



SOLAR HEATING & COOLING PROGRAMME  
INTERNATIONAL ENERGY AGENCY

# Edition 2024



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# Global solar thermal capacity in operation and annual energy yields 2000-2023

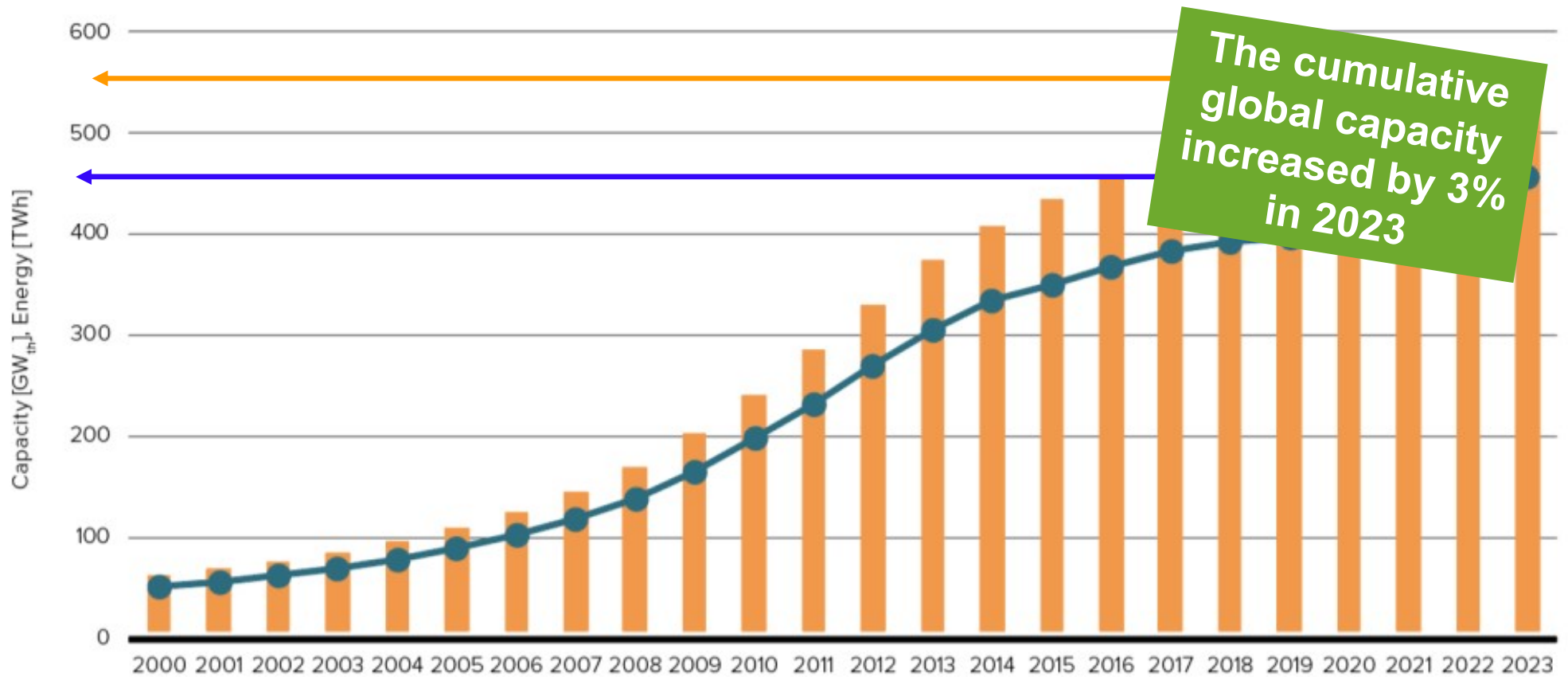


Figure 2: Global solar thermal capacity in operation and annual energy 2000-2023

■ Global solar thermal capacity in operation [GW<sub>th</sub>]  
● Global solar thermal energy yield [TWh]

