

2018 HIGHLIGHTS

Task 60 – PVT Systems

THE ISSUE

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

Two recent 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.

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, key performance 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, modelling 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 common international collaboration.

Participating Countries

Australia

Austria

Canada

China

Denmark

France

Germany

Italy

Netherlands

Spain

Sweden

Switzerland

United Kingdom

Task Period

2018 – 2020

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KEY RESULTS IN 2018

State-of-the-art

Task experts started to compile a list of PVT projects that will be described in individual InfoSheets. A total of 31 projects are expected to be evaluated in 2019. Work on classifying PVT systems got underway with the aid of an adapted 'square view system' tool developed in SHC Task 44: Solar and Heat Pump Systems. And, input from manufacturers continues to be collected through a questionnaire sent to more than 60 companies.



Typical PVT collector types in 2018: uncovered, covered, low concentration collector type.

Key performance indicators

The electricity yield and the heat production per m² are the key indicators to compare designs, but the effect of the operational temperatures of PVT collectors also needs to be analyzed. A method is being discussed within the Task to predict the PV output depending upon the temperature and its variations over the year.

Simulation models

Task experts have discussed the modeling needs for system simulation of all types of collectors and compiled a list of current modeling tools. Discussions on the reference system have started to begin to answer questions such as Are one or many references needed? Is an air heat pump system the most interesting "competitor"? Criteria to evaluate systems against a reference system to deliver the same service have also been discussed.

Work ahead

Best practices

Analyzing the field experiences will provide information on best practices.

Laboratory testing

Tests of collectors conducted in laboratories to get to a combined characteristic curve for a PVT operation.

Optimization

Simulation of several PVT applications will help to search for optimal configurations in terms of energy production or energy costs.