

# SHC Task53 / Spanish Industry Workshop

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

### General presentation of Task 53



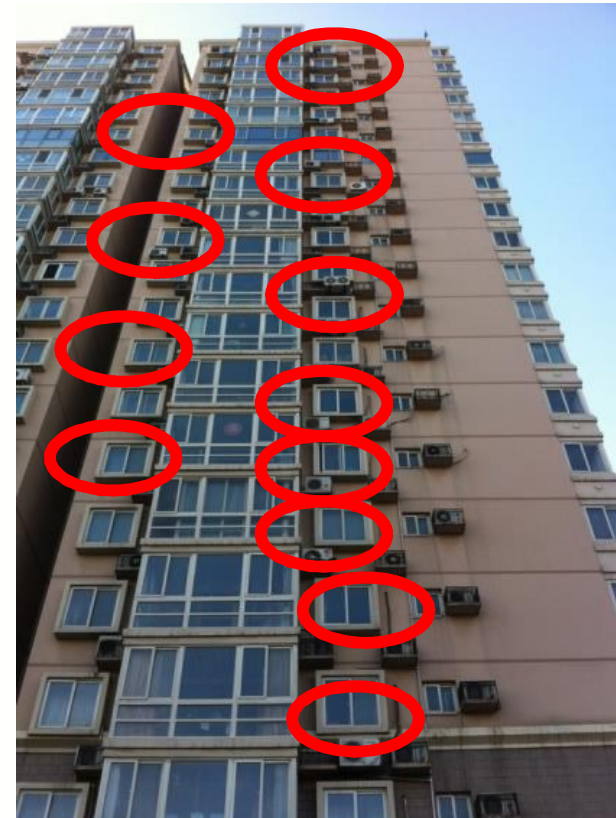
Daniel MUGNIER – Madrid, 11/04/2016

To Introduce the importance of...

## SOLAR COOLING ...

...one picture taken in  
China in 2015 !

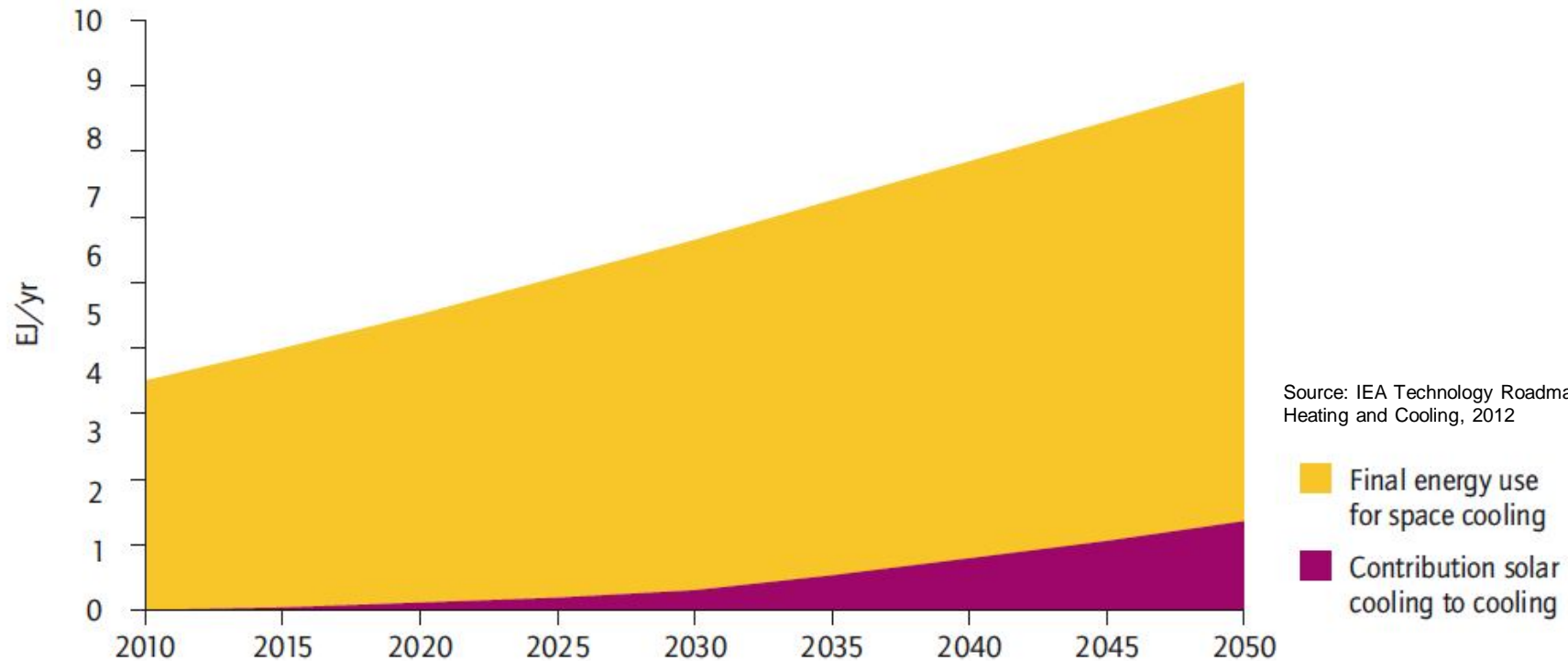
...MENA Region is deeply  
turning to Renewables  
(under League Arab States strategy and UNEP  
support)



