Webinar: Industrial Scale Solar Thermal Heating for SX-EW and Leaching Processes

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Confidential and Proprietary

Webinar Presented by:

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Nigel Cotton works for the European Copper Institute and is founding member and chairman of the advisory council of the European Solar Thermal Industry Federation, a founding member and board member of the European Solar Thermal Technology Panel and adviser to the United Nations on Solar thermal. He is the founder of solarthermalworld.org.

Werner Weiss (w.weiss@aee.at)

Werner Weiss is a mechanical engineer with more than 25 years' experience in the field of solar thermal energy. He is director of AEE- Institute of Sustainable Technologies in Austria and since June 2010 Chairman of the solar heating and cooling programme of the international Energy Agency (IEA), he is also a board member of the European Renewable Heating and Cooling Technology Platform

Ennis Rimawi (ennisr@catalystpe.com)

Ennis Rimawi is Chairman of Millennium Energy Industries (MEI); a global leader in large scale solar heating applications, with the largest solar heating EPC reference worldwide, a 25MWth peak capacity system in the desert conditions of Riyadh, Saudi Arabia. MEI can make the full investment, and provide such systems on a BOOT or lease basis, where annual payments would be less than the cost of low temp heat using conventional fuel sources such as diesel, heavy fuel or electricity.

Solar Thermal Systems for Industrial Applications SX-EW and Leaching Processes

Werner Weiss

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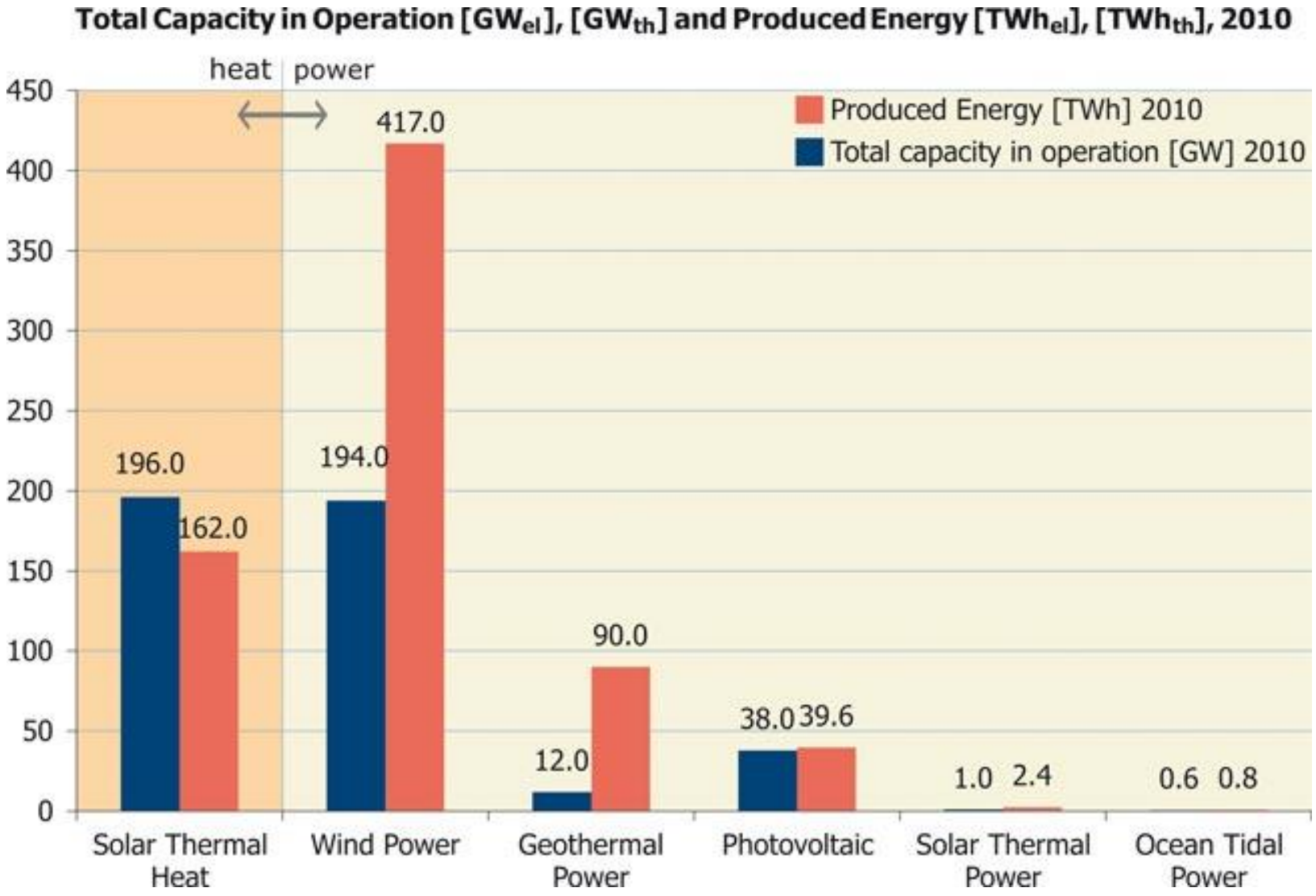
Content

