



# QAiST

Quality Assurance in Solar Heating  
and Cooling Technology

## Solar Keymark Network meeting

Brussels, Belgium  
22-23 March 2011



INTELLIGENT ENERGY  
EUROPE



# Work in Progress

WP2: Solar thermal collectors

WP3: Solar thermal systems

WP4: Quality assurance of testing

WP5: New areas for quality assurance systems

# Update on status of the Work Packages

## WP2:

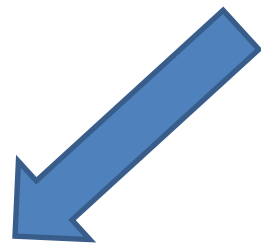
# Solar thermal collectors

(Four abstracts for the ISES conference:

- Overview of the work in CEN/TC 312/WG1 “Collectors”
- Compatibility between Steady state and Dynamic testing
  - Calculation tool for collector annual energy output
    - Air collectors)

## D 2.1 Performance of mid temperature collectors (CENER lead)

## D 2.2 Durability of collectors and materials (ISE lead)



Broad consensus revision proposals for the EN12975 standard  
which is to be revised in two steps:

- **First step** driven by EC request for CE marking. Draft for public inquiry ready in spring 2011, implemented in 2012. May be an EN ISO based on EN12975.
  - Contents are e.g. harmonized annex ZA, tracking collectors in the scope, improved durability tests, Task X method on selective coatings integrated, air collectors included
- **Second step** Further work on an EN ISO standard. Draft for public inquiry in 2012 - Contents are e.g., focusing on ETC:s and further on collector materials

## D 2.3 Guide to EN 12975 (SP lead, Due June 2011)

- Five main partners working on two deliverables, one targeted at test labs, one at manufacturers →
  - LNEG-Durability
  - ISFH- SS testing of unglazed collectors
  - DEMOKRITOS- SS testing of glazed collectors
  - AIT- Definitions and interpretation of test results
  - SP –Quasi dynamic testing and the rest
- All remaining partners provide additional input and review. Industry review?!



# T2.3 Performance calculation tool

- Extension to unglazed and tracking/concentrating collectors now implemented
- Currently being checked and fine tuned by several partners

- To be further presented at this meeting
- To be included in Scheme rules and in EN 12975 asap

Results from the Energy Output Calculator  
*Version 3.6 (TRIAL VERSION THAT HAS NOT BEEN VALIDATED, Feb. 2011)*

Identification label for the solar collector: Not specified

Date of evaluation: 18 March, 2011

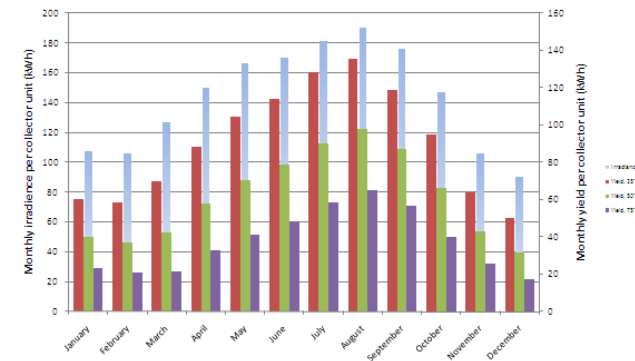
**Monthly irradiance and yield per collector unit (kWh)**

	Irradiance	Yield (three collector mean temperatures)		
		25°C	50°C	75°C
January	107	60	40	23
February	106	58	37	21
March	127	70	43	21
April	150	88	58	33
May	166	105	71	41
June	170	114	79	48
July	181	123	90	58
August	190	135	98	65
September	176	119	87	57
October	147	95	66	40
November	106	64	43	25
December	80	50	31	17
<b>Year</b>	<b>1 718</b>	<b>1 086</b>	<b>742</b>	<b>451</b>

**Location:** Athens  
**Longitude:** -23.73  
**Latitude:** 38.00  
**Climate data, time period:** 1996-2005

**Collector information** (all inputs are based on aperture)

Aperture area: 1m<sup>2</sup>  
 Evaluation method: Steady state  
 $\eta_0$ : 0.700  
 $F'(\tau - \alpha)_n$ : 0.710  
 $K_{f,r}$ : 0.908  
 $a_1$ : 3.6 W/m<sup>2</sup> K  
 $a_2$ : 0.015 W/m<sup>2</sup> K<sup>2</sup>  
 Type of tracking: No tracking  
 IAM Type: Simple, one-direction  
 $b_1 = 0.1$



