New Task Definition Workshop

IEA SHC Task on New Generation Solar Cooling systems

STATUS OF NEW TASK PROPOSAL :

ORGANISATION & RESULTS

Daniel MUGNIER – Paris, 22/03/2013

SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

www.tecsol.fr

The main ambitions of this meeting are :

- **To stimulate the R&D on New Generation Solar Cooling Systems**
  - By presenting ongoing and past works
  - By making entities meeting and exchange

- **To be able to show to the next Exco Meeting in Roma in June 2013 :**

- A significant interest among SHC countries (at least 3 !)
- To track interested participants and their possible inputs
- To show ongoing consortium/budgets/projects are on the way
- To initiate a detailed Task description, Work plan and Information Plan

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Possible Time schedule after the meeting :

20th of April	First Draft Annex Text + Work Plan from TECSOL to all Participants and designated Subtask Leaders
20th of May	Feedback from participants and visbility on possible projects
Midd of June	Presentation to the IEA SHC ExCo
End of June	Confirmation+date for second definition meeting
Midd of Oct.	New and last definition meeting to confirm Workplan
November	Final Annex/Workplan submission to Exco

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Discussion of the Task Work Plan

Task Work Plan : proposal from the Task initiators

Structure :

- what should be in the Task
- what should not be in the Task
- priority of different work items

Time Schedule including milestones

Deliverable and results
Dissemination activities
Subtask Leadership
Distribution of work: who is contributing what

Discussion of the Task Work Plan

Discussion of open questions and planning of next steps

Task name and definition

Production of first draft Work Plan and Technical Annex (main documents for the Executive Committee)

Desired Task start date and/or new planning

New Task Definition meeting

Proposed Task Structure

Subtask A

Components, Systems & Quality

Subtask B

Control, Simulation & Design

Subtask C

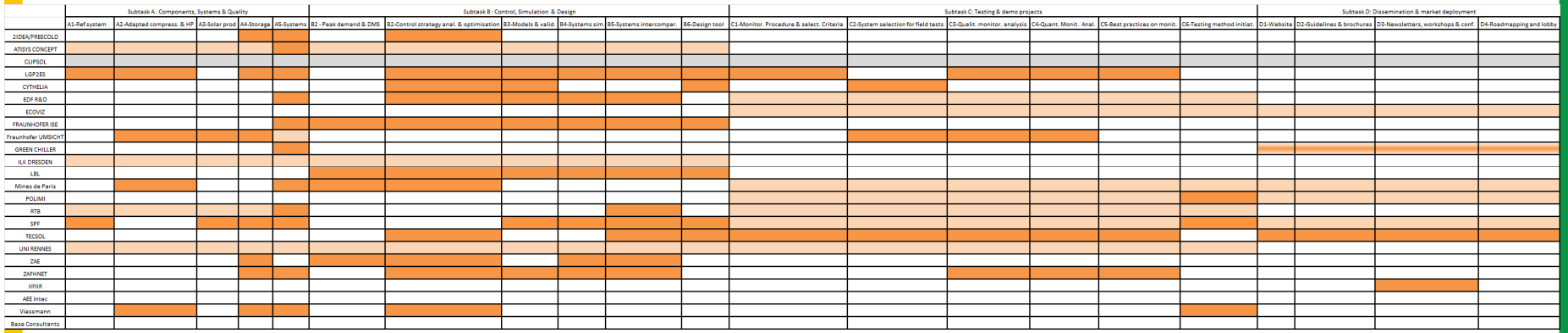
Testing and demonstration projects

Subtask D

Dissemination & market deployment

Proposed Task Involvment

SbtskA SbtskB SbtskC SbtskD



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Proposed Task Involvment : A