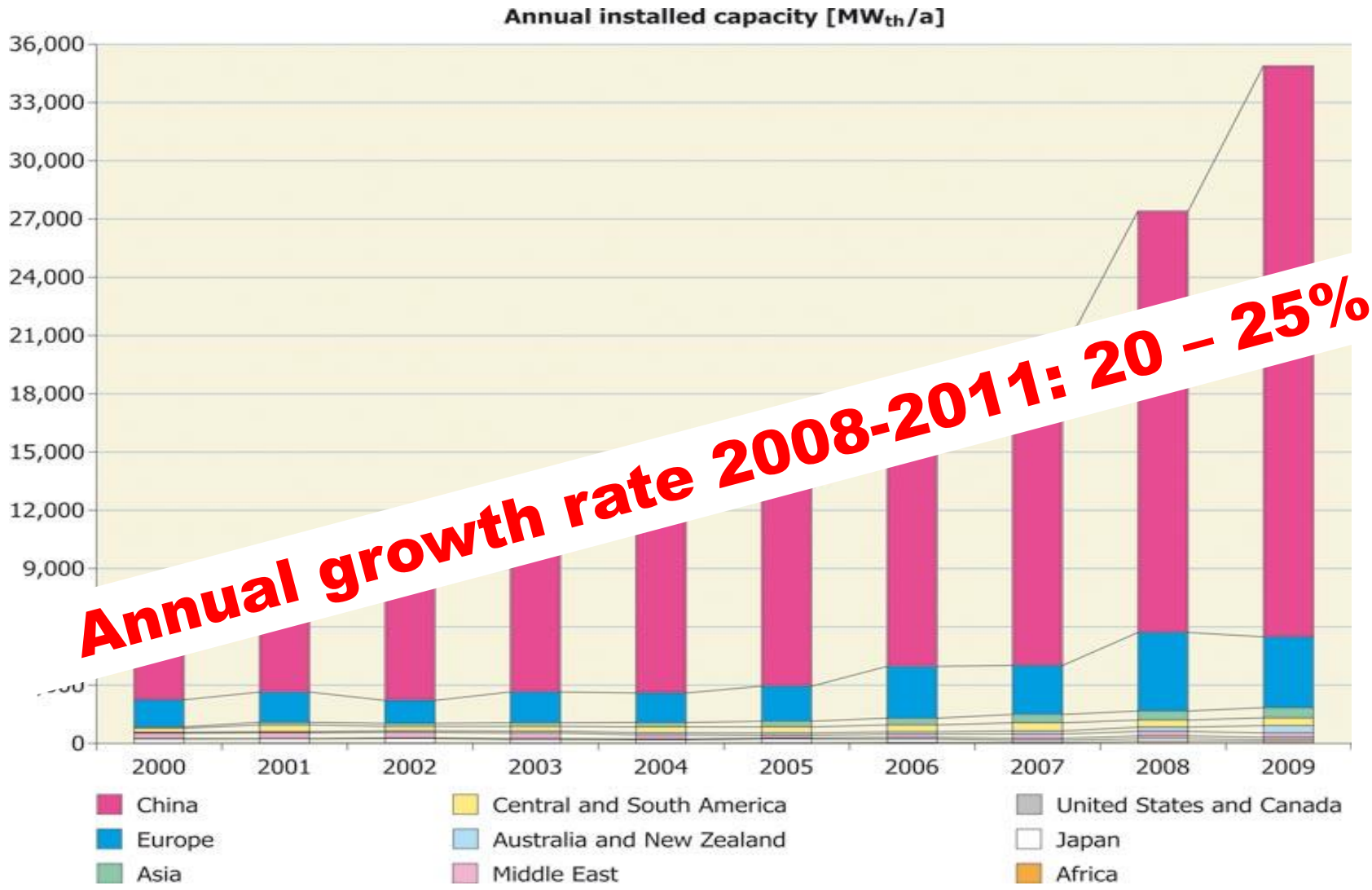
1. Solar Thermal Market Development
2. Solar Industrial Process Heat
3. The Technology – Collectors and Systems
4. Build Examples

