

Newsletter of the
International Energy
Agency Solar Heating
and Cooling Programme



#SolarHeat
#SolarThermal
#SolarProcessHeat
#SolarCooling
#SolarDistrictHeating

Solar Heat Worldwide - 2023 Edition

Our flagship report, *Solar Heat Worldwide 2023* is the most comprehensive evaluation of solar heating and cooling markets with data from 71 countries. The 2023 edition is available for free on the IEA SHC website. Highlighted below are just a few of the findings from this year's report.

In 2022, **19 GWth** or **27 million square meters** of collectors were installed, generating 442 TWhth of green heat, saving **47.48 million tons of oil** and avoiding **153.3 million tons of CO₂**. And with **115 million systems** in operation, the total solar thermal capacity was **542 GWth**.

2022 was a mixed year for solar thermal – while many solar thermal markets grew, particularly in Europe, the global market was overshadowed by declines in two of the largest markets, China and India, leading to a 9.3% decline after last year's 3% growth. With China holding over 70% of the total market share, its decline of 12.4%, largely due to Covid-19 lockdowns, combined with a 21% drop in India due to subsidy changes and PV competition, the drag on the global market is evident.

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Lucio Mesquita of Canada Elected New SHC Executive Committee Chair



Lucio Mesquita of Natural Resources Canada is a familiar face to many of us and a longtime Task participant starting with Task 25 on Solar-Assisted Air Conditioning of Buildings in 1999.

Lucio has over 30 years of experience researching, designing, and testing solar thermal products and systems for industrial, commercial and residential applications in Canada, Brazil, China and the US. His

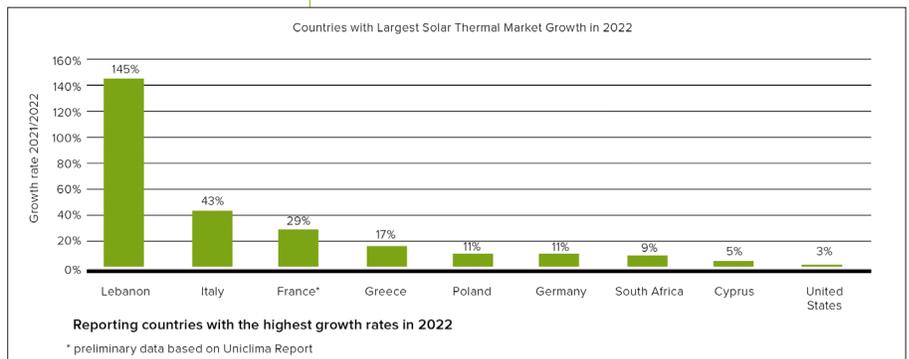
work has included designing and commissioning more than 180 commercial solar thermal projects.

Tomas Olejniczak passed the "gavel" to Lucio at the June Executive Committee Meeting in France. Thank you Tomas for your leadership as Chair these past 2 years!

SHC Members

- AUSTRALIA
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- CHINA
- DENMARK
- EACREEE
- ECI
- ECREEE
- EUROPEAN COMMISSION
- FRANCE
- GERMANY
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- ITALY
- NETHERLANDS
- NORWAY
- PORTUGAL
- RCREEE
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- SLOVAKIA
- SOUTH AFRICA
- SPAIN
- SWEDEN
- SWITZERLAND
- TURKEY
- UNITED KINGDOM

On the other end of the spectrum is Lebanon and its incredible 145% market growth, underscoring the power of subsidies and timing. This growth, mainly driven by the removal of electricity subsidies, rise in fuel prices, and currency depreciation, motivated consumers to install solar water heaters as an affordable alternative to electric heating. In Europe, Italy, Greece, and Poland recorded positive market developments for the second year in a row. After a staggering market growth of 83% in 2021, Italy's solar thermal market maintained its strong market growing by 43% in 2022. Greece experienced similarly positive development, with 18% growth in 2021 and 17% in 2022. Poland also witnessed consecutive years of strong market expansion, with 17% and 11% growth rates in 2021 and 2022, respectively. Additional positive developments occurred in France (29%), Cyprus (5%), and South Africa (9%).

