SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Solar Heat Worldwide Edition 2022

Werner Weiss, Monika Spörk-Dür
AEE – Institute for Sustainable Technologies


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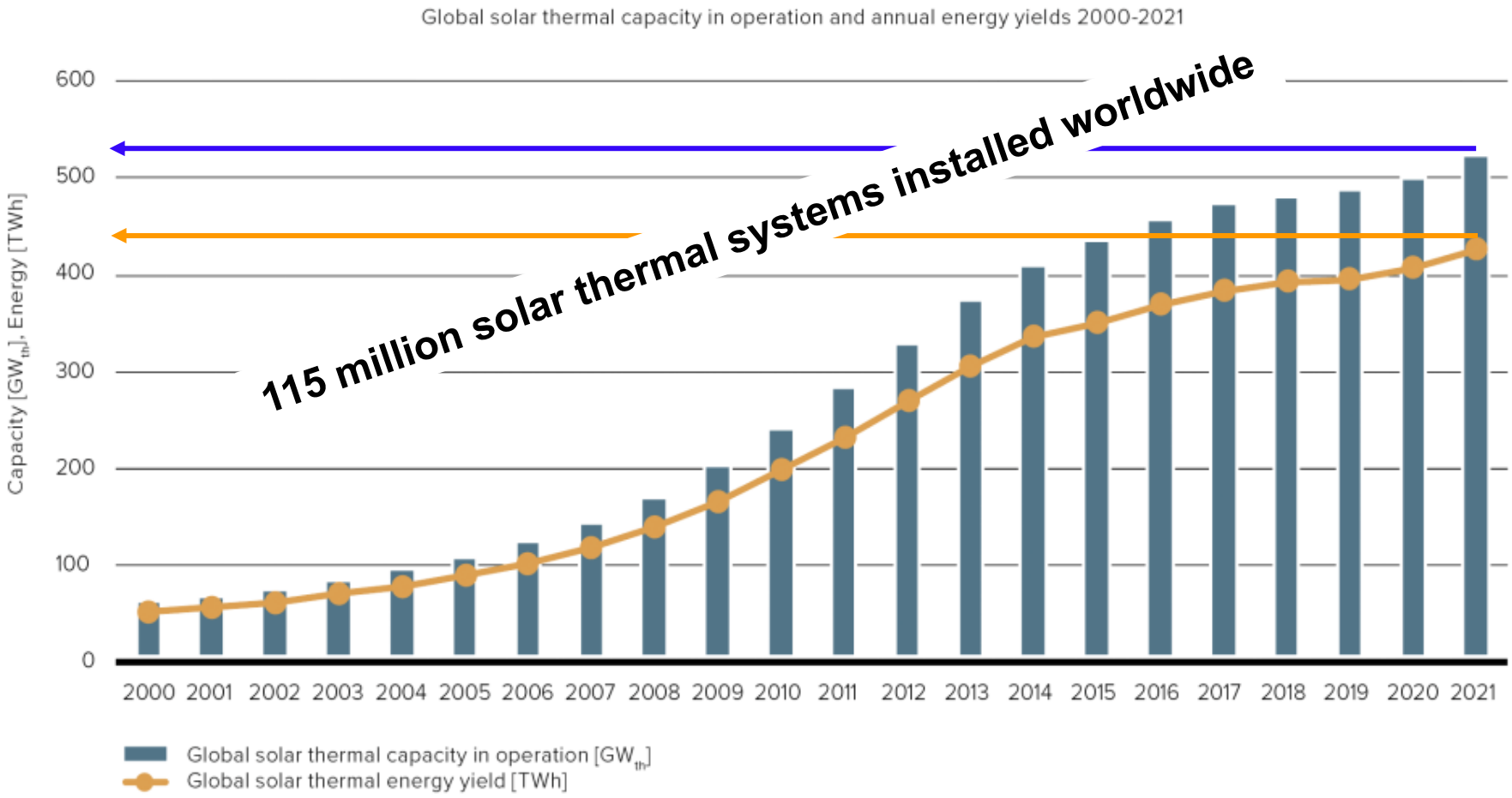
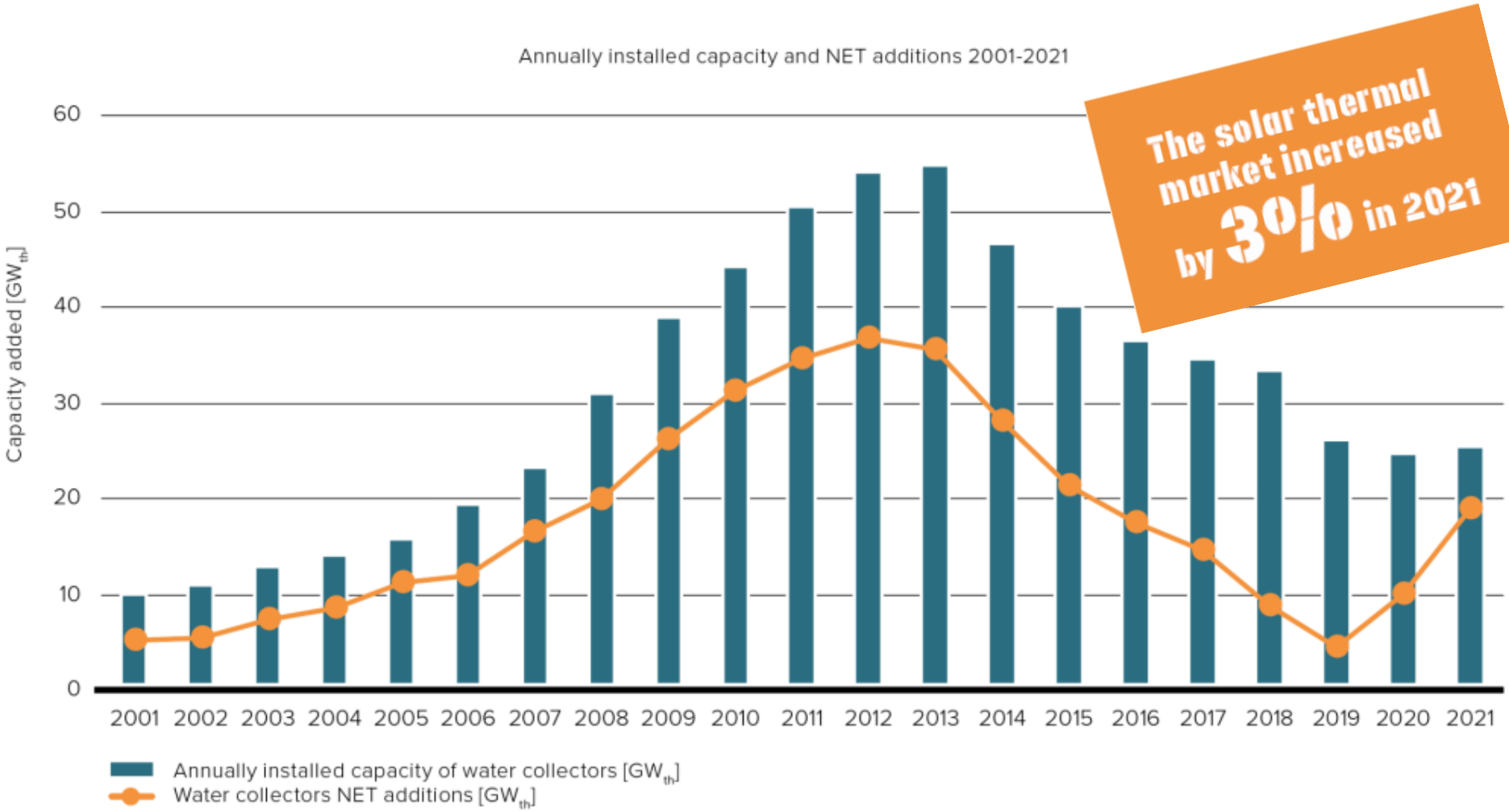
Global Market Development
and Trends 2021
Detailed Market Figures 2020
SOLAR
HEAT
WORLD
WIDE
Edition 2022
Federal Ministry
Republic of Austria
Climate Action, Environment,
Energy, Mobility,
Innovation and Technology
SHC