Achievements - 2010



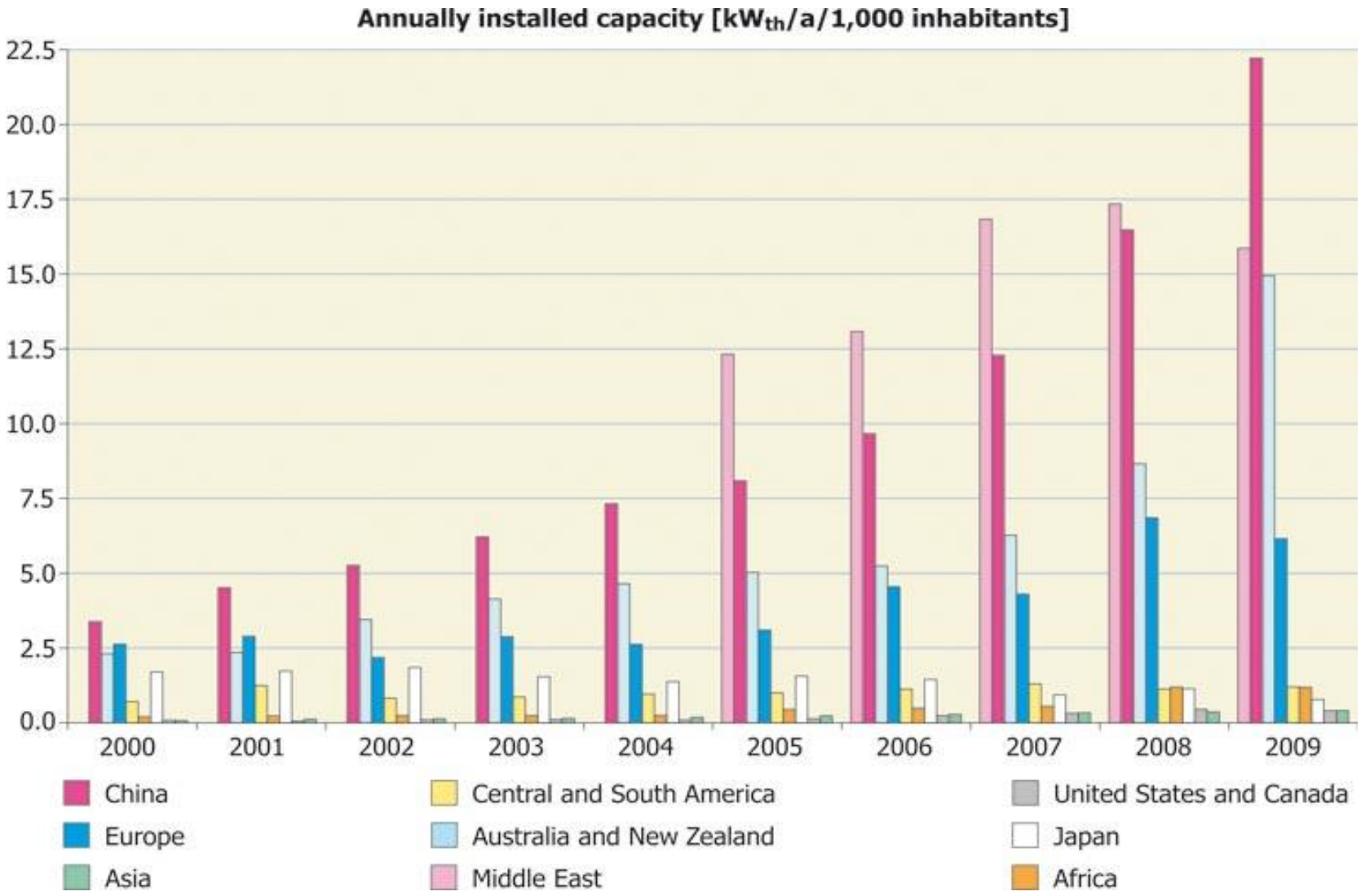
Market Development 2000 – 2009

Flat-plate and Evacuated Tube Collectors

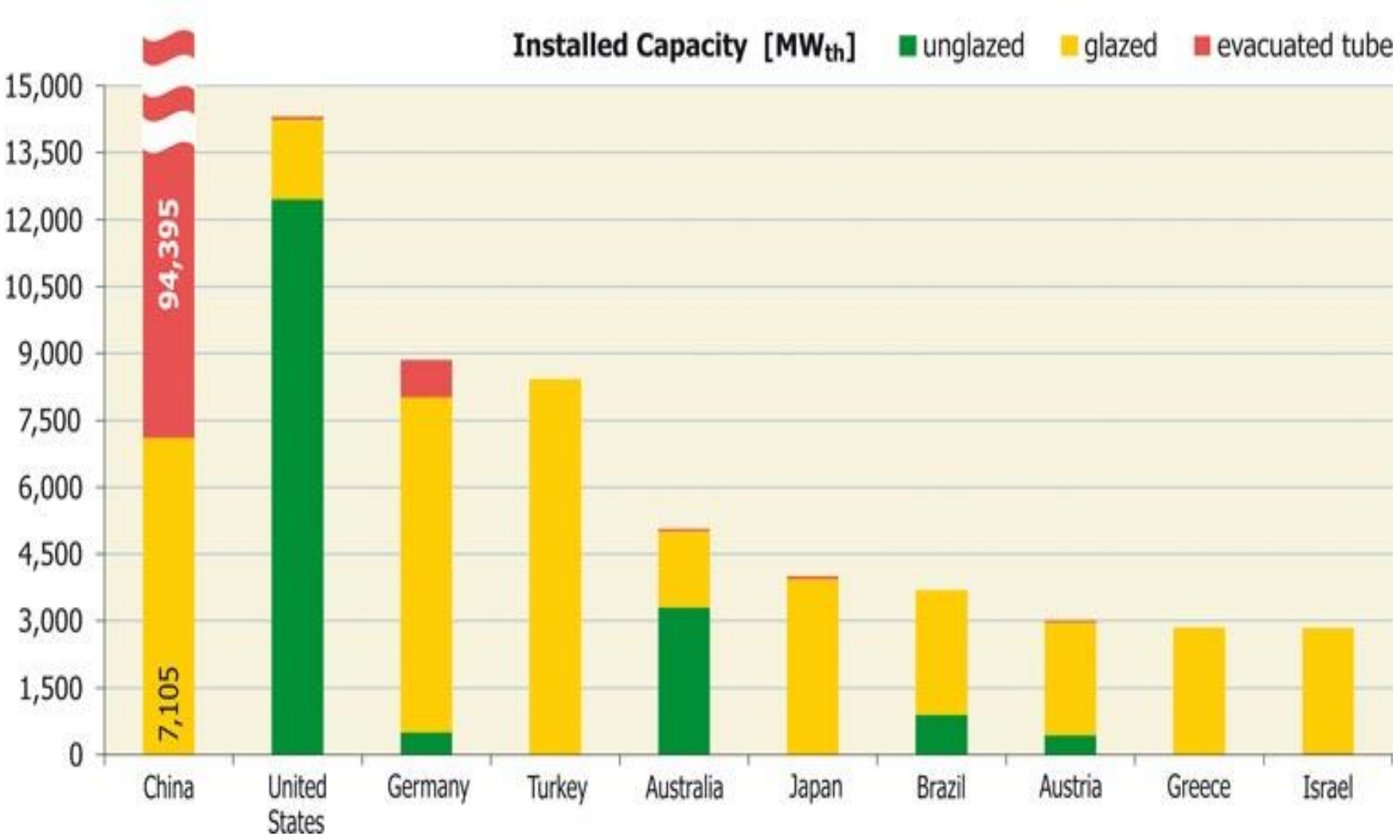


Annual growth rate 2008-2011: 20 – 25%

Annually installed capacity of flat-plate and evacuated tube collectors