Annually installed capacity and NET additions 2001-2023

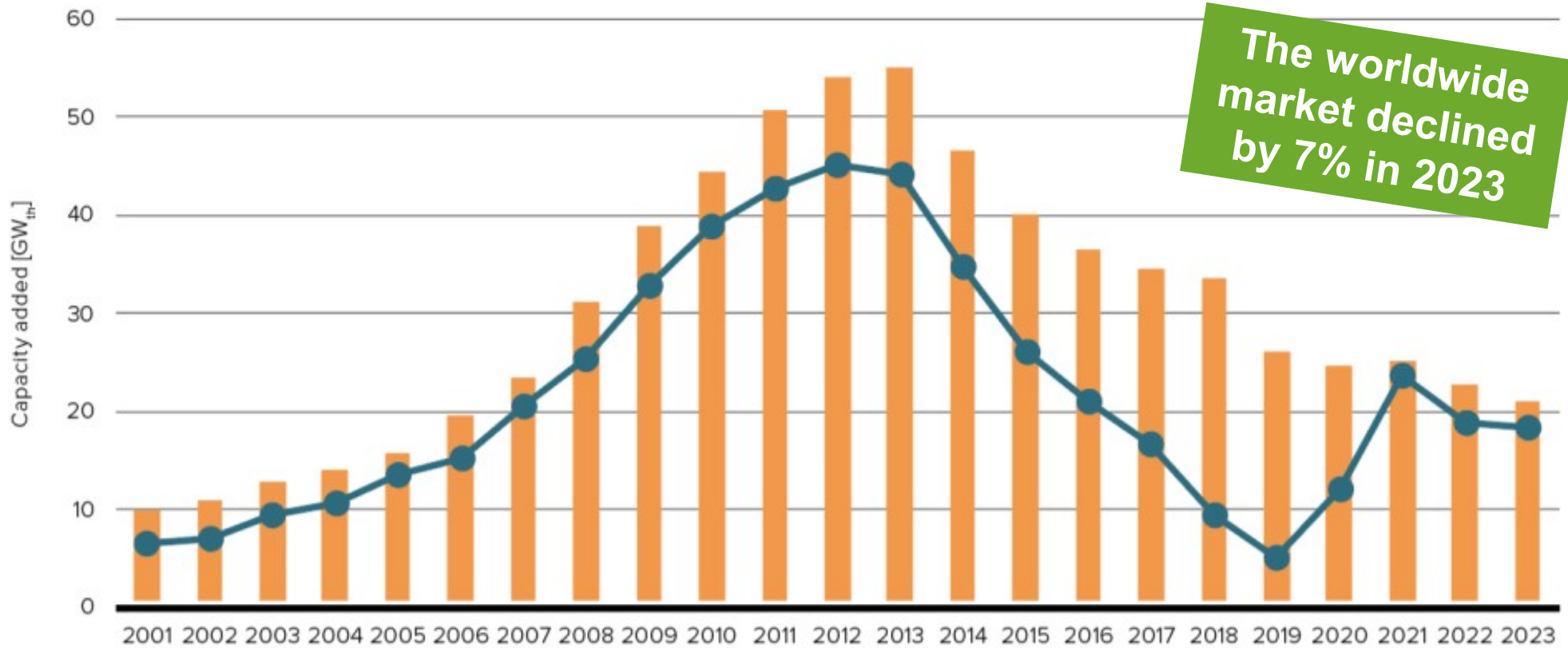


Figure 3: Annual installed collector capacity and net additions

- Annually installed capacity of water collectors [GW<sub>th</sub>]
- Water collectors NET additions [GW<sub>th</sub>]

