# Solar market trends in a nutshell

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# Solar Heat Worldwide Overview

- ➤ **Data from 73 countries**

- ➤ **Collector technologies covered**
  - o Water collectors unglazed and glazed (ETC, FPC)
  - o Air collectors
  - o PVT Collectors
  - o Photovoltaic generated heat (PVG)

- ➤ **Applications**
  - o Small scale: DHW and space heating
  - o Large-scale (>500 m²): district heating
  - o Industrial applications
  - o Air conditioning and cooling



**Regions**
- Other Asia [8]
- China [1]
- Europe [34]
- Latin America [7]
- MENA Region [8]
- North America [2]
- Oceania [2]
- Sub-Sahara Africa [13]
- NoData

- ➤ **2024: 544 $GW_{th}$ installed, 443 TWh energy yield and 153.5 million tons of $CO_{2\ equivalent}$ emissions reduction**

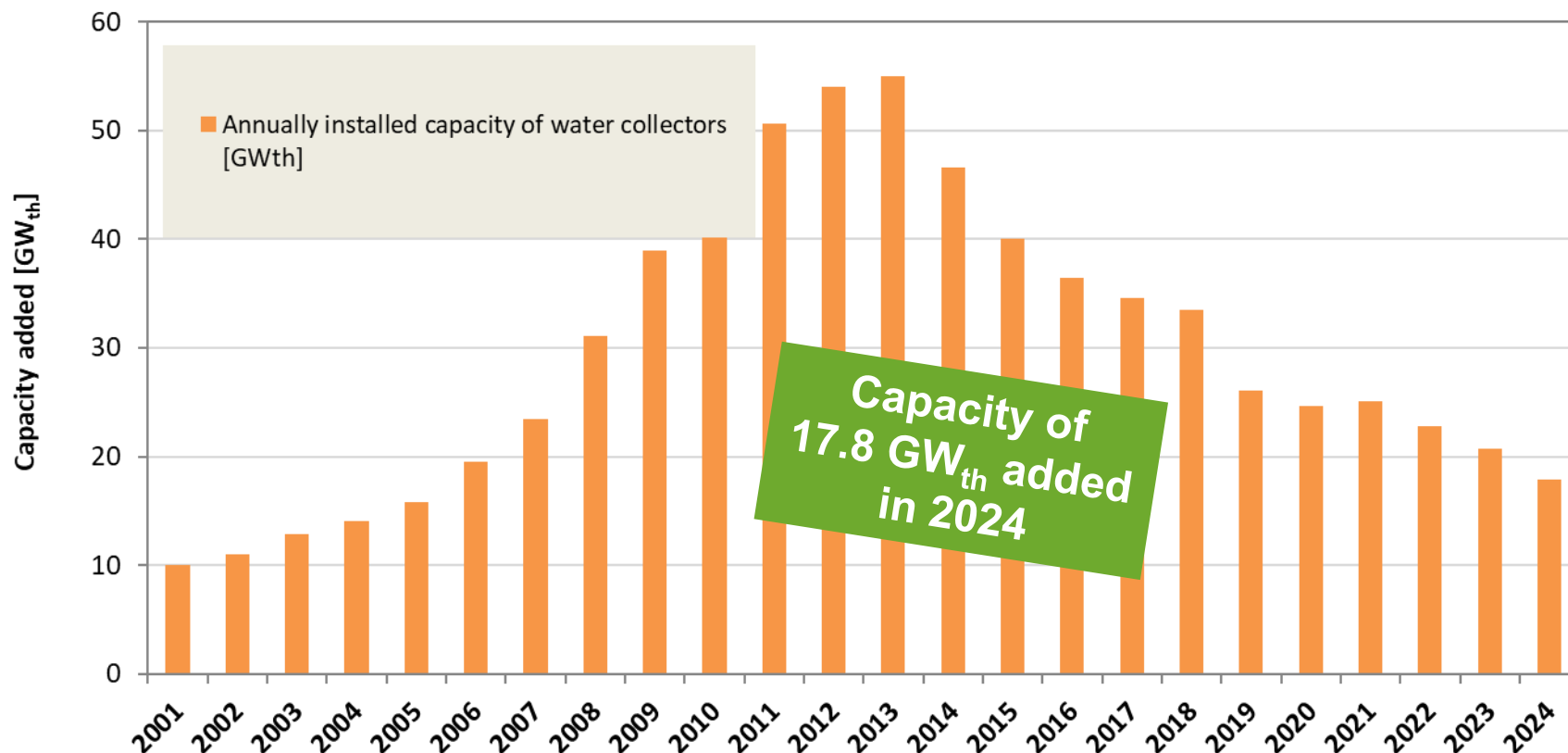- ➤ **Employment and turnover 2023: 318,000 jobs, EUR 13.9 billion (US$ 15.7 billion)**
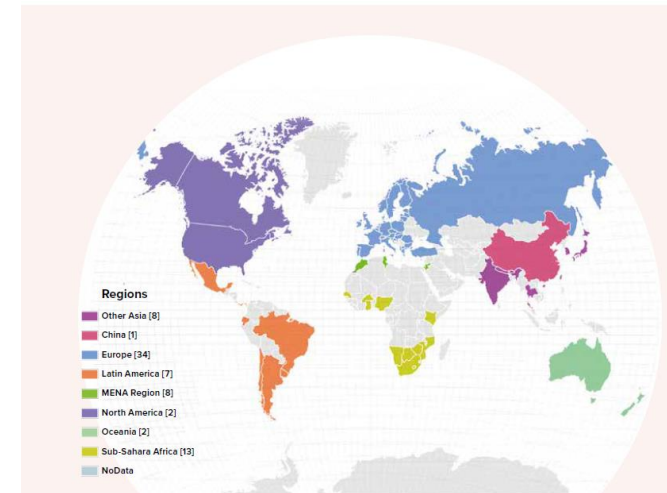
# Global solar thermal capacity in operation and annual energy yields 2000-2024