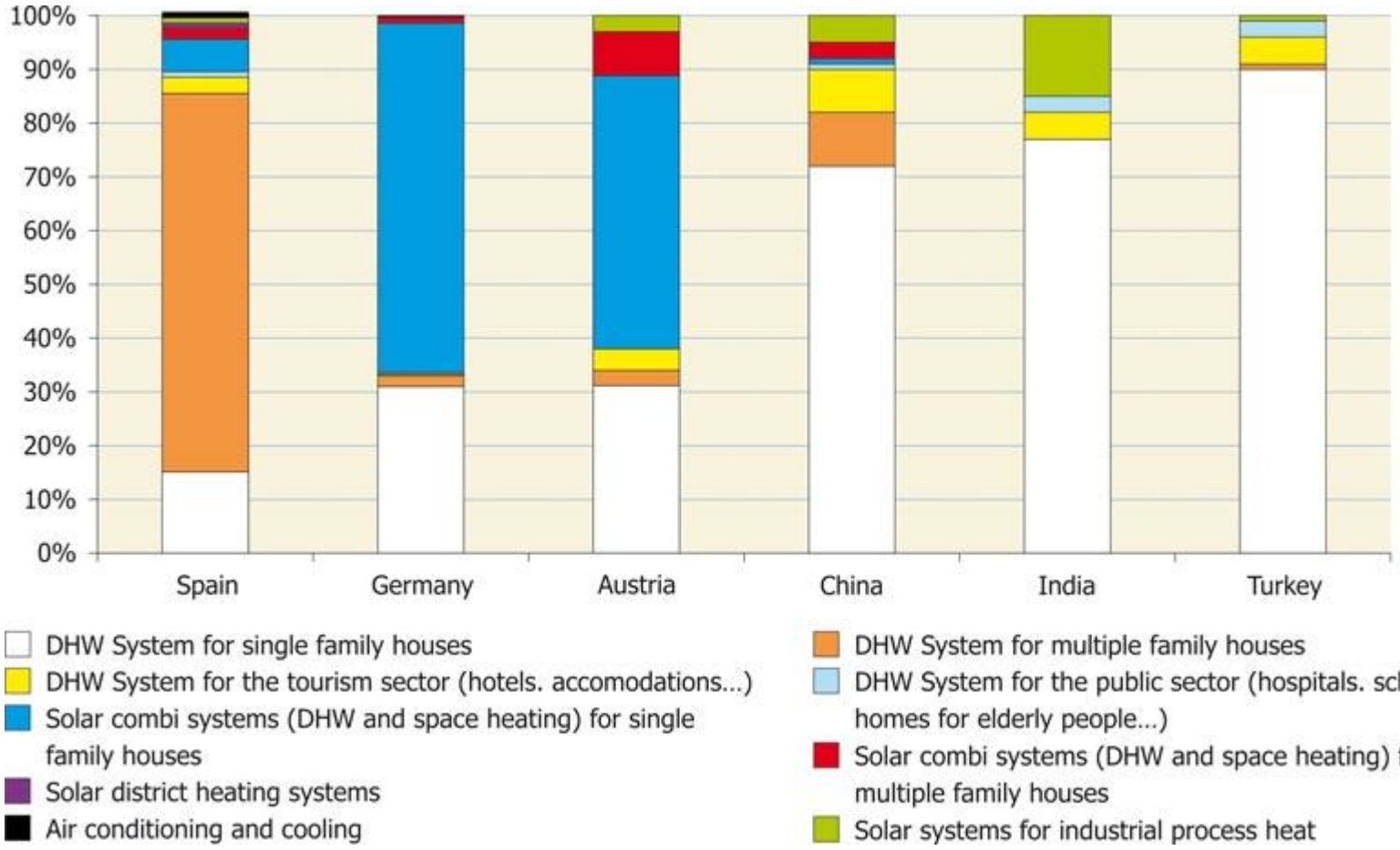


Solar Heat Worldwide – by Collector Type



Distribution by Application

World's Top 6 Countries / Related to newly installed capacity in 2009



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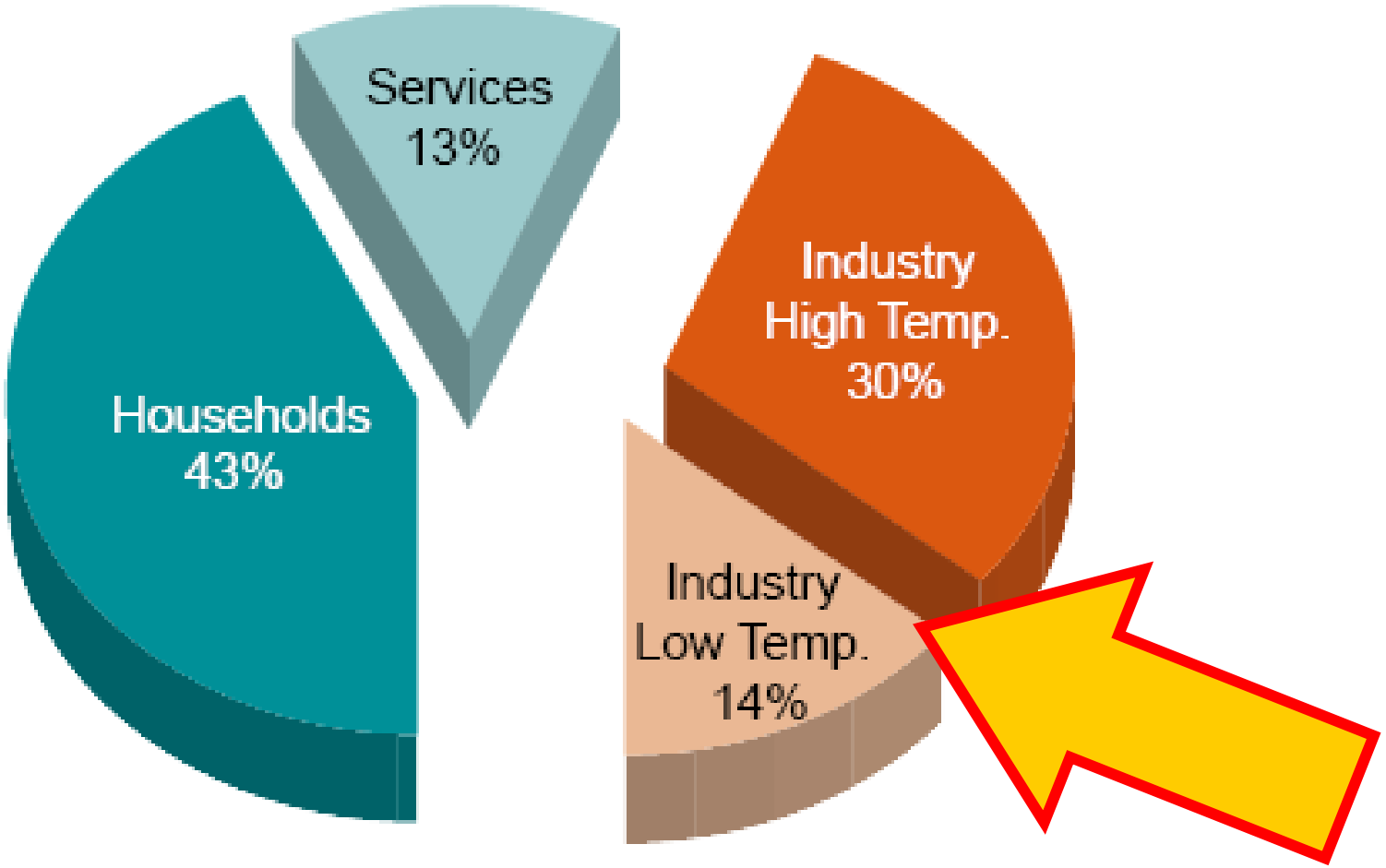