Global solar thermal capacity in operation and annual energy yields 2000-2021



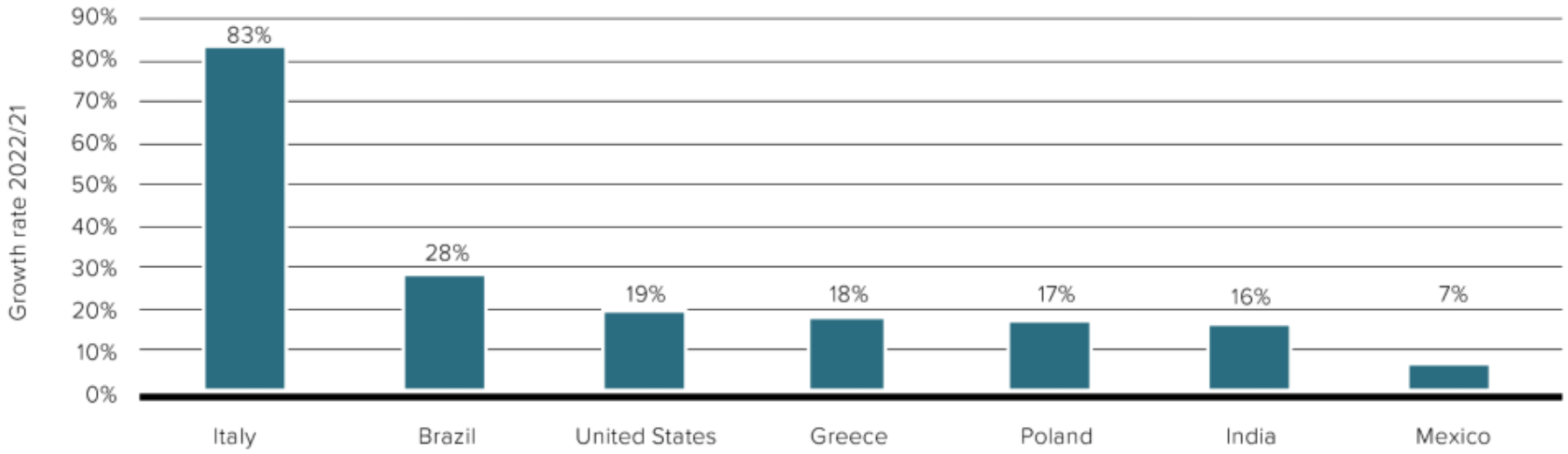

Annually installed capacity and NET additions 2001-2021
Capacity added [GWth]
60
50
40
30
20
10
0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
Annually installed capacity of water collectors [GWth]
Water collectors NET additions [GWth]
The solar thermal market increased by 30% in 2021

83%
market growth in Italy 2021

Opposite trend in Denmark due to the collapse of its solar district heating market sector. The market decreased by 45% in 2021.

Market declines in Spain (-19%), Austria (-7%) and Cyprus (-5%), South Africa (-12%) Australia (-3%).

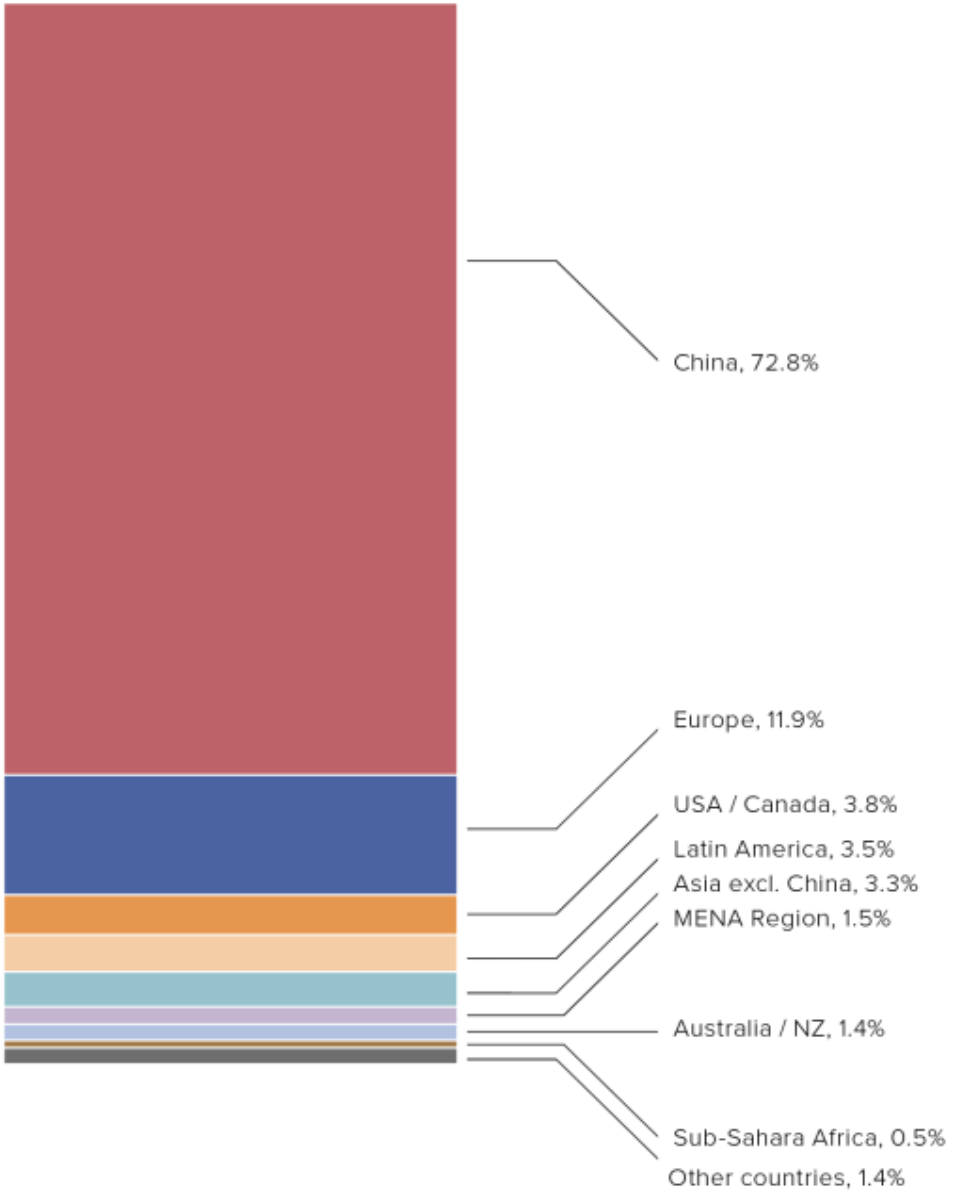
Top solar thermal markets in 2021



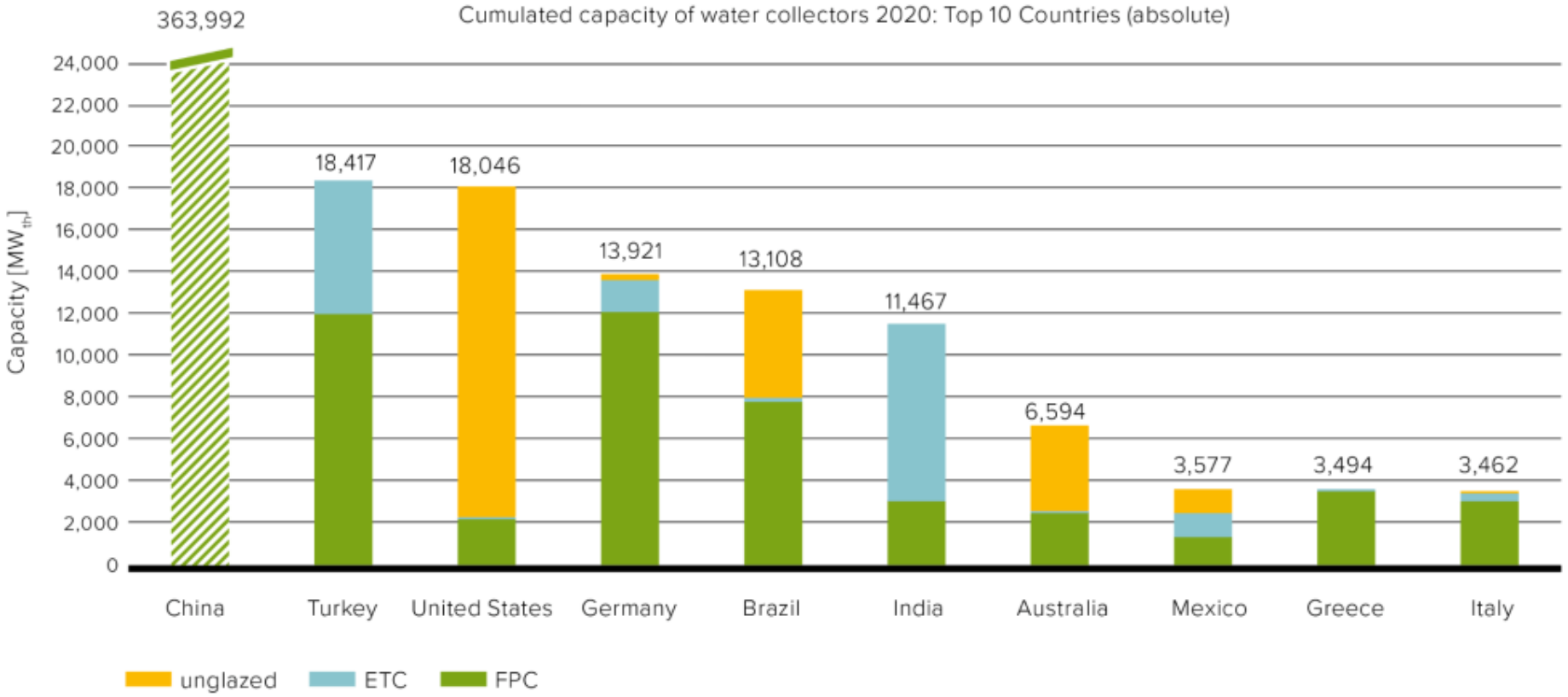
Top 10 countries of cumulated water collector installations

