SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

IEA SHC TASK 60 2018 - 2020

PVT systems

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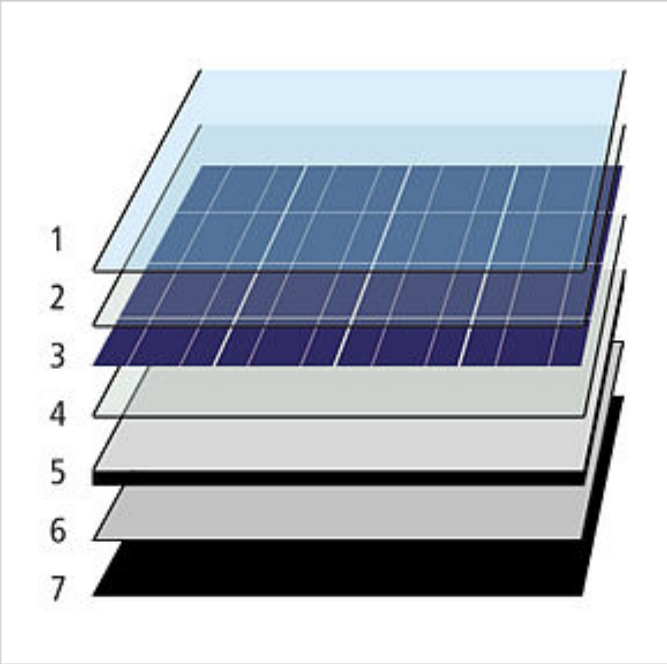
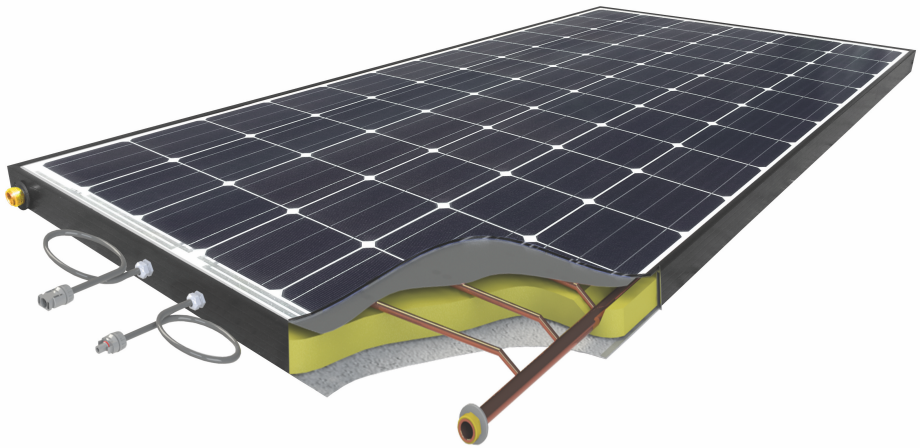
Webinar
June 12, 2018

PVT collectors



Schematic of a hybrid (PVT) solar collector:
1 - Anti-reflective glass
2 - EVA-encapsulant
3 - Solar PV cells
4 - EVA-encapsulant
5 - Backsheet (PVF)
6 - Heat exchanger (copper)
7 - Insulation (polyurethane)

- PVT liquid heating collector
- PVT air heating collector
- PVT Liquid /and air heating collector
- WISC (formaly known as glazed / unglazed)
- PVT concentrating collectors (CPVT)