# IEA Technology Roadmap SHC

## Share of solar cooling by 2050

Figure 17: Roadmap vision for solar cooling in relation to total final energy use for cooling (Exajoule/yr)



**Solar Cooling** nearly 17% of total energy use for cooling!

# Need of a new Generation solar cooling systems

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

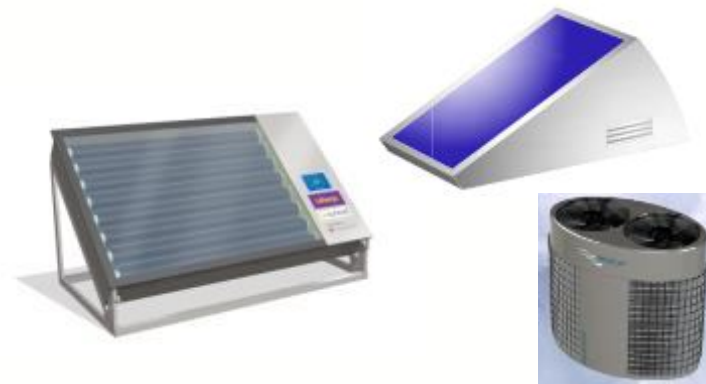
Main reasons :

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

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

⇒ Very innovative concepts

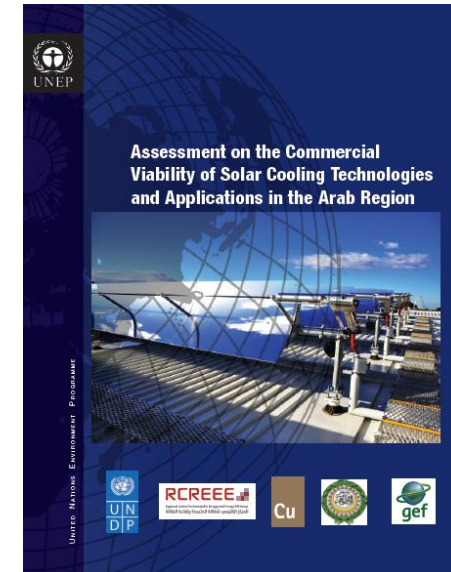
<http://task48.iea-shc.org/>



# 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*

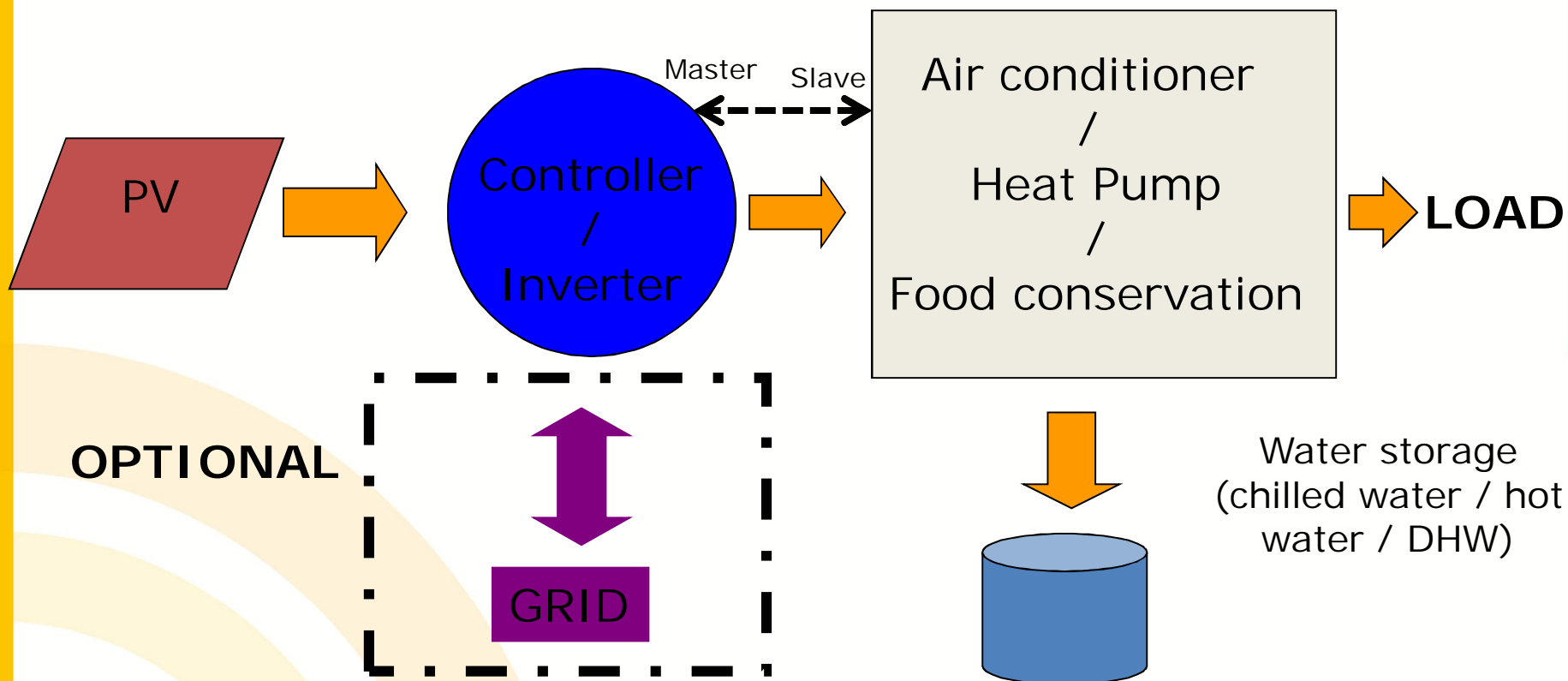


- \* **New context on economics** for PV and trend towards **selfconsumption**
- \* A real **growing market**...

... but **strong need** of:

- \* standards
- \* thermal management optimum
- \* monitoring & best practice

# Basic concept for the PV approach



# Why an IEA Solar and Heating and Cooling Task on PV cooling ?

IEA : International energy technology co-operation

IEA Committee on Energy Research and Technology

CERT

Working Parties

Fossil Fuels

Renewable Energy

End Use

Fusion Power

Implementing Agreements (Examples)

...

...

...

...

Solar Heating & Cooling

Heat Pumps

PV Power Systems

Energy Conservation in Buildings & Community Systems



# IEA SHC 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.



## TASK 53

New generation solar cooling & heating systems  
(PV or solar thermally driven systems)



Task description and Work plan

November 2013

This text has been produced by

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With the support of  
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Task 53 





