Solar Heating and Cooling – Trends in Policy and Industry

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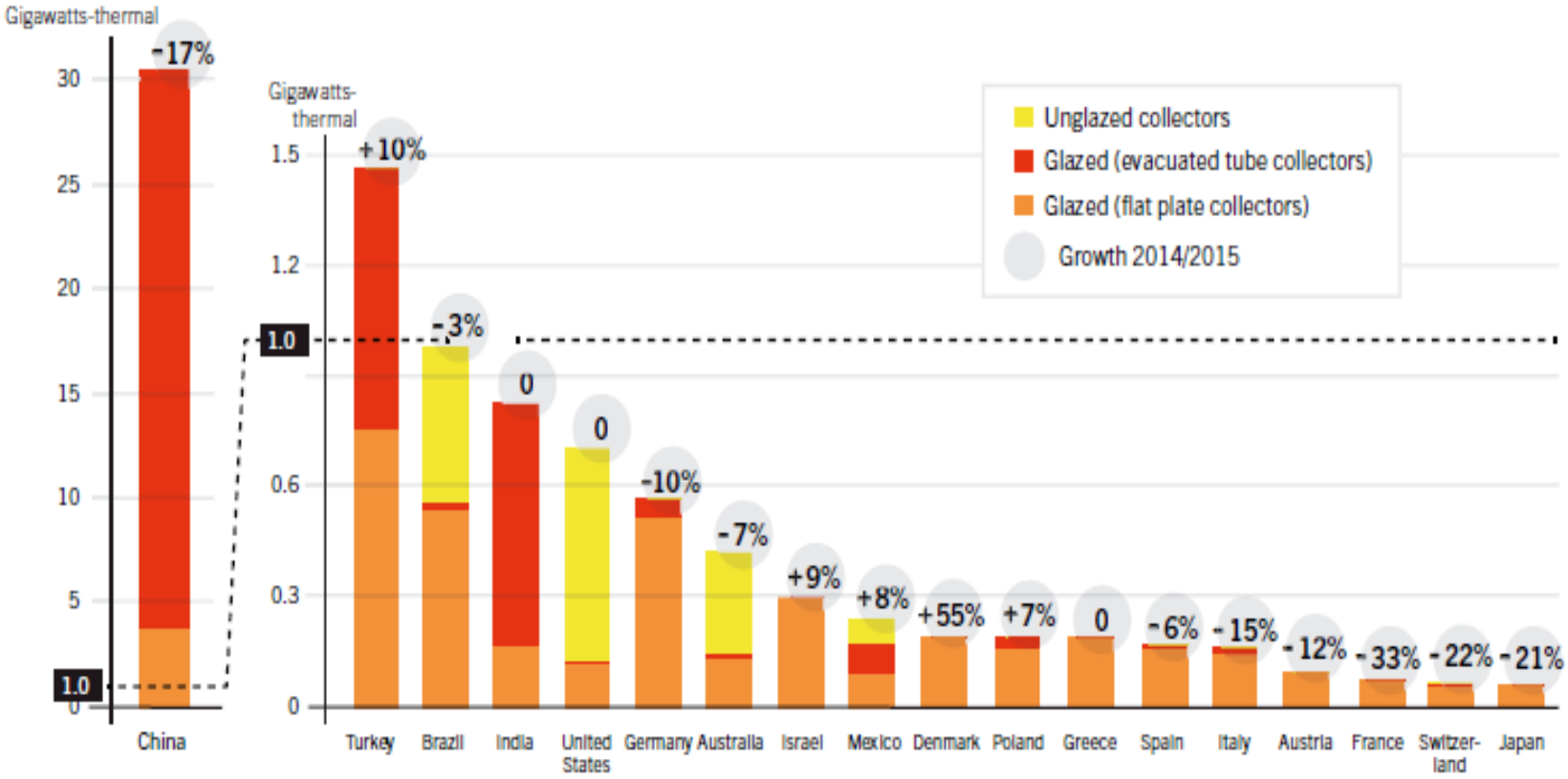
MARKETS UNDER PRESSURE IN 2015

SOLAR THERMAL HEATING AND COOLING

Figure 19. Solar Water Heating Collectors Additions, Top 18 Countries for Capacity Added, 2015