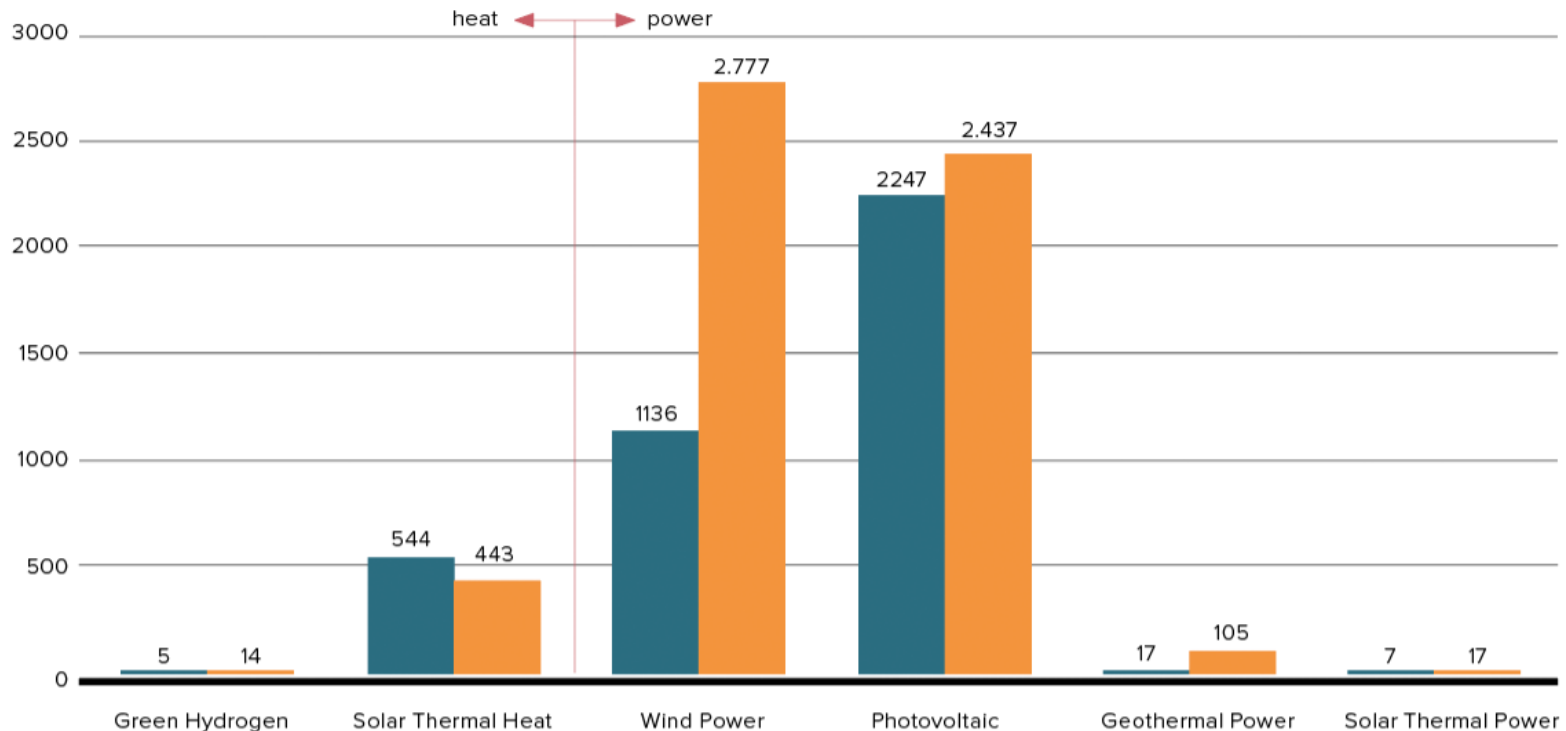Annually installed in operation and annual energy yields 2000-2024