	Subtask A : Components, Systems & Quality				
	A1-Ref system	A2-Adapted compress. & HP	A3-Solar prod	A4-Storage	A5-Systems
2IDEA/FREECOLD					
ATISYS CONCEPT					
CLIPSOL					
LGP2ES					
CYTHELIA					
EDF R&D					
ECOVIZ					
FRAUNHOFER ISE					
Fraunhofer UMSICHT					
GREEN CHILLER					
ILK DRESDEN					
LBL					
Mines de Paris					
POLIMI					
RTB					
SPF					
TECSOL					
UNI RENNES					
ZAE					
ZAFHNET					
IIFIIR					
AEE Intec					
Viessmann					
Base Consultants					

Proposed Task Involvment : B

	Subtask B : Control, Simulation & Design				
	B2 - Peak demand & DMS	B2-Control strategy anal. & optimisation	B3-Models & valid.	B4-Systems sim.	B5-Systems intercompar.
2IDEA/FREECOLD					
ATISYS CONCEPT					
CLIPSOL					
LGP2ES					
CYTHELIA					
EDF R&D					
ECOVIZ					
FRAUNHOFER ISE					
Fraunhofer UMSICHT					
GREEN CHILLER					
ILK DRESDEN					
LBL					
Mines de Paris					
POLIMI					
RTB					
SPF					
TECSOL					
UNI RENNES					
ZAE					
ZAFHNET					
IIFIIR					
AEE Intec					
Viessmann					
Base Consultants					

AEE Intec on B5 and B6

Proposed Task Involvment : C

	Subtask C: Testing & demo projects					
	C1-Monitor. Procedure & select. Criteria	C2-System selection for field tests	C3-Qualit. monitor. analysis	C4-Quant. Monit. Anal.	C5-Best practices on monit.	C6-Testing method initiat.
2IDEA/FREECOLD						
ATISYS CONCEPT						
CLIPSOL						
LGP2ES						
CYTHELIA						
EDF R&D						
ECOVIZ						
FRAUNHOFER ISE						
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ZAE						
ZAFHNET						
IIFIIR						
AEE Intec						
Viessmann						
Base Consultants						

Proposed Task Involvment : D

	Subtask D: Dissemination & market deployment			
	D1-Website	D2-Guidelines & brochures	D3-Newsletters, workshops & conf.	D4-Roadmapping and lobby
2IDEA/FREECOLD				
ATISYS CONCEPT				
CLIPSOL				
LGP2ES				
CYTHELIA				
EDF R&D				
ECOVIZ				
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IIFIIR				
AEE Intec				
Viessmann				
Base Consultants				

Subtask A: Components, Systems & Quality

General objectives :

* to better know and characterize the most important components of the new solar cooling & heating systems, considering existing solar thermal cooling systems as a reference
* to identify ongoing and future related standards and testing methods
* to identify where new solar cooling & heating systems are suitable
* to develop tools and deliverables permitting to show the level of quality of both the most critical components and systems.

Specific objectives :

* to know the commercially available equipment on the AC side compatible with PV electricity supply as well as solar thermal cooling equipment
* to know the R&D entities working at the moment on the topic and what are the ongoing outputs, especially the key points in the interface AC unit / PV modules and system /grid
* to define the different possibilities on the storage side for new solar cooling & heating
* to easily classify the ST/PV cooling products/application (schematic square view method) so as to prepare a certification process
* to define procedures for measuring the performance of the PV cooling & heating systems and prepare the conditions for a quality label
* to estimate the value of electricity and LCA of the main components and systems

Subtask A: Components, Systems & Quality (ISE)

Activities : Focusing on hardware side

A1 : Reference system (for heating/cooling)
A2: Adapted chillers and heat pumps including heat rejection
A3: new generation solar production for cooling (PV and others) and heating (DHW+ambient)
A4: Storage (electrical and thermal) with storage management
A5: Systems integration into buildings, microgrid and central Grid

