SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Solar Energy Buildings

Integrated solar energy supply concepts for climate-neutral buildings and communities for the "City of the Future"

Task 66

Presentation at BIPV Workshop 2021 – "BIPV beyond IEA PVPS Task 15"

Harald Drück, IGTE, University of Stuttgart, Germany

Technology Collaboration Programme
by iea

Task 66 (Solar Energy Buildings) – Status Nov. 2021

Agenda

- Motivation
- Scope
- Objectives
- Structure and Subtasks
- Work already done
- Subtasks – specific activities
- Past and future Meetings and industry workshops
- Questions and Discussion

Introduction to Task 66

Motivation

- On global level: Operation of buildings accounts for around 40 % of primary energy consumption and approximately 25 % of greenhouse gas emissions
- Europe: Buildings are responsible for 40 % of energy consumption and 36 % of CO_2 emissions
- Additionally large amounts of energy are embodied in the building's construction materials

→ **Goal:**
A significant reduction of non-renewable energy consumption of buildings

Task 66 (Solar Energy Buildings) – Introduction

Scope

- **IEA SHC Task 66 focuses on the development of economic and ecologic energy supply concepts for buildings with high solar fractions of at least 85% of the heat demand, 100% of the cooling demand and at least 60% of the electricity requirements for central European climate conditions**
- Target: Households and e-mobility of multi-storey residential buildings, single buildings and building blocks or distinguished parts of a city (communities) for both, new buildings and the comprehensive refurbishment of existing buildings
- Key aspect:
  - focus on the overall energy supply of the building: This means heat, cold and power
  - synergetic consideration of the interaction with grid infrastructures (electricity and heat) in the sense of bidirectional flexibility

Objectives (1/2)

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.

Task 66 (Solar Energy Buildings) – Introduction

Objectives (2/2)

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 and 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 **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.

Task 66 (Solar Energy Buildings) – Introduction

Structure of IEA SHC Task 66 on Solar Energy Buildings

Subtask A: Boundary Conditions, KPIs, Definitions and Dissemination
Lead: **Frank Späte, (OTH-AW, Germany)**

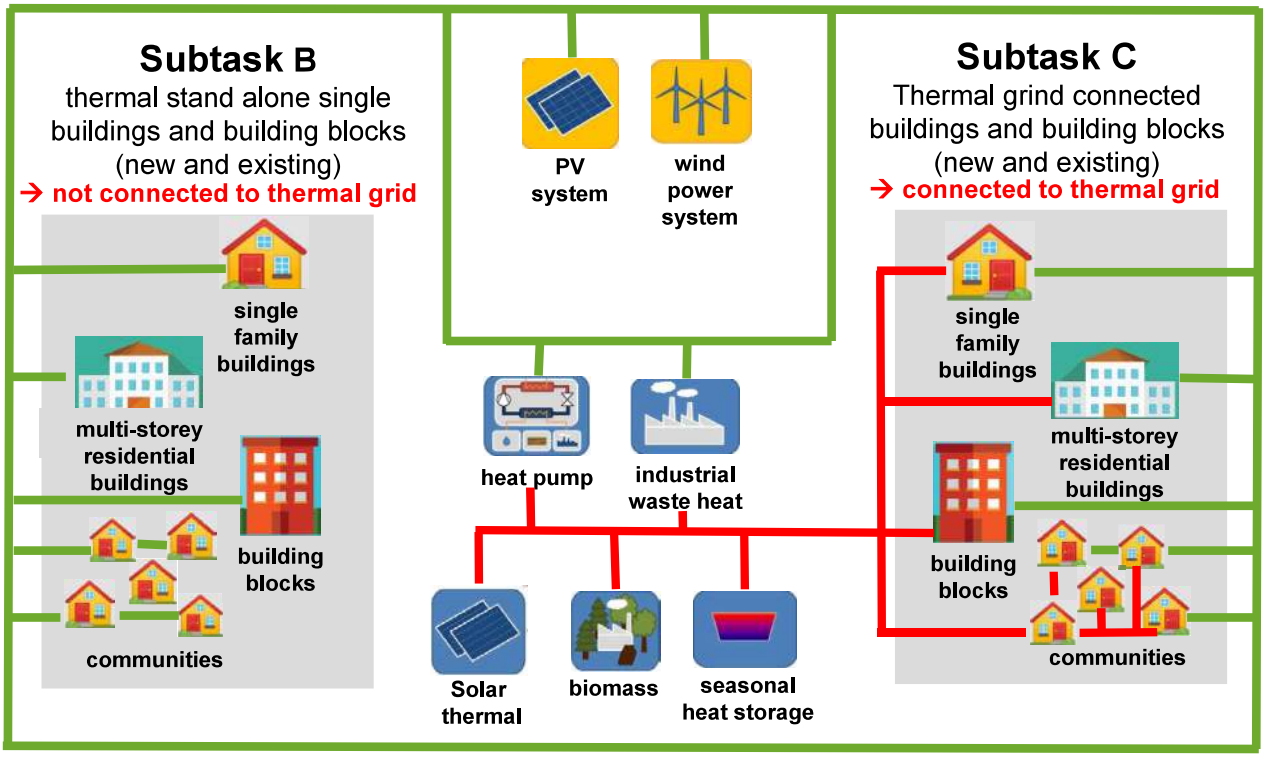
Subtask B: Thermal stand alone Single Buildings and Building Blocks (New and Existing) – Not connected to a thermal grid
Lead: **Xinyu Zhang, (China Academy of Building Research, Beijing, China)**