Global capacity in operation was 544 GWth in 2024
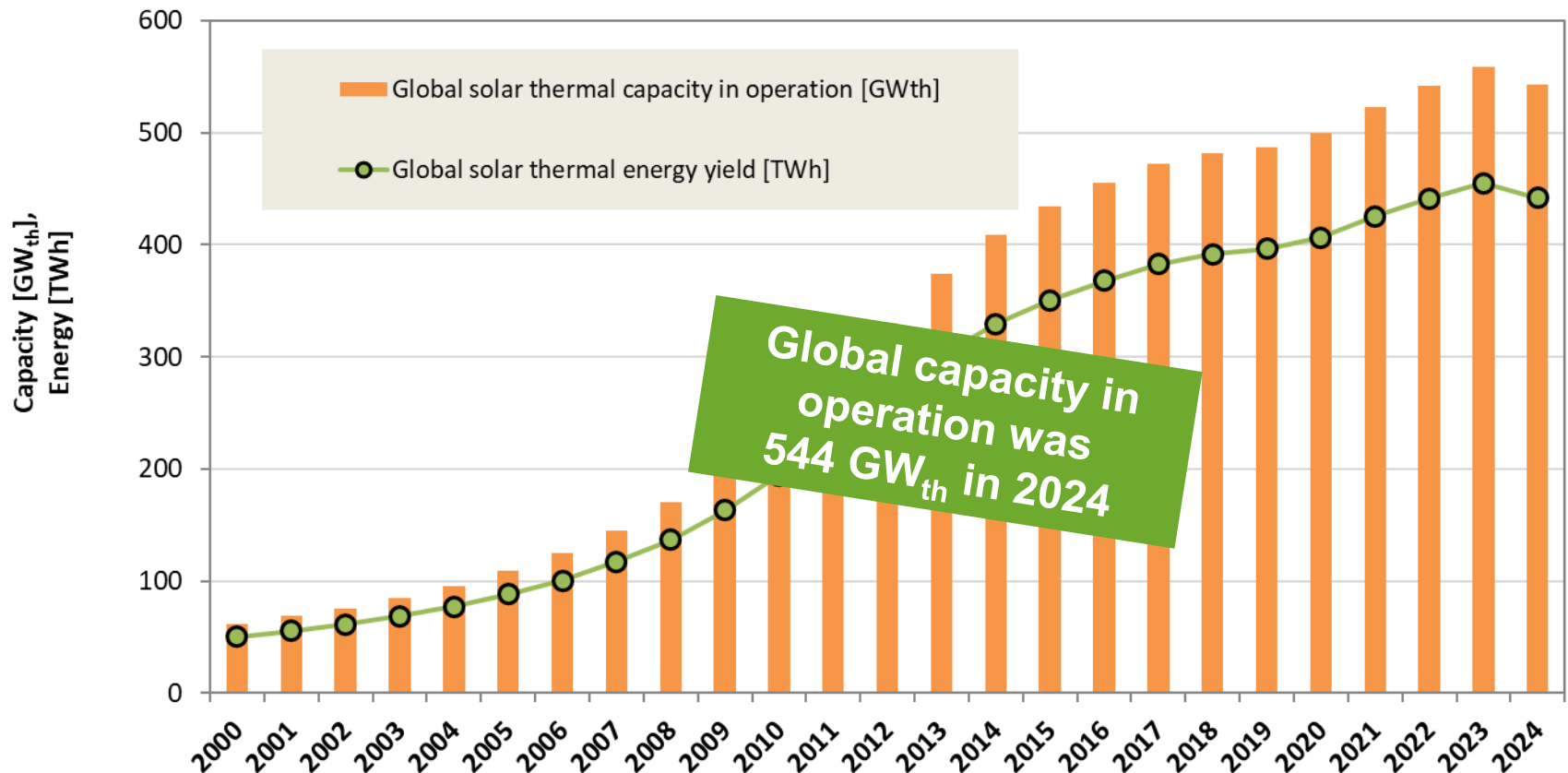
# Annually installed capacity 2000-2024



Annually installed capacity 2001-2024

# Capacities of renewable energy technologies



Figure 5: Global capacity in operation [GW$_{el}$], [GW$_{th}$] 2024 and annual energy yields [TWh$_{el}$], [TWh$_{th}$]
(Solar Thermal: AEE INTEC, Wind Power: Global Wind Energy Council (GWEC), Photovoltaic: IEA Solar PVPS (https://iea-pvps.org/snapshot-reports/snapshot-2024/), Geothermal Power and Solar Thermal Power: Irena Renewable Energy Capacity Statistics 2023)

