

# IEA Solar Heating & Cooling Programme

Soltrain Workshop  
*Cape Town, August 2010*

# International Energy Agency



International  
Energy Agency

The International Energy Agency (IEA) is an autonomous body within the framework of the Organisation for Economic Co-operation and Development (OECD)

It was established in 1974

# The IEA Research Programme

The primary mechanism for co-operation on technology matters are the co-operative Research-, Development- and Demonstration- (*RD&D*) programs carried out in the Implementing Agreements

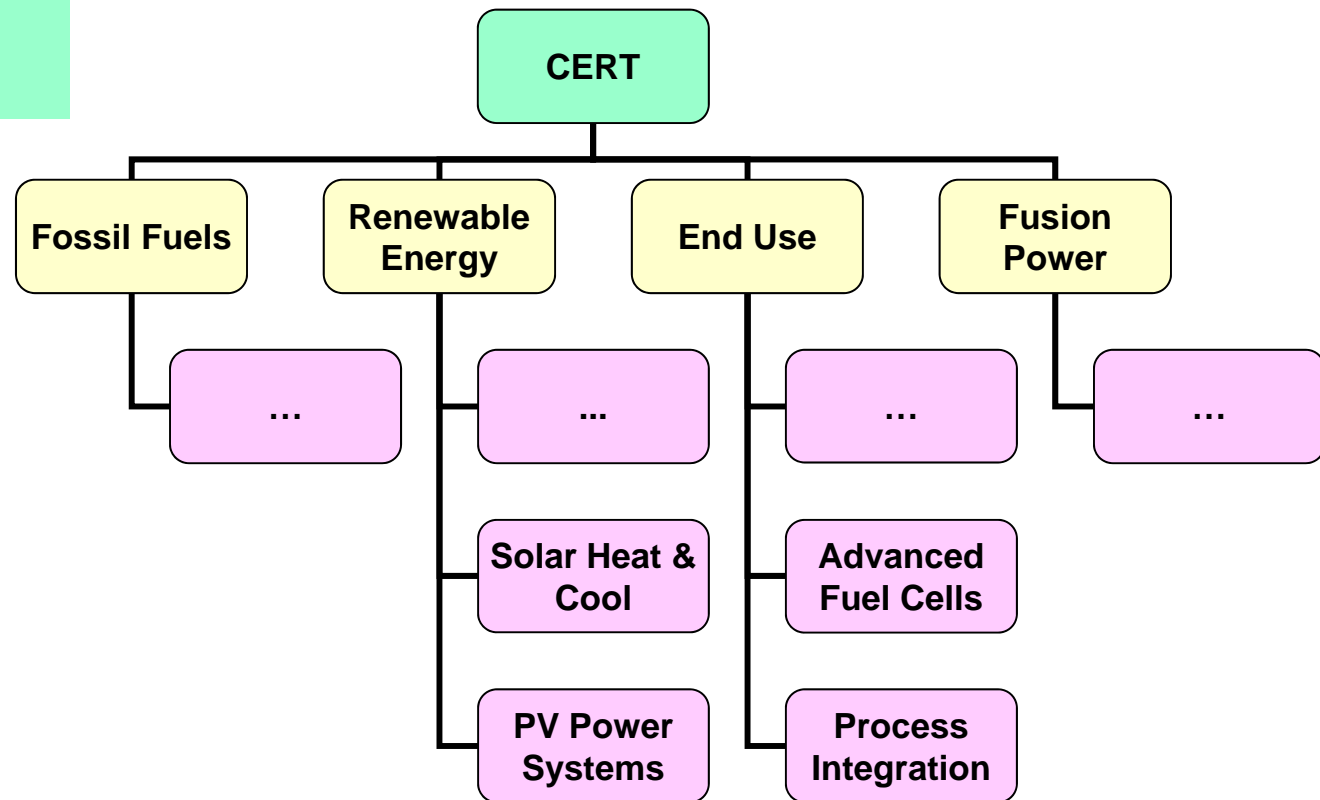
## 45 Implementing Agreements

## Energy Technology Co-operation

IEA Committee on Energy Research and Technology