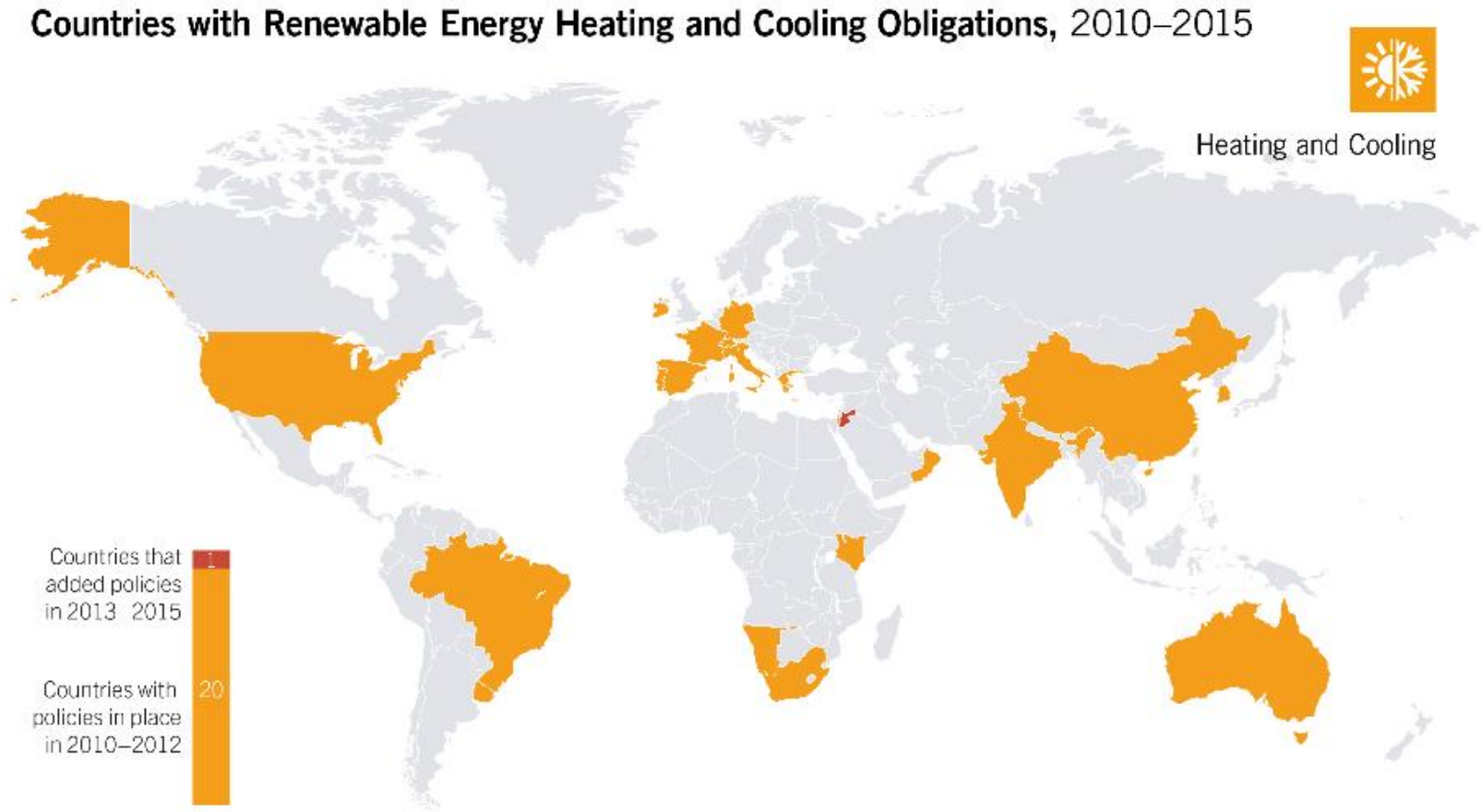


Source:
See endnote 1 for this section.

Additions represent gross capacity added.

SLOW PACE IN ADAPTION OF SOLAR/RENEWABLE OBLIGATION POLICIES

Slow pace of SHC policy adaption



Slow pace of SHC policy adaption

	Solar Heating and Cooling	Renewable Electricity
Number of countries with support policy	21 countries with solar / renewable obligation Around 50 countries with rebates / tax credits	110 countries with feed-in policies 64 countries with tenders 52 countries with net metering / net billing policies
Number of countries with renewable energy targets	47 countries*	173 countries
Number of countries that submitted an Intended Nationally Determined Contributions (INDC) in Paris	3 countries with explicit SHC targets: Bosnia and Herzegovina, Jordan and Malawi	147 countries that mentioned renewables 167 countries mentioned energy efficiency

Source: Renewables 2016 Global Status Report
* Listed in GSR2016 in table R23 on page 181f