Annual installed capacity of glazed water collectors 2000 - 2022

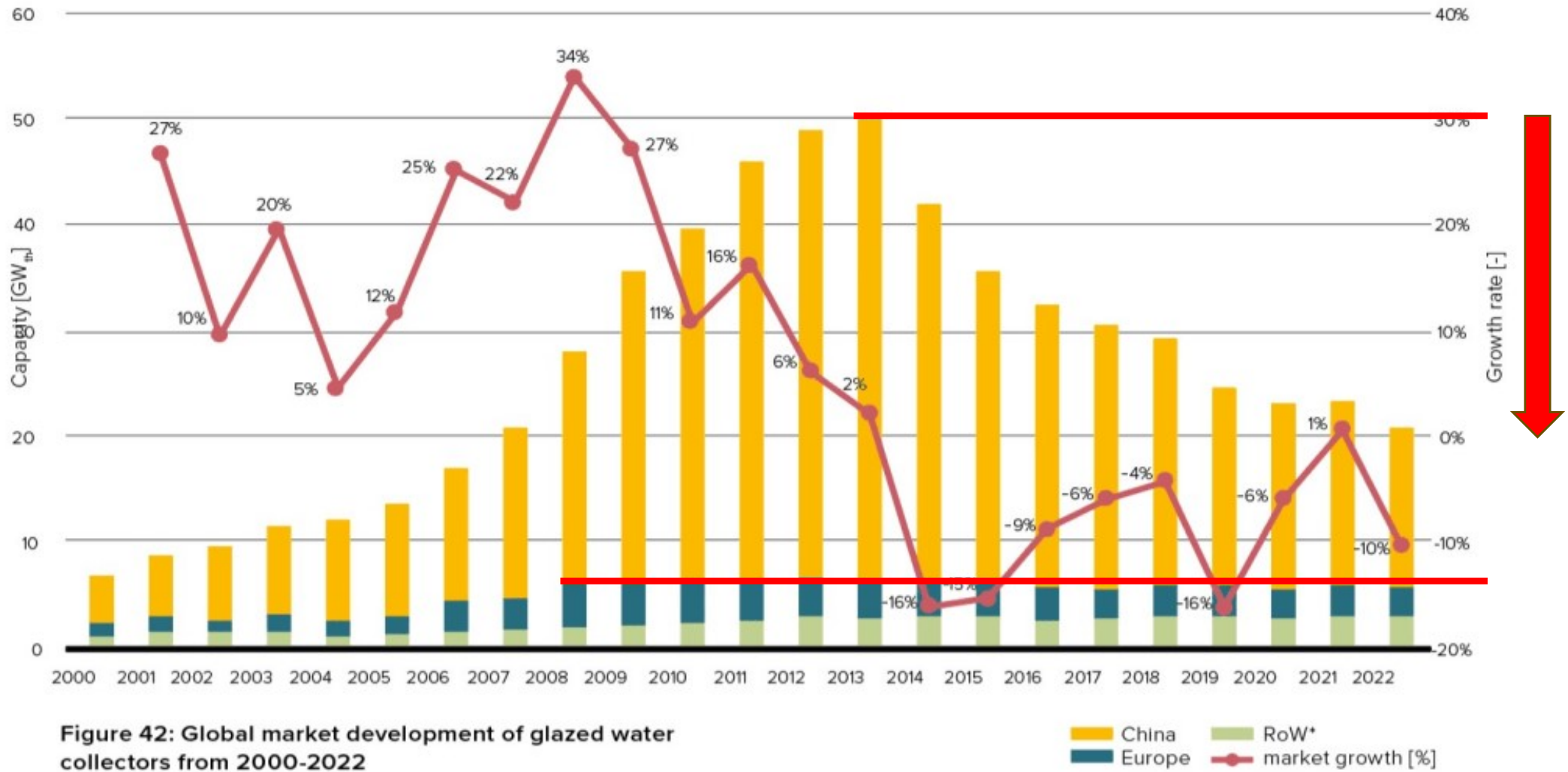


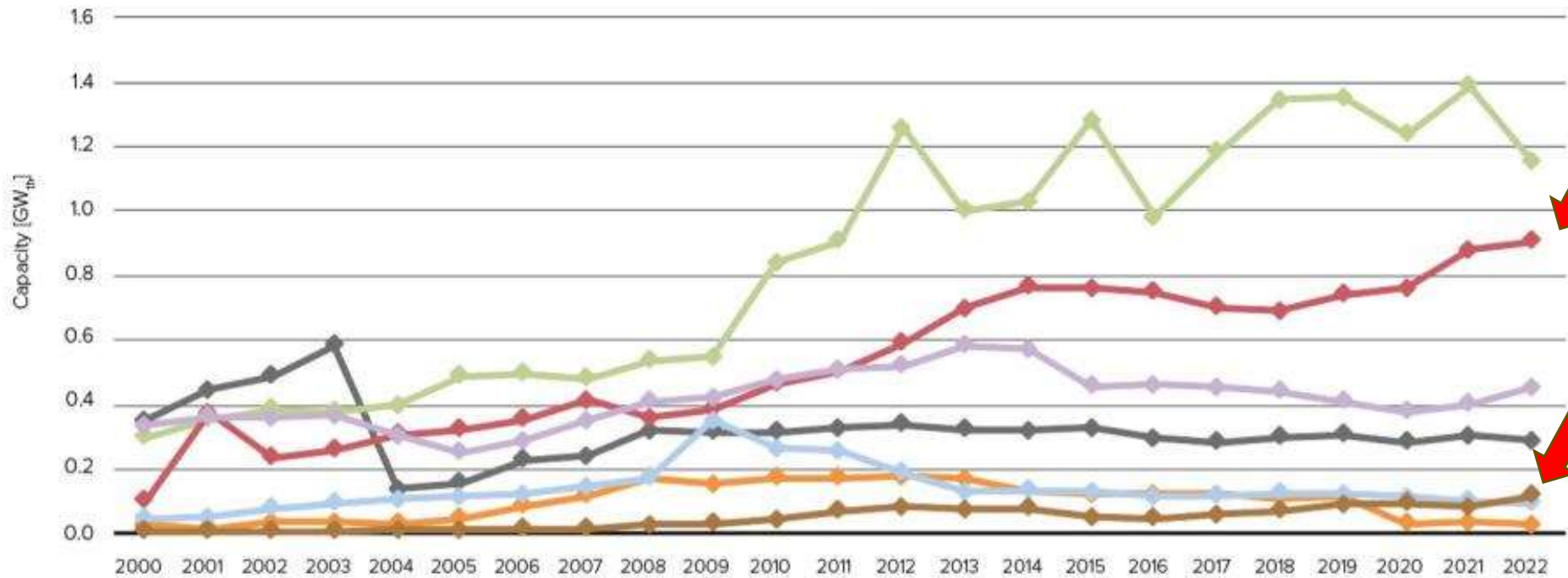
Figure 42: Global market development of glazed water collectors from 2000-2022

■ China    ■ RoW\*  
■ Europe    —●— market growth [%]

# Market Development excl. China and Europe



Annual installed capacity of glazed water collectors 2000 - 2022 RoW (excluding China and Europe)



**Figure 45: Market development of glazed water collectors in Latin America, United States / Canada, Sub-Sahara Africa, Other Asia, the MENA region, and Australia (excluding China and Europe) from 2000 to 2022**

- ◆ Other
- ◆ MENA Region
- ◆ Sub-Sahara Africa
- ◆ Other Asia
- ◆ United States / Canada
- ◆ Latin America
- ◆ Australia

**Other Asia:** Bhutan, India, Japan, Nepal, South Korea, Chinese Taipei, Thailand  
**Latin America:** Argentina, Brazil, Chile, Mexico, Panama, Uruguay  
**MENA countries:** Israel, Jordan, Lebanon, Morocco, Palestinian Territories, Tunisia  
**Sub-Sahara Africa:** Botswana, Burkina Faso, Cape Verde, Ghana, Kenya, Lesotho, Mauritius, Mozambique, Namibia, Nigeria, Senegal, South Africa, Zimbabwe