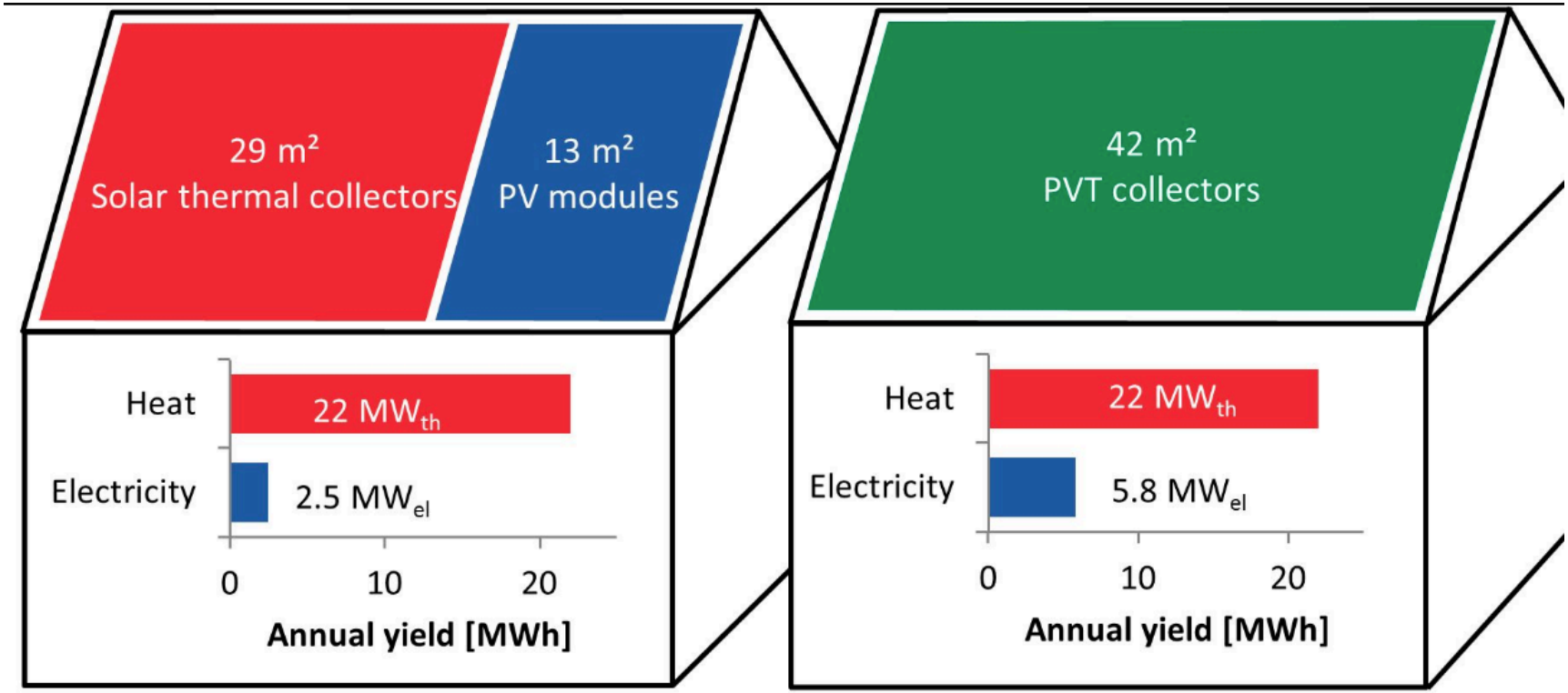
Task 60 PVT systems
Why ?

- Recognition of a potential market for PVT solutions not yet mature
- Clear Interests for an IEA SHC Task from scientists
- Actors from industries on the move to capture a new market

Key missions of the Task

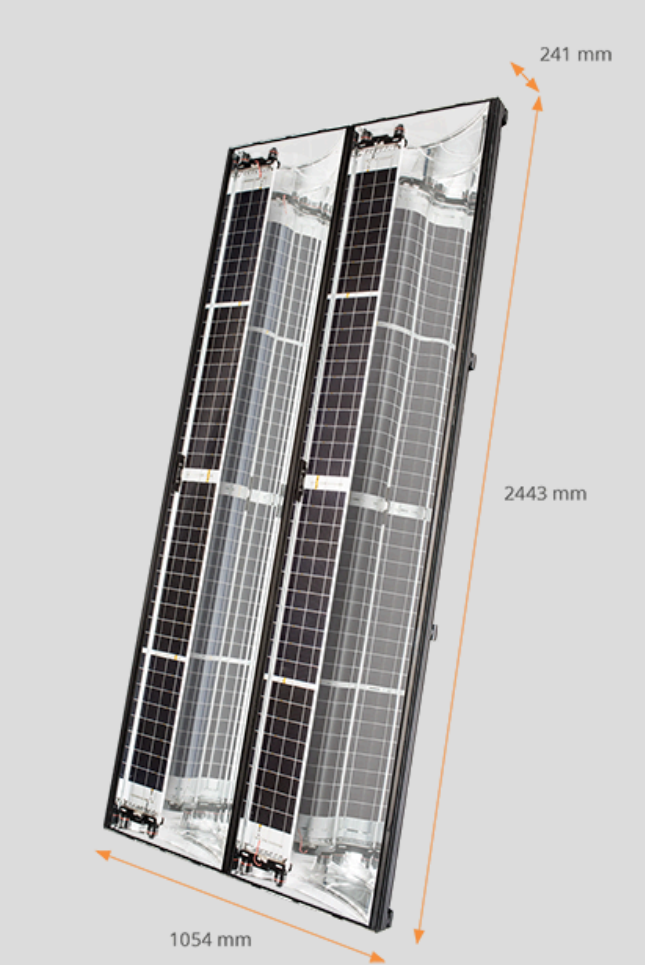
- **Spreading the available knowledge and experience**
- **Development of covered collectors without overheating issues**
- **Reduction of system complexity and costs**
- **Innovate: module, system, storage, control**