Subtask C: Thermal grid connected Buildings and Building Blocks / Communities (New and Existing) – Connected to a thermal grid
Lead: **Elsabet Nielsen (DTU, Denmark)**

Subtask D: Current and future technologies and components
Lead: **Thomas Ramschak (AEE INTEC, Austria)**

Task 66 (Solar Energy Buildings) – Introduction

Difference between Subtask B and C



Task 66 (Solar Energy Buildings) – Status Nov 2021

Meetings / Workshops already performed

- Task preparation Workshop on Mach 30, 2021 (virtual approx. 45 participants from 15 different countries)
- Task Meeting No 1 (kick-off meeting) July 1+2, 2021 virtual, with 37 participants from 14 different countries)
- Task Meeting No 2 Nov 4+5, 2021, virtual with 37 participants from 14 different countries

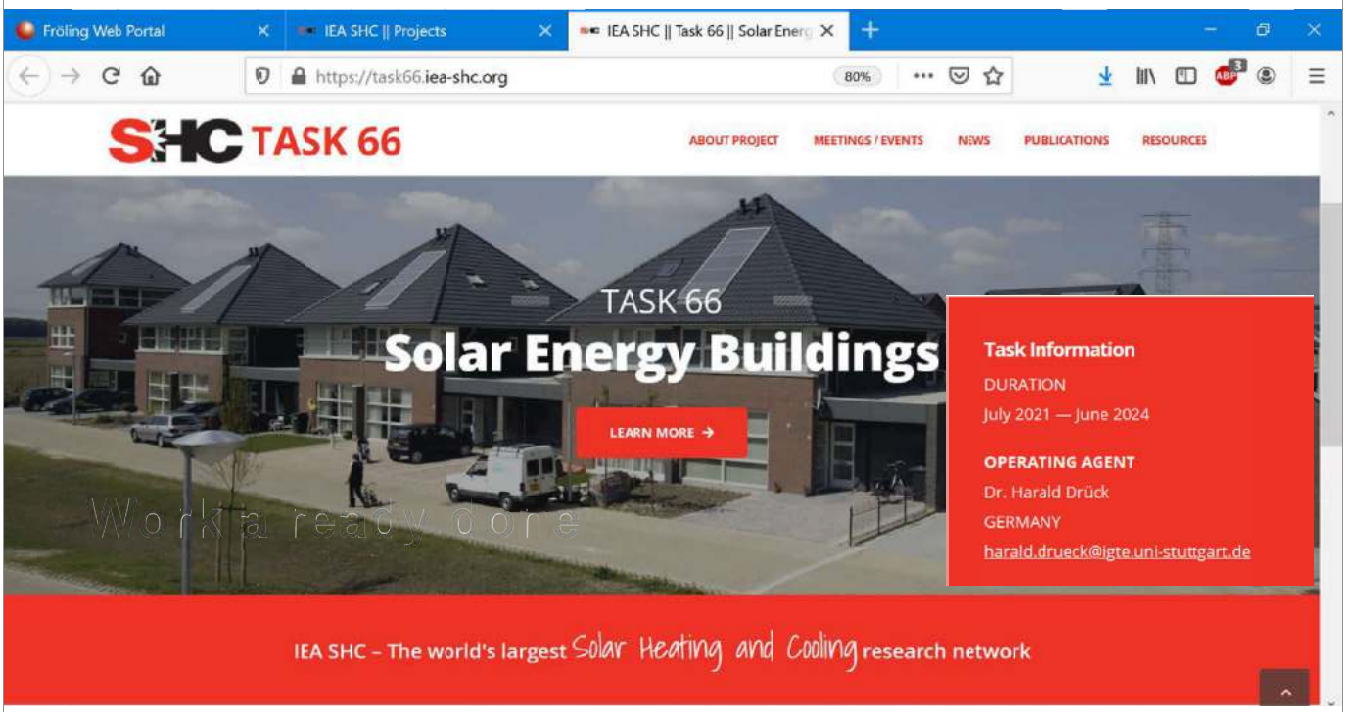
https://www.chanty.com/blog/perfect-virtual-meeting/

- **Participating countries**

- Austria	- Australia	- *Albania*	- Denmark
- Germany	- China	- Portugal	- *Mexico*
- *India*	- Belgium	- Switzerland	- Slovakia
- *USA*	- UK	- Poland	

Note: - For the USA and Mexico a "minimum collaboration level" between IEA SHC Task 66 and the PVPS TCP might be an option
- India will hopefully soon join the SHC
- Albania might to be kicked out

IEA SHC Task 66: „Solar Energy Buildings"



https://task66.iea-shc.org/

Task 66 (Solar Energy Buildings) – Status Nov 2021