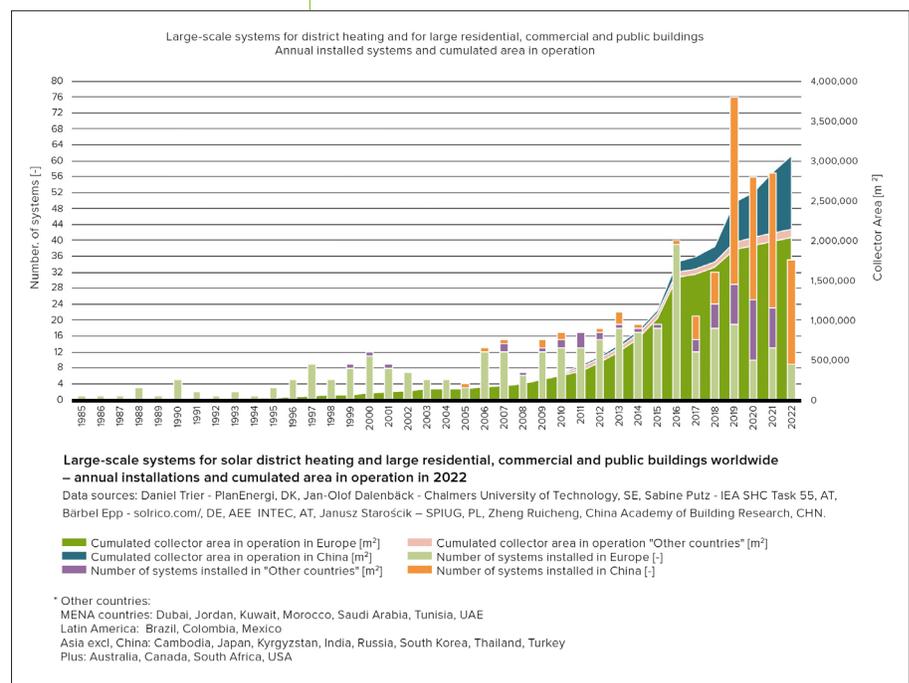


No energy turnaround without a heat turnaround

Global final energy consumption for heating and cooling has remained virtually unchanged at around 50% for many years. According to the IEA Renewables 2022 report, industrial processes are responsible for 53% of the final energy consumed for heat, while another 44% is used in buildings for space and water heating. The remainder is used in agriculture, primarily for greenhouse heating.

Fossil fuels dominate the heating sector. Apart from traditional biomass, only 11% of global heating needs were met by modern renewables in 2021, underscoring the urgent requirement for sustainable heating solutions.

The IEA Renewables 2022 report projects global heat consumption – excluding ambient heat from heat pumps – to increase by almost 14 EJ (+6%) during 2022-2027. This demand will be met to a small extent by electrifying the heating sector. Meeting the majority of this demand, however, will necessitate the adoption of geothermal energy, modern use of biomass, and solar thermal energy.



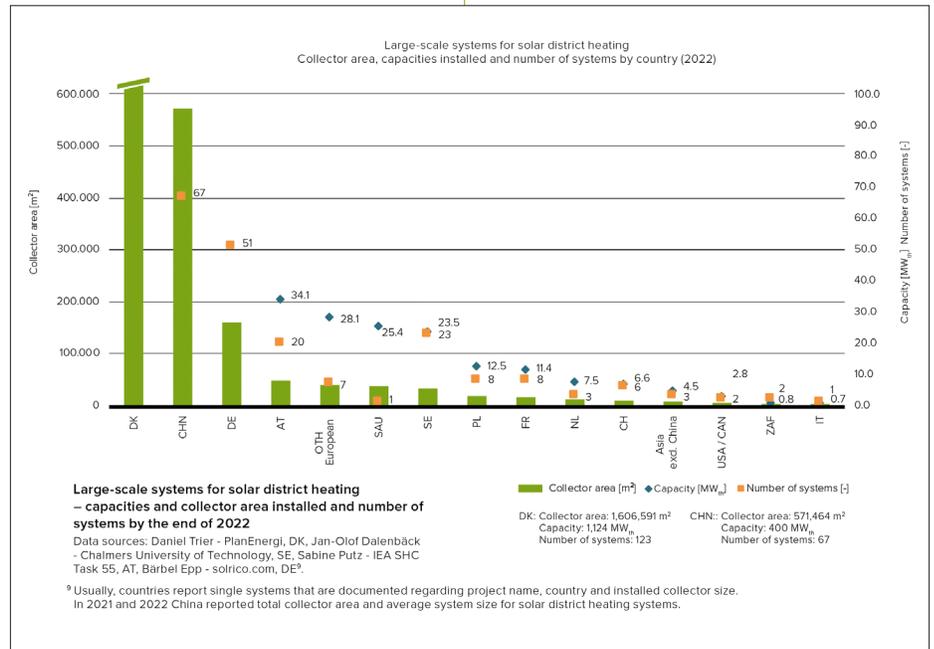


Solar district heating plant uses 9,181 m² of vacuum tube collectors in Lemgo, Germany. (Photo credit: Stadtwerke Lemgo GmbH/Viessmann)

Data indicates a significant rise in **demand for large-scale solar thermal systems in 2023**. Considering the extended lead time for developing large-scale system solar district heating and industrial process heat systems, coupled with the recent implementation of renewable heat policies, the solar thermal industry is poised for substantial growth in the coming years.