CITIES AND MUNICIPALITIES PLAY A LEADING ROLE IN GLOBAL ENERGY TRANSITION

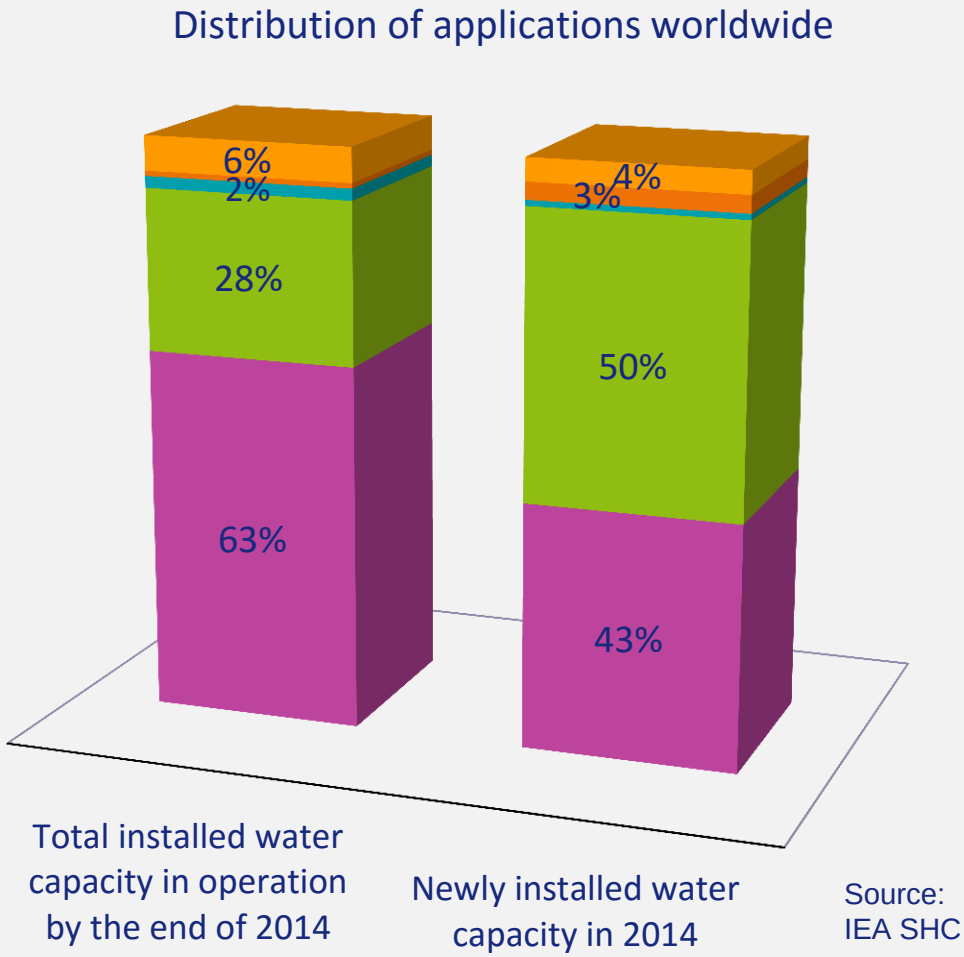
Leading role of municipalities

- Growing number of cities around the world that have committed to achieving a **100%** renewable electricity or energy (across all sectors) system (http://www.go100re.net/map/).
- In 2015, **Amsterdam**, Netherlands, committed to decarbonize its district heating system and set an immediate goal of increasing connections to a total of 230,000 houses by 2040 (a 70% increase).
- The Austrian city of **Graz** plans to realise a 350 MW_{th} solar district heating system with a seasonal storage covering 20 % of the annual net yield and will sign the contract with an Energy Service Company.

TRANSITION FROM SINGLE-FAMILY HOUSES TO THE COMMERCIAL SECTOR

Transition from residential to commercial

- Swimming pool heating
- Other (district heating, process heat and cooling)
- Solar combi systems in single- and multi-family buildings
- Multi-family houses, tourism and public sector
- Domestic hot water for single-family houses



Transition from residential to commercial

- **China:** Multi-family houses, tourism and public sector accounted already for **61 %** of the newly installed collector area in 2015: **26.5 million m²**
  (Source: SunVision Management Consulting, China)

- **Poland:** Major driver are larger projects in public buildings, financed by international funds. While such projects saw an increase of up to **10 %** in 2014, the residential segment declined significantly in response to the national subsidy scheme that favours solar PV
  (Source: Association of Manufacturers and Importers of Heating Appliances, SPIUG, Poland)

TURNKEY SYSTEM SUPPLIERS DEVELOP NEW BUSINESS MODELS

Commercial clients are challenging. They do not want to….