Information / dissemination - already done (1/2)

Publications related to Task 66 (in English)

02 MAY 2021

How to design an 85 % solar-heated and 100 % solar air-conditioned house

During an online meeting from 1 to 2 July, the IEA Solar Heating and Cooling programme will launch a new global research platform called Task 66 Solar...

read more >

24 APR 2021

Solar-heated multi-family buildings gain popularity in Germany

Many new largely solar-heated houses in Germany are multi-family buildings, and their number is growing according to Sonnenhaus-Institut (Solar House...

read more >

24 APR 2021

Solar houses: above 95 % solar fraction is possible

Between 2014 and 2019, the Austrian Climate and Energy Fund supported the construction of over 100 solar-heated houses, 19 of which were monitored by the...

read more >

20 FEB 2020

Solar Energy Buildings to make cities fit for the future

Buildings account for around 40 % of the world's primary energy consumption. Hence, they are the number one cause of resource consumption on earth.

read more >

Task 66 (Solar Energy Buildings) – Status Nov 2021

Information / dissemination - already done (2/2)

Publications related to Task 66 (in German)

SCHWERPUNKT Gebäudekonzepte

Wohnanlage in Weinstadt: Eine Sole-Wasser-Wärmepumpe, ein Eisspeicher und PVT-Kollektoren nutzen effizient Solarstrahlung und Umweltwärme