Working Parties

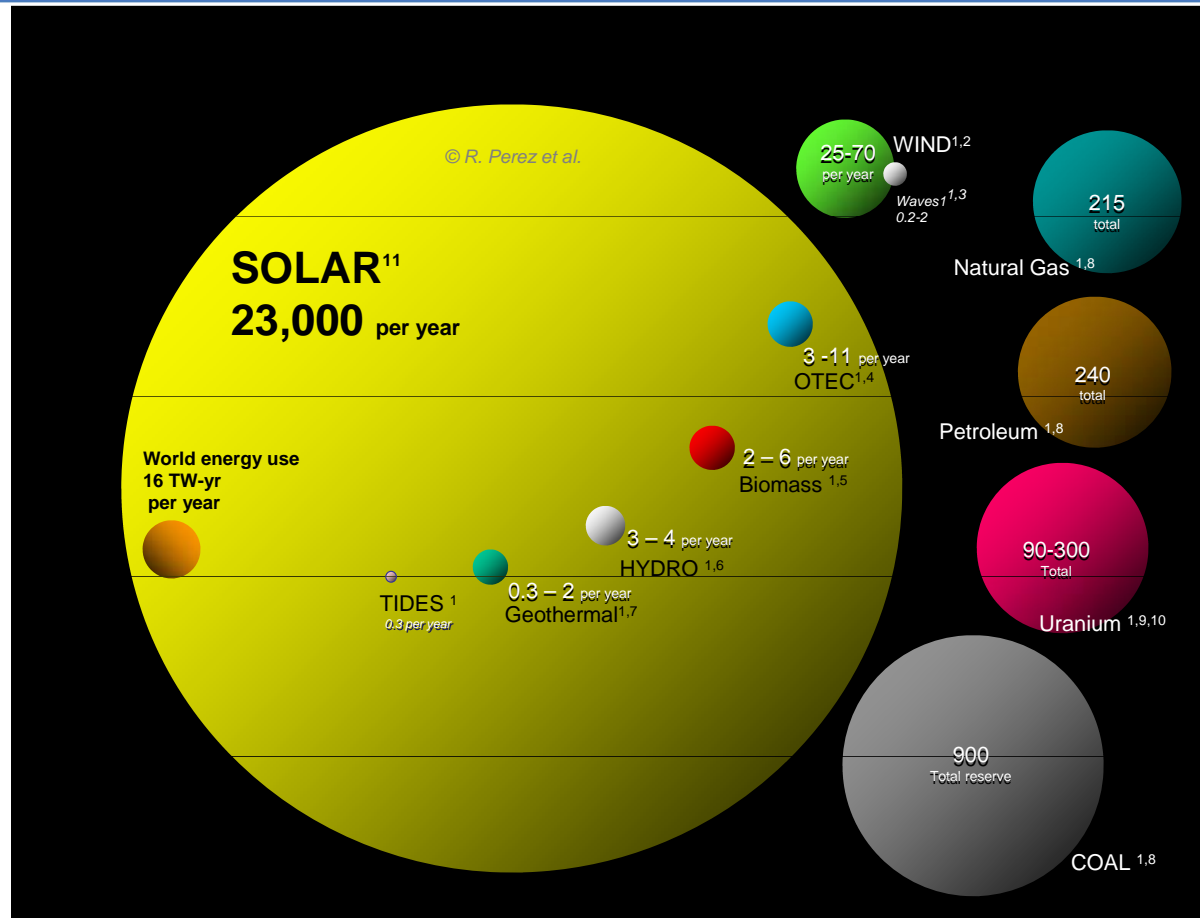
Implementing Agreements (Examples)



## Renewable Energy

- Bioenergy
- Geothermal Energy Research Technology
- Hydropower Technologies and Programmes
- Ocean Energy Systems
- Photovoltaic Power System (PVPS)
- Production and Utilization of Hydrogen
- **Solar Heating and Cooling Systems (SHC)**
- Solar Power and Chemical Energy Systems (SolarPACES)
- Wind Turbine Systems

# IEA Solar Heating and Cooling Programme



Comparing finite and renewable planetary energy reserves (Terawatt-years).  
Total recoverable reserves are shown for the finite resources.

