7 780	58.8%		402 931	413 665	289 565	2.7%
Italy	151 600	122 000	85 400	-19.5%		4 793 214	4 869 965	3 408 976	1.6%
Latvia *	23 150	1 600	1 120	-		38 532	40 012	28 008	-
Lithuania *	2 000	1 700	1 190	-		20 650	22 230	15 561	-
Luxembourg †	2 900	2 800	1 960	-3.4%		67 463	69 063	48 344	2.4%
Malta †	797	780	546	-2.2%		54 623	53 902	37 732	-1.3%
Netherlands	48 870	32 750	22 925	-33.0%		615 198	620 287	434 201	0.8%
Poland	287 190	161 100	112 770	-43.9%		2 841 603	2 994 703	2 096 292	5.4%
Portugal	68 979	69 700	48 790	1.0%		1 179 389	1 243 589	870 512	5.4%
Romania *	15 960	15 960	11 172	-		218 910	233 670	163 569	-
Slovakia *	9 120	9 120	6 384	-		176 120	180 940	126 658	-
Slovenia	1 473	1 400	980	-4.9%		133 373	132 773	92 941	-0.4%
Spain	207 150	184 612	129 228	-10.9%		4 034 171	4 178 296	2 924 807	3.6%
Sweden	1 161	4 898	3 429	321.9%		304 415	290 196	203 137	-4.7%
Switzerland	38 778	32 120	22 484	-17.2%		1 527 675	1 533 293	1 073 305	0.4%
United Kingdom	5 482	4 767	3 337	-13.0%		736 843	729 760	510 832	-1.0%
EU27 + Switzerland + UK	2 274 127	1 923 547	1 346 483	-15.4%		52 861 097	53 536 100	37 475 270	1.3%

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:

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); Holland Solar; Polish Association of Manufacturers and Importers of Heating Appliances (SPIUG); Solar Trade Association (STA); Swissolar; Syndicat des professionnels de l'énergie solaire (ENERPLAN); Uniclimate; University of Ljubljana.

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 2020 figures are based on the EurObserv'ER "Solar thermal and CSP Barometer" (2021).

- 1) The relation between collector area and capacity is 1m² = 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 2020 the newly installed capacity in overseas departments is estimated to be around 60 MW_{th} (86 000 m²).

Solar Thermal Markets in Europe

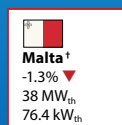
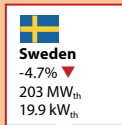
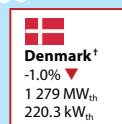
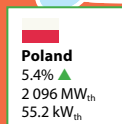
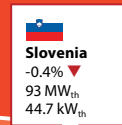
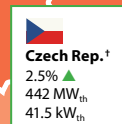
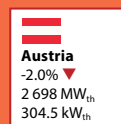
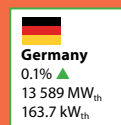
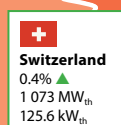
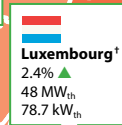
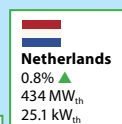
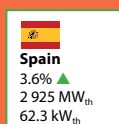
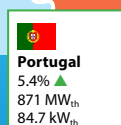
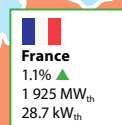
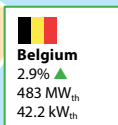
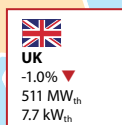
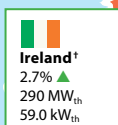
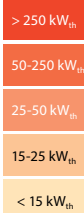
Data for 2020

