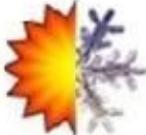


IEA PVPS Task 1 – 41<sup>st</sup> meeting

Task 53 

IEA SHC Task 53 presentation

**TECSOL** 

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



Daniel MUGNIER – Tel Aviv, 23/04/2014

[www.tecsol.fr](http://www.tecsol.fr)

# Context : Status of Solar cooling in 2014

Solar thermal « traditionnal » cooling has **difficulty to emerge as a economically competitive solution**

Main reasons :

- **Technical** : Limit on adaptability due to hydraulics, complexity
- **Economical** : Investment cost, especially for small systems

⇒ Still need **intensive R&D** for quality improvement and best solution selection (IEA SHC Task 48 ongoing)

However, for large systems, solar thermal cooling has still interesting perspectives (UWC Singapore) because :

- Economy of scale
- Specialised engineering and control
- Energy sales

# In addition... a raising interest from EU on competitive Solar cooling

HORIZON 2020 – WORK PROGRAMME 2014-2015  
Secure, clean and efficient energy  
COUNCIL DECISION ESTABLISHING THE SPECIFIC PROGRAMME  
IMPLEMENTING HORIZON 2020 - THE FRAMEWORK PROGRAMME  
FOR RESEARCH AND INNOVATION (2014-2020)

VERSION 8 OCTOBER 2013

WORK PROGRAMME 2014 – 2015

10. Energy Challenge

INFORMAL DRAFT DISCUSSION DOCUMENT

A specific topic on the last  
call on Renewable Heating  
and Cooling !

**Important notice:**

The present document is meant to facilitate the discussions towards the preparation of the work programme 2014 – 2015. It does not at this stage cover all relevant aspects and it does not prejudge the outcome of the on-going inter-institutional negotiations on Horizon 2020 or internal work on cross-cutting aspects. Hence, it remains subject to change.

# How to find a solution for small/medium size ?

- \* A very **important priority** : solar for cooling, especially for small to medium size

*Example : 10% of the entire Saudi Arabia oil production for national cooling*

- \* **New context on economics** for PV and trend towards **selfconsumption**

- \* A real **growing market...**

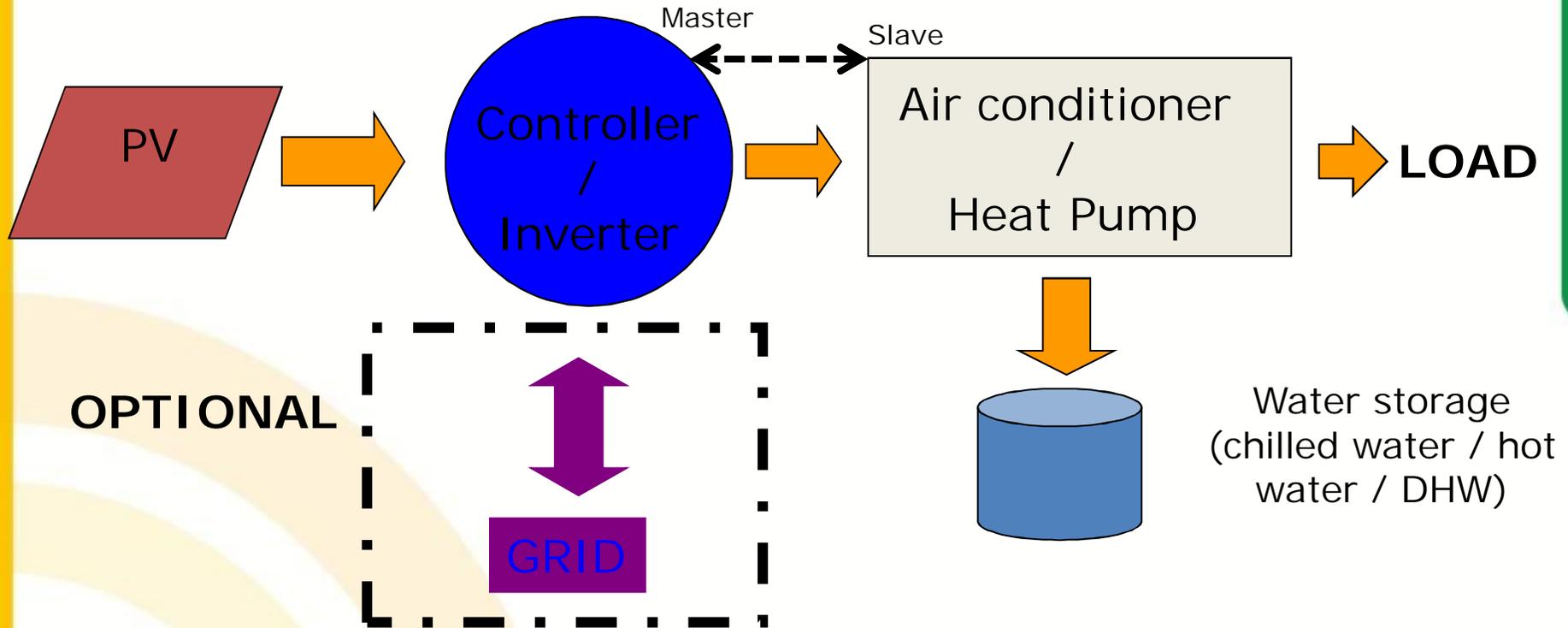
... but strong need of:

- \* standards
- \* thermal management opt.
- \* monitoring & best practice



N° 1 & 2 Chinese A/C manufacturers

# Basic concept for the PV approach



## Task 53 Goals

- (1) **to analyze the interest of new generation solar cooling & heating concepts systems for bulidings in all climates and select best solutions** which lead to highly reliable, durable, efficient and robust solar cooling and heating (ambient + DHW) systems
- (2) **to contribute to market entry of the technology** and identify most promising market areas in terms of cost competitiveness and value of electricity.

# Scope of the Task

System : solar driven systems for cooling and heating

- \* Solar thermal driven innovative compact cooling+heating systems
- \* **Photovoltaic + air conditioning system** (Compression air conditioning / heat pump (if heating as well) ; **food conservation included**)

Applications : Off grid & grid connected buildings

(houses, small multi-family buildings, offices, shops, commercial center, hotels)

Power range : **from 1 kW cooling to several tens kW cooling/heating**

Limit : Need to have **a possible direct coupling between solar and cold production machine**. The coupling can be partial or total (for the PV- machine one especially), considering special configurations and control strategies, to allow a maximised use of PV power direct for heating/cooling even without direct coupling

## Outcome

- **Investigation on new small to medium size solar cooling systems** (thermal and PV) and develop best suited cooling & heating systems technology focusing on reliability, adaptability and quality
- **Proof of cost effectiveness** of new solar cooling & heating systems
- **Investigation on life cycle performances** on energy & environmental terms (LCA) of different options
- **Assistance for market deployment** of new solar cooling & heating systems for buildings worldwide
- **Increase of energy supply safety and influence the virtuous demand side management behaviors**