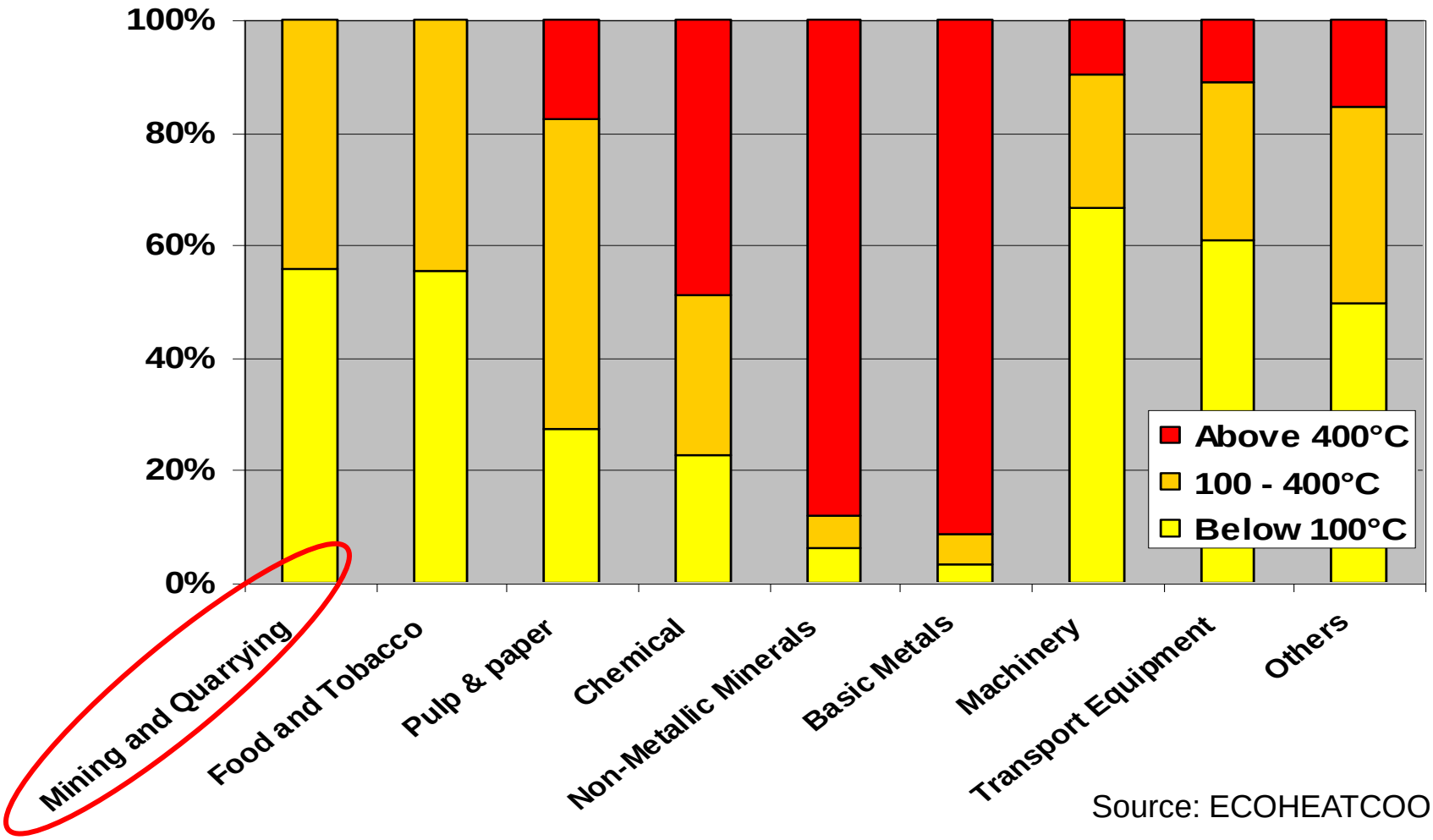
1. Solar Thermal Market Development
2. **Solar Industrial Process Heat**
3. Favourable Processes and Temperatures
4. The Technology – Collectors and Systems
5. Build Examples
6. Conclusions