# Update on status of the Work Packages

## WP3: Solar thermal systems

# WP 3: Solar thermal systems

## Improvement of the standards:

- **Factory Made Systems / Custom Built Systems**  
(EN 12976 Part 1 and 2) / (CEN/TS 12977 Part 1,2,4 and 5 and EN 12977 Part 3)
  - **Clear separation of REQUIREMENTS and TEST METHODS**
  - **Clarification of applicable reliability tests (DIFFERENT TYPES of SYSTEMS):**
    - need of additional reliability tests.
  - **Clarification of the aspects related to documentation (USER; INSTALLER)**
  - For **Custom built systems**, possibility of future certification of Storage tanks and complete systems according to improved standards



# WP 3: Solar thermal systems

## Improvement of the standards (cont.)

- **Outcomes**

- Preliminary proposals of presented in CEN TC 312 WG2/WG3 Meeting in Munich (June 2010);
- A draft of the standard is in preparation still needing discussion within project partners;
- Profiting from the ongoing Round Robin for Systems (QAiST – WP4), some aspects related to clarification of tests and of analyses of documentation are being addressed.

# WP 3: Solar thermal systems

## Development of an extrapolation procedure

- that proves to be valid for different types of systems allowing for flexibility in the definition of families of systems and reducing test costs for the manufacturers
- **Outcomes:**
  - Two different methodologies now available in Solar Keymark Scheme Rules
  - Application of these methodologies by Labs
  - Proposals for revision expected (one presented at 10<sup>th</sup> SKN meeting)

## WP 3: Solar thermal systems

### Development of a procedure for converting the test result into results valid for the “EU reference tapping cycles”

- necessary for Labeling of systems according to European Directive for Eco-Design
  - How to apply this procedure to tests performed with DST/CSTG test methodologies?

### Outcomes:

- First application with DST for Factory Made and Custom Built Systems
- First proposal for application with CSTG test results – to be validated.

## WP 3: Solar thermal systems

### Definition of concept: Hot Water Comfort (STS)

- **Outcomes:**

- First document with the revision of the existing test methods for assessment of Hot Water Comfort was prepared
- Presentation and discussion at CEN TC 312 WG2/WG3 meeting / some additional methods suggested.

# Update on status of the Work Packages

WP4:

Quality assurance of testing

# WP 4: Quality assurance of testing

- ★ T 4.1 Solar Keymark Network
- ★ T 4.2 Round Robin performance testing thermal collectors according to EN 12975
- ★ T 4.3 Round Robin testing of factory made systems according to EN 12976

# WP 4: Quality assurance of testing

## ★ T 4.1 Solar Keymark Network

- Support the work of the SKN
  - Rapperswil 15-16 March 2010
  - Graz, Austria 7-8 October 2010
  - Brussels, Belgium, 22-23 March 2011

# WP 4: Quality assurance of testing

## ★ T 4.2 Round Robin Collector

- Organization, managing and evaluation by independent body (IfEP GmbH)
- 13 flat plate and 13 evacuated tubular collectors with CPC collectors
- Each participant test 2 collectors of both types (4 tests)
- Rotation of the test collectors in winter 2010/2011 (completed)
- Midterm results will be presented by IfEP March 23<sup>rd</sup>
- Final results expected October 2011
- Participants: ***CENER, CSTB, DEMOKRITOS, AIT, LNEG, IPIEO, ISE, ISFH, ITC, IZES, SP TÜV, ITW***



# WP 4: Quality assurance of testing

## ★ T 4.2 Round Robin Collectors

- Additional participants
  - ASIC
  - Bosch Solarthermie GmbH
  - 6 North american test labs
- Collectors, transport, evaluation and all other expenses caused by the Round Robin will be covered by the additional participants
- In order not to influence the result of the QAIiST Round Robin the evaluation will be done in parallel by IfEP

# WP 4: Quality assurance of testing

## ★ T 4.3 Round Robin Systems

- Managing and evaluation by independent body (IfEP GmbH)
- 9 thermosyphon and 9 forced circulation systems
- Each participant will test 2 systems (4 tests)
- Rotation of the test collectors in winter 2010/2011 (completed)
- Midterm results will be presented by IfEP March 23<sup>rd</sup>
- Final results expected October 2011
  
