SOLARUPDATE

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Newsletter of the International Energy Agency Solar Heating and Cooling Programme

#SolarHeat
#SolarThermal
#SolarProcessHeat
#SolarCooling
#SolarDistrictHeating

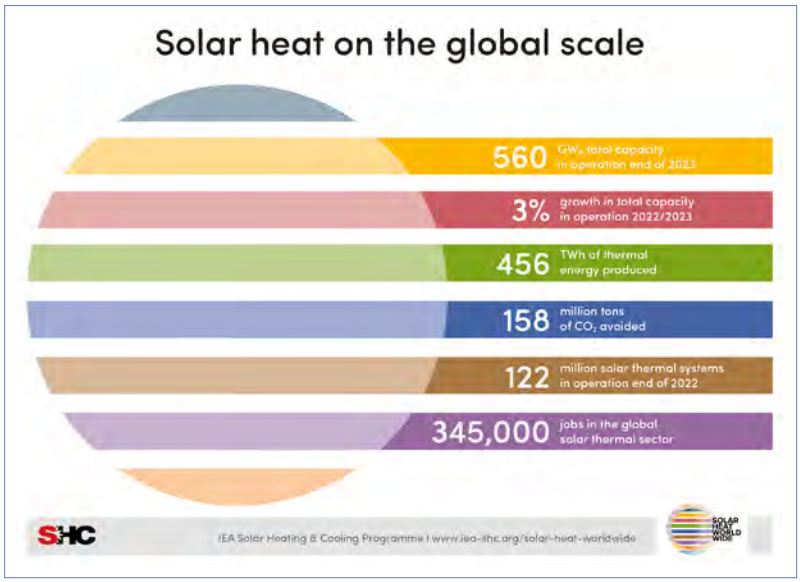
In This Issue

Solar Heat Worldwide

2024 EDITION

Our flagship report, Solar Heat Worldwide 2024 is the most comprehensive evaluation of solar heating and cooling markets, encompassing data from 72 countries. The 2024 edition is available for free on the IEA SHC website. Highlighted below are a few of the findings from this year's report.

In 2023, **18 GWth** or **26 million square meters** of collectors were installed, an increase in cumulative global installed capacity of 3% in 2023 compared to 2022. The annual solar thermal energy yield was **456 TWh**, saving **49.1 million tons of oil** and avoiding **158.4 million tons of CO_2**. With **122 million systems** in operation, the total operational solar thermal capacity reached **560 GWth**. What is behind these numbers can be found in detail in the report.



Market Trends and Developments in 2023

In 2023, there was a noticeable shift in solar markets from the traditionally strong European countries and China to emerging markets in Africa, Southeast Asia, and Latin America. This growth was counterbalanced by a decline in the largest

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solar heat market, China. Commanding over 70% of the global market share, China's 7.7% market decline, driven by challenges in the real estate sector, significantly impacted the global market landscape.

While the major solar thermal markets have faced declines, the resilience of the technology shines through as other markets steadily grow. As Lucio Mesquita, the Chair of the IEA SHC Programme, notes, *"This reaffirms the versatility and adaptability of the technology, signaling a promising future for solar heat applications worldwide. Market growth from 2022 to 2023, for the first time, was not dominated by European countries highlighting this shifting landscape."*

Taking a closer look at the market growth outside of China and Europe in Figure 1 reveals upward trends in Latin America and Sub-Sahara Africa, alongside rebounds in the MENA region.