Heat Demand by Sector*)



*) EU 27 Source:ETP RHC, 2011

Industrial heat demand by temperature level and industrial sector

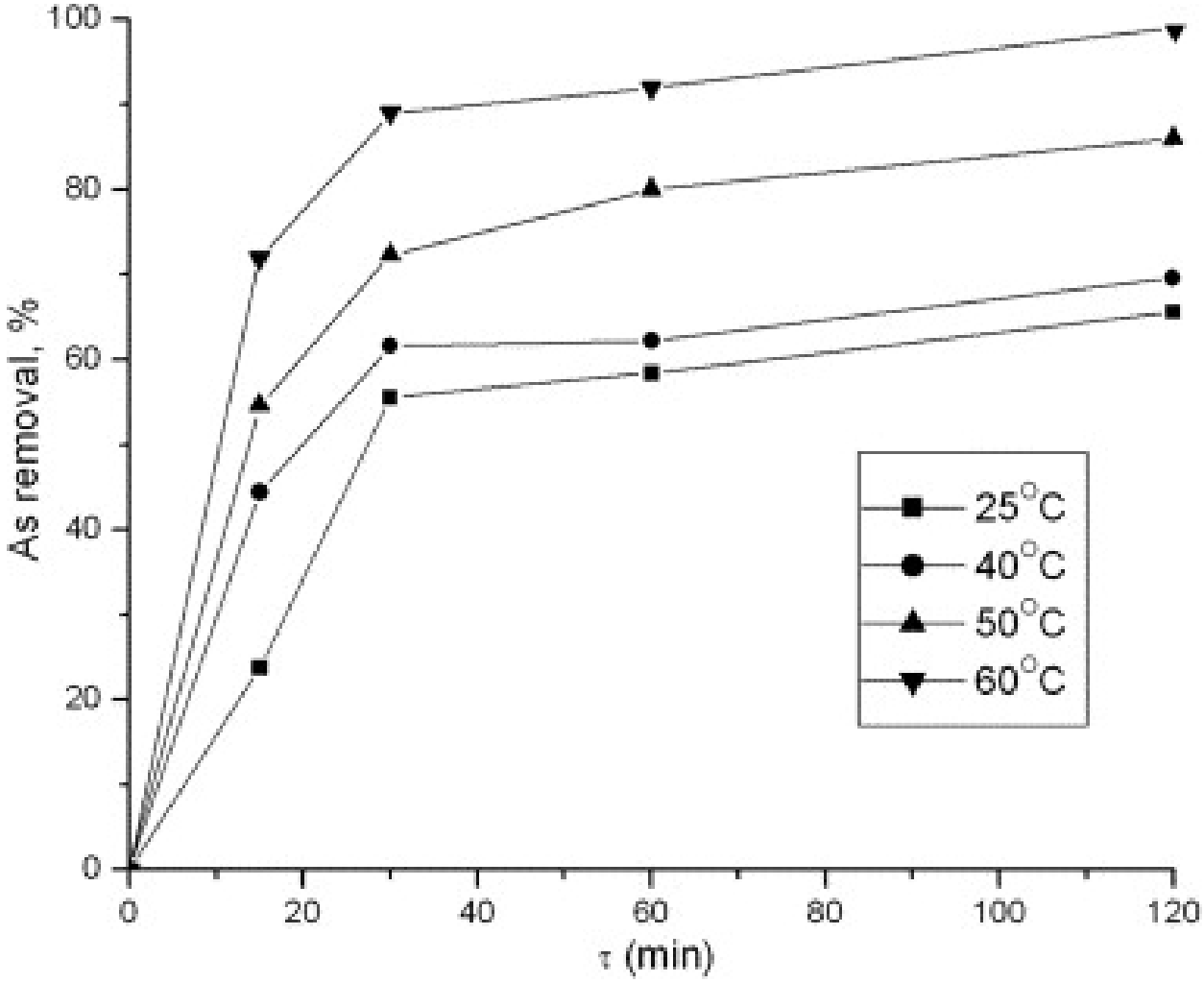


Source: ECOHEATCOOL

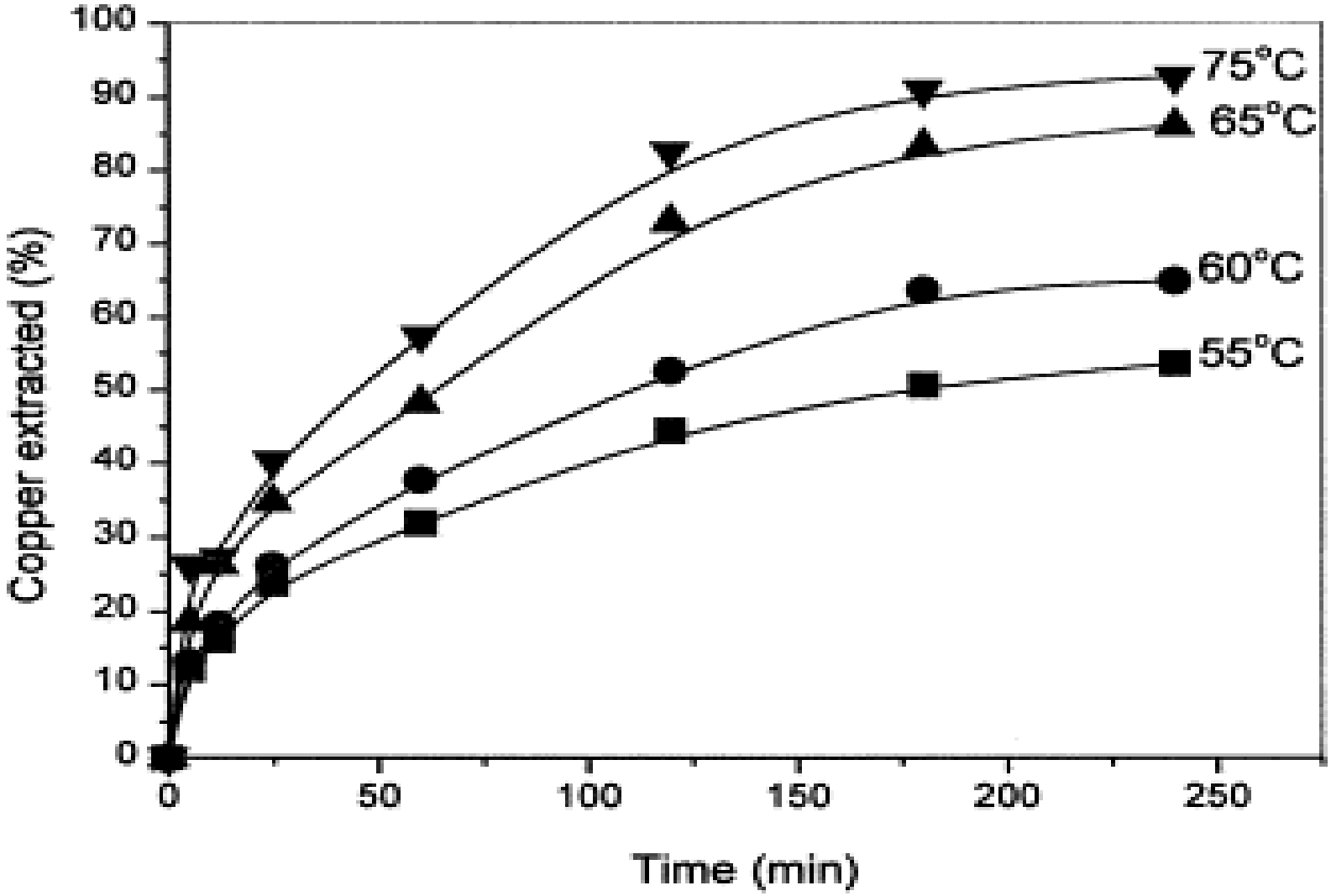
Processes and Temperature Levels

Industrial Sector	Process	Temperature Level [C]
Food and Beverages	Drying Washing Pasteurizing Boiling Sterilizing Heat Treatment	30 - 90 40 – 80 80 – 110 95 – 105 140 – 150 40 – 60