- Participants: *CENER, CSTB, DEMOKRITOS, LNEG, ISE, ISFH, IZES, TÜV, ITW*

# Update on status of the Work Packages

## WP5: New areas for quality assurance systems

# WP 5: New areas for quality assurance systems

## Objectives

- **To develop a basic set of requirements and test methods for emerging areas of solar thermal energy**

Application is already on the market => need for quality assurance measures not covered by any standards so far e.g. large solar thermal systems, solar cooling

OR

Application is new on the market => no quality assurance measures existent yet e.g. combined solar & heat pump systems

# WP 5: New areas for quality assurance systems

## Structure of the WP

**WP 5: New areas for quality assurance systems**  
**Leader: Ivan Malenkovic, AIT**

### **Task 5.1**

**Performance references and test methods for HP+ST**

**Leader: Ivan Malenkovic, AIT**

### **Task 5.2**

**Function and yield controlling of large solar thermal systems**

**Leader: Klaus Vanoli, ISFH**

### **Task 5.3**

**Quality requirements for solar cooling systems**

**Leader: Pilar Navarro, ITC**

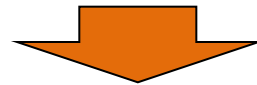
# WP 5: New areas for quality assurance systems

## Planned outcome (1)

### Task 5.1: Performance references and test methods for HP+ST

- **Market survey on available data about combined systems**
- **Elaboration of a system overview of combined systems**
- **Survey on available testing standards**
- **View and comparison of the existing testing standards**

- **Classification of different systems**
- **Development of quality enquiries on combined systems based on the previous research results**



**D5.1: Technical report on combined ST+HP systems with system overview and quality requirements**

# WP 5: New areas for quality assurance systems

## Status and outlook Task 5.1

- Overview of present HP+ST systems in cooperation with Task 44/Annex 38 ongoing. A number of countries already covered.
- ST and HP relevant standards collected and currently being analysed for extension possibilities regarding combined systems. Since a number of system test methods is currently being developed, the focus will be on the special requirements for combined systems – different operation conditions, control strategies etc.

# WP 5: New areas for quality assurance systems

## Status and outlook Task 5.1

- From the analysis of the standards, a proposal for the classification of the systems with the focus on testing and performance evaluation requirements will be elaborated.
- A unified concept of performance evaluation figures taking into account the comparability of these systems to other technologies is under development, jointly with Task 44 / Annex 38.



# WP 5: New areas for quality assurance systems

## Planned outcome (2)

### Task 5.2: Function and yield controlling of large solar thermal systems

- Updating the market survey on available data on F&YC based on previous work by contacting major stakeholders in each participating country
  - Exchange of technological descriptions and technical discussion on various F&YC systems in a workshop
- **Objective redefinition: Strategic FYC planning?**



**D5.2: Setting up basic requirements for a FYC Roadmap?**

# WP 5: New areas for quality assurance systems

## Status and outlook Task 5.2

- Currently available function and yield control concepts have been collected and reviewed in a document available on the project web page (restricted area).
- The new VDI 2169 guideline is available as a draft version (Gründruck). An internal discussion (workshop) between project partners will be initiated.

# WP 5: New areas for quality assurance systems

## Status and outlook Task 5.2

- was concluded in the group, that the final goal of this task – harmonized technical approach on F&YC – cannot be reached within the project, also due to the fact that only one product is currently commercially available. A new task objective is currently being defined in an ongoing discussion. One possible objective would be to set the basis for the strategic roadmap for the development and implementation of F&YC.

# WP 5: New areas for quality assurance systems

## Planned outcome (3)

**Task 5.3: Quality requirements for solar cooling systems**

- **Definition of requirements for durability and performance evaluation for solar cooling systems**



**D5.3: Technical report on the requirements for durability and performance testing for solar cooling systems**

# WP 5: New areas for quality assurance systems

## Status and outlook Task 5.3

- A standardised questionnaire has been developed and distributed to collect the data on running solar cooling systems in participating countries.
- First results from the collected data, including qualitative assessment of the installations in terms of performance and quality, were presented at the last meeting. Data collection and evaluation ongoing.
- Based on the results, additional in-depth questionnaire and experts' interviews are being planned.

