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

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

SHC SOLAR HEATING & COOLING PROGRAMME INTERNATIONAL ENERGY AGENCY

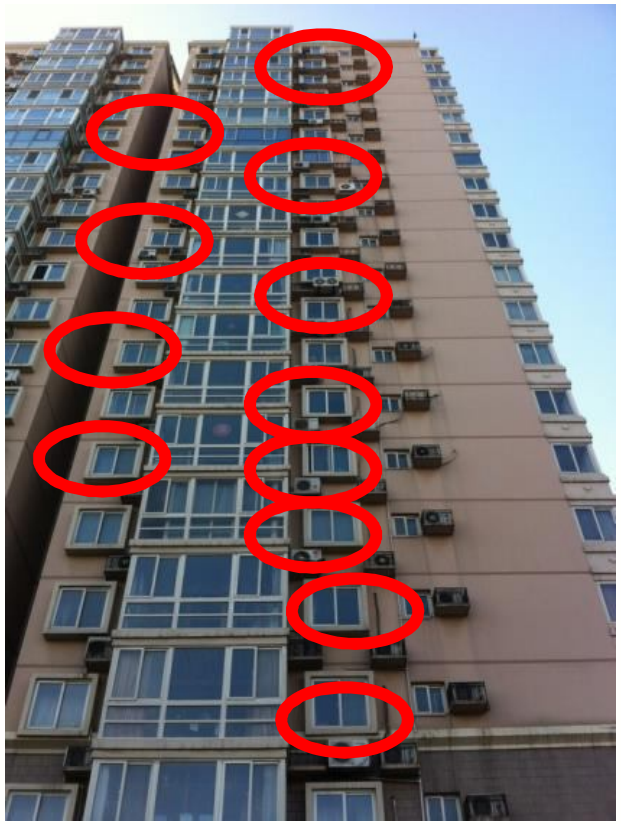
Task 53

www.tecsol.fr

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)

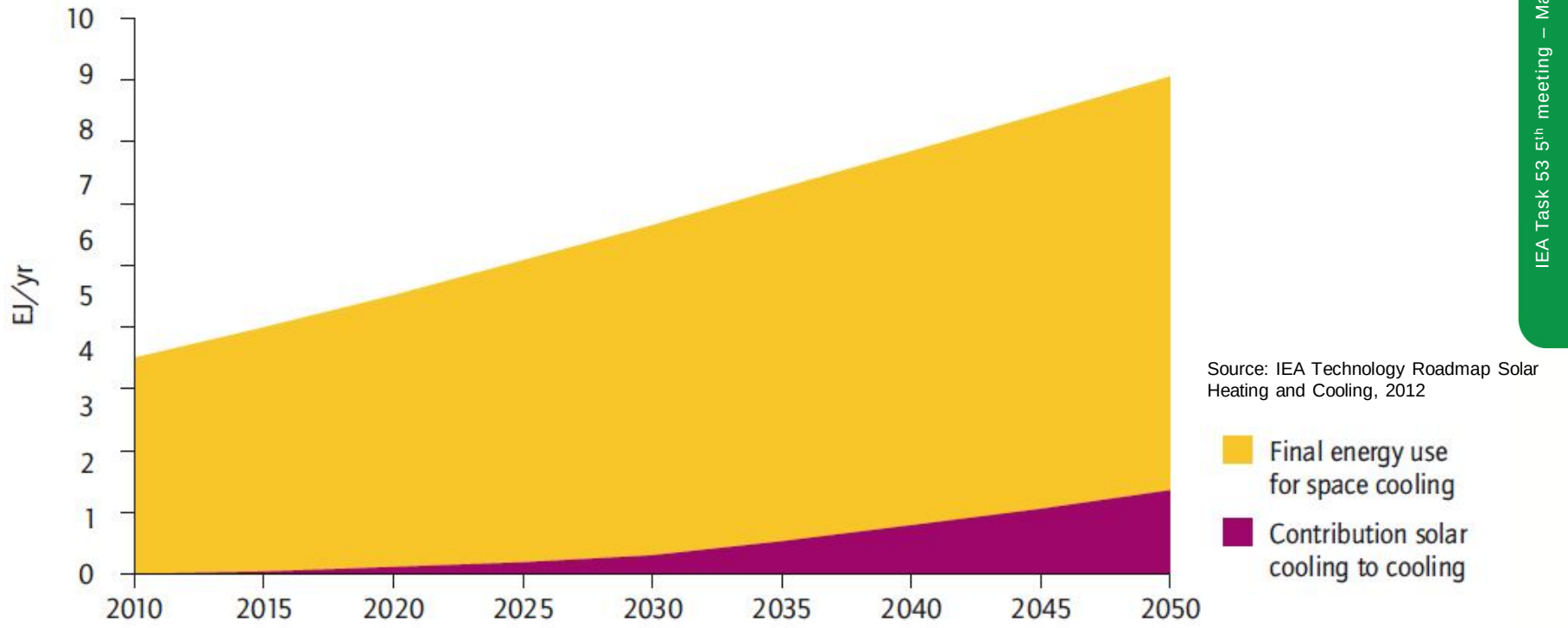
SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Task 53

