IEA Solar Heating and Cooling Programme

Technical Day: IEA TCP on Energy in Buildings and Communities (EBC)

Brussels, June 11, 2019

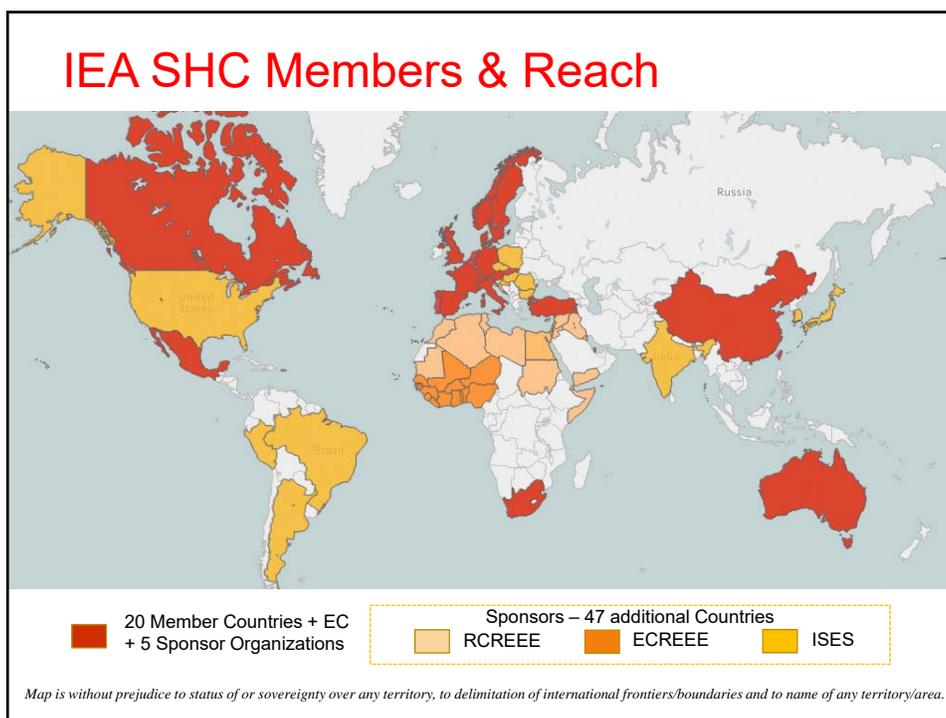Sergio Altomonte, UC Louvain

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SHC TCP Snapshot

- 20 member countries, the EC and various Sponsors (including ECREEE, RCREEE, ISES)

- Tasks focused on:
  - o Solar heating and cooling technologies for residential, commercial, industrial and agricultural end-uses
  - o Capacity building projects for all solar technologies
  - o Market information and projects to support global market deployment.

- Estimated number of experts participating in Tasks:
  - o **Formally participating**
    - Total approx. 210
    - 25% from Industry
  - o **Informally engaged**
    - Total approx. 100
    - 35% from Industry

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IEA SHC Members & Reach

20 Member Countries + EC + 5 Sponsor Organizations	**Sponsors – 47 additional Countries**
	RCREEE ECREEE ISES

Map is without prejudice to status of or sovereignty over any territory, to delimitation of international frontiers/boundaries and to name of any territory/area.
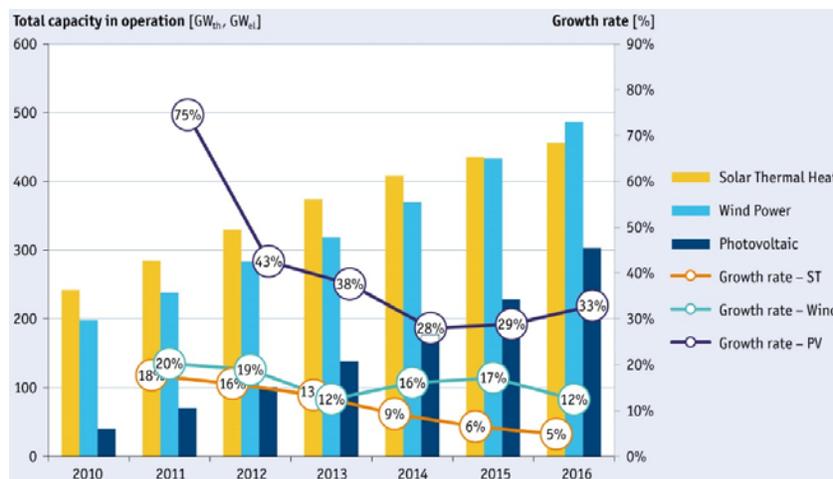
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Solar Thermal Global Context

➢ **SHC Market** – From 2000 to 2017 capacity grew by a **factor of 7.6**. Slow, steady long-term growth. Declines in largest markets – China and Europe. Positive market growth – India, Mexico and Turkey.

➢ **Heat is >50%** of global final energy consumption and **38% of CO2** emissions

➢ **Climate Change** – **Energy yield** 388 TWh ⟹ 134.7 million tons of **CO_2 avoided /** 41.7 million tons of **oil saved**.

➢ **Employment and Turnover** – Estimated **708,000 jobs** worldwide. Worldwide turnover approx. US$ 19.2 billion.

➢ **Technologies**

- o **Large-scale Solar District Heating and Cooling** Steady growth, 15 new systems in 2017. Proving to be most cost-effective means to decarbonize heat sector.

- o **Solar Heat for Industrial Processes.** Record year in 2017 with 124 new installations (India and Mexico leaders).

- o **Solar Air Conditioning and Cooling.** Growing market - 1,350 solar thermal cooling systems end of 2015 (latest available data).