# WP 5: New areas for quality assurance systems

## Status and outlook Task 5.3

- The collection of relevant standards and other normative documents is ongoing. The documents will be analysed and used as a starting point for the development of test method proposals.
- A definition of best practice and lessons learned will be published on the project web page (restricted area)

# Update on status of the Work Packages

## WP6&7: Communication and Dissemination

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## T6.1 Distr. dissemination of project results

- Prepare info-release for 2011 targetted to specific countries
- Inform on CE marking mandate & planned revisions
- Previously: update of national reports from SK II
  - AT , DK, FR, DE, GR, IL, IT, PL, PT, SP, SE

## T6.3 Project Website

- QAISt intranet (discussion board)



# WP 6&7: Communication and Dissemination

**QAIST**  
Quality Assurance in Solar Heating and Cooling Technology

Forums Members Calendar Downloads

QAIST Discussion Board

View New Content

**Project Management**

**Work Packages**

Forum	Stats	Last Post Info
<p><b>WP 2: Solar thermal collectors</b></p> <ul style="list-style-type: none"> <li>Tracking and/ or concentrating collectors</li> <li>Durability Testing</li> <li>A guideline to the standard EN 12975</li> <li>Validation Tool</li> </ul>	6 Topics 0 Replies	08 March 2011 - 03:06 PM In: Performance Calculation Tool By: Maria Gomez-Reino
<p><b>WP 3: Solar thermal systems</b></p> <ul style="list-style-type: none"> <li>FMS/CBS: Reliability tests &amp; vague criteria</li> <li>FMS: Extrapolation procedure</li> <li>FMS/CBS: "EU reference tapping cycles"</li> <li>FMS/CBS: Hot water comfort</li> </ul>	2 Topics 0 Replies	08 March 2011 - 12:35 PM In: Proposal for flexible Syste... By: Maria Gomez-Reino
<p><b>WP 4: Quality assurance of testing</b></p> <ul style="list-style-type: none"> <li>Solar Keymark Network</li> <li>Round robin performance testing: collectors &amp; systems</li> </ul>	3 Topics 0 Replies	08 March 2011 - 03:04 PM In: T.4.2&4.3- Round Robin ... By: Maria Gomez-Reino
<p><b>WP 5: New areas for quality assurance systems</b></p> <ul style="list-style-type: none"> <li>Heat Pump + ST combi-systems</li> <li>Function and yield controlling of LSTS</li> <li>Solar Cooling Systems</li> </ul>	2 Topics 0 Replies	08 March 2011 - 02:51 PM In: 5.2 - Function and Yield co... By: Maria Gomez-Reino

**Communication and Dissemination**

**Industry Steering Group**

Today's active content The moderating team Today's top 20 posters Overall top posters

**1 active user(s)** (in the past 15 minutes)  
1 members, 0 guests, 0 anonymous users | Show by: Last Click or Member Name

**Our Board Statistics**

Total Posts	48
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**Recent Topics Added**

- EUROPEAN ROUND ROBIN TEST ON SOLAR COLLECTORS AND SOLAR THERMAL SYSTEMS by Maria Gomez-Reino # Yesterday, 05:03 PM
- Workshop Romania by Maria Gomez-Reino # Mar 15 2011 09:15 AM
- QAIST contract changes by Pedro Dias # Mar 14 2011 04:44 PM
- Upcoming Events by Maria Gomez-Reino # Mar 10 2011 09:56 AM
- Coordinate with new IEA proposed task by Maria Gomez-Reino # Mar 08 2011 05:28 PM

**Watched Content**

- Forums Topics
- Project Meetings
- Dissemination: Events' listing

# WP 6&7: Communication and Dissemination

## T6.5 WP6/ International harmonization

- Broad European participation in IEA SH&C Task 43 on global standards and certification--> Harmonization in practice!
- Agreed with ISO/TC 180 to have the ISO 9806 revision follow closely that of EN 12975

# WP 6&7: Communication and Dissemination

## T6.5 SK implementation in CEE NMS

- Workshop South-Eastern Europe
  - Bucharest, Romania: 25 November
  - Cooperation with REECO (Renexpo)
  - Approx. 80 participants
- Workshop Northern Europe
  - Spring 2010 (tbc)
  - Cooperation IPIEO (now PIMEO)

# WP 6&7: Communication and Dissemination

- T6.5 SK implementation in CEE NMS
  - Information package for CEE new members states produced
    - Brochure produced
    - Translations to be done
  - Participation of NMS partners at SKN Meetings (T4.2)
    - Cyprus / Slovakia / Czech Republic
    - Macedonia (fYRO)

# WP 1: Management

Input from

- SC WG (on-going)
- Industry Steering Group (22/4/2011)
- Steering Committee STTP / RHC-Platform (8/2/2011)
  
- Further discussion with ISG – Webinar (April)



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