IEA SHC Task 68
Efficient Solar District Heating Systems

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Why solar district heating systems?

For a better future and less CO_2 emissions.

Heat is the largest energy end-use, accounting for 50% of global final energy consumption in 2019 and contributing to **40% of global carbon dioxide** emissions. Regarding the heat supply of buildings, district heating plays an important role and is well-established in many countries.

In order to decarbonize the district heating sector, **solar thermal technologies** provide a very efficient option, allowing for large-scale **seasonal energy storage**, while sidestepping the need both for critical elements (like lithium, cobalt, phosphorus and rare earth metals) and for harmful substances like PFAS and SF_6, required in significant amounts for completely electrified systems.

What are the challenges?

Efficiently providing the heat at the desired temperatures.

Currently operated **solar district heating (SDH)** systems, typically equipped with flat-plate collectors, provide a valuable option to decrease carbon emissions. Their efficiency, however, decreases with increasing fluid temperature. Thus, the temperature levels frequently demanded in district heating applications, pose significant challenges for efficiently integrating solar thermal systems.

In the **IEA SHC Task 68** – "*Efficient Solar District Heating Systems*", we investigate how to further **increase the efficiency** of SDH systems by using **modern collector** technologies, **combining** solar thermal solutions with other technologies and examining how to benefit from **digitalization** measures, **data science** and **advanced control strategies**.

Goals of IEA SHC Task 68

1. **Provide** the **heat most efficiently at** the **desired temperature level**
2. **Increase digitalization level** for a more **efficient data preparation** and **utilization**
3. **Make SDH systems more cost-efficient** and explore **new business models**
4. **Raise awareness** for solar technologies and **efficiently disseminate the results**

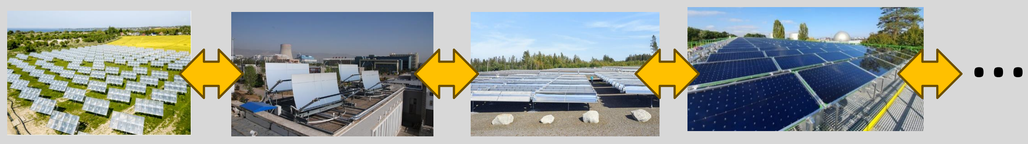
To address these **goals**, the IEA SHC Task 68 is structured in four **Subtasks** A, B, C and D.

Publication of (Preliminary) Results

➔ see https://task68.iea-shc.org/publications

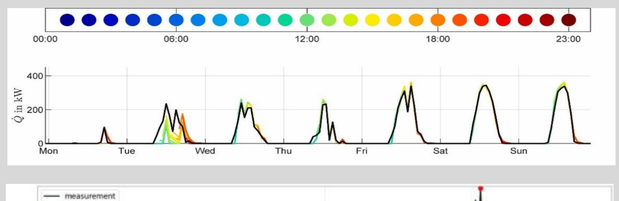
Subtask A – Concepts

- Report regarding *"Comparison of different collector technologies for providing medium-high temperature heat with respect to technical and economic characteristics".* The report provides a sophisticated overview of different collector technologies considering also latest technologies like high vacuum flat plate collectors or collectors using high-efficiency lenses. **(coming soon)**

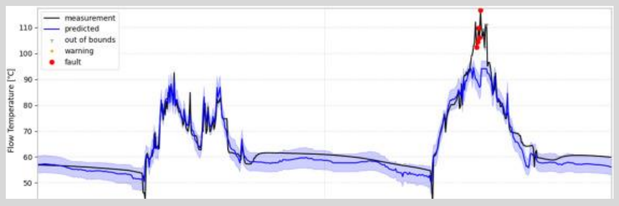


Subtask B – Subtask B: Data Preparation & Utilization

- Self-learning algorithm to forecast solar heat output **(online)**



- Automatic AI-based fault-detection for solar systems **(online)**



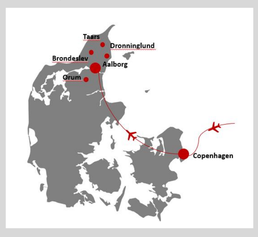
- Report regarding the *Efficient Gathering, Storing, Distributing and Validation of Data* **(online)**
- Report on modern **control strategies** **(coming soon)**
- Article on **Open Data** for Solar Thermal Systems **(coming soon)**

Subtask C – Business Models

- Different funding schemes for SDH will be analyzed, showing their differences and telling about their impact and success stories in different countries in a report. **(coming soon)**

Subtask D – Use Cases and Dissemination

- Industry workshops



- Overview of present systems + future scenarios **(coming soon)**

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Technology Collaboration Programme
by iea

Participating Countries

Austria *China*
Denmark *Germany*
Italy *Netherlands*
Spain *Sweden*
Switzerland *Turkey*