Legend:
- Total capacity in operation [GW$_{th}$, GW$_{el}$]
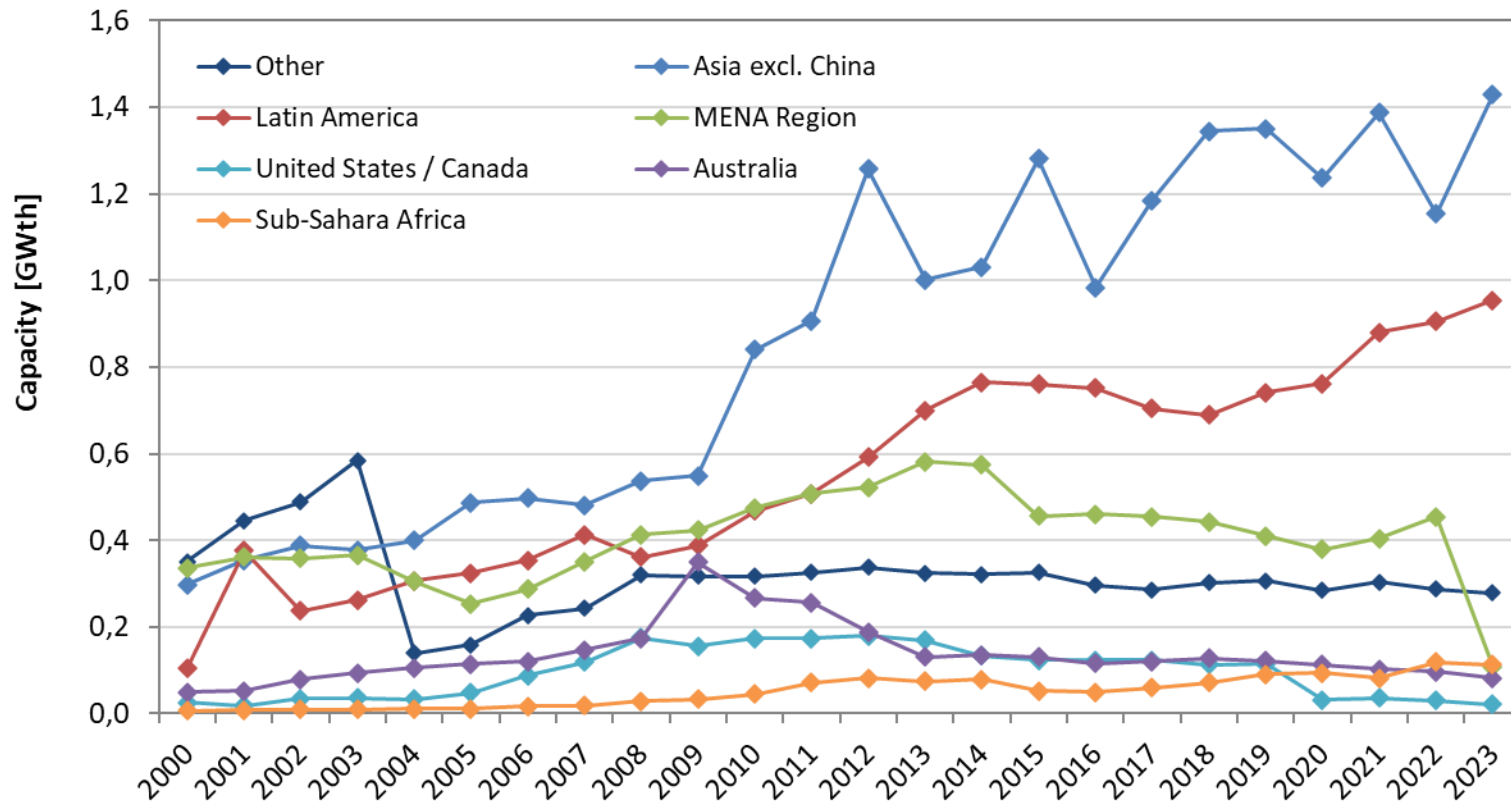- Energy supplied [TWh]

# Market Development 2000-2023



Annually installed capacity of glazed water collectors 2000 - 2023

www.iea-shc.org
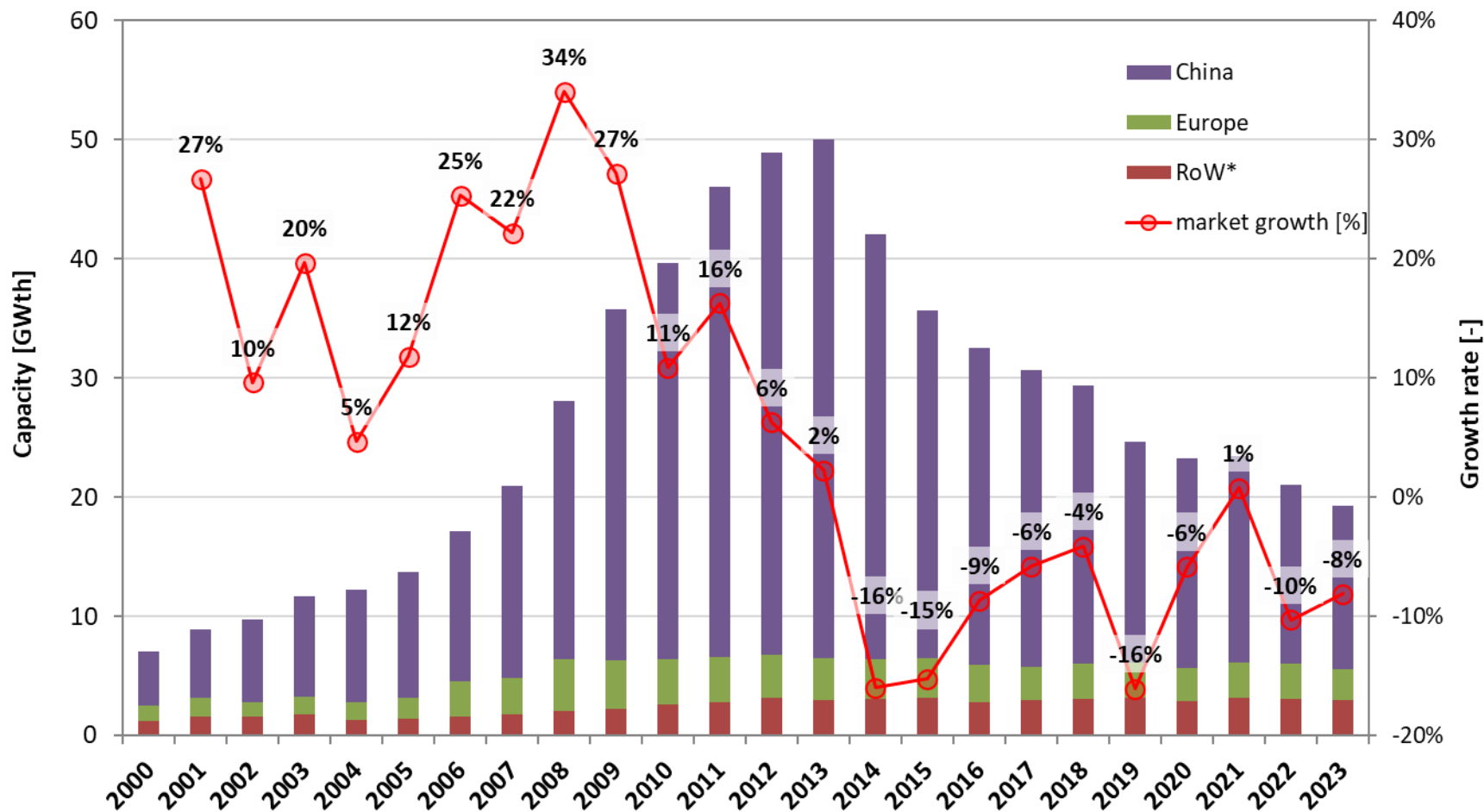
# Market Development excl. China and Europe