Mit Eis und Sonne heizen

SOLARE KONZEPTE FÜR KLIMANEUTRALE GEBÄUDE Klimaschutz braucht echte Klimaneutralität, keine virtuelle oder bilanzielle. Worin sich die drei Formen der Ökobilanzierung unterscheiden und wie sich mit einem solaren Eisspecher-Konzept der CO_2-Ausstoß vor Ort mindern lässt, erläutert der folgende Beitrag. Dr. Harald Drück

IEA Task 66 „Solar Energy Buildings"

Die Entwicklung von Konzepten und Technologien zur weitgehend solaren Energieversorgung von Gebäuden ist von globalem Interesse. Aus diesem Grund wurde im Solar Heating und Cooling Programm (SHC) der Internationalen Energieagentur (IEA) auch die Arbeitsgruppe bzw. Task 66 zum Thema "Solar Energy Buildings – integrierte solare Energieversorgungskonzepte für klimaneutrale Gebäude und Quartiere für die Stadt der Zukunft" etabliert. Die Task 66 wird von Dr. Harald Drück vom IGTE der Universität Stuttgart als Operating Agent geleitet und wird offiziell zum 01.07.2021 beginnen.

Eisspeicher im Außenlabor am IGTE

Visualisierung der Neubau-Wohnanlage Weinstadt Smart-Living

Solare Konzepte für klimaneutrale Gebäude

Im Projekt Sol4City arbeiten deutsche und österreichische Partner aus Forschung und Industrie zusammen, um solare Energieversorgungskonzepte für klimaneutrale Gebäude der „Stadt der Zukunft" zu entwickeln.

Task 66 (Solar Energy Buildings) – Introduction

Structure of IEA SHC Task 66 on Solar Energy Buildings

Subtask A: Boundary Conditions, KPIs, Definitions and Dissemination
Lead: **Frank Späte, (OTH-AW, Germany)**

Subtask B: Thermal stand alone Single Buildings and Building Blocks (New and Existing) – Not connected to a thermal grid
Lead: **Xinyu Zhang, (China Academy of Building Research, Beijing, China)**

Subtask C: Thermal grid connected Buildings and Building Blocks / Communities (New and Existing) – Connected to a thermal grid
Lead**: Elsabet Nielsen (DTU, Denmark)**

Subtask D: Current and future technologies and components
Lead: **Thomas Ramschak (AEE INTEC, Austria)**

Presentation of Task 66 – Solar Energy Buildings

Subtask A
Boundary Conditions, KPIs, Definitions and Dissemination

Lead**: Frank Späte,** OTH-AW, Germany

Key Activities:

A1: Define performance assessment methodology for SEBs including KPIs

A2: Assessment of Solar Energy Buildings (SEBs)

A3: Organize Industry Workshops

A4: Preparation of guidelines for policy makers, municipalities, and energy related companies

Presentation of Task 66 – Solar Energy Buildings

Subtask B
Thermal stand alone Single Buildings and Building Blocks
(New and Existing) – Not connected to a thermal grid

Lead: **Xinyu Zhang**, China Academy of Building Research, Beijing, China

Key Activities:

B1: Summary of demonstration cases

B2: Planning and implementation methodology

B3: Modeling, simulation and optimization tools

Presentation of Task 66 – Solar Energy Buildings

Subtask C
Thermal grid connected Buildings and Building Blocks / Communities
(New and Existing) – Connected to a thermal grid

Lead: **Elsabet Nielsen,** DTU, Denmark

Key Activities:

C1: Summary of demonstration cases

C2: Planning and implementation methodology

C3: Modeling, simulation and optimization tools

Presentation of Task 66 – Solar Energy Buildings

Subtask D
Current and future technologies and components

Lead: **Thomas Ramschak,** AEE INTEC, Austria

Key Activities:

D1: Documentation and analysis of current and future technologies

D2: Classification and techno-economic technology assessment

D3: Development SEB solution sets and guidelines

Task 66 (Solar Energy Buildings) – Status Nov. 2021

Past and future Meetings

Note: Future Meetings are printed in *italic*

Meeting #	Date	Location	Number of participants &
0	30.03.2021	Virtual task preparation workshop	45 participants from 15 countries
1	01.-02.07.2021	Virtual meeting	37 participants from 14 countries
2	04.-05.11.2021	Virtual meeting	37 participants from 14 countries
3	23.-24.03.2022	*Virtual meeting*	*? participants from ? countries*
4	30.09.2022	*Kassel, Germany*	*? participants from ? countries*