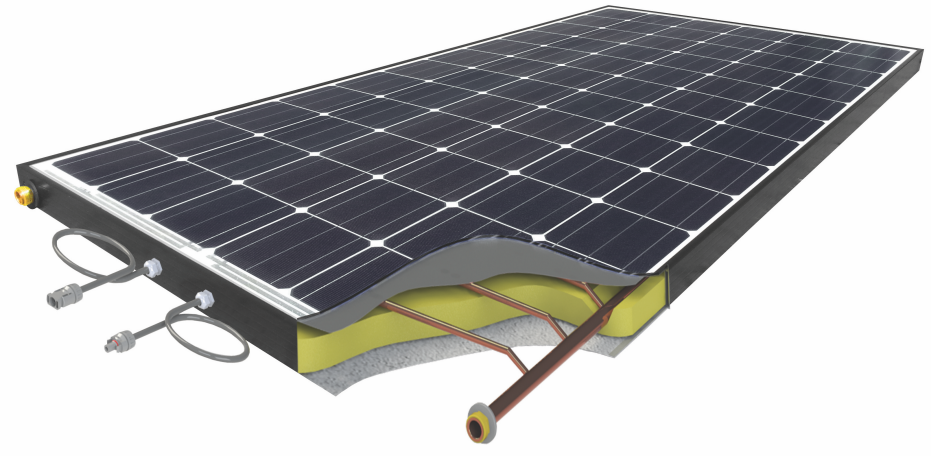
More complex...more efficient enough ?



From K. Kramer, Fraunhofer ISE

Example of 3 types on the market





Segments of market

Delivery of:

- Heat…. 10 to 80 C ?
- Cold
- Electricity

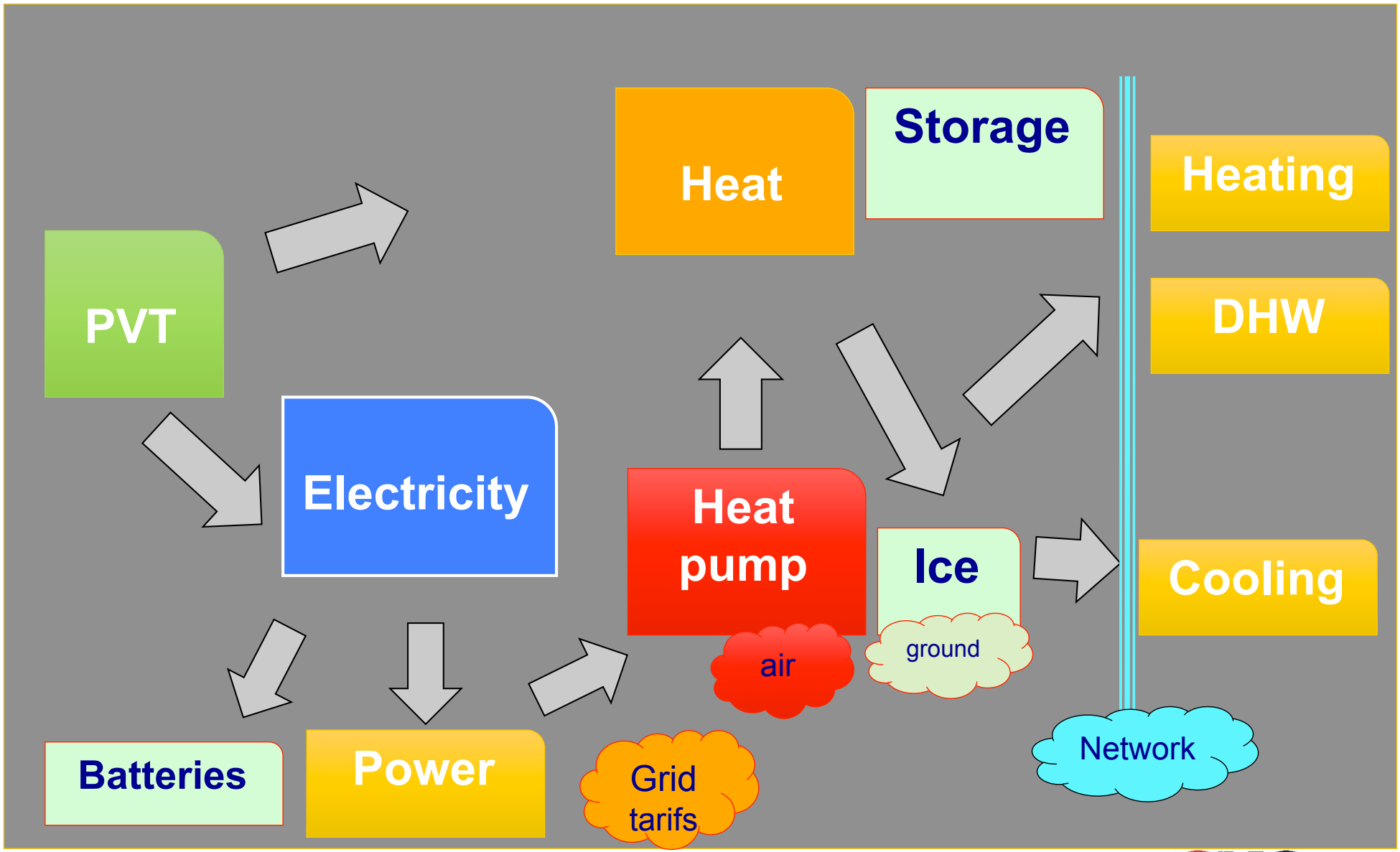
- **One family house 10 kW**
- **Multifamily house 100 kW or more**
- **Commercial – Industrial processes 100-200 kW**
- **District heating and cooling systems : 1 MW**
- Where PV is !
- Where Heat pump or cooling machine is !
- Where electricity and heat or cold are needed !
- Process energy…

