

# Solar Heating and Cooling Technology roadmap

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4 October 2018  
ISEC 2018, Graz - Austria



# Summary of most promising technologies

Technology	Innovation potential	Needed support
SCOHYS (Solar Compact Hybrid Systems)	SCOHYS is applicable for existing and new buildings. It increased its compactness and improved performances.	There are few R&D initiatives on cost reduction, thus substantial improvements are still needed.
SAH (Solar-Active-Houses)	An attractive solution to achieve Nearly Zero Energy Buildings (NZEB).	Funding is lacking or mainly focusing on NZEB.
SHIP (Solar Heat for Industrial Processes)	SHIP could reduce the fossil fuel demand of the industry, and is reaching target price of solar heat cost of 5-9 €cent/kWh (research conditions).	A larger number of projects is needed to reach SHIP potentials. In most European countries there is not enough deployment yet.

# Solar Heating and Cooling Pathways

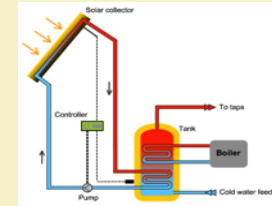
# ST Challenges & Research Topics

## CHALLENGES

- **Cost reduction**
- **Simplification and compactness**
- **High solar fraction per building**
- **Solutions for industrial processes**

## Roadmap: MAIN RESEARCH TOPICS

### SCOHYS: Solar Compact Hybrid Systems



### SAH: Solar-Active-Houses

Solar fraction above 50%  
Nearly zero-energy building

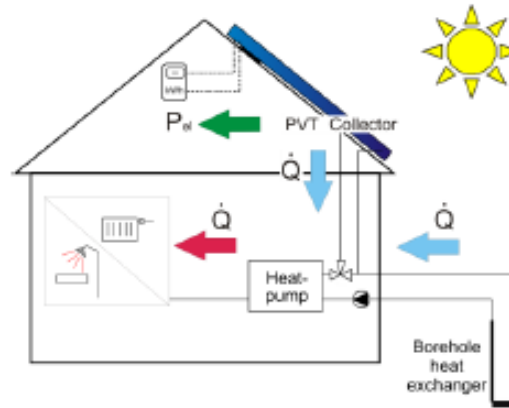
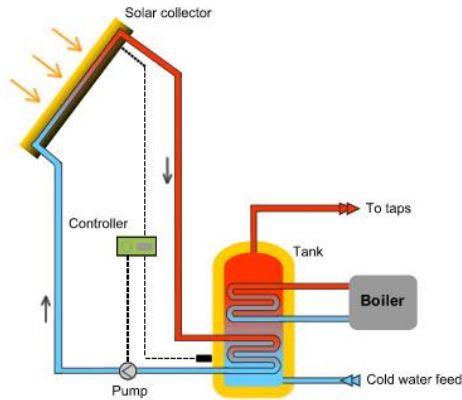


### SHIP: Solar Heat for Industrial Processes

Low temperature < 100°C  
Medium temperature < 250°C



# Solar Compact Hybrid Systems - SCOHYS



## Why it is innovative

- For the existing building stock and new “standard” buildings. SCOHYS reliability and performance has improved, and it reached an increased compactness.

## What needs to be done

- Major R&D improvements are needed in the next 2 years. There are diverse compact hybrid concepts with other technologies coming into the market.



# Solar-Active-House - SAH



## Why it is innovative

- SAH is an attractive solution to achieve nearly zero-energy buildings, which are required by the European Union from 2021 onwards.

## What needs to be done

- Existing projects are not enough to create standardized solutions. This is due to scarce private funding, and public funding focusing on NZEB.



# Solar Heat for Industrial Processes - SHIP

## Why it is innovative

SHIP could reduce the fossil fuel demand of the industry. It achieved solar heat costs in the range of 5-9 €cent/kWh for systems with 10-20% solar fraction. Process temperatures reach up to 250°C (both low and medium temperature applications).



## What needs to be done

- There is not enough deployment in most European countries that would allow reaching SHIP potential. More start-ups and ESCOs are needed to develop more SHIP projects.

## Other international and national R&D topics

- **Solar thermal** in district heating networks (also combined with CHP)
- Development of **hybrid Heating & Cooling** solutions
- Integration of **high vacuum flat and evacuated tube collectors** in larger projects covering higher temperature ranges
- Development of **hybrid PVT collectors** (PV & ST)
- **Thermal storage**, seasonal and diurnal, small and large scale
- The **decentralisation of feed-in of solar heat** into DH networks
- **Land availability** (large systems), **policy and market support**
- **And ... several more**



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**Thank you for the attention!**