Task 66 (Solar Energy Buildings) – Status Nov. 2021

Industry Workshops

Note: Future Workshops are printed in *italic*

Workshop #	Date	Location	Number of participants
1	*23.03.2022*	*Virtual*	*? participants from ? countries*
2	*29.09.2022*	*Kassel, Germany*	*? participants from ? countries*

Task 66 – Solar Energy Buildings

Duration: 3 Years

From July 2021 to June 2024

Task sharing requirements – relevant for national participation letter

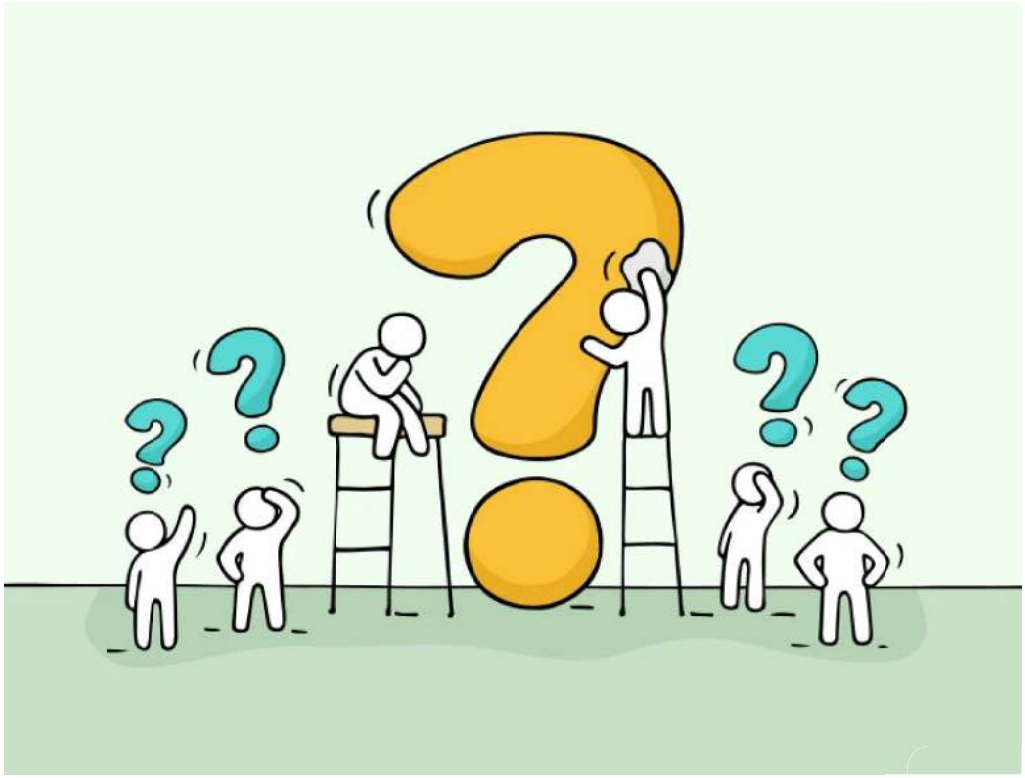
- Participating country:
  min. 3 person month per year → 9 person month in total
- Subtask leaders:
  min. 2.5 person month per year → 7,5 person month in total

Cooperation (planned) with

- EBC (Energy in Buildings and Communities)
- ECES (Energy Conservation and Energy Storage)
- PVPS (Photovoltaic Power Systems)

Additional participants are very welcome!

Questions and Discussion



Thanks for listening!

www.iea-shc.org

SHC TASK 66 Solar Energy Buildings

SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

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