**66%**  
market growth  
in the UK in 2023

### Countries with Largest Solar Thermal Market Growth in 2023

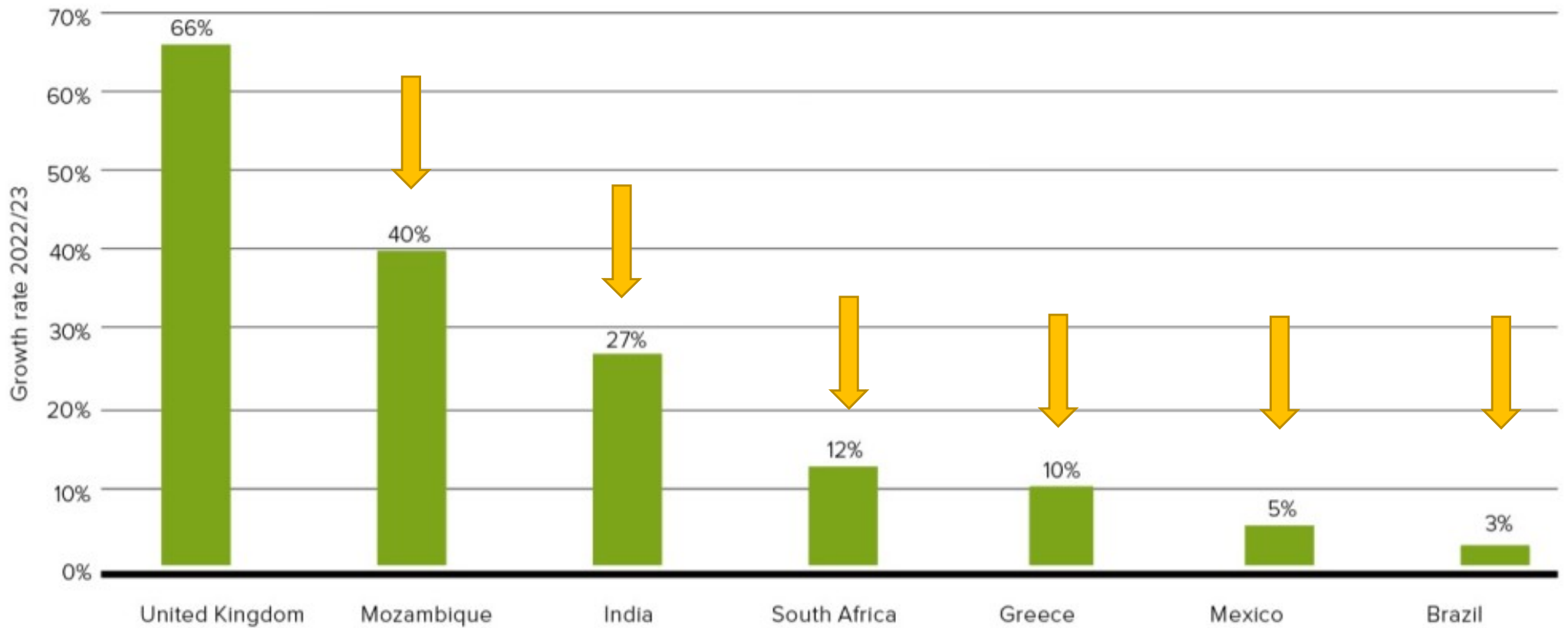


Figure 6: Reporting countries with the highest growth rates in 2023





# Large-scale solar thermal heating systems

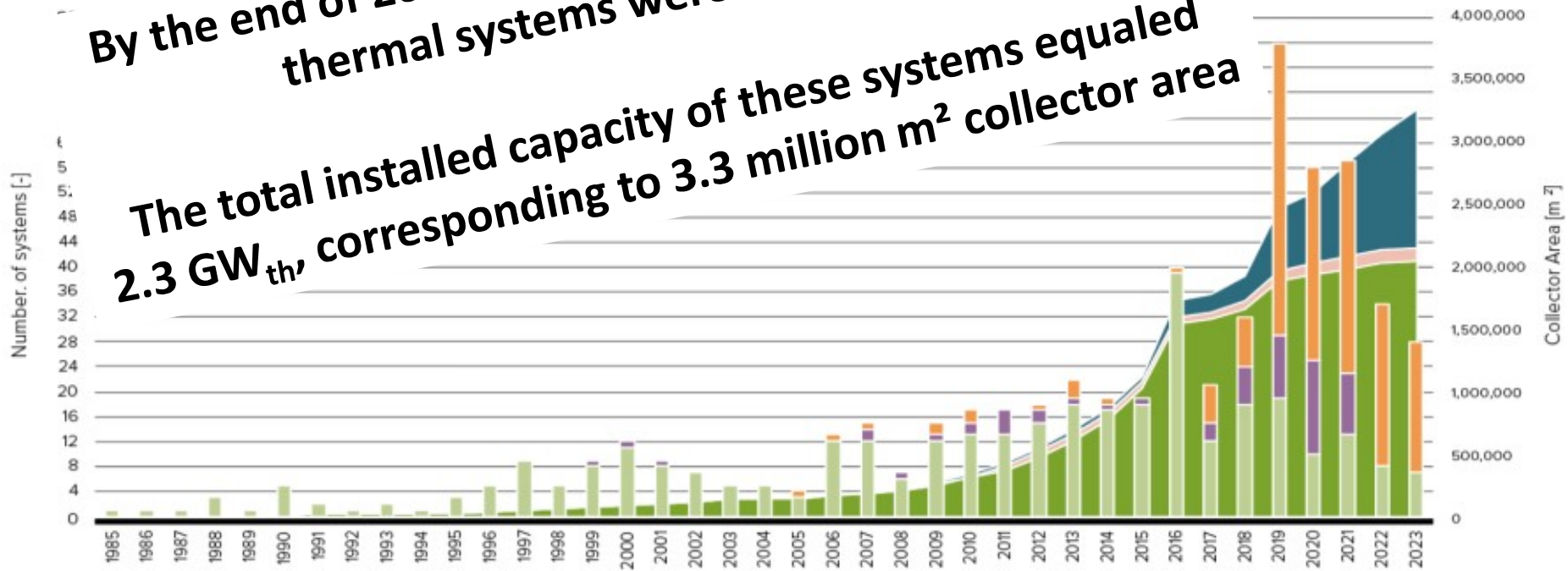


Photo: Savosolar / Solar Heat Europe



By the end of 2023, 598 large-scale documented solar thermal systems were in operation.

The total installed capacity of these systems equaled 2.3 GW<sub>th</sub>, corresponding to 3.3 million m<sup>2</sup> collector area



**Figure 7: Large-scale systems for solar district heating and large residential, commercial, and public buildings worldwide – annual installations and cumulated area in operation in 2023**

Data sources: Daniel Trier - PlanEnergi, DK, Jan-Olof Dalenbäck - Chalmers University of Technology, SE, Sabine Putz - IEA SHC Task 55, AT, Bärbel Epp - solrico.com/, DE, AEE INTEC, AT, Janusz Starościk – SPIUG, PL, Zheng Ruicheng, China Academy of Building Research, CHN.