Share of the total installed capacity in operation (glazed and unglazed water and air collectors) by economic region in 2020

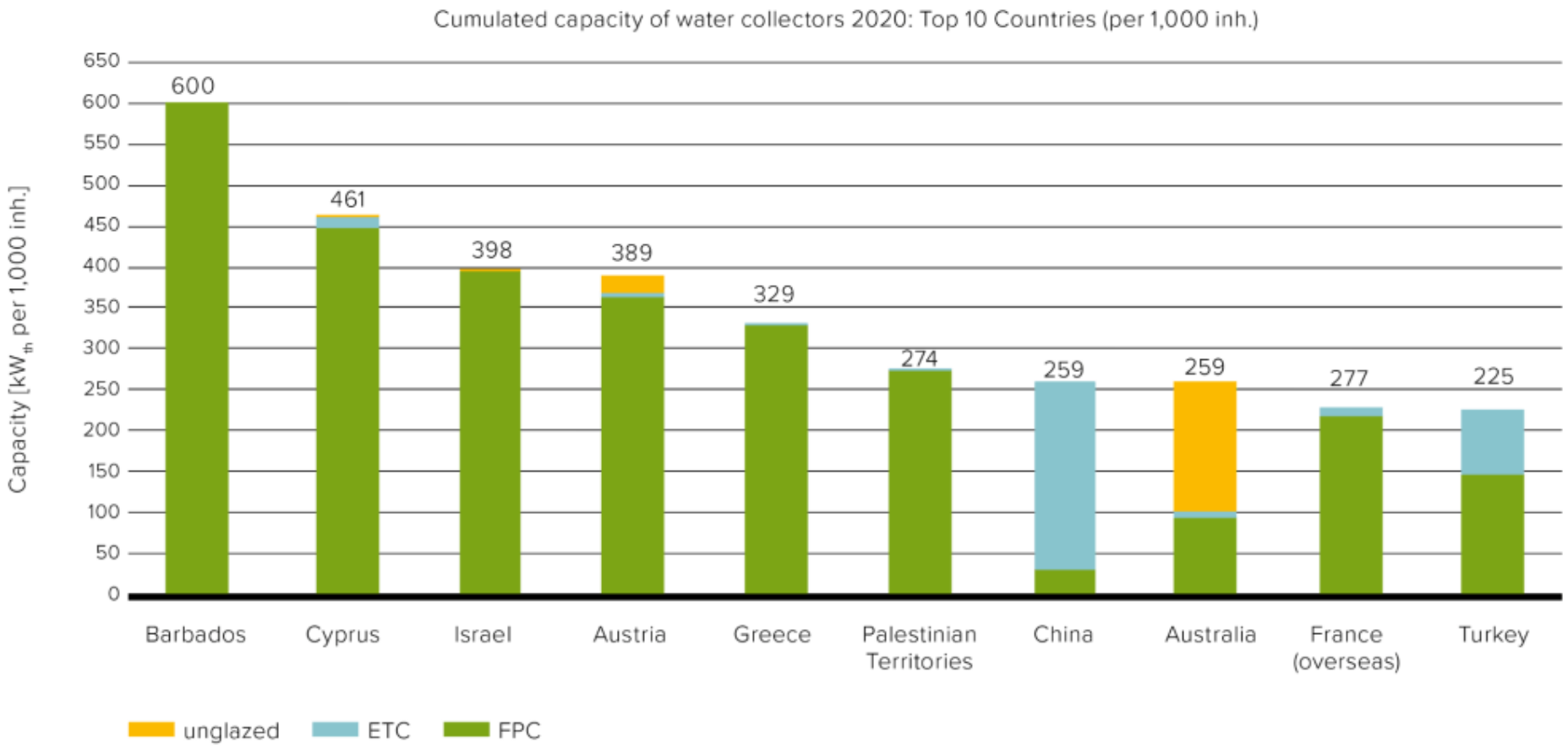
Sub-Sahara Africa: Botswana, Burkina Faso, Cape Verde, Ghana, Kenya, Lesotho, Mauritius, Mozambique, Namibia, Nigeria, Senegal, South Africa, Zimbabwe
Asia w/o China: Bhutan, India, Japan, South Korea, Taiwan, Thailand
Latin America: Argentina, Barbados, Brazil, Chile, Mexico, Uruguay
Europe: EU 27, Albania, North Macedonia, Norway, Russia, Switzerland, Turkey, United Kingdom
MENA countries: Israel, Jordan, Lebanon, Morocco, Palestinian Territories, Tunisia



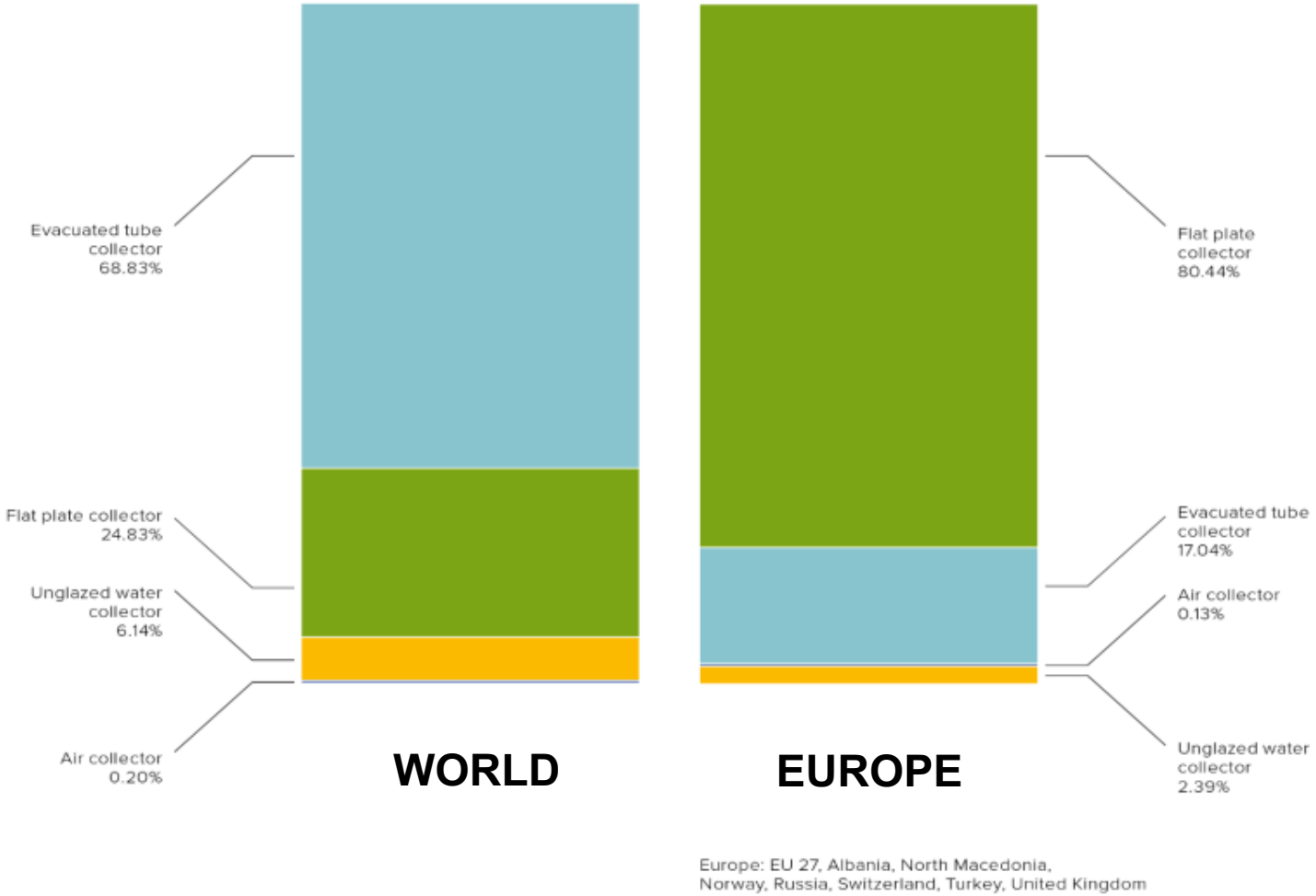
Top 10 countries of cumulated water collector installations in 2020



