

# IEA SHC TASK NG Solar Cooling and Heating

Proposal of Contribution

DI Tim Selke

2<sup>nd</sup> Definition Workshop  
Paris, October 22<sup>nd</sup> , 2013

## Austrian Partners

### History/ Team / Contribution

- Already contribution to SHC TASKs
  - SHC TASK 25 'Solar-Assisted Air-Conditioning in Buildings' (finished)
  - SHC TASK 38 'Solar-Assisted Air-Conditioning and Refrigeration' (finished)
  - SHC TASK48 'Quality Assurance & Support Measures for Solar Cooling Systems' (on-going)
- **Austrian Team: AIT, AEE INTEC, UIBK**
- National research projects
  - SolarCoolingMonitor (End Oct 2011)
  - SolarCoolingOpt (End 2013)
  - Technical Roadmap (End Oct 2011)

# SHC TASK NG Solar Cooling and Heating

## OVERVIEW - Intended contribution to Subtasks and Activities

### SUBTASK A Components, Systems & Quality

- **A1 Reference system (for heating/cooling)**  
(AEE INTEC Contribution factor +0)
- **A2 Adapted chillers and heat pumps including heat rejection**  
(AEE INTEC CF+0)
- **A3 New generation solar production for cooling (PV and others) and heating (DHW+ambient)**  
(AEE INTEC CF+0, AIT CF+0 PV related)
- **A5 Systems integration into buildings, microgrid and central Grid**  
(AIT CF+0 PV related)

# SHC TASK NG Solar Cooling and Heating

## OVERVIEW - Intended contribution to Subtasks and Activities

### SUBTASK B Control, Simulation & Design

- **B2 Grid access and load management**  
(AIT is willing to share /corporate with ATISYS CF++)
- **B3 Building/grid Load and weather forecast**  
(AIT is willing to lead CF++)
- **B5 System simulation and validation +  
Control strategy analysis and optimization (ST and PV)**  
(AIT CF0+; AEE INTEC CF++; UIBK CF++)
- **B6 System inter-comparison (cost/ performance/reliability)(between  
systems and with conventional, solar thermal, gas, etc.)**  
(AEE INTEC CF++)

# SHC TASK NG Solar Cooling and Heating

## OVERVIEW - Intended contribution to Subtasks and Activities

### SUBTASK C - Testing and demonstration projects

- **C1** Monitoring procedure and monitoring system selection criteria  
(AEE INTEC CF++)
- **C2** Definition of energy performance indicators  
(AIT CF+0 PV related interest to lead)
- **C3** System description for field test and demo project  
(AIT 0+)
- **C4** Monitoring data analysis on technical issues & on performances  
(AIT CF+0; AEE INTEC CF++)
- **C6** Testing method initiation for standards  
(AIT CF+0 PV related)

# SHC TASK NG Solar Cooling and Heating

OVERVIEW - Intended contribution to Subtasks and Activities

SUBTASK D Dissemination and market deployment

- **D4 Road mapping and lobbying actions**  
(AIT ++ and open for lead)

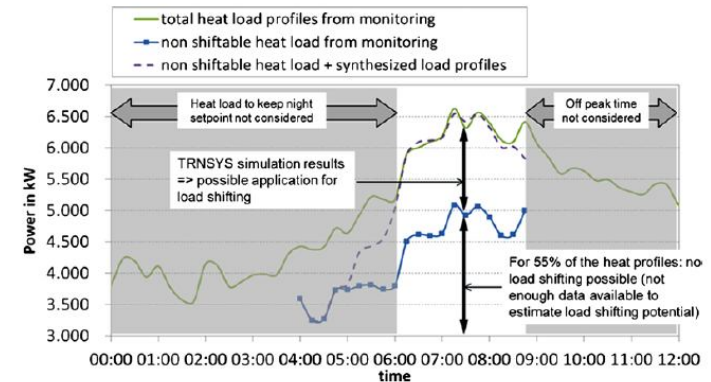
# SHC TASK NG Solar Cooling and Heating

AIT Expertise

B2 Grid Access

B3 Building/grid Load and weather forecast

AIT as a key research partner of  
Smart Grids Modellregion Salzburg  
(National Projects)



- B2G - Building to GRID**  
**Building as an active player of the electrical grid**  
 (shiftable loads, load shedding, duty-cycling, etc.)

- Grid friendly buildings**  
 (interaction between electrical and thermal grids)  
 Demonstration building is constructed as flagship project, in order to investigate the possibilities and benefits of Smart Grids in connection with buildings.