Textile Industry	Washing Bleaching Dyeing	40 –80 60 – 100 100 – 160
Chemical Industry	Boiling Distilling Various chem. Processes	95 – 105 110 – 300 120 - 180
Copper Mining Industry	Solvent Extraction Electro Winning Leaching - Copper	20 - 30 40 - 50 40 – 80

Influence of temperature on arsenic removal efficiency versus leaching time



Temperature dependence during Cu(I) sulphide leaching



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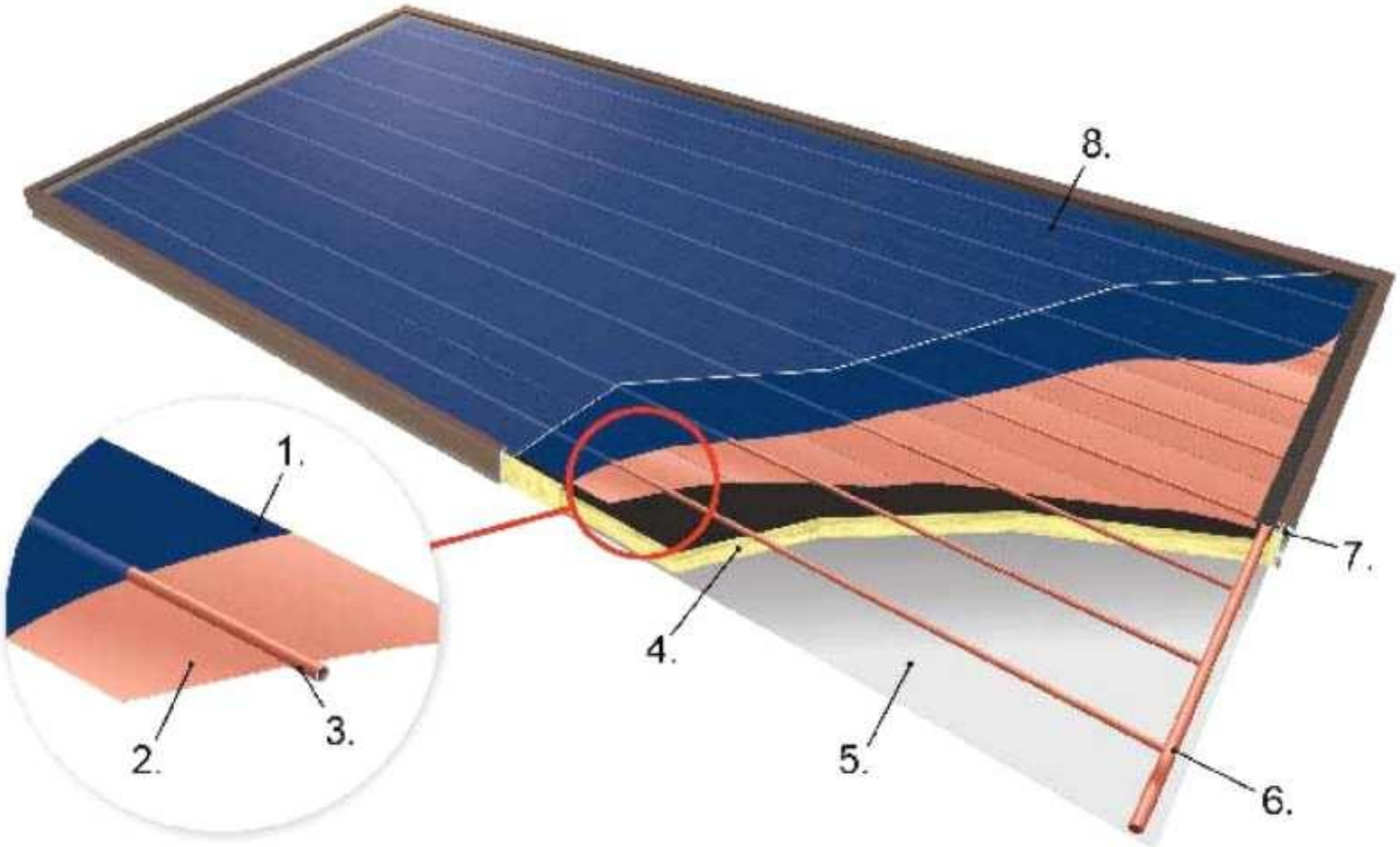
FLAT-PLATE COLLECTOR