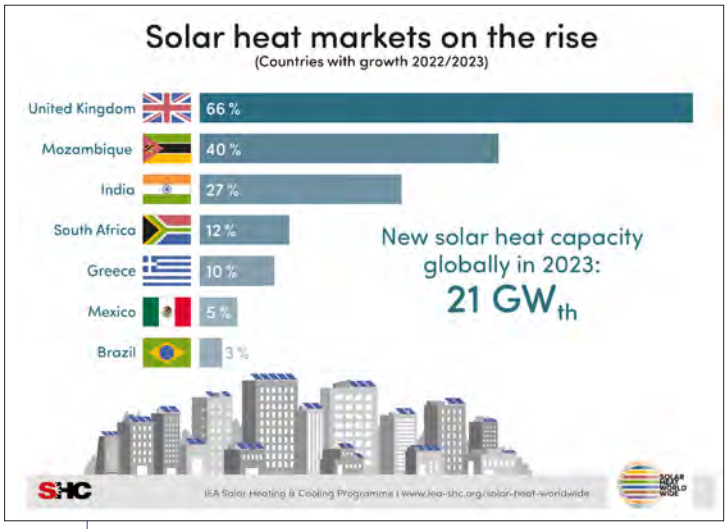
Sectors on the Move

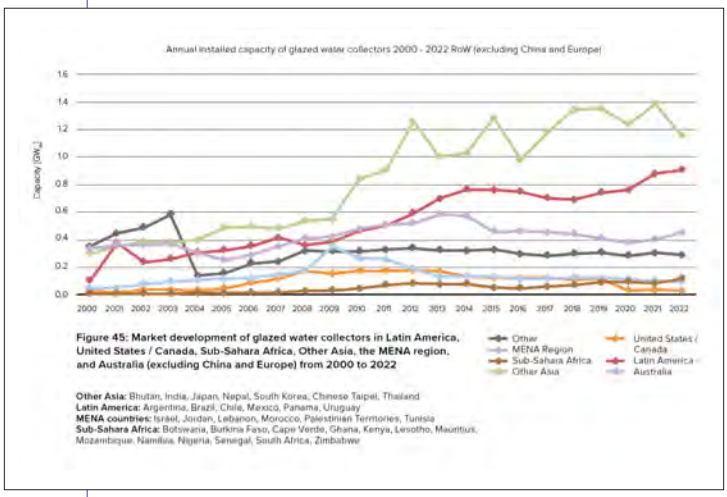
Large-scale Solar Heat Systems

At the end of 2023, there were **598 large-scale solar heat systems** operating, collectively totaling **2.3 GWth** of installed capacity and covering **3.3 million m²** of collectors. Historically dominated by Denmark, the Danish solar district heating market suffered a collapse in 2020 due to significant shifts in energy technology policy and funding conditions. This void has since been filled by other European countries, such as Germany and Austria, as well as China.

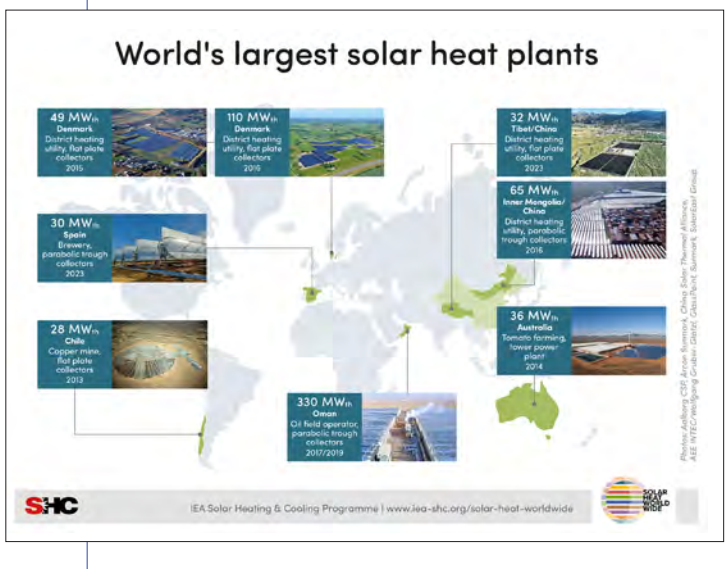
Solar district heating

Large-scale solar thermal heating systems meet a variety of heating needs, with solar district heating being the largest sub-sector. By the end of 2023, there were **336 large-scale solar district heating systems** (>350 kWth, 500 m²) in operation, with a total installed capacity of **1,908 MWth (2.73 million m²)** were reported in operation. As shown in Figure 2, Denmark leads in this market segment, having the most systems and the largest installed area. Alongside Denmark (124 systems) and China (72 systems), several other countries have a growing interest in solar district heating for decarbonizing neighborhood and city heat sectors. Countries to note are Germany (56 systems, some with seasonal storage), Sweden (23 systems), Austria (20 systems), and Poland and France (with 8 systems each). Outside of Europe and China, solar district heating systems are installed in Saudi Arabia, Japan, Kyrgyzstan, Russia (Other Asia), the USA, Canada, and South Africa.





▲ **Figure 1. Market development of glazed water collectors from 2022 to 2022.**



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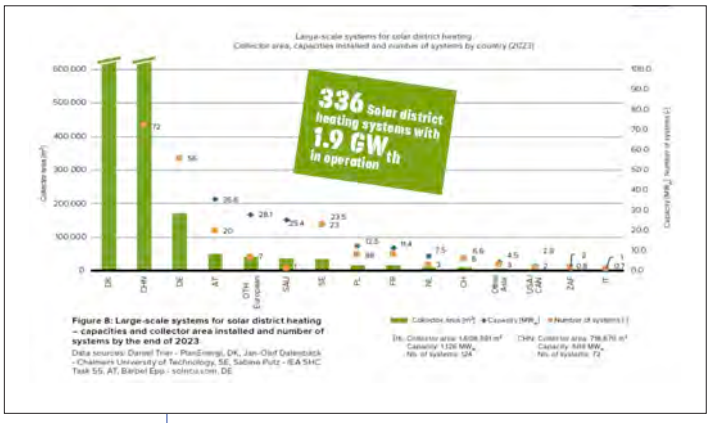
Solar heat in industrial processes (SHIP)