- Cumulated collector area in operation in Europe [m<sup>2</sup>]
- Cumulated collector area in operation in China [m<sup>2</sup>]
- Number of systems installed in "Other countries" [m<sup>2</sup>]
- Number of systems installed in Europe [-]
- Number of systems installed in China [-]

\* Other countries:

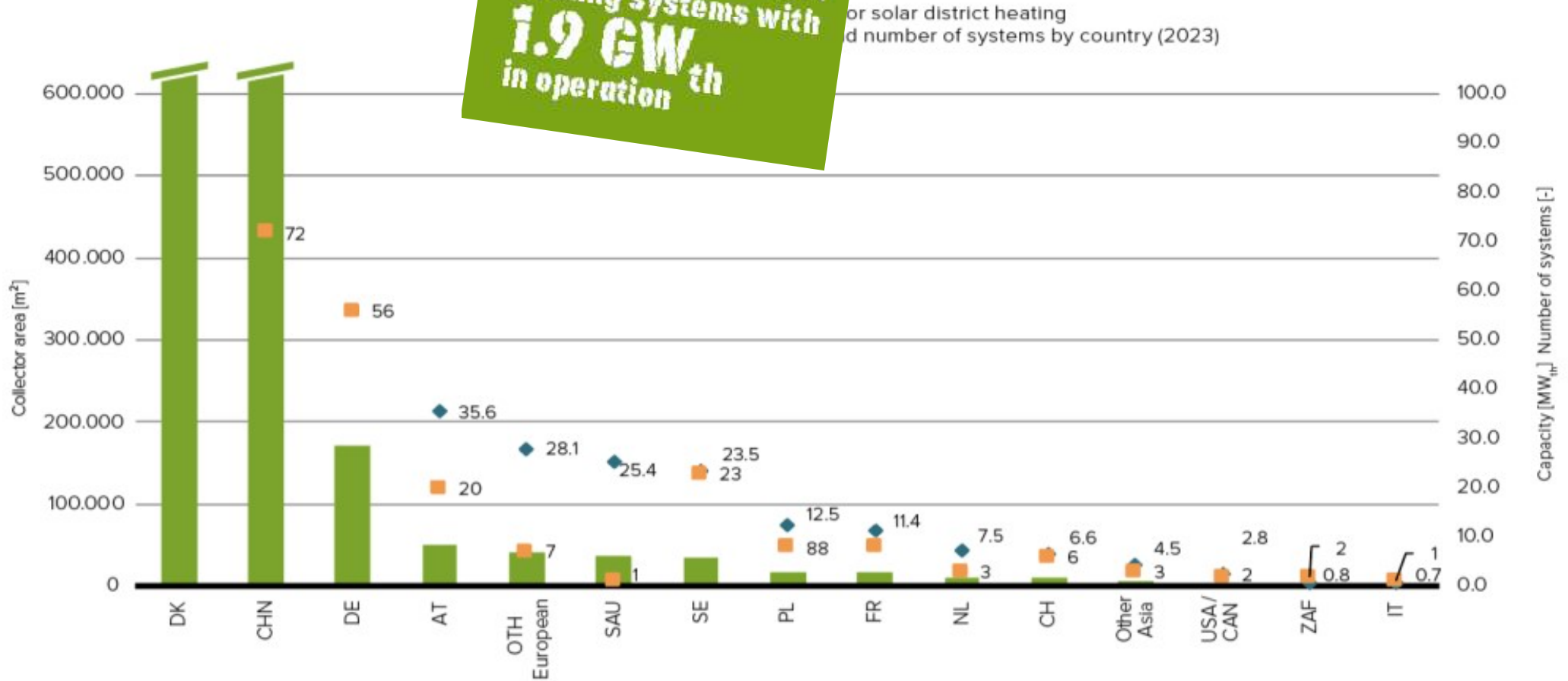
**MENA countries:** Dubai, Jordan, Kuwait, Morocco, Saudi Arabia, Tunisia, UAE

**Latin America:** Brazil, Colombia, Mexico

**Other Asia:** Cambodia, Japan, Kyrgyzstan, India, Russia, South Korea, Thailand, Turkey

**Plus:** Australia, Canada, South Africa, USA

**336** solar district heating systems with **1.9 GW<sub>th</sub>** in operation



or solar district heating and number of systems by country (2023)

**Figure 8: Large-scale systems for solar district heating – capacities and collector area installed and number of systems by the end of 2023**

Data sources: Daniel Trier - PlanEnergi, DK, Jan-Olof Dalenbäck - Chalmers University of Technology, SE, Sabine Putz - IEA SHC Task 55, AT, Bärbel Epp - solrico.com, DE

