IEA SHC Task 53

New Generation Solar Cooling & Heating systems
(PV or solar thermally driven systems)

Daniel Mugnier, Operating Agent Task 53

November 2014
Task 53 Short description
### Task 53 Structure

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<th>Subtask B</th>
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<td>Components, Systems &amp; Quality</td>
<td>Control, Simulation &amp; Design</td>
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- **Subtask C**
  - Testing and demonstration projects

- **Subtask D**
  - Dissemination & market deployment

### 4 Subtasks & 19 activities

- **Time Schedule**: 3.5 years
  - From March 2014 to June 2017
Activities brief description (1/2)  Task 53

Subtask A: Components, Systems & Quality
A1: Reference systems
A2: New system configurations for cooling and heating
A3: Storage concepts and management
A4: Systems integration into buildings, microgrid and central Grid
A5: LCA & techno-eco comparison between reference & new systems

Subtask B: Control, Simulation & Design
B1: Reference conditions
B2: Grid access conditions and building load management analysis
B3: Models of subcomponents and system simulation
B4: Control strategy analysis and optimization for ST and PV
B5: System inter-comparison
Activities brief description (2/2)  

Subtask C: Testing and demonstration projects
C1: Monitoring procedure and monitoring system selection criteria
C2: System description for field test and demo project
C3: Monitoring data analysis on technical issues & on performances
C4: Best practices / feedback

Subtask D: Dissemination and market deployment
D1: Website dedicated to the Task
D2: Handbook and simplified brochure
D3: Newsletters, workshops and conferences
D4: Road mapping and lobbying actions
PV Heating/cooling

Market

Environment
State of the art of this new Market

(no claim for completeness)
Main categories

Solar air conditioners: Splits

PV+ HP coupling for Office/Commercial
Solar Air Conditioner
SEER 35 • Solar Hybrid Heat Pump
Model ACDC12
Connect Up To Three Panels (Max 840W)
Runs On Solar Power & AC Power
11,000 BTU Cooling/12,000 BTU Heat
Plug-And-Play Solar Connection
No Batteries Required

Home
Keep the inside cool all day for next to nothing in energy costs. Preventing daytime heat build-up also cuts evening cooling costs.

Office
Keep the work area comfortable during business hours for pennies per day. Cool or heat up to 750 Sq. Ft. (60m²).

International
Compatible with 50Hz and 60Hz power, use it anywhere in the world.

Ultra-High SEER
Solar Air Conditioner

Connects Directly To Solar Panels

ACDC12-Hybrid
Retail/List-$1695ea FOB Factory
Dealer Price: 4-49 units $1290ea FOB Factory
Distributor Price: 50+ units $891ea FOB China
**Unit includes 3m lineset

250W Solar Panel
250W Solar Panel
250W Solar Panel
Up To 3 Panels 840W Max.
ACDC12 Outdoor Unit

Solar DC
DC Indoor Unit

DC
AC Power
220V 50/60Hz
Typical **ALREADY** EU market available solution

Efficient Geothermal Heat Pump: COP of 5.3
Field test since 2011 in Switzerland

**PV booster** => overall yearly COP of 6.9
State of the art of the future new Market

Active R&D participants in Task 53

Testing principle for a Chinese PV split unit
(Source: Universidad Miguel Hernández de Elche)

Concept for compact solar thermal air conditioner based on fixed & cooled adsorption beds
(Source: Solarinvent)
Task 53 new developments & progress
Subtask A: Components, Systems & Quality

Task 53

Activity A2

Objective: New system configurations for cooling (AC, food conservation) and heating (CHW, ambient)

This activity will be dedicated at building the state of the art of the new system configurations for cooling and heating. This activity will be achieved realised in the early beginning part of the Task according to existing market available solutions. A second step of this activity will be to update this state of the art with progress occurring in the field thanks to R&D.

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Brand name: ISACLARINE

Cooling power range: 10-20 kW

Template for investigation with 2 examples

State of the art of new generation commercially Available activity ongoing

(A2 : New system configurations for cooling and heating)
Subtask A: Components, Systems & Quality

Milestone report

Date: 16.10.2014

Storage types

Next steps

Best practices activity for energy storage ongoing

(A3: Storage concepts and management)
Subtask C: Testing and demonstration projects

Monitoring procedure
KPI’s
Reference conditions
Example

Monitoring procedure for field test & demo systems ongoing
(C1: Monitoring procedure and monitoring system selection criteria)

Figure 2. PV driven solar heating and cooling system of a HVAC installation.
Task 53 meetings

& communication with PVPS
**Last Task Expert meeting**

**Place**: Västeras, MDH

**Date**: 07-08/10/2014

**Side event**: SUNCOOL CLIMATEWELL workshop

14 experts from 8 countries

- To deal with admin issues
- To confirm the content of the Annex & Work plan document
- To have a discussion on the priority targets
- To make a status on ongoing Activities
- To make a planning for next steps

Johan Lindhal, PVPS Task 1 from Sweden
Participating countries

.. at least 8 countries

France
Austria
Spain
Italy
Sweden
Australia
Switzerland
China

Turkey ?
Germany ?
Netherlands ?
Task 53 next meetings

3\textsuperscript{rd} Task 53 expert meeting:
The next meeting will be organized during a “Solar Cooling week” in Shanghai, gently organized by SJTU from 25 to 26/03/2015. This meeting will be organized in conjunction with Task 48 final expert meeting (23-24/03) and including a Dissemination workshop on 27/03.

Planned schedule from SJTU

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*Visiting to solar cooling facilities in SITU can be arranged at coffee break time.*
Task 53 next meetings

Meeting 4: Autumn 2014

- Place to be determined but option for Innsbrück (AT) -

Strong ambition to coordinate the Meeting 4 of Task 53 with Task 14 PVPS (High penetration in grids) managed by AIT(Austria) because a common workshop should be co-organised during EU PVSEC 2015 conference which will take place from 14 to 18/09 in Hamburg (Germany).

Proposed dates to be confirmed: 15 & 16/09/2015
IEA PVPS Task 1 Meeting + Workshop
Place: EU PVSEC conference - Amsterdam
Date: 22/09/2014

Self-consumption business models - technical and economic challenges

Jointly with IEA – International Energy Agency PVPS Task 1 / Task 14

IEA SHC Task 53 presentation on what means PV for Solar Cooling and Heating
PVPS ↔ IEA SHC Task 53

Proposed type of Collaboration:

• Task Liaison-Officers (mainly Task 1 PVPS and Task 53 SHC)

• Joint Task Meetings when possible

• Meetings at same place & time when possible

• Joint Workshops at Conferences

• Type of collaboration: Based on expert-level not (only) formally

Official position validated by 76th SHC ExCo in Beijing (October 2014)
http://task53.iea-shc.org/

Thanks for your attention!

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