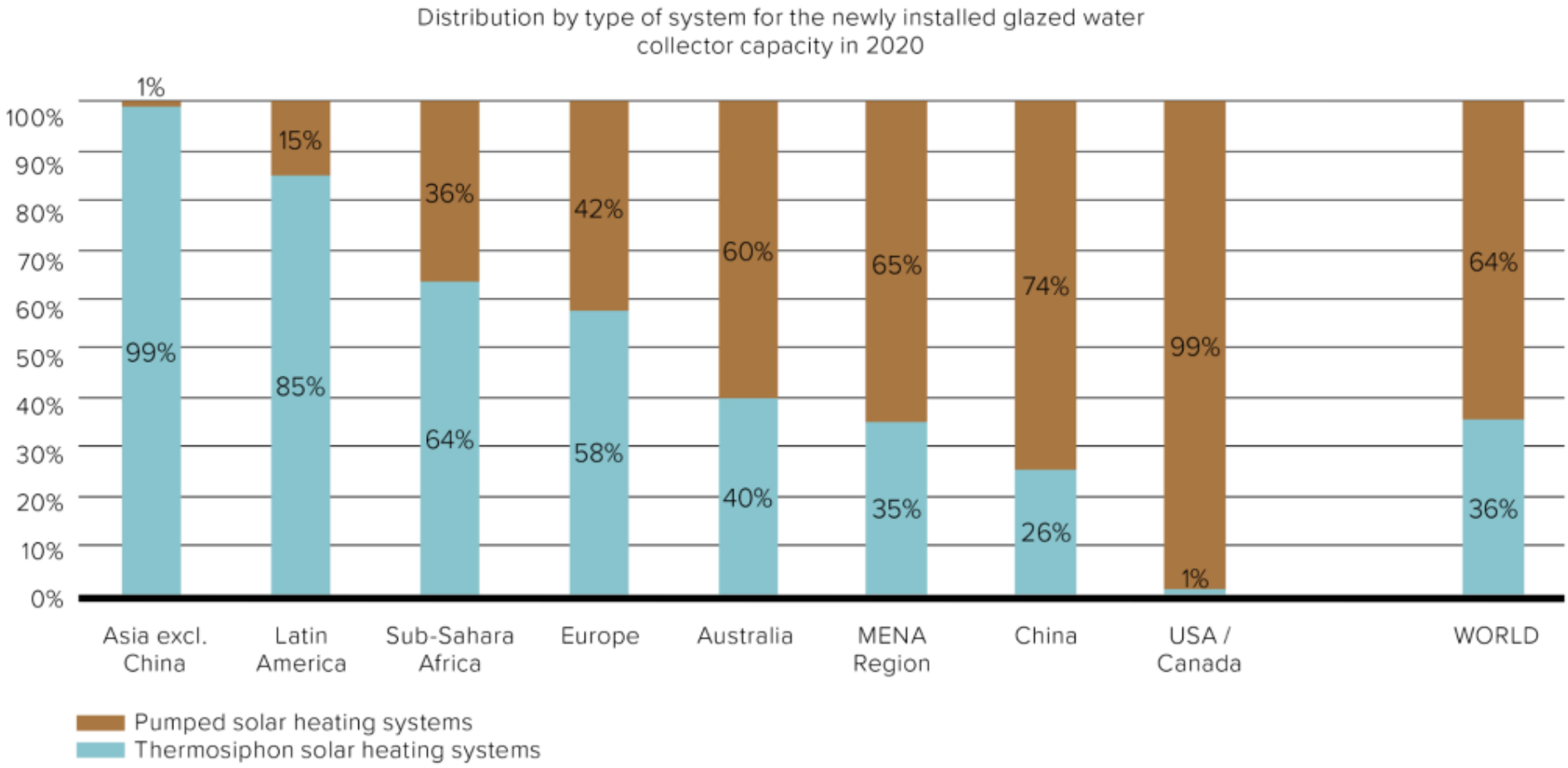
Top 10 countries of cumulated water collector installations per 1,000 inhabitants in 2020



Distribution of the newly installed capacity by collector type in 2020



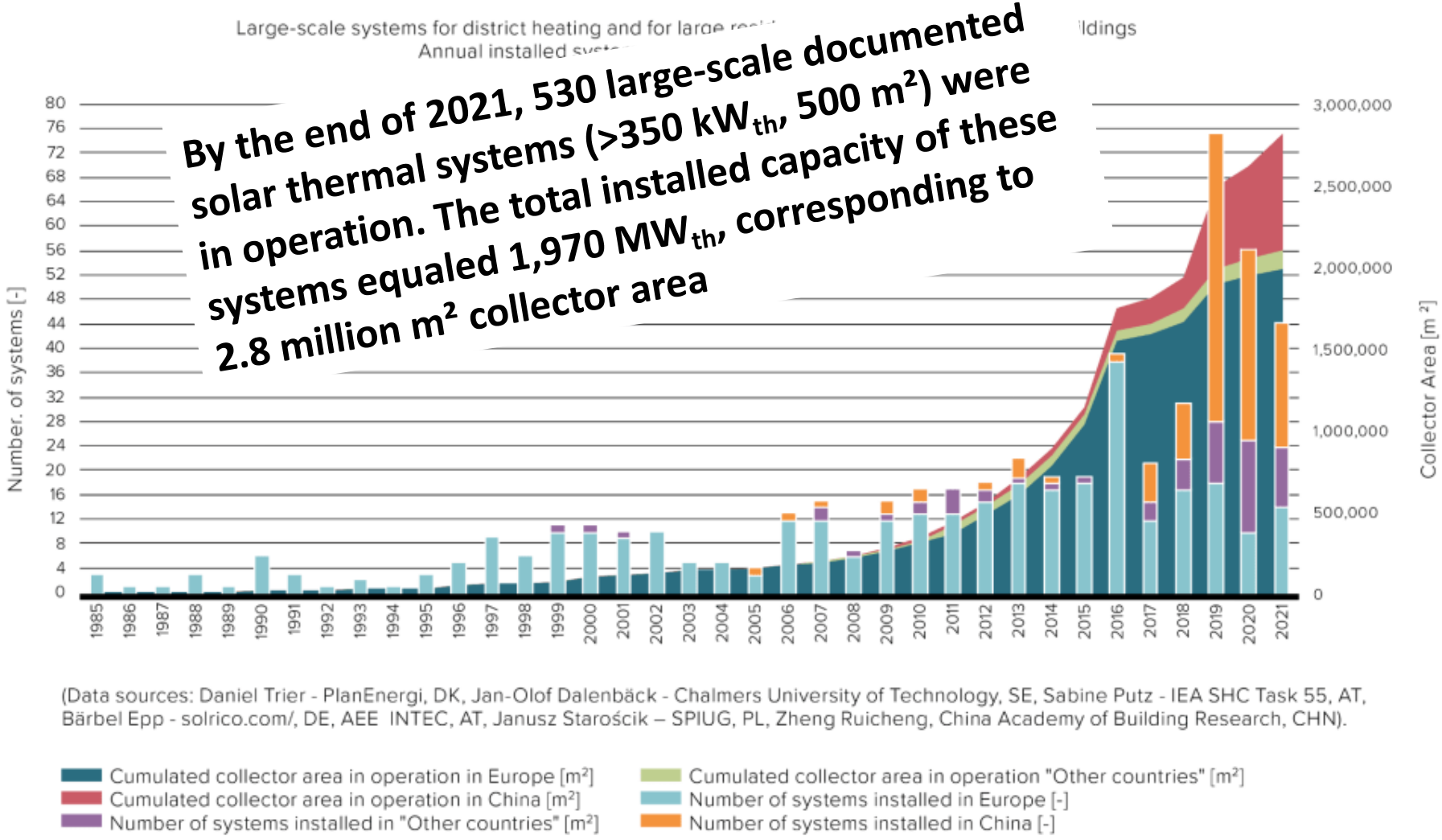
Europe: EU 27, Albania, North Macedonia, Norway, Russia, Switzerland, Turkey, United Kingdom