Annually installed capacity of glazed water collectors 2000 - 2023
RoW (excluding China and Europe)

www.iea-shc.org

# Countries with largest market growth in 2024

Countries with Largest Solar Thermal Market Growth in 2024

www.iea-shc.org
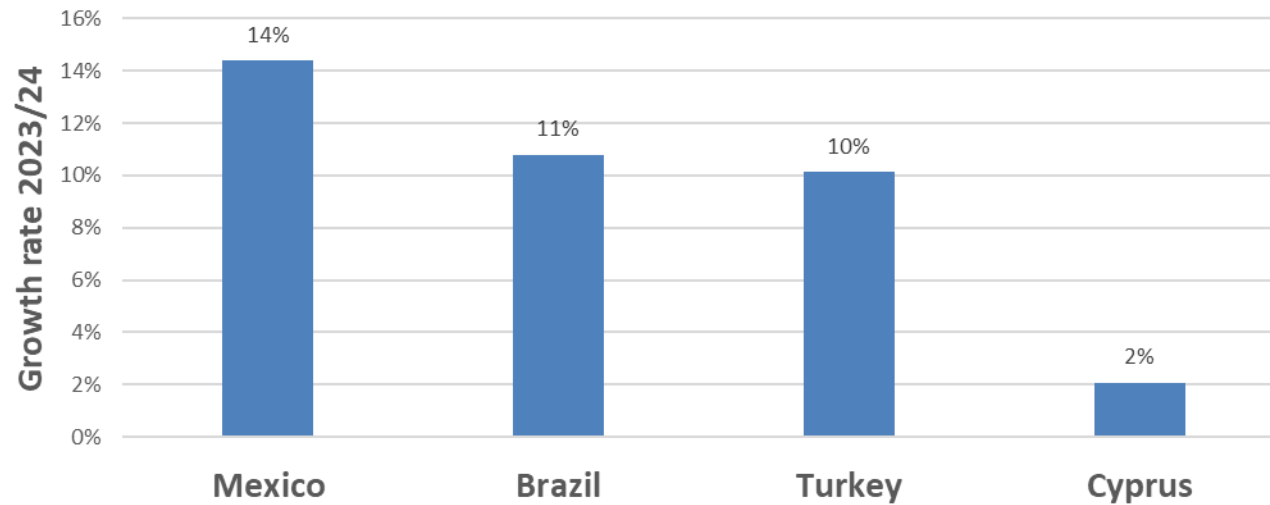
# Large-scale solar thermal heating systems



Solar heat costs range from €20 to €50/MWh

48,800 m² collector area for DH in Groningen, Netherlands commissioned in 2024
Photo: TVP