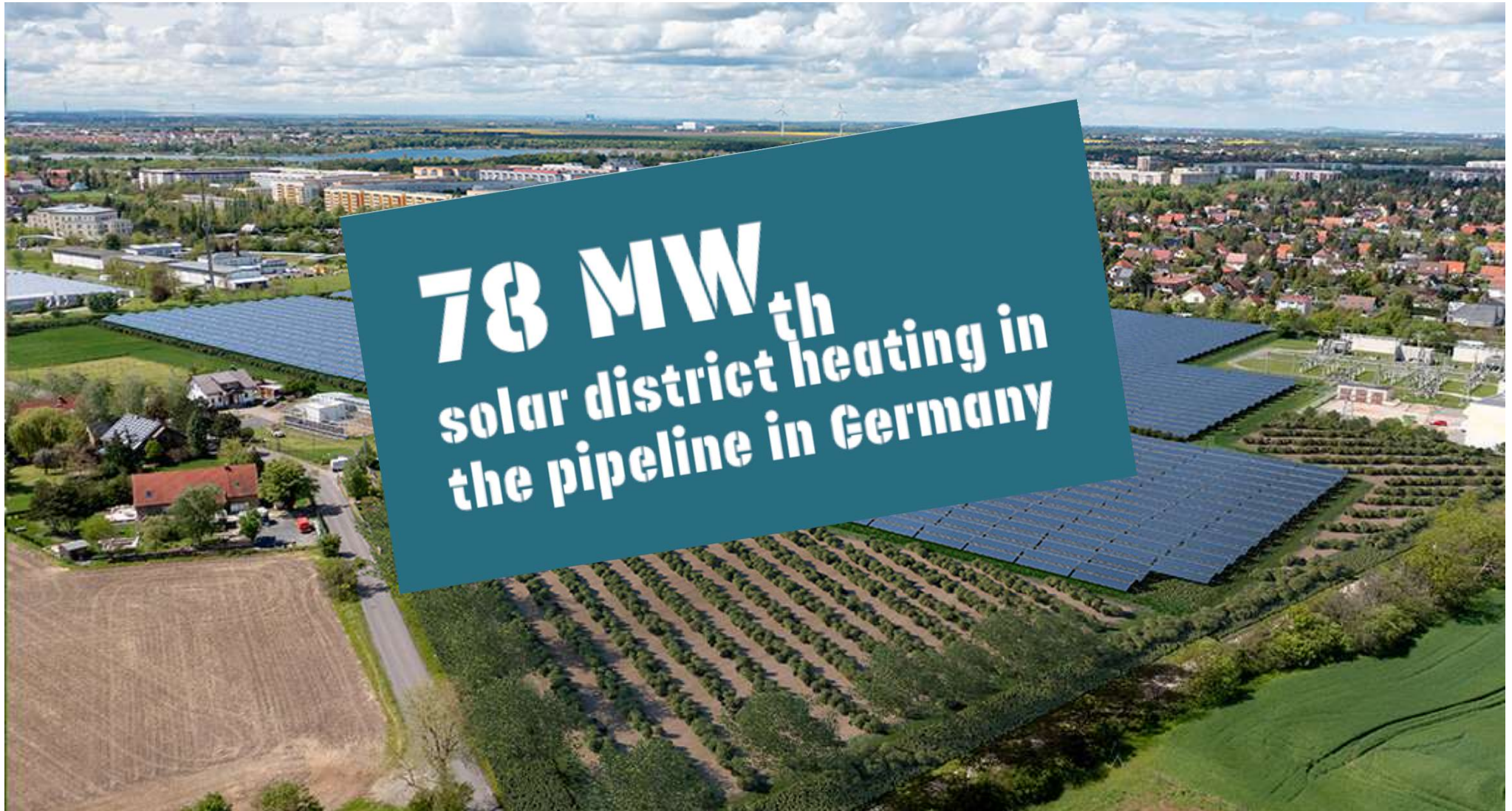
Collector area [m<sup>2</sup>] Capacity [MW<sub>th</sub>] Number of systems [-]

DK: Collector area: 1,608,591 m<sup>2</sup>  
Capacity: 1,126 MW<sub>th</sub>  
No. of systems: 124

CHN: Collector area: 718,670 m<sup>2</sup>  
Capacity: 503 MW<sub>th</sub>  
No. of systems: 72



# Leibzig builds Germany's largest solar thermal plant – 41MW<sub>th</sub> (58.500 m<sup>2</sup>)





In 2023, at least 116 new SHIP systems<sup>\*)</sup>  
with a capacity of 94 MW<sub>th</sub> were installed worldwide



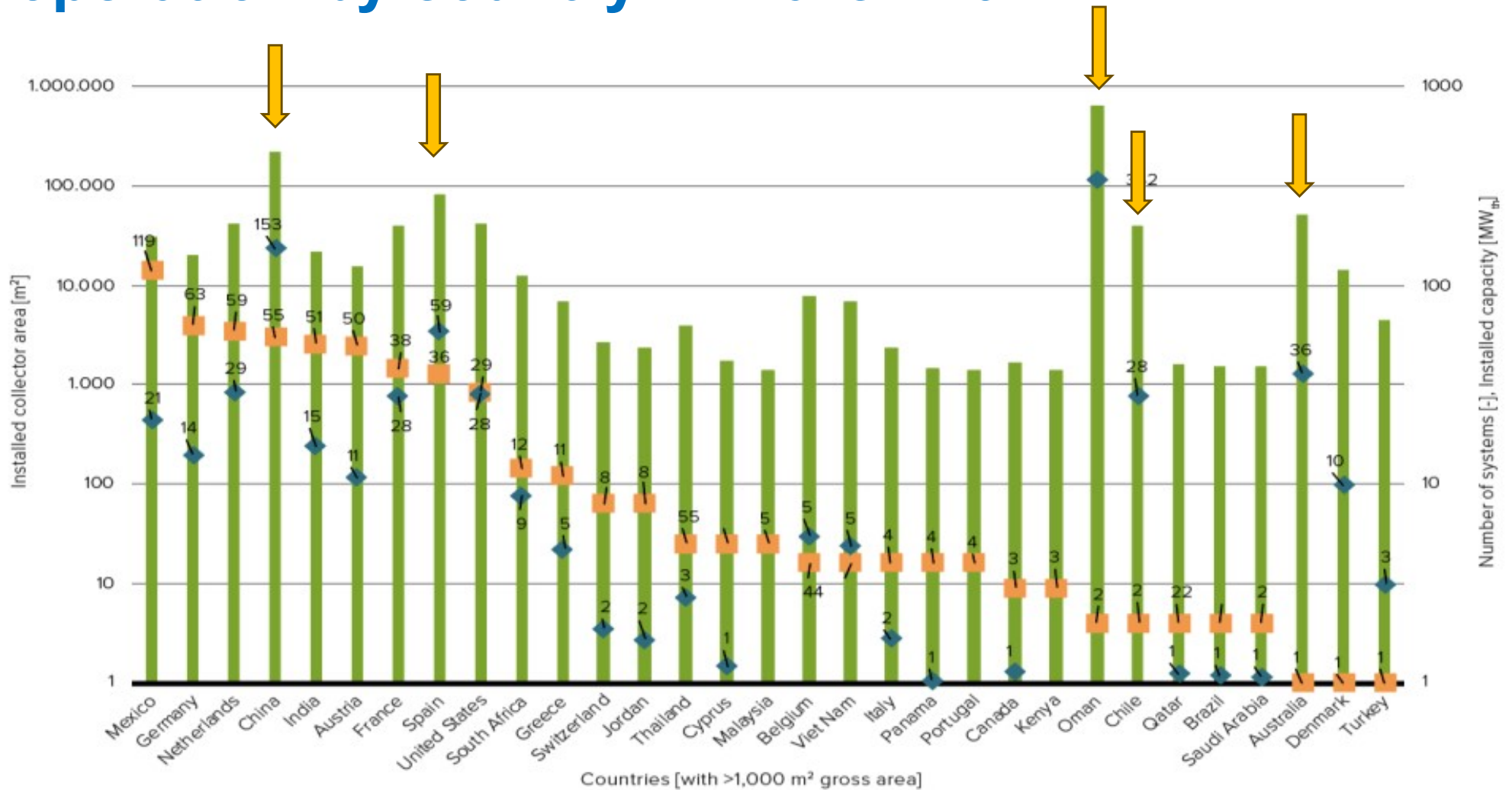
Parabolic trough collectors for one of the breweries of the Carlsberg Group in Salonika, Greece