Distribution by type of system for the newly installed glazed water collector capacity in 2020
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1%
99%
15%
85%
36%
64%
42%
58%
60%
40%
65%
35%
74%
26%
99%
1%
64%
36%
Asia excl. China
Latin America
Sub-Sahara Africa
Europe
Australia
MENA Region
China
USA / Canada
WORLD
Pumped solar heating systems
Thermosiphon solar heating systems

Hallwang Event Center, Salzburg / Photo: Arch. Schindlmeier

Small-scale solar water heating systems represent about 60% of the world's annual solar thermal installations

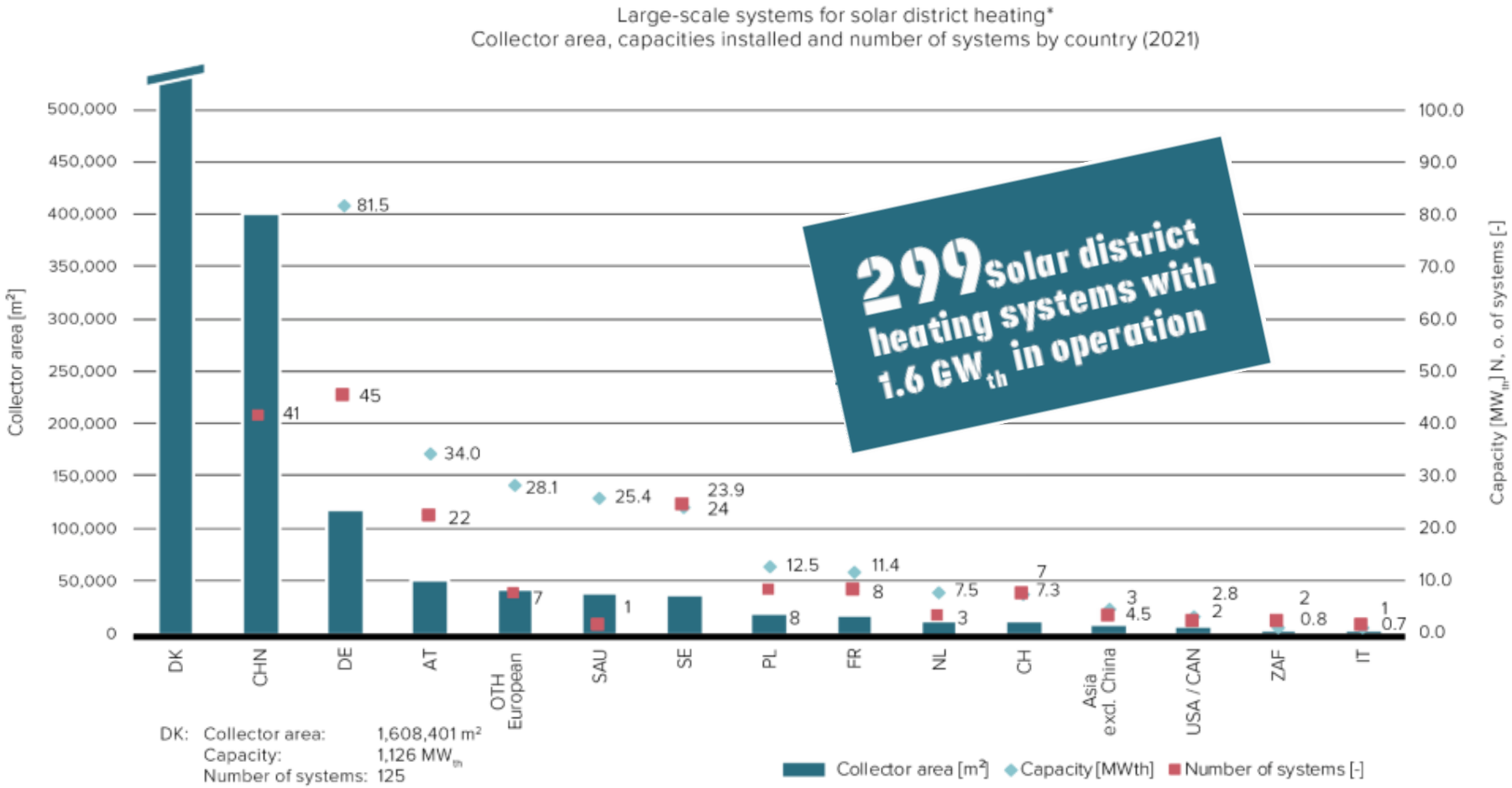
Simple thermosiphon systems are very common in the Sunbelt. Photo: Young Africa Mozambique / AEE INTEC


Large-scale systems for district heating and for large
Annual installed
ildings
By the end of 2021, 530 large-scale documented solar thermal systems (>350 kW$_{th}$, 500 m²) were in operation. The total installed capacity of these systems equaled 1,970 MW$_{th}$, corresponding to 2.8 million m² collector area
Number. of systems [-]
Collector Area [m²]
0
4
8
12
16
20
24
28
32
36
40
44
48
52
56
60
64
68
72
76
80
0
500,000
1,000,000
1,500,000
2,000,000
2,500,000
3,000,000
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
(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 [m²]
Cumulated collector area in operation in China [m²]
Number of systems installed in "Other countries" [m²]
Cumulated collector area in operation "Other countries" [m²]
Number of systems installed in Europe [-]
Number of systems installed in China [-]

In 2021, 44 new large-scale solar heating systems (>350 kWth, 500 m²) with a capacity of 142 MW_{th} were built

Solar District heating system with 18,732 m² evacuated tube collectors in Greifswald, Germany / Photo: Ritter XL Solar

Large-scale systems for solar district heating



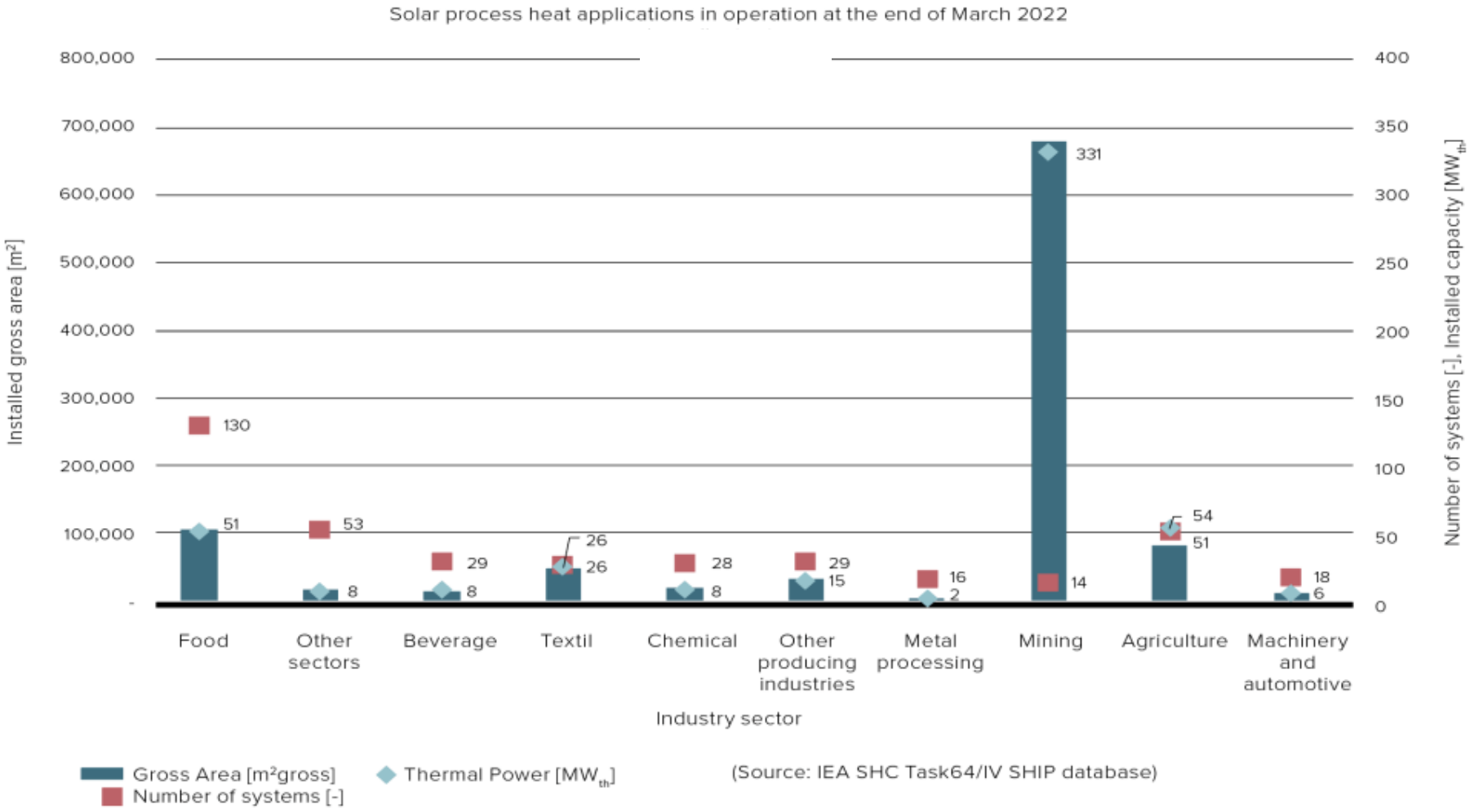
2021 was dominated by smaller SDH systems in Europe