TECSOL

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)



Source: IEA Technology Roadmap Solar Heating and Cooling, 2012

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

SHC SOLAR HEATING & COOLING PROGRAMME INTERNATIONAL ENERGY AGENCY

Task 53

TECSOL

Need of a new Generation solar cooling systems

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

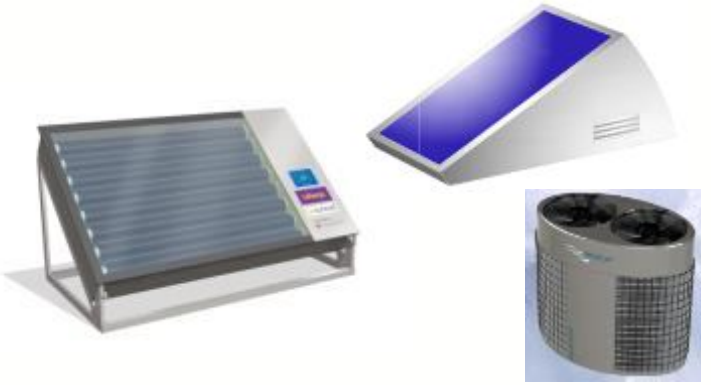
Main reasons :

- **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/



SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

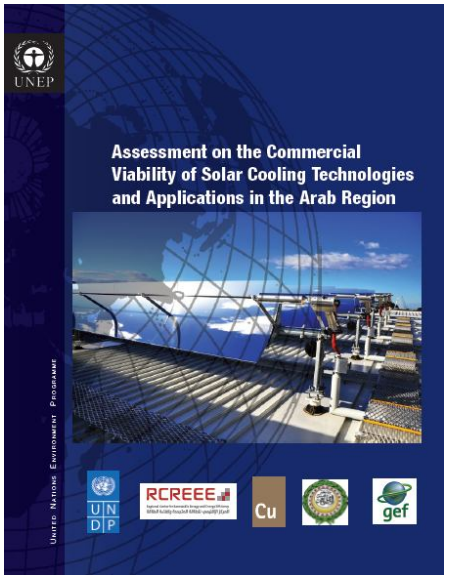
Task 53

TECSOL

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:

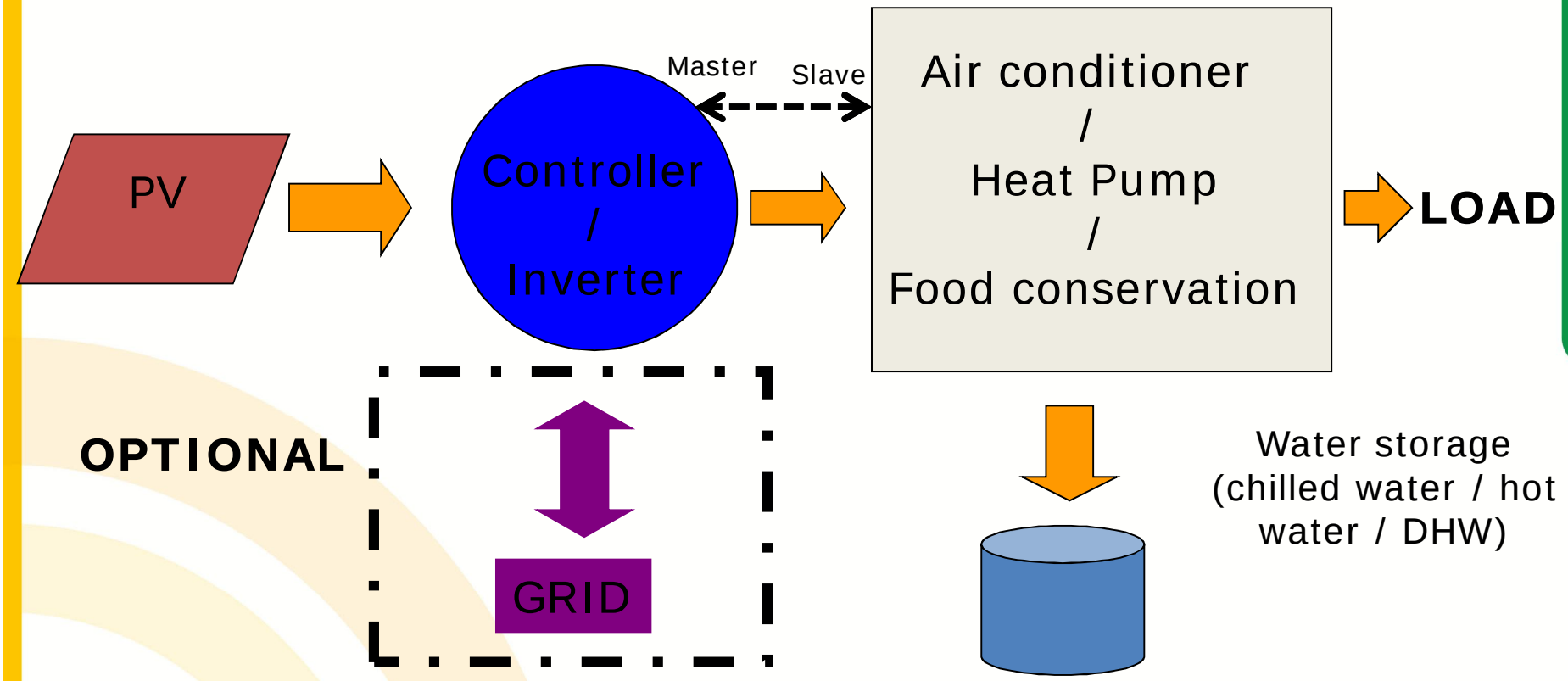
* standards
* thermal management optimum
* monitoring & best practice