… invest money in activities, that are not part of their core business.

... take over high financial risk and Operation & Maintenance responsibility

More and more companies offer Energy Performance Contracting (EPC).

They finance, install, operate and maintain the solar thermal system and sell the solar heat to the customer.

Increasing number of SHC-specialised ESCOs

Company, Country	Collector area operated by ESCOs	No. of systems	Comments and links
Pampa Elvira Solar, Chile	39,300 m²	1	Largest solar process heat installation worldwide
S.O.L.I.D., Austria	26,427 m²	13	Solar heating and cooling installations in Austria, Singapore and the USA
Nextility (formerly Skyline Innovations), USA	17,100 m²	210	Solar water heater systems for multi-family buildings in the USA
Wien Energie (formerly Energiecomfort), Austria	5,000 m²	50	Multi-family buildings in Austria
EDF Optimal Solutions, France	1,500 m²	1	Solar process heat for dairy producer in France
Aspiration Energy, India	1,365 m²	1	Solar process heat for wheel producer in India
Sumersol, Spain	750 m²	8	Six retirement homes, one hotel and one industrial laundry in Spain
Enertracting, Germany	585 m²	2	Gas pressure regulators and two multi-family buildings in Germany
Source: Companies´ information, survey: solrico/solarthermalworld.org			

Increasing number of SHC-specialised ESCOs

An increasing number of startups/newcomers aims at operating as solar heating and cooling ESCOs:

- Sunti, France, www.sunti.fr
- Sunvapor, United States, www.sunvapor.net/
- Aalborg CSP, Denmark, www.aalborgcsp.com/
- Shtigen, Armenia, shtigen.com/en/ (cooperation with Armenian ACBA Leasing for financing)
- Artic Solar, United States, www.articsolar.com (subcontract of ESCOs/EPC)

SOLAR PROCESS HEAT: NEW ERA OF INVESTMENT

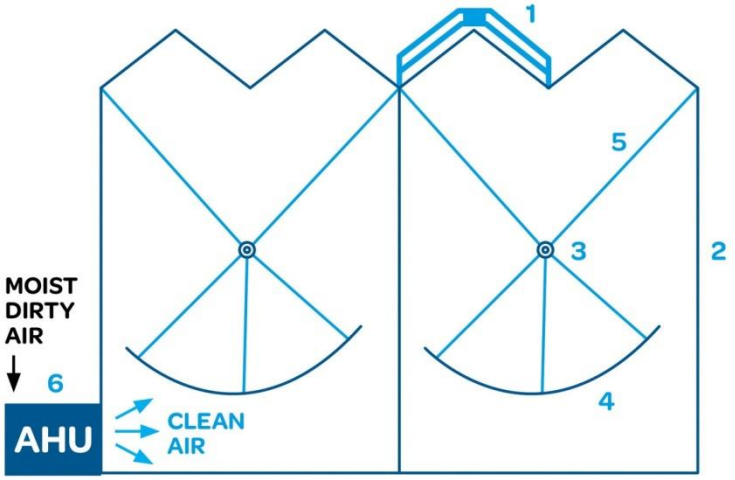
Solar process heat: status

- SHC deployment in the industry sector is a fraction of that in the residential sector
- Similar long-term potential: Solar heat could contribute 8.9 Exajoule (EJ) in the residential segment by 2050 and 7.2 EJ in the industrial segment (Technology Roadmap, 2012).
- As of March 2016, at least 188 solar process heat projects with a total of 106 MW_{th} were in operation (www.ship-plants.info)
- Major barriers slow down the uptake:
  - low oil and gas prices
  - high systems and planning costs
  - the absence of guidelines and tools for planners and engineers
  - Lack of business models
  - Lack of knowledge among potential customers

Solar process heat: new era of investment

Gigawatt investment: Petroleum Development Oman invests USD 600 Million in 1 GW_{th} steam producing plant with parabolic trough collectors in 36 glasshouse modules. 6,000 tons of solar steam daily from 2017 onwards to heat the heavy crude oil in the ground so that it can be pumped up easier.