Photo: Absolicon

<sup>\*)</sup>Source: Solrico



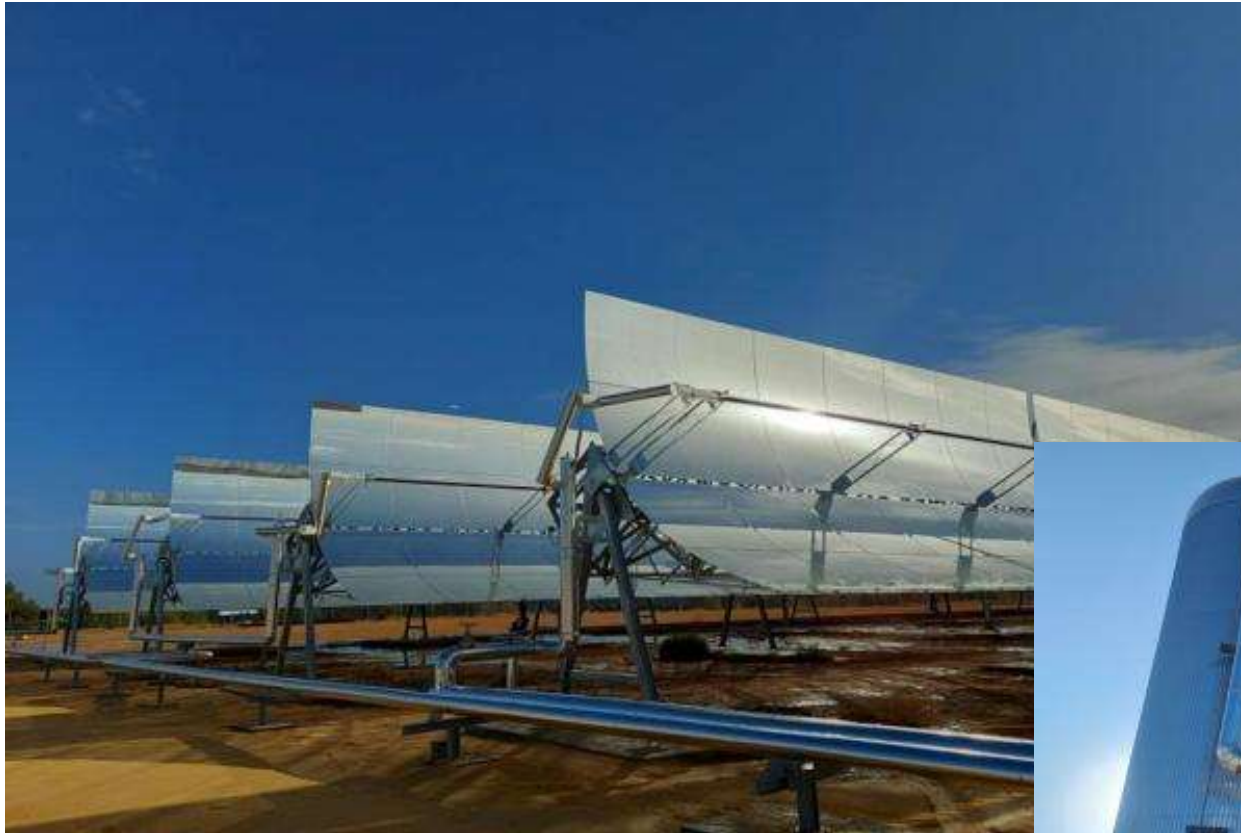
# Global solar process heat applications in operation by country in March 2024



**Figure 13: Global solar process heat applications in operation by country in March 2024**  
Source: SHIP database

Collector area [m²] Thermal Power [MW<sub>th</sub>] Number of systems [-]

# Breweries point the way



**Europe's largest solar industrial heat plant, with a capacity of 30 MW<sub>th</sub>, was installed at the Heineken brewery in Seville, Spain**

Photo: Wolfgang Gruber-Glatzl, AEE INTEC



# Breweries point the way



**660 m<sup>2</sup> parabolic trough collectors for the Brewery Birra Peroni in Bari, Italy**

Photo: Absolicon, Sweden



# Handan Bay Water World in China

80 MW<sub>th</sub> Parabolic trough collectors



The parabolic trough collector system supplies snow for an indoor ski hall, as well as heating and cooling at the Handan Bay Water World in China

Photo: Inner Mongolia Xuchen Energy Co., Ltd





# PVT - Photovoltaic-Thermal Systems

1.6 million m<sup>2</sup>  
PVT collector  
area installed  
worldwide



Domestic hot water and swimming pool system with 2,082 m<sup>2</sup> PVT in Barcelona, Spain  
Photo: Abora Solar, Spain