Yearly potential is shown for the renewables. (R. Perez et al.)

# IEA Solar Heating and Cooling Programme



- **Started in 1976**
- **19 member countries plus the European Commission**
- **Trade Association MOU signed with 9 associations**
- **Industry participation**
  - past 5 years represented over 25% of Task participants
- **Interested countries**
  - Brazil, China, India, Japan, Singapore, Slovenia, United Arab Emirates
- **35 Tasks completed**
- **7 Tasks running with over 150 experts participating**

# IEA Solar Heating and Cooling Programme



## PARTICIPATING COUNTRIES



**Australia**



**Austria**



**Belgium**



**Canada**



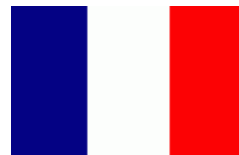
**Denmark**



**European Union**



**Finland**



**France**



**Germany**



**Italy**



**Mexico**



**Netherlands**



**New Zealand**



**Norway**



**Portugal**



**South Africa**



**Spain**



**Sweden**



**Switzerland**



**United States**



# SHC PROGRAMME Membership

## Europe (14):

Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the European Commission

## North America (3):

Canada, Mexico, United States

## Asia and Pacific (2):

Australia, New Zealand

## Africa (1)

South Africa

## IEA SHC

### **Technologies and Designs:**

includes active solar heating and cooling, passive solar, daylighting, and combined photovoltaic/thermal.

### **Energy End Uses:**

heating, cooling, hot water, and light.

### **Applications:**

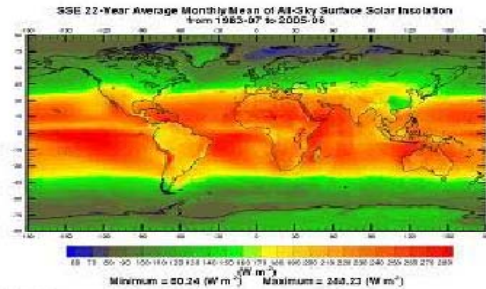
all building types – single-family homes, multi-family, office, industrial buildings, schools, hospitals, public buildings, etc.

also, agricultural, industrial process heat, and water treatment applications.

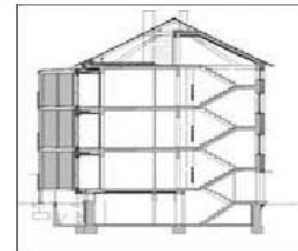
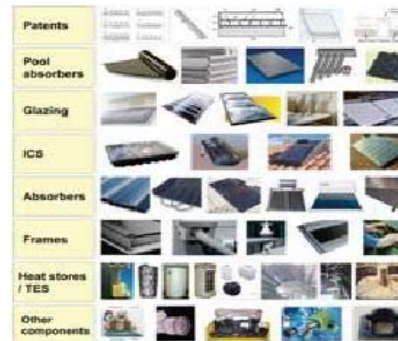
## IEA SHC is contributing in key areas

- **Technology Development**
- **Technology Deployment**
- **Policy Development**
- **Efficient Use of R&D Resources**
- **Market Outreach**

## OUR WORK



2007-06-27



## TASKS (2003-2010)

### COMPLETED (11)

- Building Energy Analysis Tools (22) *1996-2003*  
*(United States)*
- Solar Procurement (24) *1998-2003*  
*(Sweden)*
- Solar Assisted Air Conditioning of Buildings (25) *1999-2004*  
*(Germany)*
- Performance of Solar Façade Components (27) *2000-2005*  
*(Germany)*
- Sustainable Solar Housing (28) *2000-2005*  
*(Switzerland)*
- Solar Crop Drying (29) *2000-2006*  
*(Canada)*

## TASKS (2003-2010)

### COMPLETED (11)

- Daylighting Buildings in the 21<sup>st</sup> Century (31) *2001-2005*  
*(Australia)*
- Advanced Storage Concepts for Solar  
and Low Energy Buildings (32) *2003-2007*  
*(Switzerland)*
- Solar Heat for Industrial Processes (33)  
*2003-2007 (Austria)*
- Testing & Validation of Building Energy Simulation Tools (34)  
*2003-2007 (United States)*
- PV/Thermal Systems (35) *2005-2007*  
*(Denmark)*