- o **Compact Thermal Energy Storage.** Innovations under development in Phase Change Materials (PCMs) and Thermochemical Materials (TCMs).

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Solar Thermal Global Context

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2018 Work

Solar Cooling – 2 online tools: T53E4, a technical and economic assessment tool and ELISA, an Excel-based tool on Environmental Life Cycle Impacts of Solar Air-conditioning Systems; Position Paper

Solar Certification – Global Certification Network; 4 ISO standard proposals

Solar Heat & Energy Economics in Urban Environments – Cost curves for heat savings in buildings; Scenarios on future role of ST; Scenario analysis of solar heat in 4 European countries

System Price Reduction – Levelized Cost of Heat tool; costs reductions <30%

Large Solar DHC Networks – 17 partners and 27 projects working on network analysis and integration; 6 new country reports; Supporting website SolarHeatData.EU. *Collaborating with DHC TCP.*

Building Integrated Solar Envelope Systems – Report on barriers for new solar envelope systems; database of national and international funded projects; evaluating easy to use simulation tools.

Thermal Energy Storage – Database on PCM test results: https://thermalmaterials.org/pcm. *Joint with ECES TCP.*

Historic Building Renovation – selecting 50 innovative solutions to showcase potential of retrofitting historic buildings; successfully applied for *Label of the European Year of Cultural Heritage*; produced Task brochure. *Collaborating with EBC and PVPS TCPs.*

PVT Systems – Task starting; compiling state-of-the-art projects (30+ in total); evaluating modeling tools, discussing method to predict PV output. *Collaborating with PVPS TCP.*

Daylight and electric lighting – 2nd Industry workshop; questionnaire on opportunities and barriers; developing a simple monitoring protocol. *Collaborating with EBC and PVPS TCPs.*

Industrial Water & Wastewater Management – Kick-off meeting in October 2018.

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2018 Outreach

- **SHC Solar Academy** – 4 **webinars** highlighting Task work. 2 **onsite trainings:** solar cooling (South Africa) and solar SHC (China). 2 **national days** with ExCo meetings (Stockholm, Lisbon).
- **Solar Heat Worldwide 2018** – published every year, represents 95% of solar thermal market.
- **SHC Solar Update Newsletter** – published online PDF; July and December 2018 (6,000+ pp).
- **Monthly Internal Newsletter** – sent to current and past ExCo, OAs, and Task experts (680+ pp).
- **Tasks** – just under 100 reports, articles, presentations, newsletters posted online.
- **Task Highlights** – each Task prepares annually to highlight recent work.
- **Press Releases** – Solar Heat Worldwide
- **Social Media –** news on Twitter and LinkedIn
- **Conference Presentations** – every Task presents at 1 or more conferences per year, e.g. EuroSun 2018 (Tasks 53, 54, 56, 57, 59, 61) Asia Pacific Solar Research 2018 (Tasks 57), ISEC 2018 (Tasks 54, 56), ABS 2018 (Task 56, 61), and EEHB 2018 (Task 59).

Collaboration outside IEA/TCPs

- **solarthermalworld.org** – write and disseminate TCP specific news
- **Industry** – strong involvement in Tasks, e.g., Solar DHC (16 companies), Solar Cooling (11 companies), Daylight and Electric Lighting (7+), Price Reduction of ST Systems (9)

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Our Strategic Goals 2019-2023

- **Collaborate, create networks** with RE and EE TCPs, intermediary industries; end users; research, international and standards organizations
- Seek **increased participation** from Africa, South America and MENA (Middle East and North Africa) region
- Continue to produce **high quality data, analysis** and **research results**
- Support the acceleration of **market penetration** and **improved cost effectiveness** of solar designs, components and systems
- Work on SHC technology **performance** (system efficiency)
- Work on **cost reduction** of SHC components and systems
- Analyze and evaluate the use of **PV for heating and cooling applications**
- Cooperate with **stakeholders** to increase the market share of SHC
- Communicate the **potential** and **value** of solar heating and cooling systems to non-technical stakeholders, such as decision makers and the public
- Hold **international conference** every 2 years
- Conduct targeted **R&D work**

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Current R&D Work

Task 55: **Towards the Integration of Large SHC Systems into DHC Networks**

Task 56**: Building Integrated Solar Envelope Systems for HVAC and Lighting**

Task 57: **International Standards & Global Certification**

Task 58: **Material and Component Development for Thermal Energy Storage**

Task 59: **Renovating Historic Buildings To Zero Energy**

Task 60: **Application of PVT Collectors and New Solutions with PVT Systems**

Task 61: **Integrated Solutions for Daylight and Electric Lighting**

Task 62: **Solar Energy in Industrial Water and Wastewater Management**

Proposed Work
- Renewable Heating: Enhanced Systems in a **Digital Driven Environment**
- Solar Neighborhood Planning
- **Solar Process Heat   => Industry focused and demo oriented**
- Solar Cooling for the Sunbelt Region (with Mission Innovation #7)
  => Future of Cooling..

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Forthcoming Activities

- **SHC International Conference on Solar Heating and Cooling for Buildings and Industry –** 6th conference and 2nd time with ISES Solar World Congress

- **SHC Solar Award 2019** – theme: Financing Mechanism to Support Deployment of Solar Heating or Cooling Project(s). **Nominations due May 1st**. Ceremony at SHC 2019 in Santiago

- **Solar Academy Webinars 2019** –September, November

- **Solar Heat Worldwide 2019** – annual statistics report to be published June

- **Programme newsletter, Solar Update 2019** – June and December

- **Task publications/databases/info sheets/newsletters** – continually posting online

- **Social Media**
  - Twitter - @IEASHC
  - LinkedIn - IEA Solar Heating and Cooling Programme (group 4230381)

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Thank you!

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