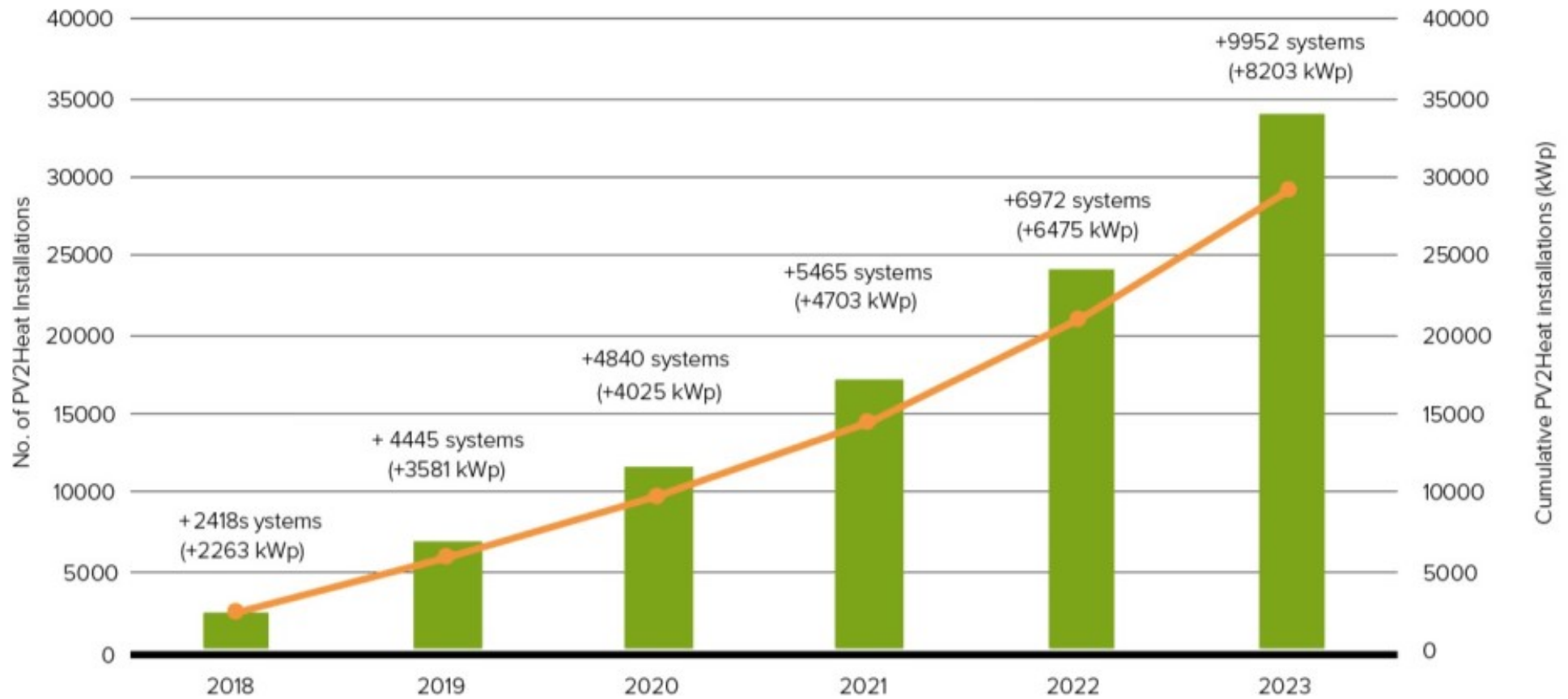
**Figure 14: Distribution of the total installed collector area by economic region in 2023**  
Source: AEE INTEC

# PVT market development in 2023





# Photovoltaic Generated Heat - PGH



**Figure 18: PV2Heat Market development in South Africa between 2018 and 2023**

Source: Lavhe Maluleke, Stellenbosch University, South Africa

■ Cumulative PV2Heat installations  
—●— Cumulative PV Capacity Installed kWp

## PV2Heat systems installed in South Africa

Photo: Bongani Xakaza, SANEDI, South Africa



# Solar Combisystems powered by PV



**A 144 kW<sub>peak</sub> photovoltaic system supplies the multi-family with electricity, hot water, and space heating**

Photo: Markus Ursprung, Switzerland  
[www.synergieplus.ch](http://www.synergieplus.ch)





# PV district heating in Germany



**125 MWpeak PV system in Bundorf, Germany, uses part of the solar power to supply the district heating network**

Photo: MaxSolar, Germany

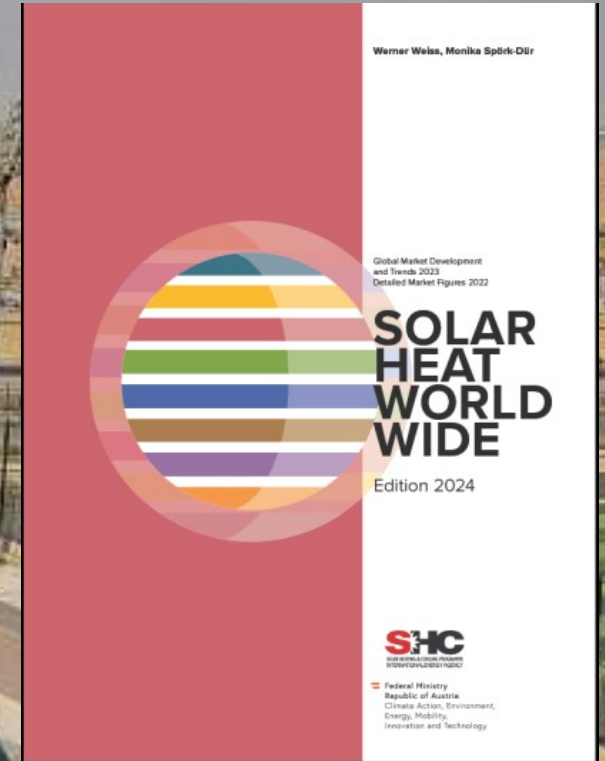


# Outlook 2024 and beyond



Photo: Soltop Energie AG, Switzerland





<https://www.iea-shc.org/solar-heat-worldwide>