# SHC TASK NG Solar Cooling and Heating

AIT Expertise

SUBTASK D4 Road mapping and lobbying actions

AIT activities

- **National Technology Roadmap for STC**  
(already published)
- **Co-Coordination SHC TASK 48 Roadmaps**  
(ongoing)

Neue Energien 2020 - 1. Ausschreibung  
Klima- und Energiefonds des Bundes - managed by Österreichische Forschungsförderungsgesellschaft

Technologie-Roadmap für  
solarthermische Kühlung in Österreich



**Programmsteuerung:**  
Klima- und Energiefonds

**Programmabwicklung:**  
Österreichische Forschungsförderungsgesellschaft mbH (FFG)

**Autoren:**  
Ing. Anita Preisler, Austrian Institute of Technology/Energy Department  
DI Tim Selke, Austrian Institute of Technology/Energy Department  
DI Hilbert Focke, Austria Solar Innovation Center  
DI (FH) Nicole Hartl, Austrian Energy Agency  
DI (FH) Georg Geissegger, Austrian Energy Agency  
Dr. Erich Podesser, Podesser Consulting  
Dr. Alexander Thür, AEE INTEC

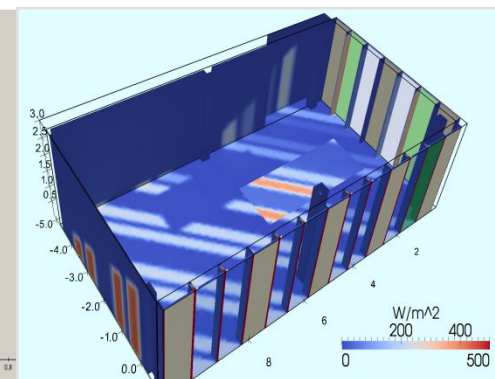
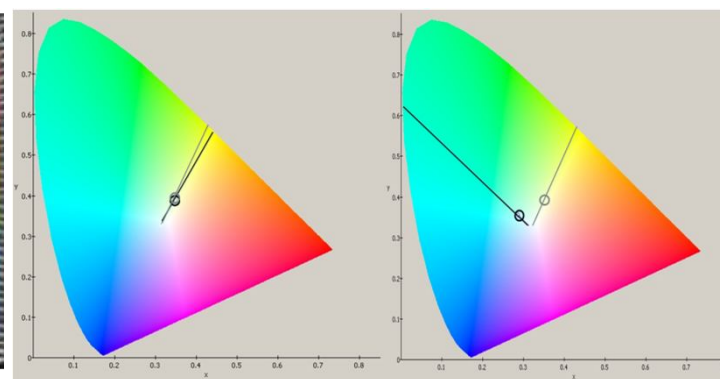
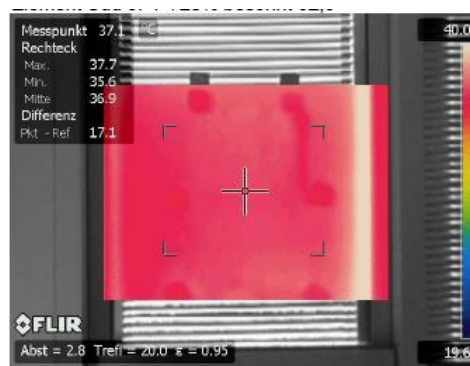
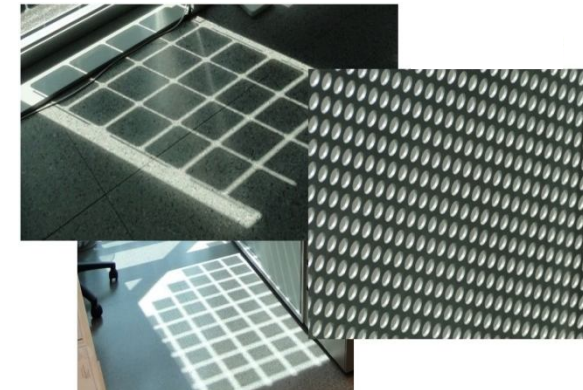


# SHC TASK NG Solar Cooling and Heating

AIT Expertise

Building Integrated Photovoltaics BIPV

- Multifunctionability of BIPV & comfort
- Decentralization
- Ultra light, affordable, lifetimes > 50 years