# Large-scale solar thermal heating systems
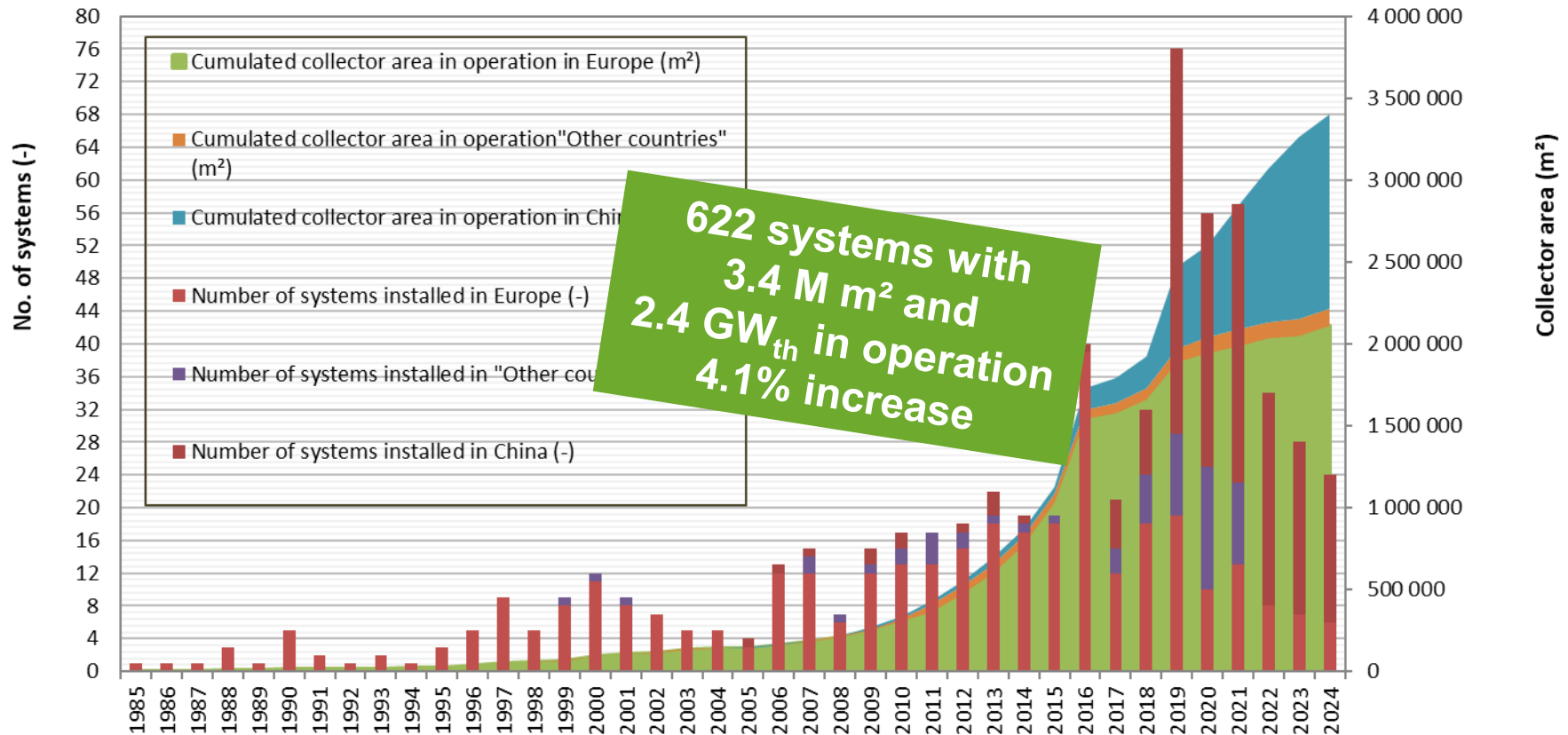


Large-scale systems for district heating and for large residential, commercial and public buildings

Annual installed systems and cumulated area in operation

622 systems with 3.4 M m² and 2.4 GW$_{th}$ in operation 4.1% increase

Legend:
- Cumulated collector area in operation in Europe (m²)
- Cumulated collector area in operation "Other countries" (m²)
- Cumulated collector area in operation in China
- Number of systems installed in Europe (-)
- Number of systems installed in "Other countries"
- Number of systems installed in China (-)

# Large-scale solar thermal heating systems



**Large-scale systems for solar district heating**
Collector area, capacities installed and No. of systems by country (2024)

DK:
Collector area: 1,608,591 m²
Capacity: 1,126 MW$_{th}$
No. of systems: 124

CHN:
Collector area: 763,749 m²
Capacity: 534.6 MW$_{th}$
No. of systems: 76

346 SDH systems with 2.8 M m² and 2.0 GW$_{th}$ in operation

Legend: Collector area [m²] ◆ Capacity [MWth] ■ Number of systems [-]