The Austrian solar district heating system in Friesach, with a capacity of 4.1 MW_{th}, corresponding to 5,950 m^2 flat plate collectors, was installed in 2021 / Photo: Greenonetec Solar Industry GmbH, Austria

Solar heat for industrial processes

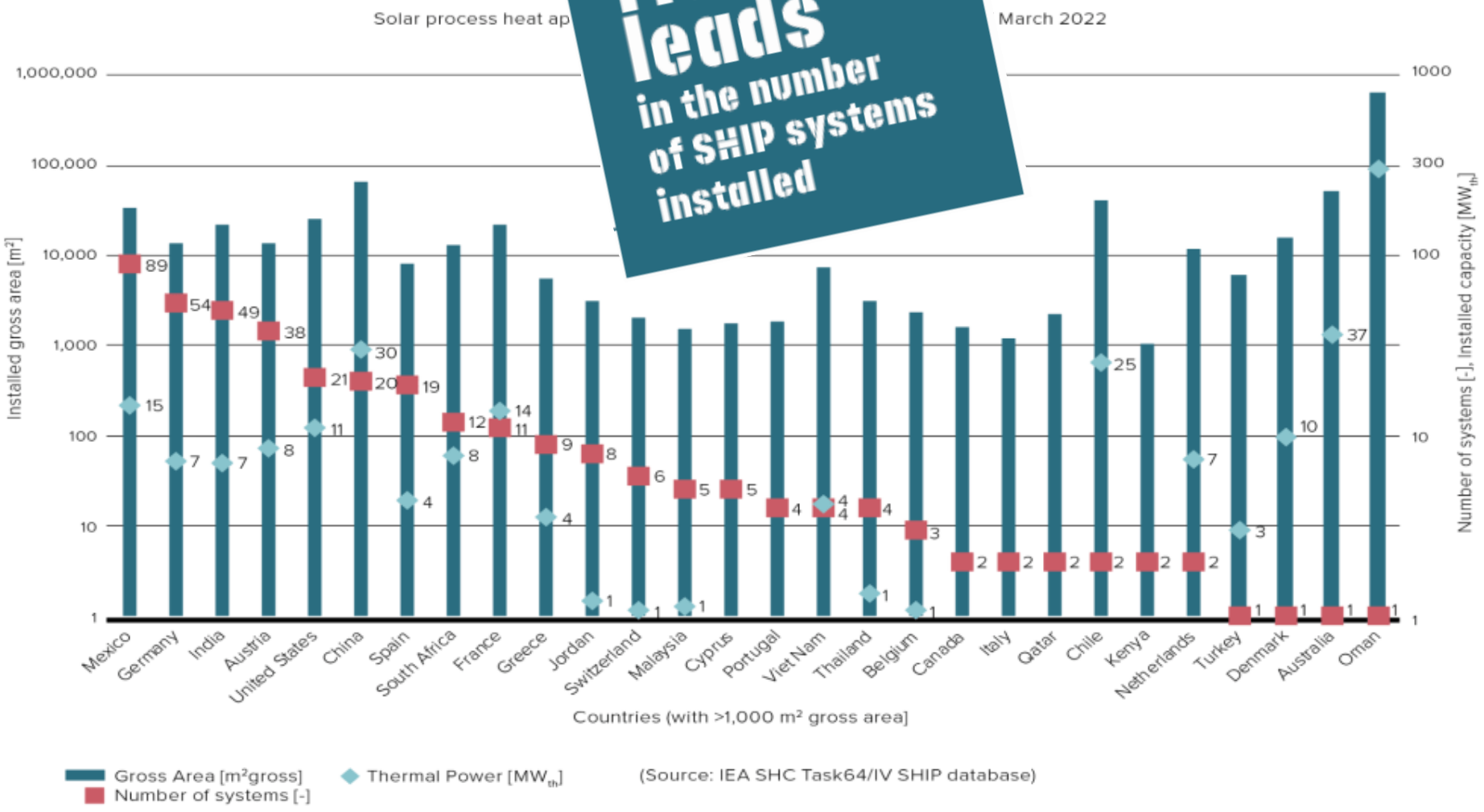
Solar process heat system for Martini & Rossi with a capacity of 0.42 MW_{th} and equipped with high-vacuum flat plate collectors in Turin, Italy
Photo: TVP Solar, Switzerland

Solar process heat applications in operation worldwide end of March 2022 by industry sector