# SHC TASK NG Solar Cooling and Heating

## Cost-efficient Building Integrated PV

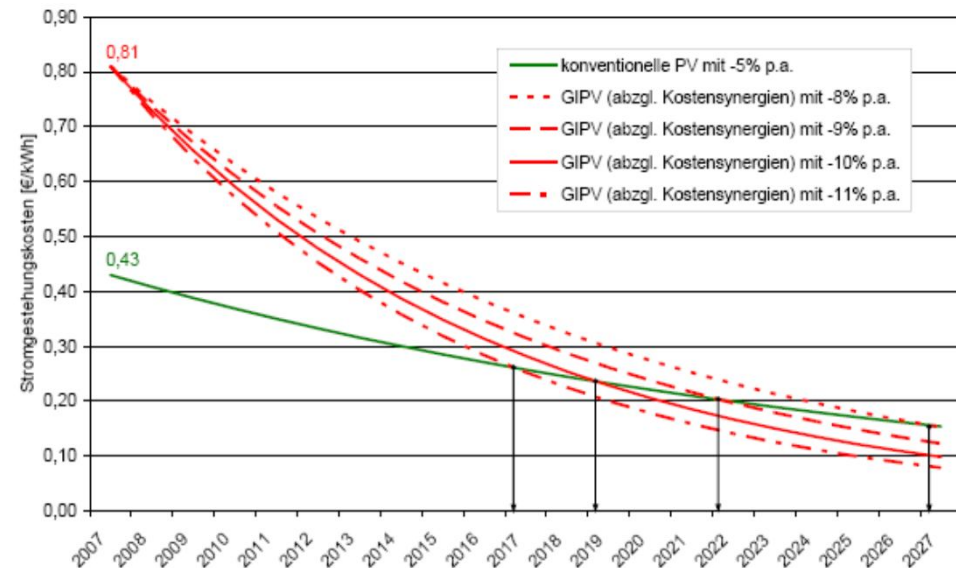
- Project target is to develop a BIPV-technology that allows a substantial cost reduction triggering BIPV to the price sensible mass market.

### Role of AIT:

- Characterisation of innovative modules like e.g. the spheral solar cell



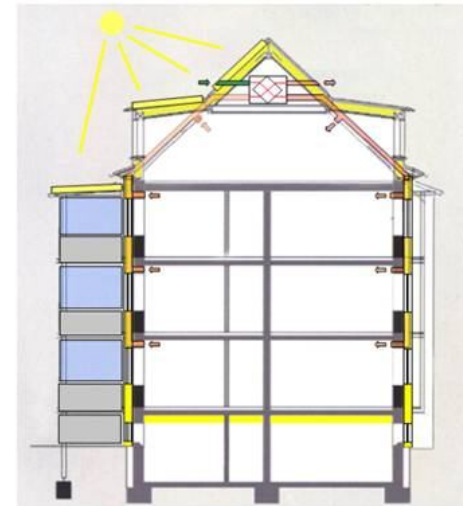
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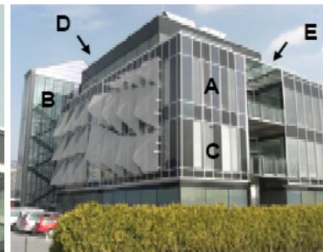
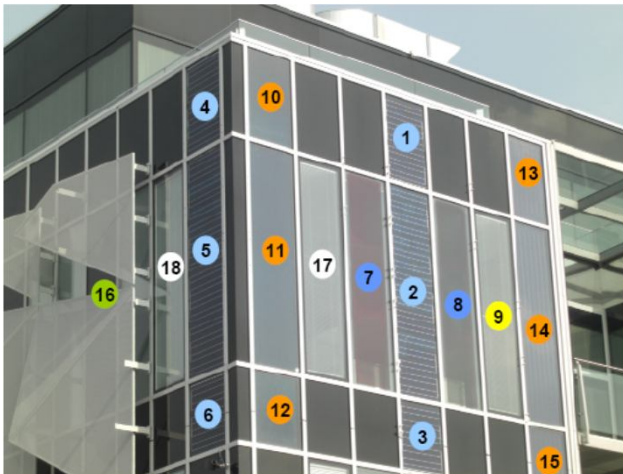
- **Multifunctional** is ...  
Integration of existing technologies
- **Plug & play** is ...  
full pre-fabrication and exchangeable functions