SHC SOLAR HEATING & COOLING PROGRAMME INTERNATIONAL ENERGY AGENCY

Task 53

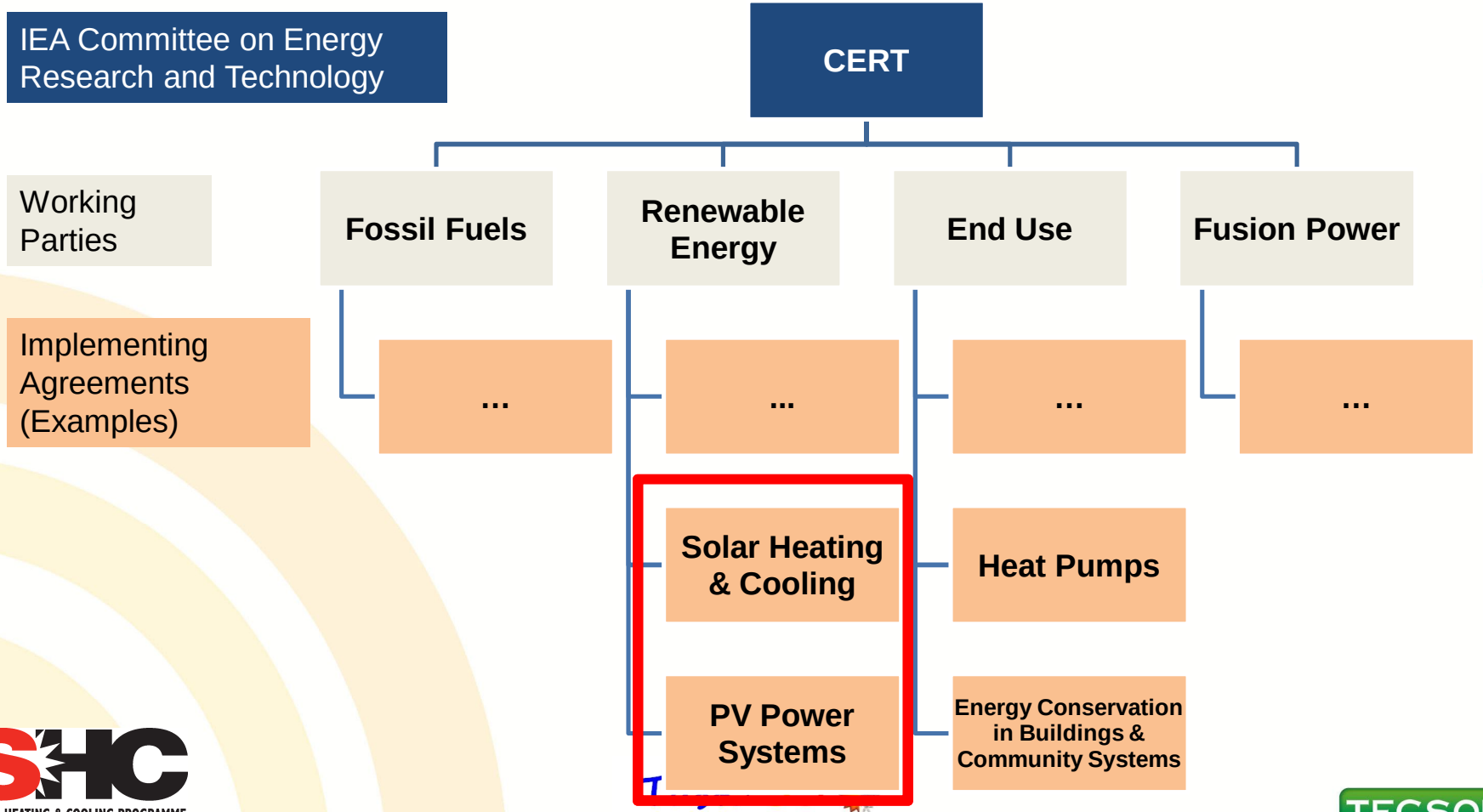
TECSOL

Basic concept for the PV approach



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

IEA : International energy technology co-operation



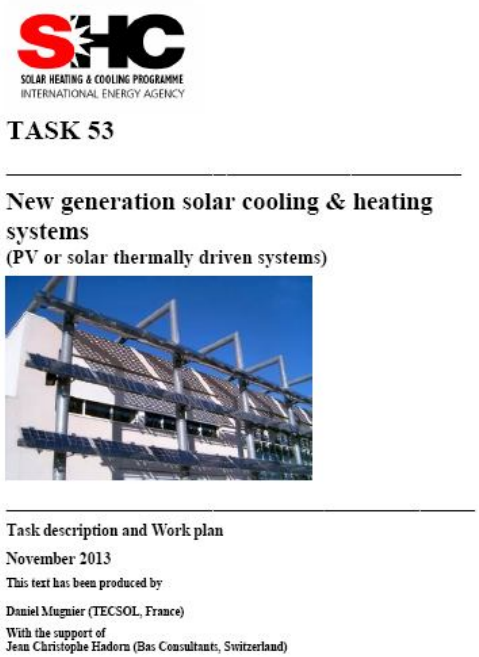
SHC SOLAR HEATING & COOLING PROGRAMME INTERNATIONAL ENERGY AGENCY

TECSOL

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.


SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

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

Daniel Mugnier (TECSOL, France)

With the support of
Jean Christophe Hadorn (Bas Consultants, Switzerland)