# Solar Heat for Industrial Processes
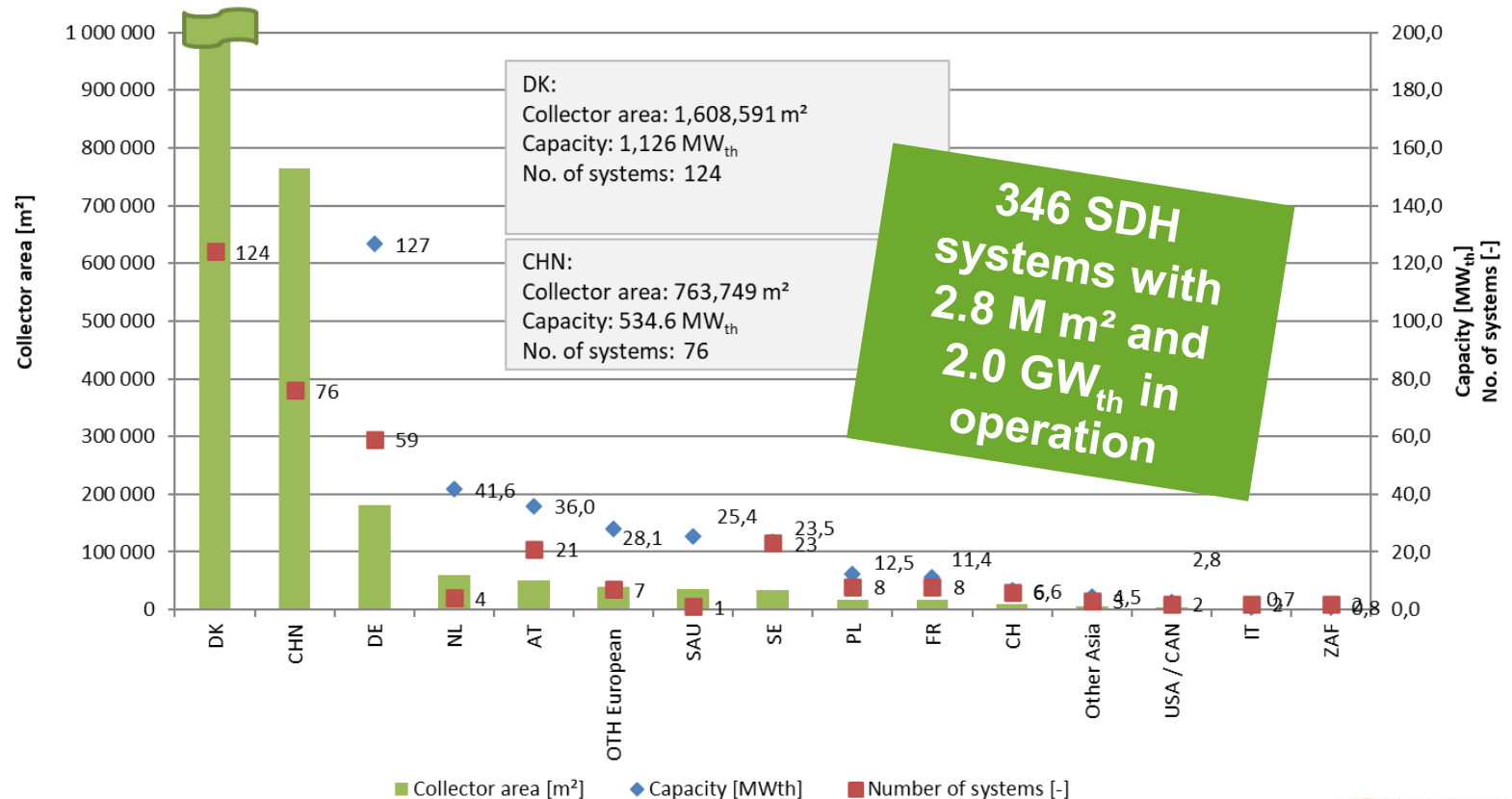
**1,315 systems in operation worldwide**

**106 systems with 120 MW$_{th}$ added in 2024**

**Main collector types**
- Parabolic trough:
  75 systems with 482 MW$_{th}$
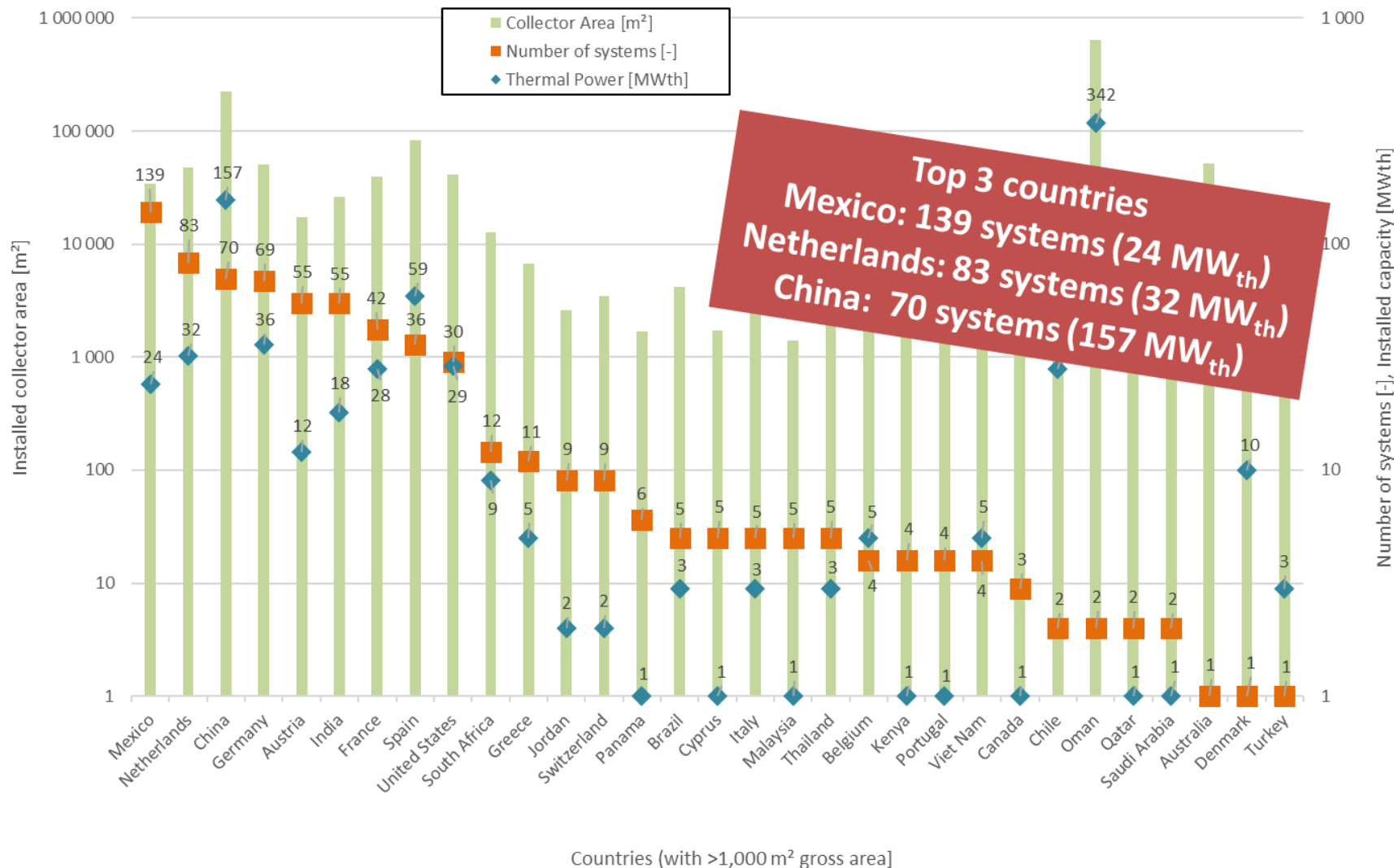- Flat plate collectors:
  331 systems with 196 MW$_{th}$