### Topics:

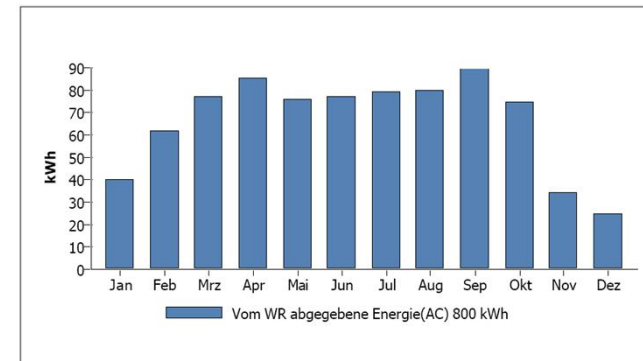
- Dezentralization (PV&shading, PV& cooling, dezentralized HVAC)
- Day light use vs. shading
- Solar heat production
- Combination of systems
- Thermal and visual comfort



Renovation via the facade (source EMPA Switzerland)



- A .. Testfassade Prototyp 1
- B .. Stiegenturm Prüfstand
- C .. Innovationslabor mit Warmwasserspeicher
- D .. Fassadenprüfstand
- E .. Entwicklungsräume der „predictive control“



PV\*SOL Expert 4.0 (R7)

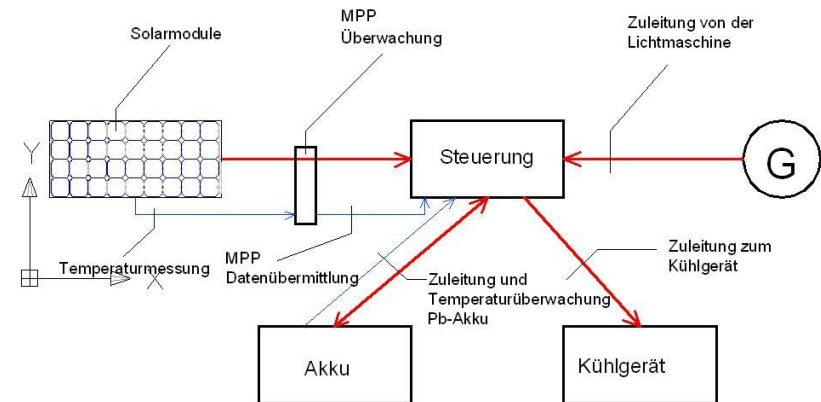
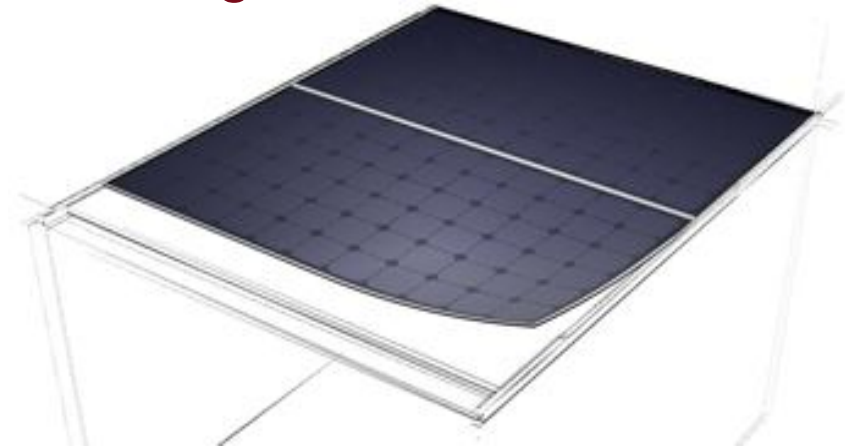
# SHC TASK NG Solar Cooling and Heating

## PROJECT HELIOSTAR

- Combination of PV&decentralized cooling in moving vehicles

### Topics

- PV-roof-top element for trucks (ultralight and semi flexible)
- Adapted and useful loading electronics
- Optimized electrical circuits
- ageing





## IEA SHC TASK48

### Willing to coordinate

- B2 or B3 Grid access / Building/grid Load and weather forecast
- Interest to coordinate C2 Definition of energy performance indicators related to PV
- D4 Road mapping and lobbying actions

### Financing issue

- BMVIT Ministry accepted offer from AIT, AEE INTEC, UIBK
- Finished and ongoing National Research Projects
- New national submission planned for 2014



# AIT Austrian Institute of Technology

your ingenious partner

Tim Selke  
tim.selke@ait.ac.at