Source: GREENoneTEC

FLAT-PLATE COLLECTOR



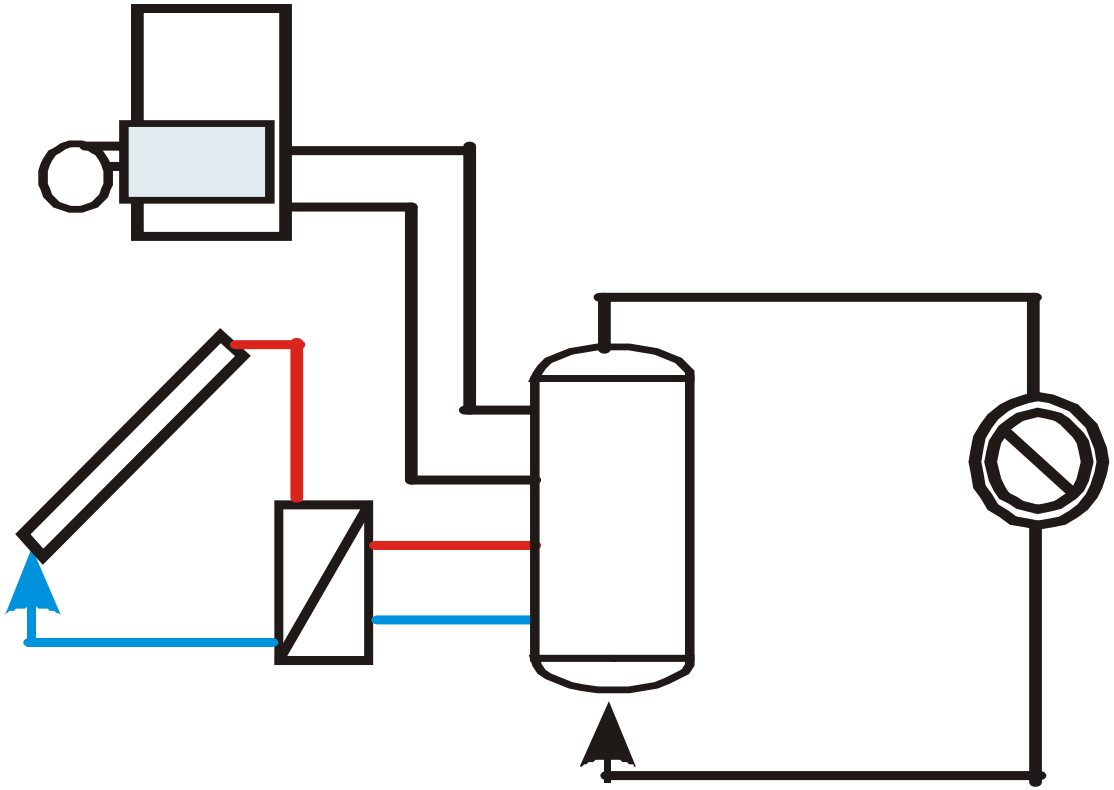
Source: IEA SHC Task 33

Advantages of Flat Plate Collectors

- Reliable and Durable Technology (30 years on market)
- International quality standards – Solar Keymark Tests
- High efficiency in the temp. range from 20 – 90°C
- Annual yields in desert climate 800 – 900 kWh/m²
- No tracking needed
- Low maintenance
- Low safety requirements (hot water instead of steam)
- Remote price of the heat

Flat plate collectors – Installation

System concept



Temperature range for the processes : 30 - 100 C

Heat carrier: Water

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Textile Industry Hangzhou China 13000 m² (9 MW_{th})

Pre-Heating of Process Water

Source: SOLID GmbH. Graz Austria

Biggest System Worldwide, Saudi Arabia

36.000 m² / 25 MW_{th}