# 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**

Partial or total coupling

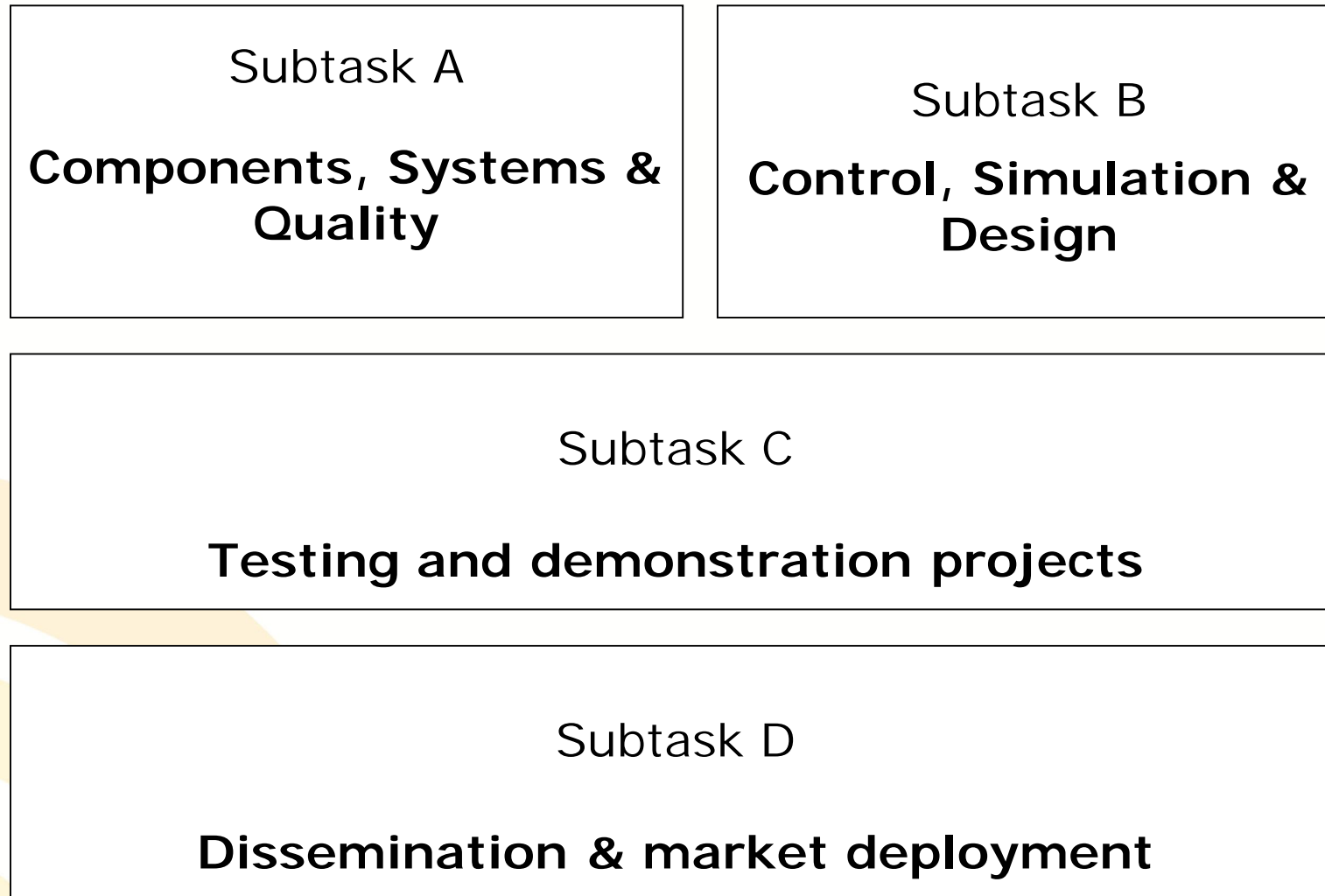
# Outcome

- **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



# IEA SHC 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  
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## 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, interaction will be considered where necessary.

**Task Information**

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

**Participating countries** : France, Spain, Germany, Italy, Austria, China, Australia, South Korea, Sweden, Switzerland

# State of the art of this new Market



(no claim for completeness)



# Air conditioning market evolution..Or revolution ?



**Gree Solar-Inverter Air Conditioner**

Energy saving  
Eco-friendly  
High efficiency



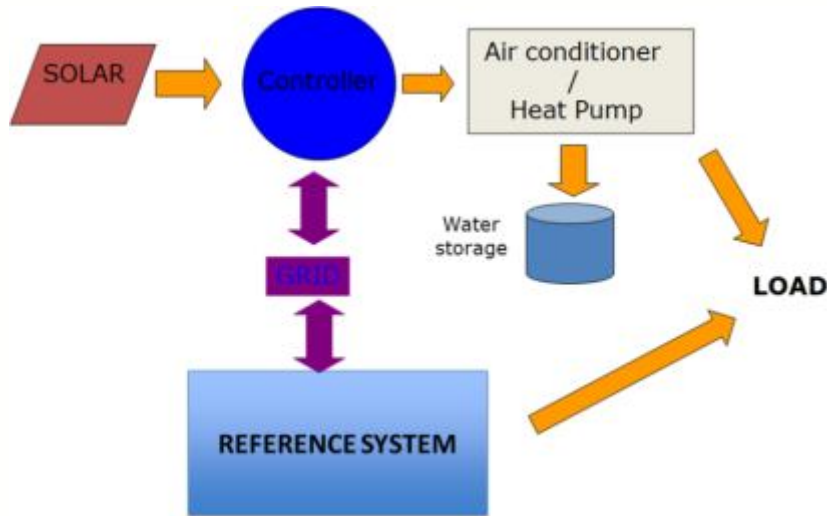
IEA Task 53 5<sup>th</sup> meeting – Madrid 12-13/04/2016

GREE is one of the major Chinese Airconditoner manufacturer..



Task 53





Task 53 

Thanks for your attention !

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

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Task 53 