Clear upward trend in solar district heating in Europe

According to the German Steinbeis research institute Solites, in 2022, the total collector area for district heating in **Germany** grew by 30% compared to the previous year. This positive trend appears set to continue in 2023 and beyond. Nine systems representing a collector area of 28,000 m² (19.6 MW_{th}) are under construction or in an advanced planning stage. Another 66 systems with a collector area of 454,550 m² (318 MW_{th}) are under discussion. The construction of the largest solar district heating plant in Germany with a collector area of 65,000 m² (45.5 MW_{th} capacity) was announced by Stadtwerke Leipzig in April 2023, with plans for commissioning in 2025.



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Things are also on the move in the **Netherlands**. A large-scale solar district heating system will be completed in the first quarter of 2023 in the city of Groningen. This plant has a collector area of 48,000 m² (33.6 MWth capacity).

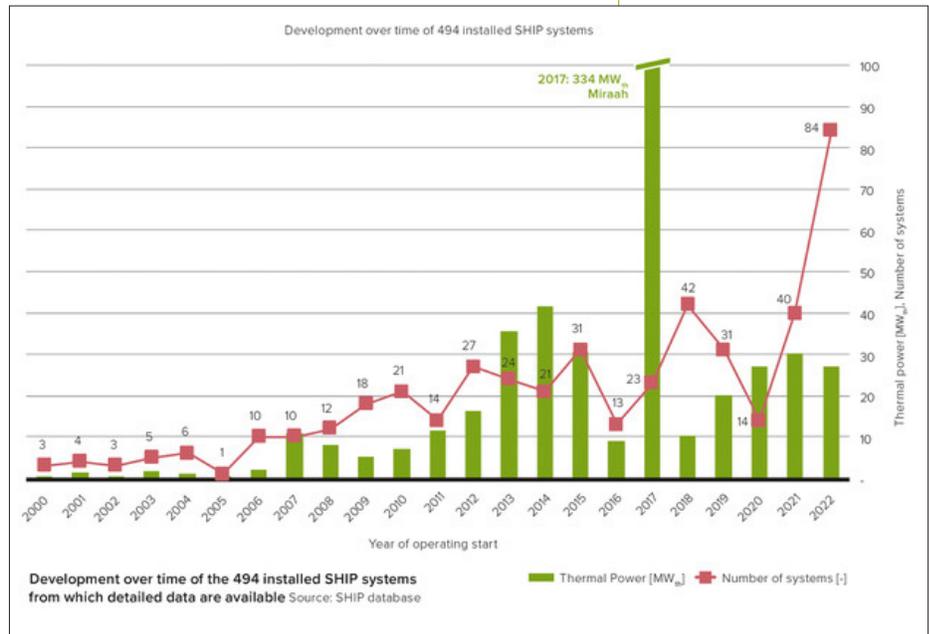
And the **Western Balkan** countries of Kosovo and Serbia are emerging as dynamic players in solar district heating. Advanced planning is underway for a solar plant in Pristina, the capital city of Kosovo, including a 58,000 m² collector area (40.6 MWth capacity) and a 408,000 m³ seasonal, set to come online in 2024. And two district heating plants are planned for Serbia. The feasibility study for a 35,000 m² (24.5 MWth capacity) plant in the city of Pancevo is completed, and plans are underway for a solar district heating plant in the range of 45 to 136 MWth in combination with seasonal storage for the city of Novi Sad.

A new dimension is opening up in China

In China, a groundbreaking solar plant with a 79.8 MWth capacity is under construction, providing heat to the Handan Bay Water World resort. The impressive 114,000 m² parabolic trough collector system will supply the hotel's HVAC and hot water systems, indoor swimming pool, and ice and snowmaking facilities for an indoor ski slope. Completion and commissioning are scheduled for the second quarter of 2023.

Positive outlook for solar industrial heat plants

Another sector showing promising signs of growth in 2023 is solar heat for industrial processes (SHIP). According to solarthermalworld, a significant increase in plants using solar process heat above 100 °C is expected. And the number of multi-MW plants to be commissioned in Europe in 2023 promises a sevenfold increase. These projects include a 2.5 MWth chemical plant in Turnhout, Belgium, and two brewery systems in Spain, 28.5 MWth and 4 MWth, respectively. Additionally, a solar thermal heating plant, heat pumps, and a storage facility for a malting plant in Croatia are being implemented, with commissioning scheduled for the first quarter of 2024.



The first GW-scale solar heat plant for an industrial application

By far, the largest solar process heat plant is in the planning stage in **Saudi Arabia**. Saudi Arabia's leading mining company signed an MOU in 2022 to facilitate a study to develop the first solar steam project in the kingdom to decarbonize an alumina refinery. When complete, the 1.5 GWth solar steam plant will reduce carbon emissions by over 600,000 tons annually, more than a 50% reduction in the refinery's carbon footprint.

Article contributed by Werner Weiss of AEE INTEC and co-author of Solar Heat Worldwide and the Austrian IEA SHC Executive Committee member.