In 2023, at least **116 new SHIP systems** with a capacity of 94 MWth were installed. This is the same number of systems installed in 2022. So, what makes 2023 noteworthy? First, the **average system size more than tripled** compared to 2022. Second, concentrating collectors replaced flat-plate collectors as the predominant choice, especially in larger systems. From January 2023 to March 2024, 11 solar systems for industrial process heat with **concentrating collectors** were installed, totaling 120 MWth in capacity. Interestingly, most of these installations were at breweries. Additionally, in early 2024, an extraordinary plant was completed for the tourism industry in China using a parabolic trough collector system to supply snow for an indoor ski hall and heating and cooling for the Handan Bay Water World.

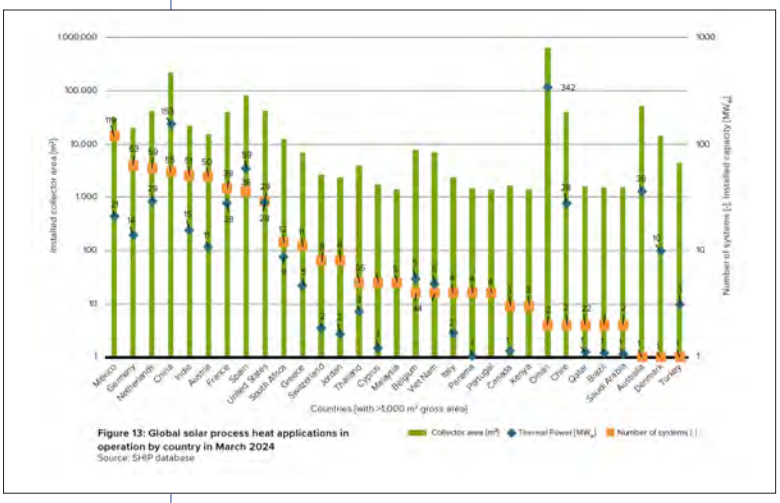
PV2Heat

PV2Heat systems connect the direct current (DC) from rooftop photovoltaic (PV) panels directly to a DC resistance heating element in the hot water tank, eliminating the need for inverters and minimizing intermediary electronics. These systems are well-suited for areas with unreliable grid service, high connection costs, or low initial capital. With the decreasing costs of PV technology, PV2Heat systems have become an attractive alternative for hot water generation. They also offer benefits such as eliminating the need for rooftop hot water storage tanks and avoiding issues with stagnation or frost. This technology has gained significant traction in recent years, especially in southern Africa. In **South Africa, 34,000 PV2Heat systems** have already been installed.

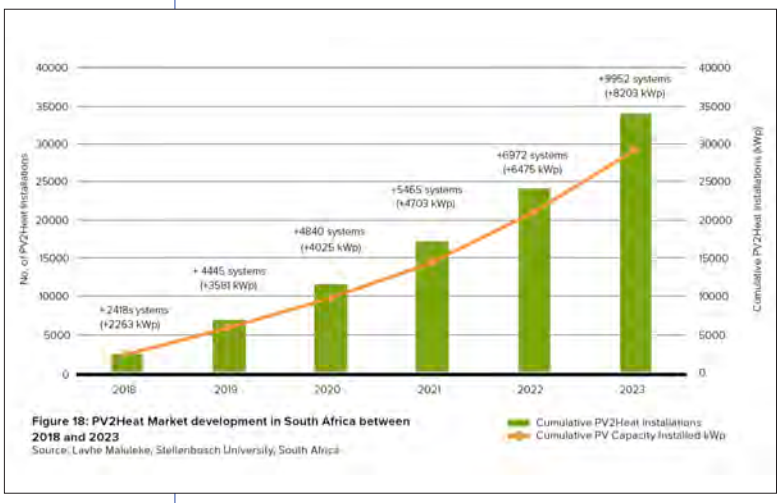
Explore the latest developments in all the solar heat technologies in our report, Solar Heat Worldwide*, and make use of our infographics showcasing key insights, available for free at here.*



▲ **Figure 2. Solar District Heating systems at the end of 2023.**



▲ **Figure 3. Solar Heat in Industrial Processes (SHIP) systems in operation in March 2024.**



▲ **Figure 4. South Africa's PV2Heat market growth from 2018 to 2023.**