Scope of the Task

System : solar driven systems for cooling and heating

* Solar thermal driven innovative compact cooling+heating systems

* **Photovoltaïc + 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**

SHC SOLAR HEATING & COOLING PROGRAMME INTERNATIONAL ENERGY AGENCY

TECSOL

Task 53 Structure

Subtask A

Components, Systems & Quality

Subtask B

Control, Simulation & Design

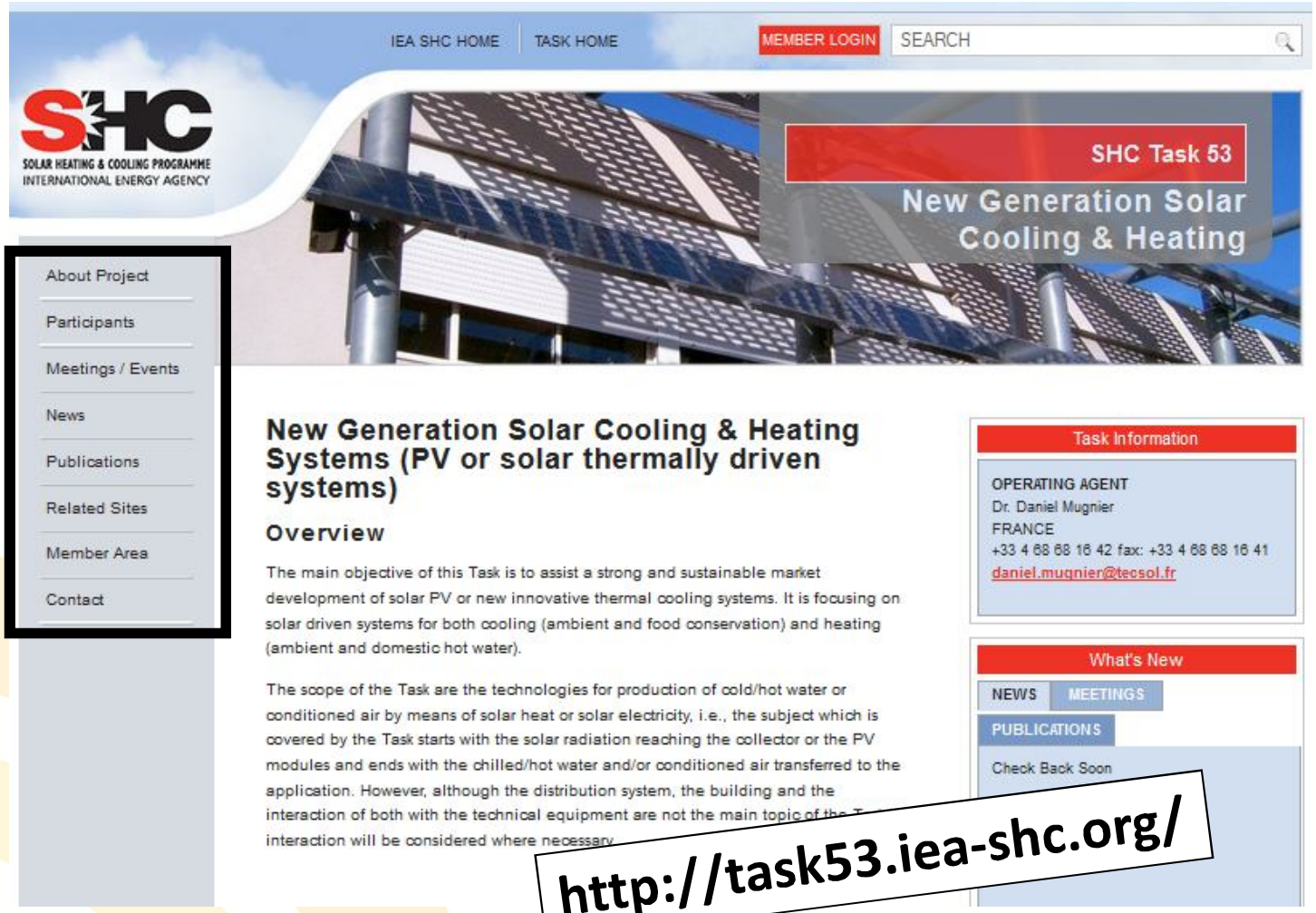
Subtask C

Testing and demonstration projects

Subtask D

Dissemination & market deployment

IEA SHC Task 53 Website



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

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

SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Task 53

TECSOL

State of the art of this new **Market**

(no claim for completeness)

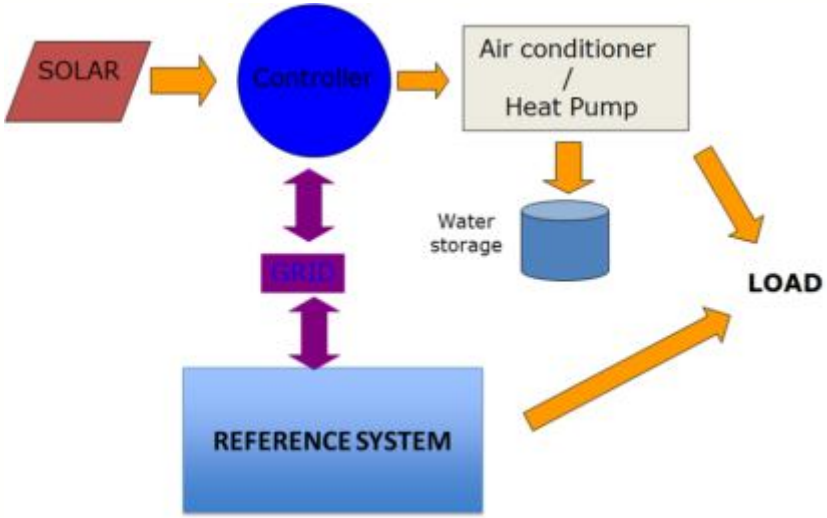
SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Task 53

TECSOL

Air conditioning market evolution..Or revolution ?

GREE is one of the major Chinese Airconditoner manufacturer..



Task 53

Thanks for your attention !

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

Contact : Daniel Mugnier, TECSOL

daniel.mugnier@tecsol.fr

Task 53

SHC SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

TECSOL