## TASKS

### ONGOING

Solar Resource Knowledge Management	(36)	2005-10	(US)
Advanced Housing Renovation with Solar & Conservation	(37)	2006-09	NO)
Solar Air Conditioning and Refrigeration	(38)	2006-10	(DE)
Polymeric Materials for Solar Thermal Applications	(39)	2006-10	(DE)
Net Zero Energy Solar Buildings	(40)	2008-2013	(CA)
Solar Energy & Architecture	(41)	2009-2012	(DK, NO, SE)
Compact Solar Thermal Energy Storage	(42)	2009-2012	(NL)
Rating & Certification Procedures		2009-2012	(US)

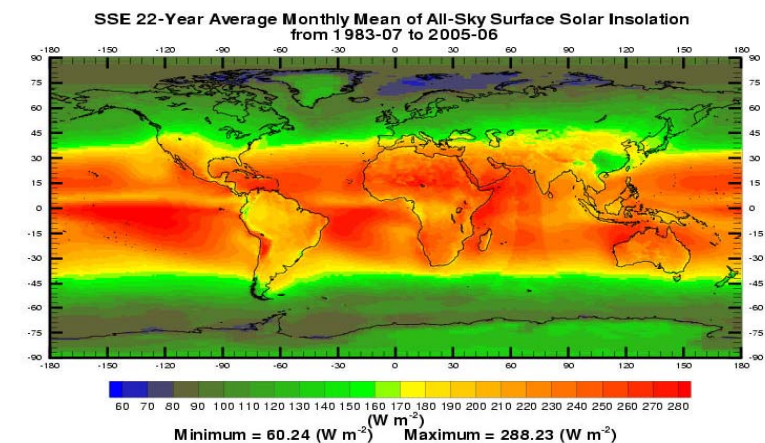
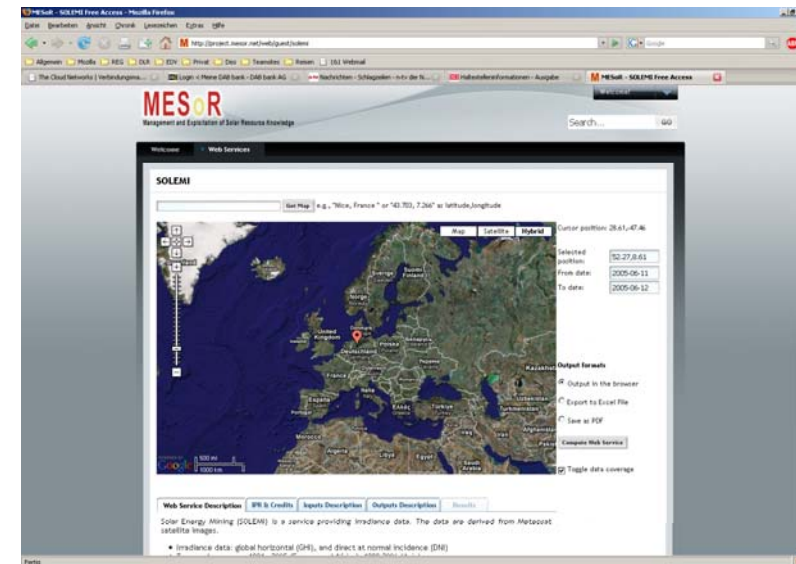
### UNDER DEVELOPMENT

Systems Using Solar Thermal in Combination with Heat Pumps



## CURRENT TASKS

- **Task 36: Solar Resource Knowledge Management**
  - To provide solar energy industry, electricity sector, governments, researchers, and renewable energy organizations and institutions with:
    - the most suitable and accurate information on solar radiation resources at the Earth's surface
    - easily-accessible formats and understandable quality metrics

