SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

2019 HIGHLIGHTS

Task 60 – PVT Systems

THE ISSUE

A solar PV/Thermal (PVT) collector produces both heat and electricity.

Two developments in the heating industry are opening the door for PVT applications.

1. The strong and increasing interest in Building Integrated PV (BIPV) and Façade Integrated PV (FIPV) not only in office and industrial buildings, but also in residential buildings where electricity and heating and sometimes cooling is required.

2. The developments in heat pump technology create more possibilities to make use of the low exergy heat source of uncovered PVT collectors and reduce the energy cost for the user and the need for borehole storage.

The HVAC industry, however, is not fully aware of the possibilities and benefits of PVT solutions, and international standards are lacking, which creates less confidence for the final PVT customer.

Participating Countries

Australia
Austria
Canada
China
Denmark
France
Germany
Italy
Netherlands
South Africa
Spain
Sweden
Switzerland
United Kingdom

OUR WORK

The aim of SHC Task 60 is to assess existing PVT solutions and develop new system solutions principles in which the PVT technology offers advantages over the classic “side by side installations” of solar thermal collectors and PV modules. Best practices are not yet widespread for these systems, and so this international collaborative project will help to accelerate the market acceptance of PVT technologies.

Many parameters of a PVT installation must be assessed: heat production, electricity yield, global efficiency, qualitative indicators, user benefits, investment, energy and maintenance costs, and safety and reliability of operation. All of which will be assessed by SHC Task 60 participants as they apply to several typical PVT applications.

SHC Task 60 experts will:

- Provide a state-of-the-art of PVT technology worldwide.
- Gather operating experiences with existing PVT systems.
- Improve the testing, modeling and adequate technical characterization of PVT collectors.
- Find standard and best practice PVT solutions.
- Explore potential cost reductions in PVT systems.

Increasing awareness of PVT solutions to all stakeholders is a key issue of our joint international collaboration.

Task Period	2018 – 2020
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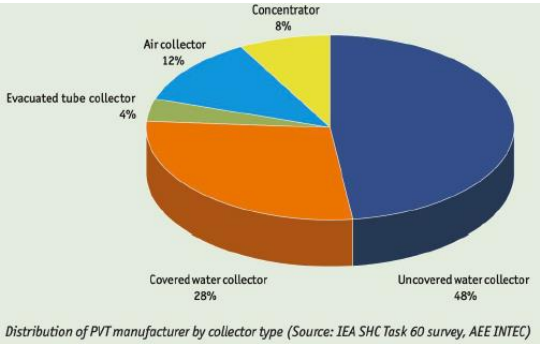
TASK60 PVT SYSTEMS

KEY RESULTS IN 2019

State-of-the-Art

Task experts have compiled a list of PVT projects that are described in detail to understand the project and application of PVT collectors in different markets and countries.



Distribution of PVT manufacturer by collector type (Source: IEA SHC Task 60 survey, AEE INTEC)

PVT market situation from Task 60 2019 survey and example of a glazed PVT application for a hotel.

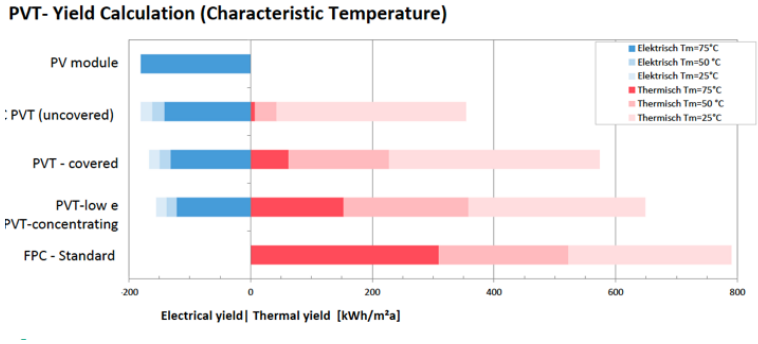
Key Performance Indicators

KPIs for PVT solutions have been extensively defined, such as the solar utilization ratios (thermal, electric and energy) or the yield for different application temperatures (from Subtask reports).

$$\omega_{sol,th}^{gross} = \frac{Q_{PVT} + Q_T}{\int G_{col}\, dt \cdot (A_{PVT}^{gross} + A_{PV}^{gross} + A_T^{gross})},$$

$$\omega_{sol,el}^{AC,gross} = \frac{E_{PVT}^{AC} + E_{PV}^{AC}}{\int G_{col}\, dt \cdot (A_{PVT}^{gross} + A_{PV}^{gross} + A_T^{gross})},$$

$$\omega_{sol,en}^{AC,gross} = \frac{Q_{PVT} + Q_T + E_{PVT}^{AC} + E_{PV}^{AC}}{\int G_{col}\, dt \cdot (A_{PVT}^{gross} + A_{PV}^{gross} + A_T^{gross})}.$$



Work Ahead

Simulation and Comparison

Analyzing the field experiences with models will allow us to understand the best control strategies and to compare them to a reference system along all KPIs.

Best Practices

Gathering and reporting the best practices in PVT applications from all over the world is on the agenda.

Using KPIs

The KPIs will be used for the evaluation of the PVT solutions that are reported and simulated in the Task.