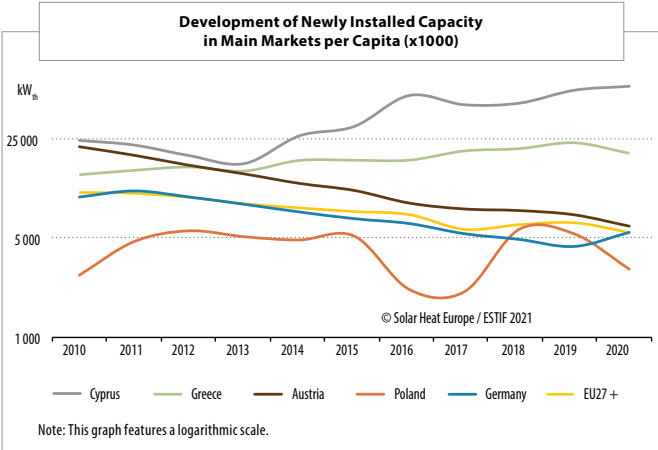
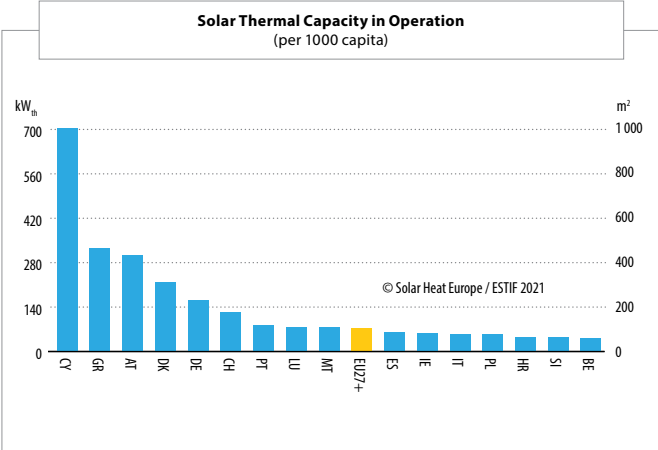
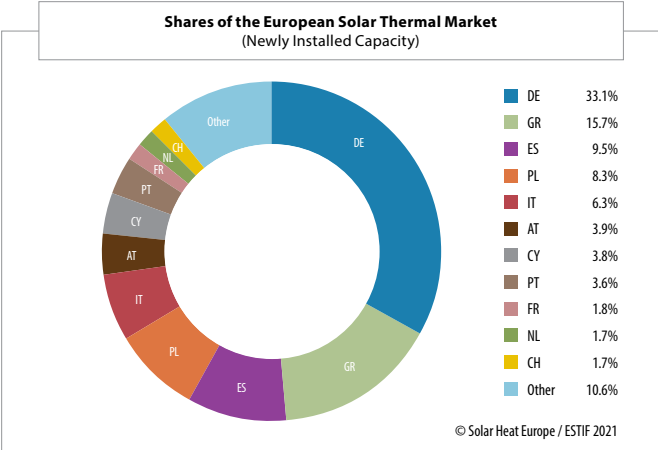
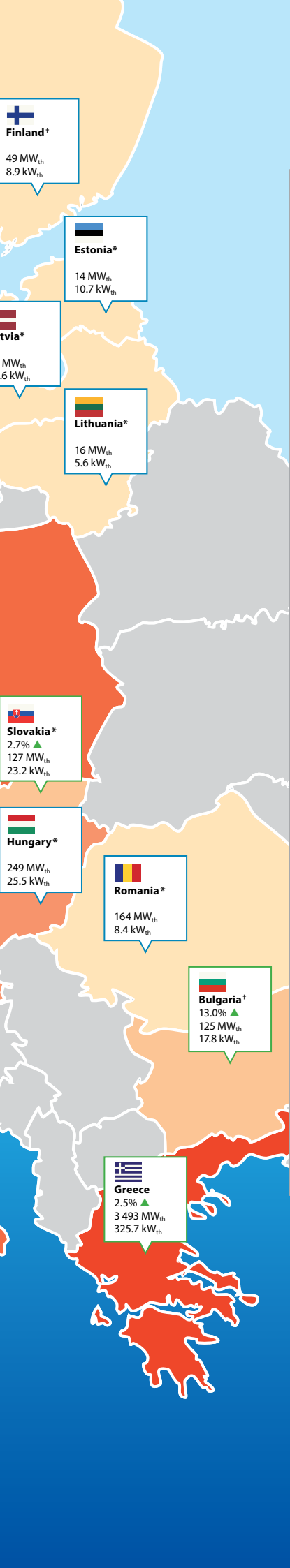
Key



EU27+CH+UK

1.3% ▲ Annual evolution 2020/2019 (cumulative capacity)
37 475 MW_{th} Cumulative installed capacity in operation (MW_{th})
73.3 kW_{th} per 1000 capita





2020 Barometer