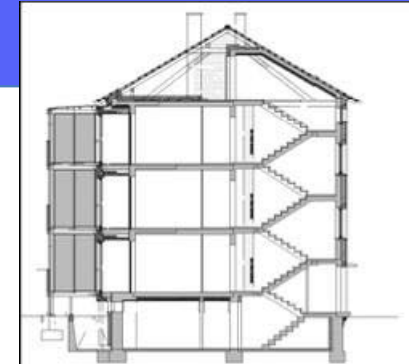




## CURRENT TASKS

### **Task 37: Advanced Housing Renovation with Solar & Conservation**

- To develop a solid knowledge base on how to renovate housings to a very high energy standard
- To develop strategies that support the market penetration of such renovations.
- Focuses on both technical R&D and market implementation



## CURRENT TASKS

### Task 38: Solar Air-Conditioning and Refrigeration

- To improve conditions for market introduction of solar air-conditioning and refrigeration systems in residential and small commercial buildings.
- Focused on improved components and system concepts.



## CURRENT TASKS

### Task 39: Polymeric Materials for Solar Thermal Applications

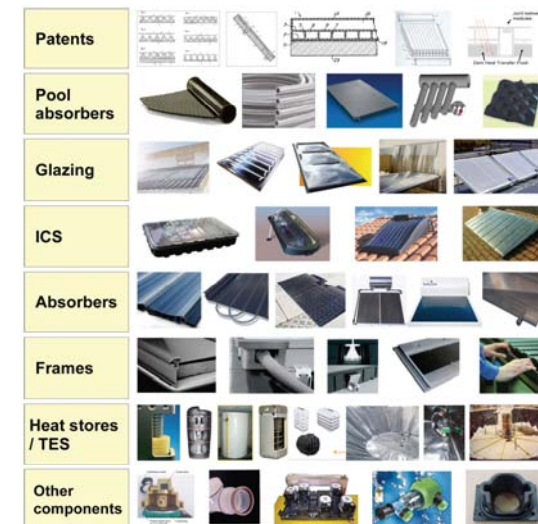
- To assess applicability and cost reduction potential of polymeric materials and polymer-based novel designs in solar thermal systems
- To promote increased consumer confidence in these products by developing and applying appropriate methods to assess their durability and reliability

Production of steel and polymers in terms of volume



PlasticsEurope  
Das Verbund der Kunststoffhersteller

Source: PlasticsEurope Deutschland, Wirtschaftsvereinigung Stahl



## Preparation/Definition of New Tasks

Interest of IEA-SHC-Member Countries  
(Executive-Committee)

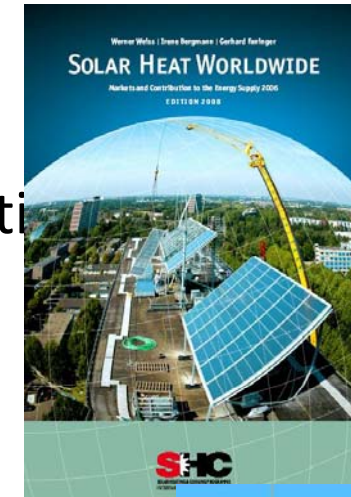
Available experts and national budget  
for TASK-sharing

### **Project-Leaders:**

Operating Agent and Subtask-Leaders  
Working Program with Milestones

## WHERE TO FIND MORE INFORMATION

- Website – [www.iea-shc.org](http://www.iea-shc.org)
- Solar Heat Worldwide: Markets & Contribution to the Energy Supply report
- Solar Update newsletter
- SHC Annual Report
- Task reports
- Task organized workshops, seminars, etc.
- International Solar Heating & Cooling Conference organized jointly with ISES  
– to be held Sept. 28 – Oct 1<sup>st</sup> in Graz, Austria





**Thank you!**

[www.iea-shc.org](http://www.iea-shc.org)

## IEA SHC Vision and Mission

### Vision:

Solar thermal energy systems will provide up to 50% of low temperature heating and cooling demand by 2030. The IEA SHC provides a unique opportunity to bring together leading experts from research, industry, and government to stimulate the development of new ideas and approaches for improving the cost and performance and marketability of solar thermal technologies.