### Time Schedule

- 40 months
- From March 2014 to June 2017

# Task 53 Structure

**Subtask A**  
**Components, Systems & Quality**

**Subtask B**  
**Control, Simulation & Design**

**Subtask C**  
**Testing and demonstration projects**

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

# Activities brief description (1/2)

## 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

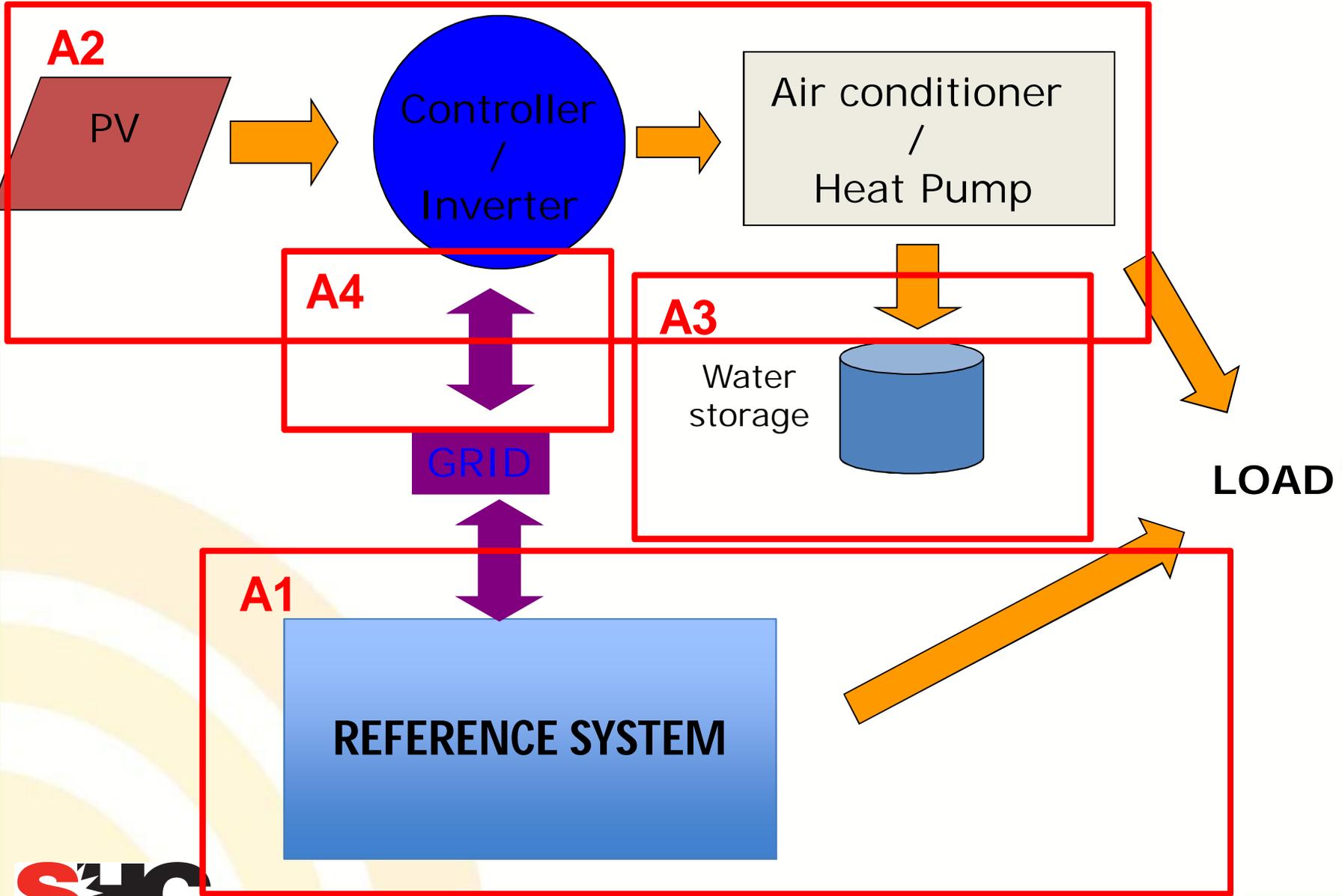
B3: Models of subcomponents and system simulation

B4: **Control strategy analysis** and optimization for ST and PV

B5: System inter-comparison

# Subtask A

A5



## 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

# Participating countries

.. at least 8 countries

France

Austria

Spain

Italy

Sweden

Australia

Switzerland

China

Turkey ?

Germany ?

Algeria ? Korea ?

Israel : no more for the moment

# Task 53 Website

IEA SHC HOME | TASK HOME | MEMBER LOGIN | SEARCH

**SHC**  
SOLAR HEATING & COOLING PROGRAMME  
INTERNATIONAL ENERGY AGENCY

SHC Task 53  
New Generation Solar Cooling & Heating

- About Project
- Participants
- Meetings / Events
- News
- Publications
- Related Sites
- Member Area
- Contact

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

### Overview

The main objective of this Task is to assist a strong and sustainable market development of solar PV or new innovative thermal cooling systems. It is focusing on solar driven systems for both cooling (ambient and food conservation) and heating (ambient and domestic hot water).

The scope of the Task are the technologies for production of cold/hot water or conditioned air by means of solar heat or solar electricity, i.e., the subject which is covered by the Task starts with the solar radiation reaching the collector or the PV modules and ends with the chilled/hot water and/or conditioned air transferred to the application. However, although the distribution system, the building and the interaction of both with the technical equipment are not the main topic of the Task this interaction will be considered where necessary.

**Task Information**

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Task 53 presentation - PVPS Task 1 - 41st meeting -23/04/2014



<http://task53.iea-shc.org/>



# Task 53 next meetings

## 2<sup>nd</sup> Task 53 meeting :

Malärdalen University, Sweden on 07-08-09/10/2014

## Meeting 3: Spring 2014

– Place to be determined –

Strong ambition to coordinate the Meeting 3 of Task 53 with Task 14 PVPS (High penetration in grids) managed by AIT(Austria)

## More information (Operating Agent Task 53)

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