SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

SHC
TASK 66
Solar Energy Buildings

IEA SHC Task 66: Solar Energy Buildings

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

IEA SHC Task 66: Solar Energy Buildings – Presentation of Final Results

Assessment of Solar Energy Buildings

Prof. Frank Späte, OTH Amberg-Weiden – Leader Subtask A

Limassol Cyprus EuroSun2024 **August 27, 2024**

Table of Content

- Key Performance Indicators of Solar Energy Buildings
- Definition of Reference Solar Energy Buildings

Key Performance Indicators of Solar Energy Buildings

The KPIs collected/defined in Task66 can be used to

- assess and compare different buildings/blocks/communities
- assess and compare different concepts in one building/block/community
- assess and optimize components of the building in terms of energy use/flows, economics, ecological etc.

They cover the following aspects:

- **Energetic and technical**
- **Ecological**
- **Economic**
- **Sociological**

17 KPIs

Example: Solar Fraction

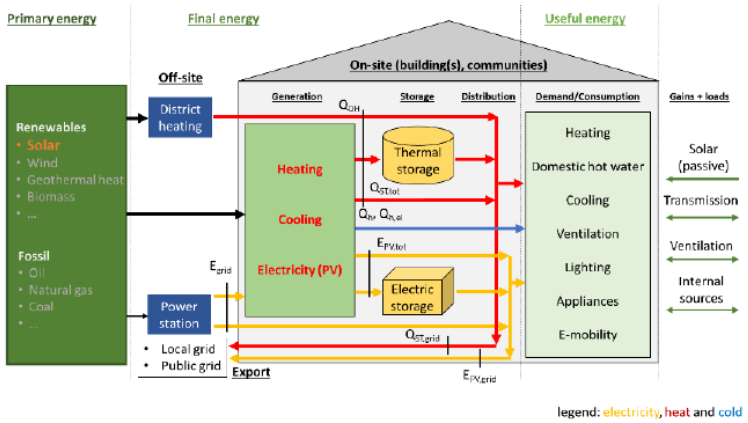
Total solar fraction = LCF – Solar Load Cover Factor [%]

$$f_{sol} = \frac{E_{PV,tot} - E_{PV,grid} + Q_{ST,tot} - Q_{ST,grid}}{E_{PV,tot} - E_{PV,grid} + E_{grid} + Q_{ST,tot} - Q_{ST,grid} + Q_{grid} + Q_h - Q_{h,el}}$$

Fraction of self-generated and self-used PV electricity and solar thermal useful heat referred to the total energy used for household and technical purposes in the form of heat and electricity.
Energy supplied by solar part (PV or ST) of a system divided by the total system load (electrical and thermal).

$$f'_{sol,th} = \frac{(E_{use} - E_{grid} - E_{CHP}) + (Q_{use} - Q_{DH} - Q_h)}{E_{use} + Q_{use}}$$

This definition considers thermal losses of the storage as not usable heat. This definition is especially useful for storages with a high share of losses.



A Draft of the publication „Key Performance Indicators of Solar Energy Buildings“ is available

Authors: Franziska Bockelmann, Tillman Gauer, Frank Späte

Definition of reference Solar Energy Buildings

Why reference buildings, building blocks and/or communities?

1. Comparing different energy supply concepts on the basis of clear and comprehensible boundary conditions
2. Elaboration of reasonable energy supply concepts for typical buildings, building blocks and/or communities in the participating countries based on representative samples
3. Validation and calibration of simulation models based on representative samples

Method:

Definition of one or more country-specific reference building(s) for each of the country-relevant building types (single family, multi family, block, community) and related energy generating system(s) for each of the participating countries.

Part 2: Template

Part 2 of the Deliverable is a Template for the documentation of the reference building → excel-sheet for the following informations

- **general building information** → building type, size, energy consumption, location etc.
- **building envelope** → walls, roof, windows, air exchange rate etc.
- **energy supply system(s)** → solar thermal and photovoltaic system, thermal and electrical storage etc.
- **heat and cold distribution and emission** → heating, cooling, DHW
- **operating conditions** → space heating/cooling, DHW, ventilation etc.

Authors: Markus Peter, Dominik Bestenlehner

Thank you for your attention

www.iea-shc.org

SHC
TASK 66
Solar Energy Buildings

SHC
SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Task66 Manager: Dr. Harald Drück

harald.drueck@igte.uni-stuttgart.de

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

Prof. Frank Spaete, f.spaete@oth-aw.de