### Mission:

To foster international collaboration in R,D&D to accelerate the development of solar thermal technologies to reach the goal set in the vision and to provide significant added value to national R,D&D, and policy and program initiatives related to the built environment and for agricultural and industrial process heat.



## MOU ACTIVITIES

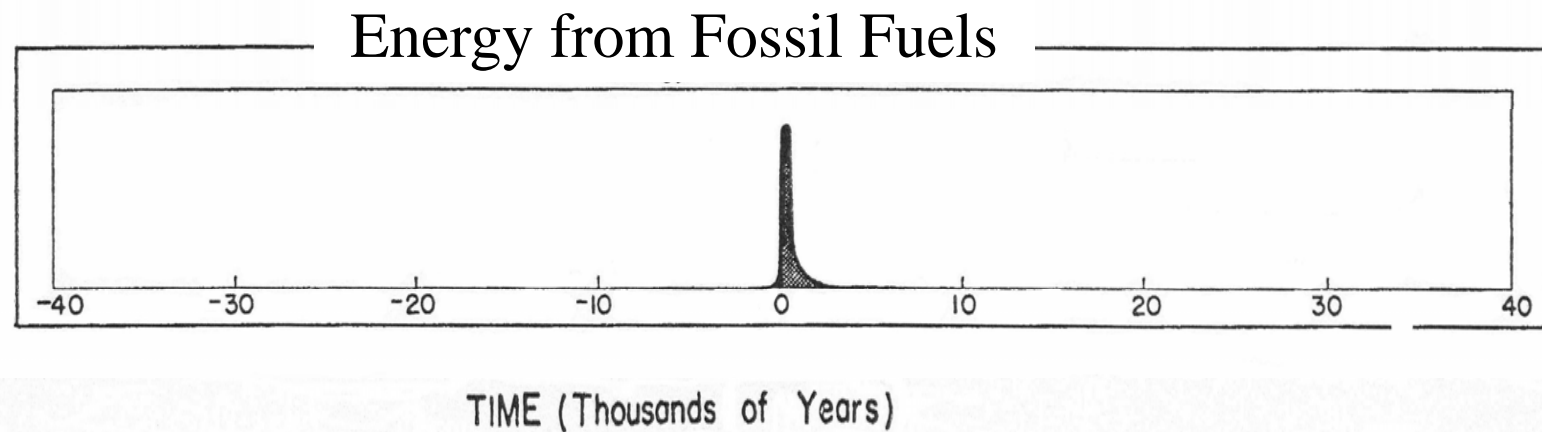
- Disseminate facts, information and advice on R&D and market development needs
- Publicize new m<sup>2</sup> to MW conversion methodology
- Industry invited to provide input in new SHC Tasks
- TAs can send experts to participate in SHC Tasks
- TAs invited to participate in relevant SHC Executive Committee and Task activities
- SHC invited to present Task results at TA meetings
- TAs invited to assign a SHC liaison to disseminate Task information
- TAs invited to contribute articles to SHC Newsletter
- SHC invited to contribute articles to TA publications
- TAs and SHC invited to speak at each other's conferences and to co-sponsor conferences
- Coordinating group representing MOU signatories to be formed to review activities initiated and to recommend improvements
- Develop a common vision of the global potential and role for solar heating and cooling and a strategy to reach this vision.



## Energy End-use

- Energy end-use: Transportation
- Energy end-use: Industry
- Energy end-use: Buildings
  - Demand Side Management
  - **District Heating and Cooling**
  - **Energy Conservation in Buildings and Community Systems**
  - **Energy Conservation through Energy Storage**
  - Heat Pumping Technologies
- Energy end-use technologies: information centres, systems analysis

## Human Affairs in Time Perspective



“The consumption of energy from fossil fuels is thus seen to be but a ‘blip’ . . . representing but a moment in the total of human history.”

## CURRENT TASKS

- **Solar Cooling**
- **Building Integration/Solar Architecture**
- **Thermal Storage (materials, central & distributed, seasonal & short-term)**
- **Zero Energy Housing**
- **Building Renovation**
- **Advanced Materials & Components (polymers)**
- **Solar Resource Assessment**
- **Rating and Certification Procedures**