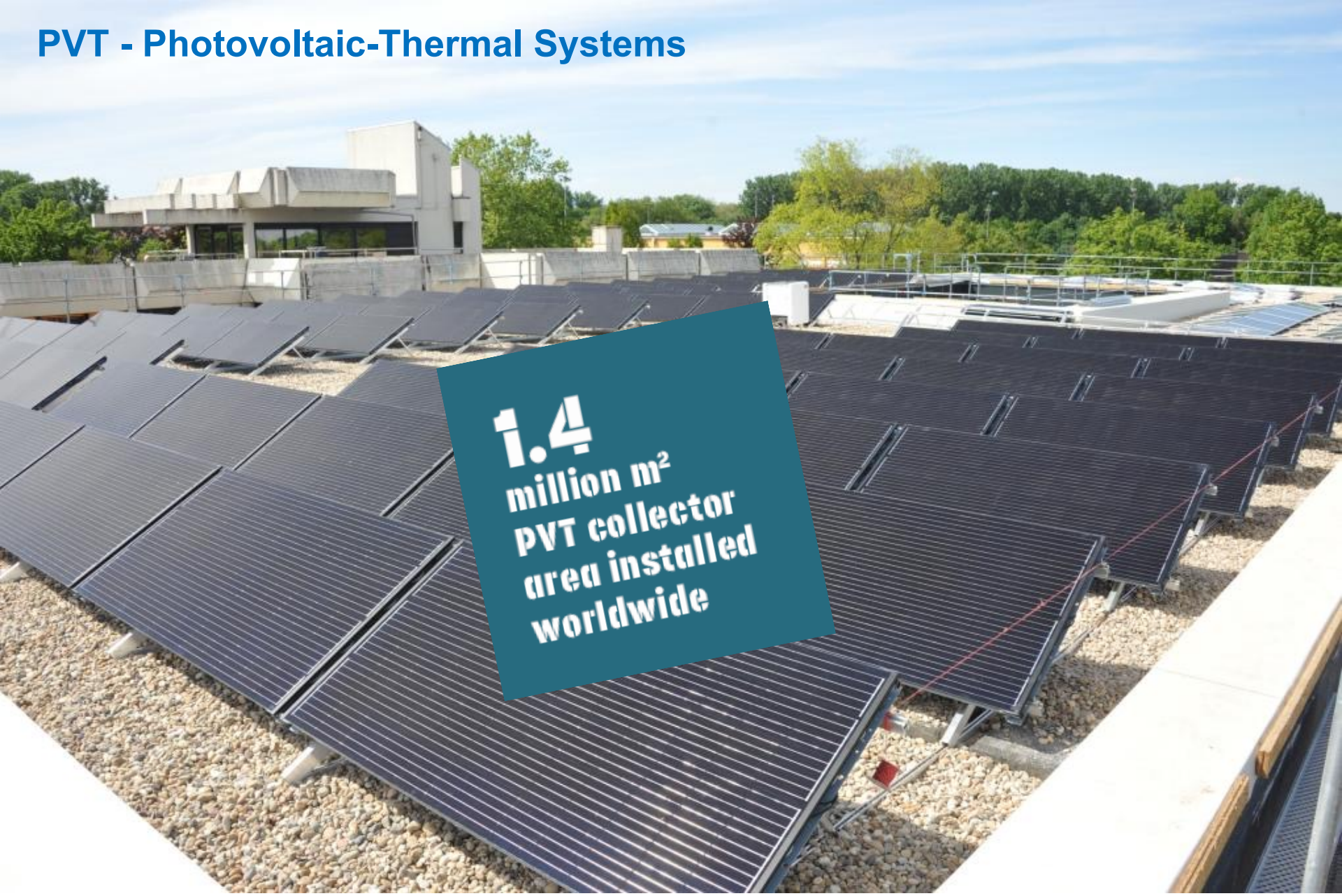


Solar process heat appli ration worldwide end of Marc ry

Mexico leads in the number of SHIP systems installed

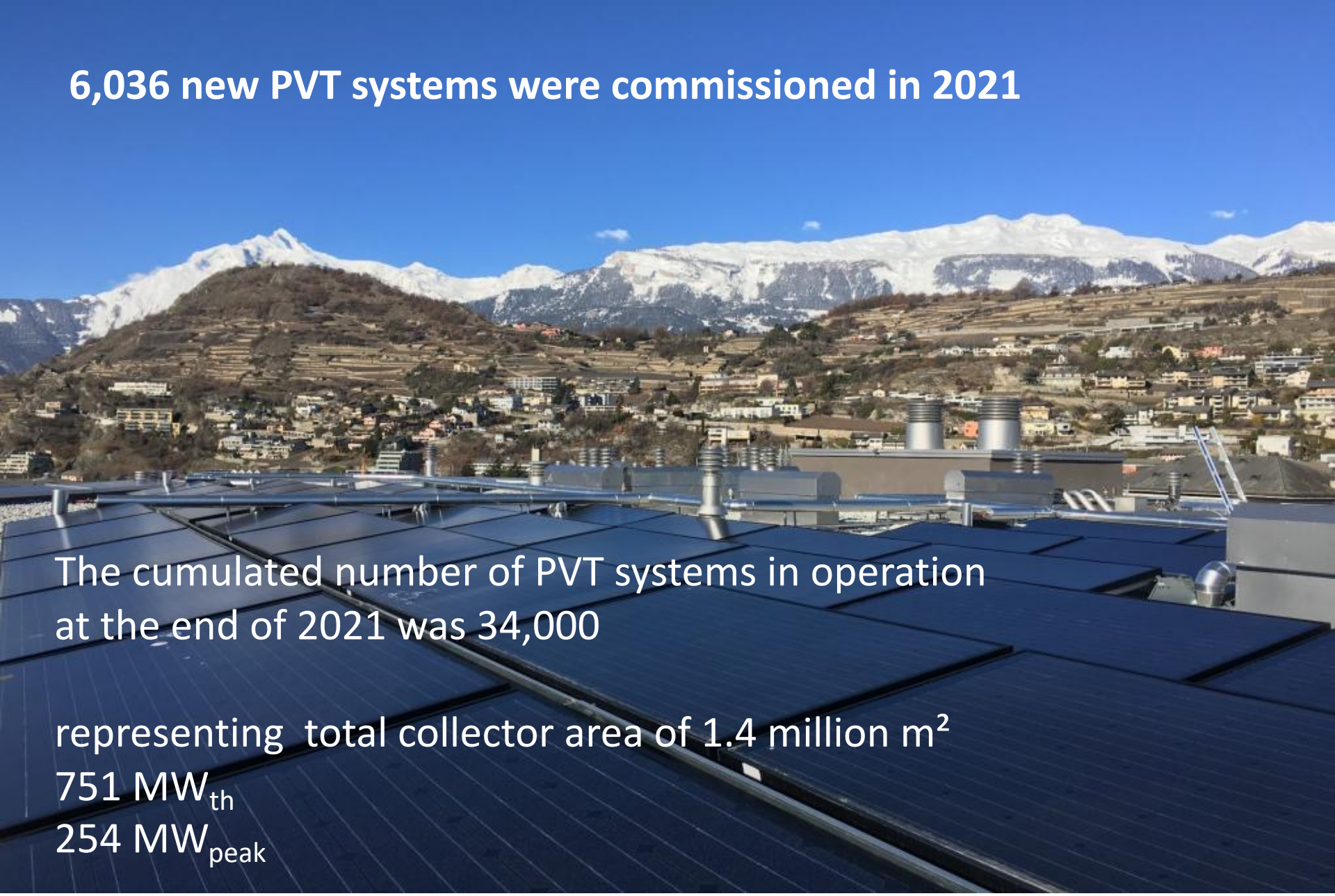


PVT - Photovoltaic-Thermal Systems



200 m² PVT-collector field for a new office/council building in Offenbach, Germany / Photo: Consolar, Germany

