

IEA SHC TASK 66 Solar Energy Buildings: Objectives and Working Progress

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Australia is an active country member in the IEA SHC TASK 66 Solar Energy Buildings since mid-2021. This abstract is not for publication purpose but provides an update to Australian interested stakeholders on the Task objectives, current working progress and commitments from Australia. The author declares that all information related to this Task is developed by the Task experts as a collaborative outcome in the Task workplan and can be identified from the Task homepage (IEA SHC Task 66, 2021).

Task Objective

The IEA SHC Task 66 will focus on the development of economical energy supply concepts for high solar fractions of single-family buildings, multi-story residential buildings and building blocks or distinguished parts of a city (communities) for both, new buildings and the comprehensive refurbishment of existing buildings. A central component of the energy supply concept development is the synergetic consideration of the interaction with grid infrastructures (electricity and heat) in the sense of bidirectional flexibility. The targeted solar thermal and solar electrical fractions depend significantly on the climate zone (IEA SHC Task 66, 2021).

In the context of this proposed SHC Task the separation between (single) buildings and building blocks or communities is based on the aspect whether the buildings are connected to a thermal grid or not. This separation is based on the fact, that in general all buildings will be connected to an electricity grid. Hence, with regard to the interexchange ability of energy between different buildings the only difference is the aspect if the buildings are connected to a thermal grid or not (IEA SHC Task 66, 2021).

The content of this new proposed project was defined based on know-how from the expert knowledge of approx. 50 participants from around 15 different countries and position papers, such the strategic research agenda of the European Solar Thermal Technology Panel, the European Technology and Innovation Platform on Renewable Heating & Cooling (RHC-ETIP) and the experience of several national projects in the field of solar energy buildings.

The main goals and objectives of the activity will be (IEA SHC Task 66, 2021):

- Objective 1: Identifying and mapping of the relevant involved stakeholders (energy suppliers, housing developers, urban planning, industry, research, and governmental (local, regional, national) and their needs and roles as well as supporting and inhibiting (legal) framework conditions.
- Objective 2: To give an overview on various technology options and the available technology portfolio, taking into account existing and emerging technologies with the potential to be successfully applied within the context of this Task. Furthermore, strategies will be elaborated how challenges in an economical context can be overcome.
- Objective 3: To exploit the new degrees of freedom and possibilities by linking individual technologies from the technology portfolio and to optimize the interaction of local generation, storage, consumption at the building and district level enabling interactions with the grid capitalizing on new technological opportunities and unlocking new revenue streams
- Objective 4: To develop and define optimized integrated and grid-interacting energy supply concepts for heat, cold, domestic electricity demand and e-mobility with intelligent control concepts and promoting user-oriented approaches.
- Objective 5: To give recommendations to policy makers and energy related companies on how they can influence the uptake of cost-effective solutions related to the planning and implementation of Solar Energy Buildings.

Overview of the Subtasks

The main activities in this Task are:

- Development and implementation of promising concepts for single solar energy buildings (SEB) and building blocks or communities respectively
- identification and (further) development of current and future technologies in a technology portfolio and the techno-economic assessment of newly developed solutions
- Definition of KPIs and Dissemination

The detailed Sub-activities are:

- Subtask A: Boundary Conditions, KPIs, Definitions and Dissemination
 - A1: Define performance assessment methodology for SEBs including KPIs
 - A2: Assessment of SEB's
 - A3: Organize Industry Workshops
 - A4: Preparation of guidelines for policy makers, municipalities, and energy related companies
- Subtask B: New and existing single buildings
 - B1: Demonstration cases
 - B2: Planning and implementation methodology
 - B3: Modelling, simulation and optimization tools
- Subtask C: New and existing building blocks / communities
 - C1: Demonstration cases
 - C2: Planning and implementation methodology
 - C3: Modelling, simulation and optimization tools
- Subtask D: Current and future technologies and components
 - D1: Documentation and analysis of current and future technologies
 - D2: Classification and techno-economic technology assessment
 - D3: Development SEB solution sets and guidelines

Commitment from Australia

The Solar Energy Application Lab at RMIT University (2021) represents Australia in this Task. We have joined the Task preparation workshops in late 2020 and March 2021. We have also given a presentation in July 2021 on the Task kick-off meeting to explain our lab work and explore contribution opportunities to this Task. Currently we have committed to contribute to Subtask B in relation to B3 for single building modelling, simulation and optimisation.

In summary, this Task will focus on the development of economic and ecologic feasible solar energy supply concepts with high solar fractions for new and existing single buildings and building blocks or communities. We aim at drive the uptake of solar energy in the Australian built environment by the development of processes, methods and tools that assist them.

References

Solar Energy Application Lab (2021) <https://www.rmit.edu.au/about/schools-colleges/property-construction-and-project-management/research/research-centres-and-groups/solar-energy-application-laboratory>

IEA SHC Task 66 (2021) <https://task66.iea-shc.org/supporting-documents>