Innovations to come

- Fluid
- Cover
- Sealing
- Layers
- ….

- Also at system level !

Much to optimize!



Task Organisation

Operating Agent
JC Hadorn, Switzerland

A
PVT systems in operation

T. Ramschak, AEE, Austria

In situ monitoring

B
PVT Performance Characterization

K. Kramer, Fraunhofer ISE, Germany

Performances Measurement

C
PVT Modeling

As. Sanz Tecnalia, Spain

System Simulation

D Systems Design Examples
best practice of solutions from B and C with A constraints – high level approach and optimization – Basic recommended control strategies

Dissemination and market support

A. Haeberle, SPF, Switzerland

System Design examples

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Interest of participants from:

- Germany
- Austria
- Switzerland
- Spain
- France
- Italy
- UK
- NL
- Sweden
- Denmark
- + other countries…

task60.iea-shc.org

- See the poster on our web site.

Task Proposal
PVT systems
2018 - 2020

SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Application of PVT collectors and hybrid solutions in energy systems

Keywords

PVT collectors - PVT systems – Optimisation of heat and electricity production – Heat and electricity storage – Cost of hybrid solutions – Collectors integration - Performance

4 topics

PVT systems in operation | PVT collectors testing | PVT systems simulation | Global Performance assesment

Scope

What is PVT ?

A PVT (PhotoVoltaic and Thermal) collector is a solar device able to provide both heat and electricity. A PVT system is an installation able to provide heating, cooling and electricity along the year to any consumer (building, process, network, grid) at a suitable temperature and voltage. The electricity can be internally consumed, or delivered to a grid.

Optimizing a PVT systems means delivering the maximum of solar energy over a year at a minimum cost of kWh. This comprises both heat and electricity.

PVT collectors or PVT systems ?

The development of new PVT collectors is a matter of the industrial sector and new collectors are on the market with industries willing to participate in our IEA activity. The proposed project will therefore concentrate on the application of PVT collectors. The aim is to assess existing solutions and to develop new system solutions principles in which the PVT technology really offers advantages over classical "side by side installations" of solar thermal collectors and PV modules.

Objectives

1. Provide an overview on the present (2018-2020) state-of-the-art of the PVT technology
2. Gather operating experience with the systems in which PVT collectors are integrated.
3. Improve the testing, modeling and adequate technical characterization of PVT collectors
4. Find best PVT solutions for all kind of applications

The optimum is not only technical

Optimizing when both heat and electricity are produced, can be readily of later consumed, locally stored or injected in a network needs economical parameters such as local electricity tariffs and variations. The project will address this issue with adequate methods and tools.

Caption: A PV and T collector with a similar appearance an be one elegant solution to produce both heat and electricity (courtesy: supplier).

Caption: PVT combined in a single product easy to integrate in roofs or facades and even under concentration (courtesy: MB. Solarus, Dualsun)

Interested countries:

Austria
China
Germany
Denmark
France
Italy
The Netherlands
Qatar
RSA
Spain
Sweden
Switzerland
Turkey
UK

The PVT project

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Soon to appear on: | www.iea-shc.org

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