**Main applications**
- Mining
- Food and beverage
- Other processing industries



Photo: Kyotherm / Solatom

# Solar Heat for Industrial Processes



Top 3 countries
Mexico: 139 systems (24 MW$_{th}$)
Netherlands: 83 systems (32 MW$_{th}$)
China: 70 systems (157 MW$_{th}$)

Countries (with >1,000 m² gross area]

# Photovoltaic / Thermal (PVT) collectors



1.7 M m² PVT collector area installed worldwide

Installed capacity
864 MW$_{th}$
315 MW$_{el}$
4.3% increase

PVT Collectors on a hospital in South Africa
Photo: Green Line Africa / Solarus

# Photovoltaic Generated Heat - PGH
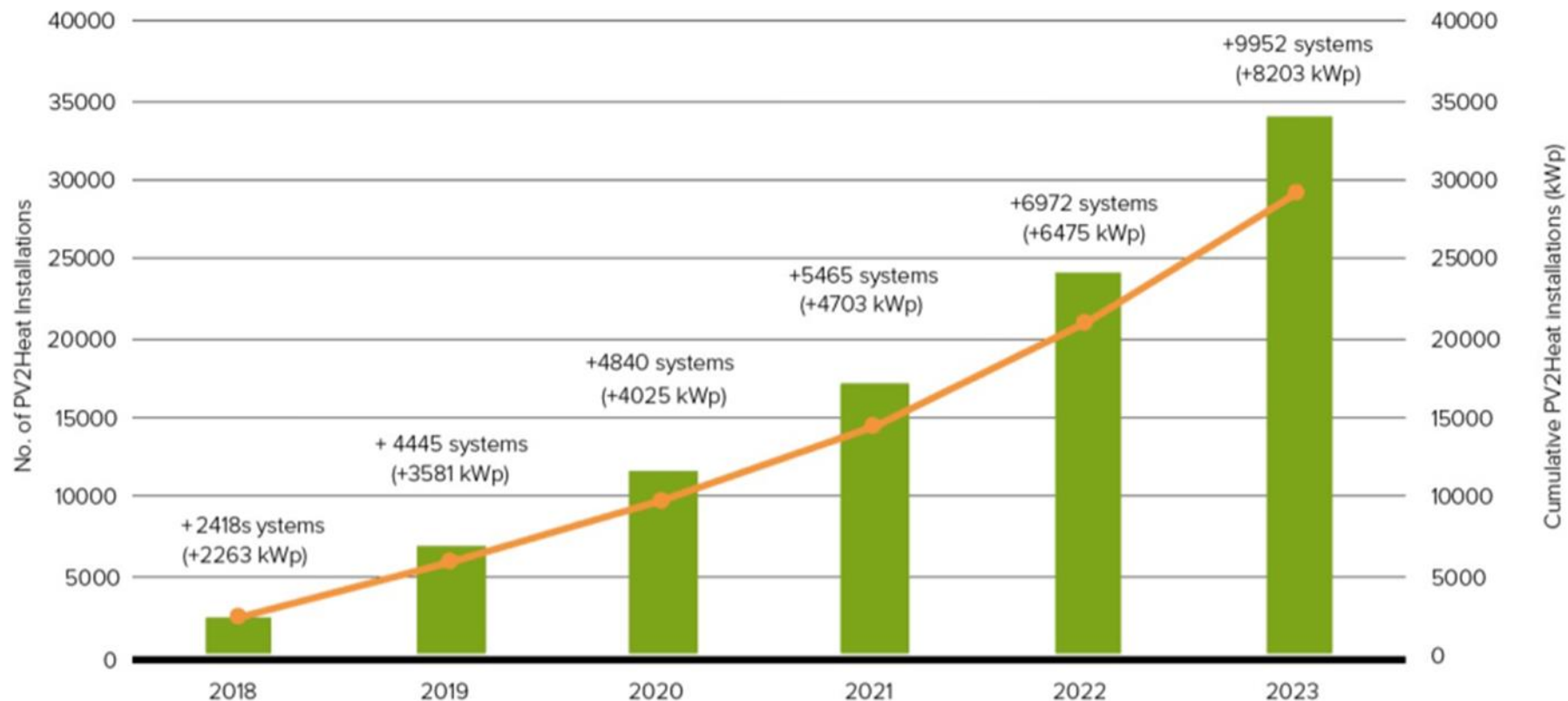


**Figure 18: PV2Heat Market development in South Africa between 2018 and 2023**

Source: Lavhe Maluleke, Stellenbosch University, South Africa

# Outlook 2025 and beyond

**Renewables supplied about 10% of global heat demand in 2023**

**Solar heating and cooling offers diverse technologies for decarbonizing buildings and industries**

**Small-scale systems for buildings in markets like Latin America, Asia, Africa**

**Large-scale systems for district heating and process heat in the pipeline**

**Solar cooling options could help reduce cooling related carbon emissions by 60% by 2050**

**Research and Development**

Bracht - 100% renewable district heating; 11,637 m² collector area, 26,600 m³ seasonal pit storage, 75-80% solar fraction
Photo: Viessmann

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