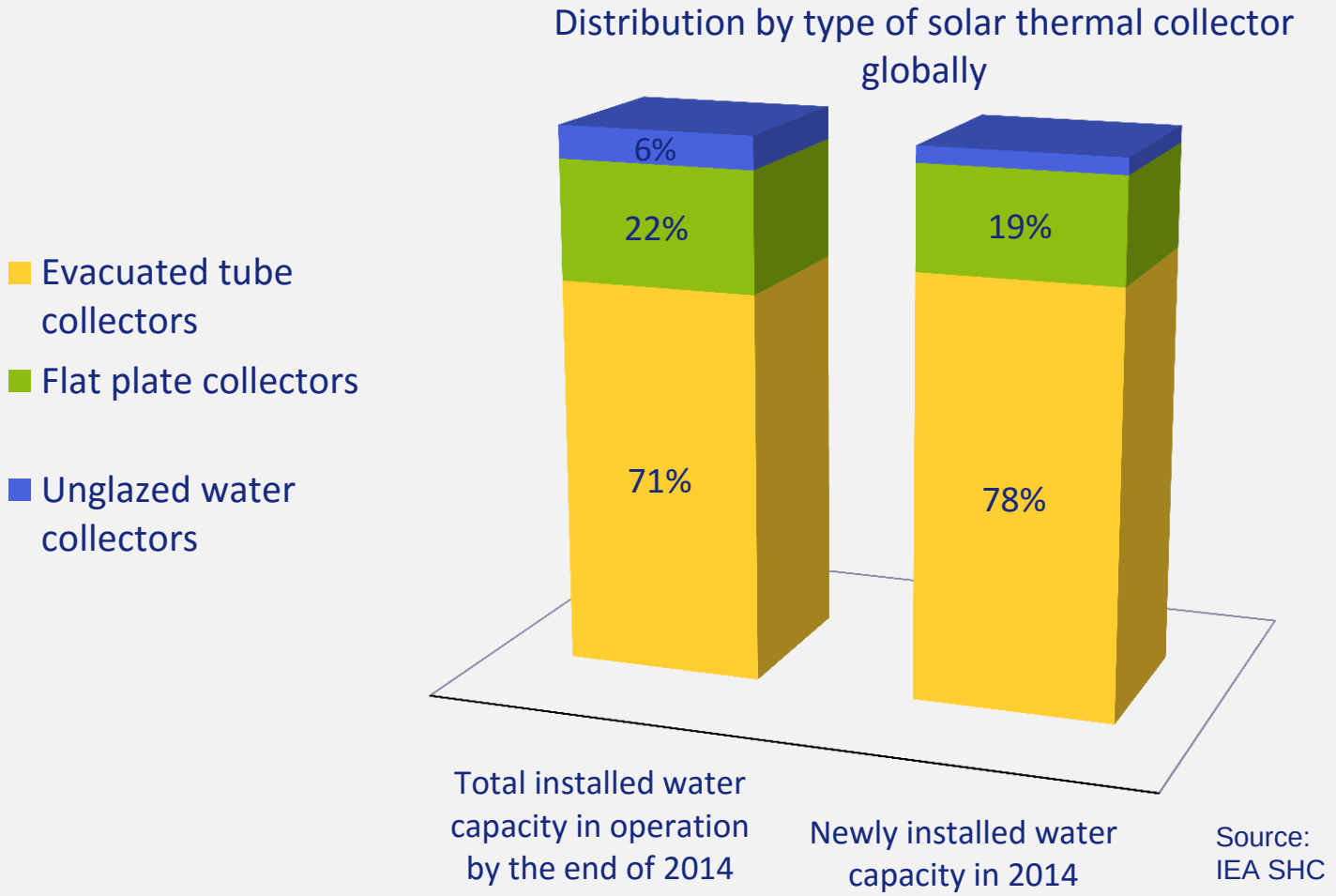
Solar process heat: new era of investment



Automatic roof washers (1), glasshouse (2), 60 mm, non-evacuated receiver with an air stable selective absorber and glass convection shields (3), parabolic mirrors with a lightweight aluminium honeycomb construction (4), steel rods to suspend receivers from structure (5) and air handling unit (6).

INCREASE OF VACUUM TUBE PRODUCTION CAPACITIES OUTSIDE CHINA

Increase of vacuum tube collectors



Increase of vacuum tube production outside China

- **Turkey:** Three vacuum tube manufacturers established since 2011: Lara Solar, Assolar and Solarsan and cover the increasing demand of vacuum tube collectors in Turkey: 1.03 million m² in 2015, almost 50 % of the total market.
- **Mexico:** vacuum tube production from Frantor to start 2018 with 80,000 tubes per months
- **India:** 78 % of the 1 million m² newly added collector area in the fiscal year 2015-2016 based on imported tubes from China.

Thanks for your attention!

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