6,036 new PVT systems were commissioned in 2021

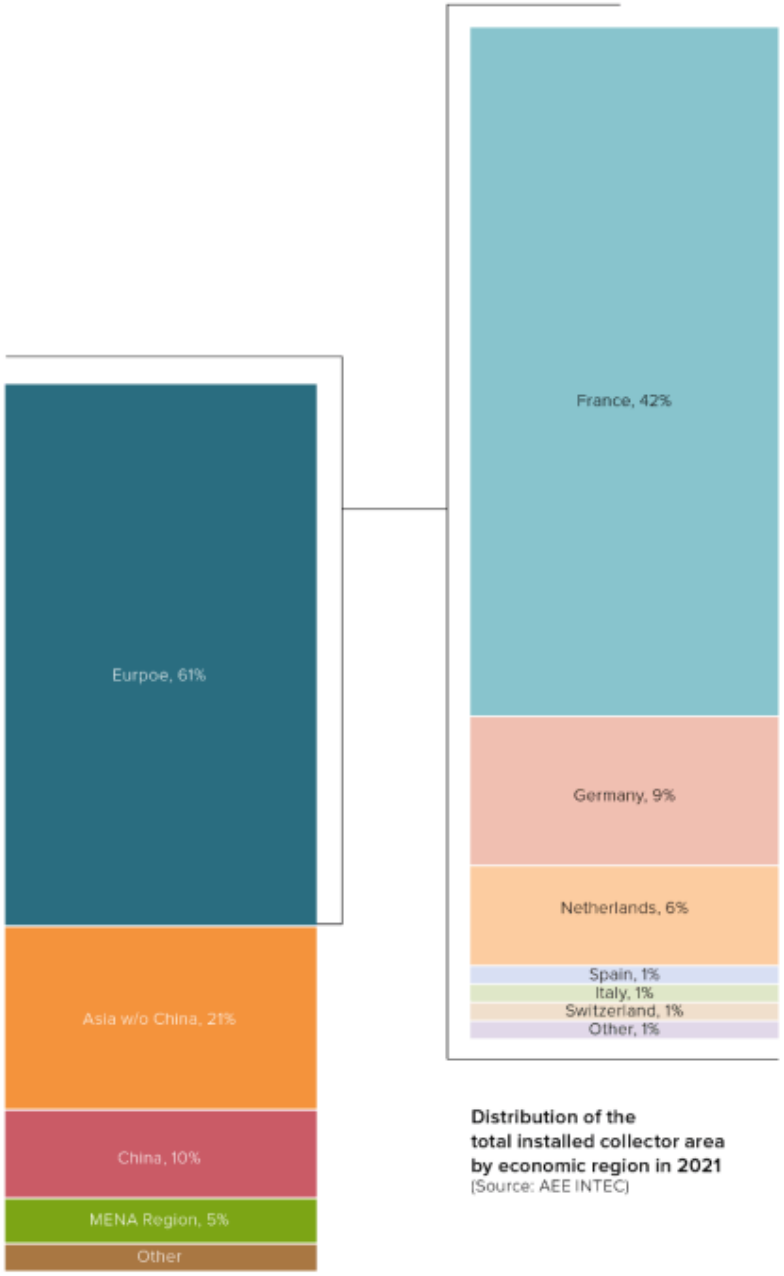


The cumulated number of PVT systems in operation at the end of 2021 was 34,000

representing total collector area of 1.4 million m^2
751 MW_{th}
254 MW_{peak}

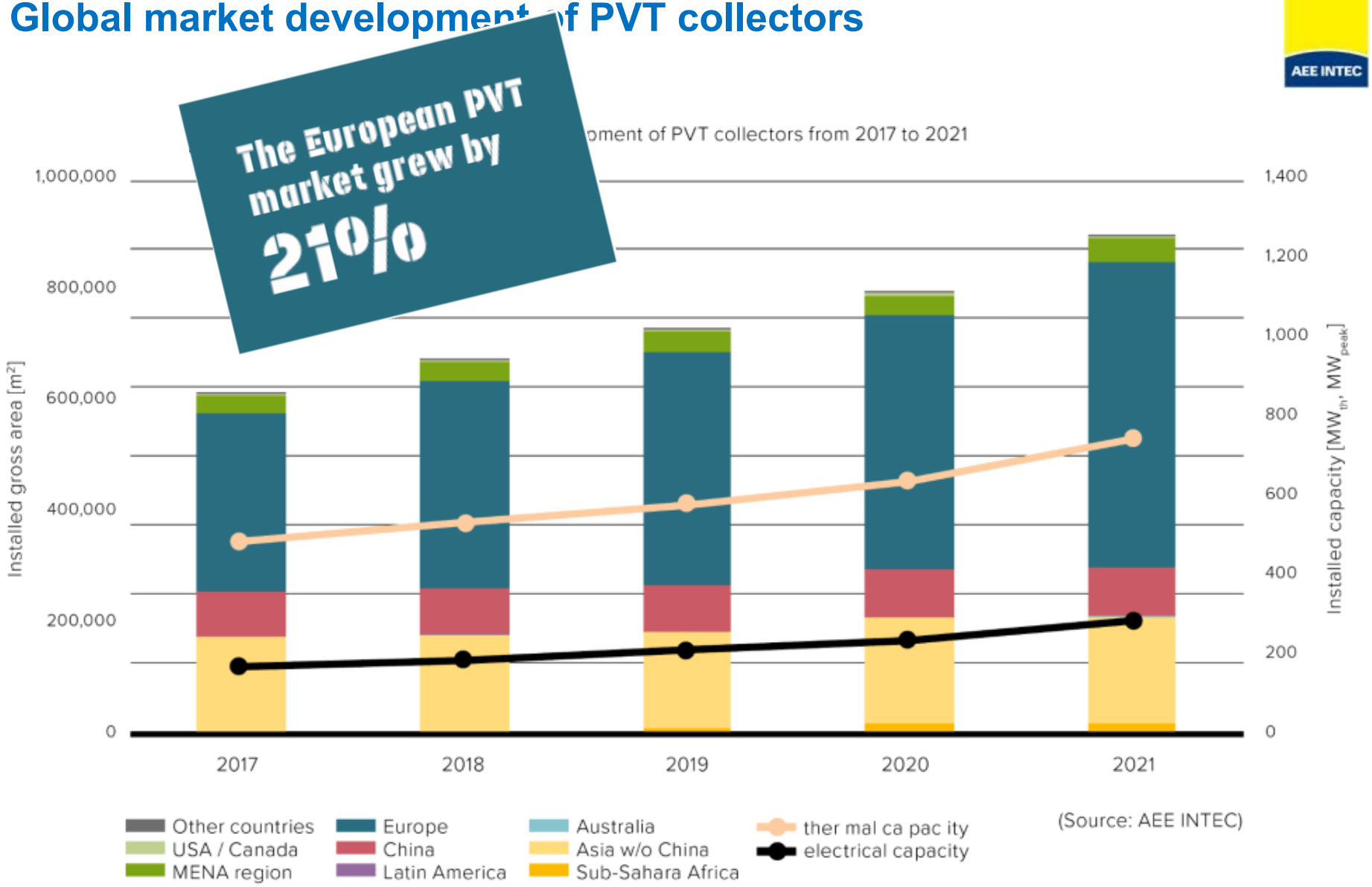
Sion, Switzerland. 41 PVT collectors on a building in the city center (sustainable building with Minergie label) Photo: DualSun, Switzerland

PVT Markets

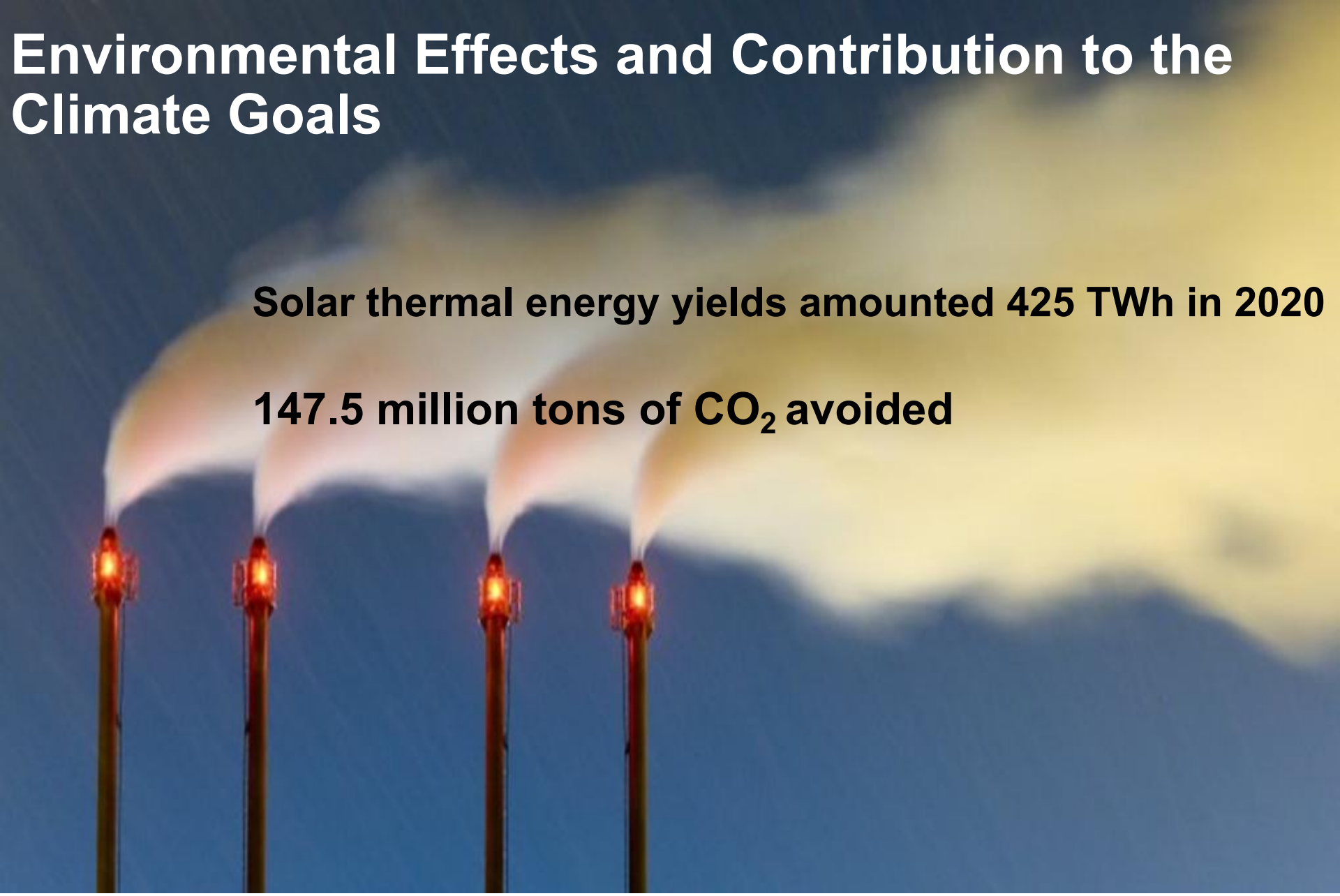


Distribution of the total installed collector area by economic region in 2021
(Source: AEE INTEC)

Global market development of PVT collectors



Environmental Effects and Contribution to the Climate Goals



Solar thermal energy yields amounted 425 TWh in 2020

147.5 million tons of CO_2 avoided

https://www.iea-shc.org/Data/Sites/1/publications/Solar-Heat-Worldwide-2022.pdf

www.iea-shc.org