Deliverables

* D-A1: Definition of the existing cooling reference systems.
* D-A2: State of the art of new generation commercially available products including costs, efficiency criteria ranking and performance characterization. (beginning of the Task)
* D-A3: Technical report on recent R&D work on the topic (end of the Task)
* D-A4 : Report on best practices on how to manage the interface AC unit / PV modules and system /grid
- D-A5: Technical report on best practices for energy storage including both efficiency and adaptability in solar cooling systems
- KPI of systems
- * D-A6: Techno-economical analysis report on comparison between thermal and PV existing solar cooling systems including as well LCA approach and Ecolabel sensibility

* D-A7: Report on a new and universal classification method “new generation solar cooling square view” for generic systems
* D-A8 : Draft document defining the performance indicators and possible characterization test method (permitting to lead to a quality labeling scheme for new generation solar cooling systems) as well as standards

Subtask B: Control, Simulation & Design

General objective : to investigate the different control possibilities for the new generation cooling & heating systems for buildings so as to select the best strategies for given climates and countries and then develop modelling tools to predict performances and size/design systems. Besides, to manage a smart interaction with electric grid

Specific objectives :

* to analyze and select optimized control strategies to manage the interaction between solar and cooling machine (PV and heat pump unit especially)
* to provide modelling tools for complete generic systems
* to report sensitivity analysis on most of the selected systems
* to compare the performances at system level of all innovative systems
* to size the systems
* to investigate demand/response strategies to optimise the interaction with smart grids
- to create models including energy price variation sensibility

Subtask B: Control , Simulation and Design (Italy to be asked)

Activities : **Focusing on software side**

B1 : Reference conditions (economical, climatic, reference building, etc..)
B2 : Grid access conditions and building load management analysis (ATISYS interest)

B3 : Building/grid Load and weather forecasts
B4: Model of subcomponents and validation (ATISYS interest)
B5: System simulation and validation + Control strategy analysis and optimisation for ST and PV
B6: System inter-comparison (cost/performance/reliability) (between systems and with conventional, solar thermal, gas, etc.)

Deliverables

* D-B1 : Overview on peak demand & demand side management possibilities
* D-B2 : Technical report on optimised control strategies for solar cooling & heating systems
* D-B3 : Technical report on system simulation and validation
* D-B4 : Technical report on system dimensioning
* D-B5 : Design tool including a country- and climate-sensitive economical analysis

Subtask C: Testing and demonstration projects

General objective : to stimulate, monitor and analyse performances of field test systems and demonstration projects for new generation solar cooling & heating systems

Specific objectives :

* to create a monitoring procedure for field tests or demo projects
* to select identified projects and organise a complete field test monitoring campaign for it
* to analyse potential technical issues on the monitored systems
* to report on the measured performances of the systems
* to validate and initiate standardised testing methods

Subtask C: Testing and demonstration projects (ECOVIZ)

Activities:

C1: Monitoring procedure and monitoring system selection criteria
C2 Definition of energy performance indicators
C3: System description for field test and demo project (at least 3 projects)
C4: Monitoring data analysis on technical issues & on performances
C5: Best practices / feedback (planning+ commissioning + operation/measurements, user and grid utility…)
C6 : Testing method initiation for standards

Deliverables :

* D-C1 : Monitoring procedure for field test & demo systems (depending on size and application)
* D-C2 : Catalogue of test/demo systems (with full description)
* D-C3 : Technical report on monitoring data analysis (technical issues + performances)
* D-C4 : Technical content for best practice brochure on efficient new generation cooling and heating systems
* D-C6 : Technical report presenting a draft testing method for a quality standard on new generation cooling & heating systems

Subtask D: Dissemination and market deployment

General objectives :

* implementation of targeted promotion activities based on the collective work results;
* production of dissemination material for external communication; the implementation of knowledge transfer measures towards the technical stakeholders;
* development of instruments and their provision for policy makers and the creation and promotion of certification and standardisation schemes.

Specific objectives :

* to **disseminate the Task results** on national and international level
* to provide **efficient communication tools such as brochures and guidelines**
* to collect and structure **evidence for policy actions**
* to create guidelines for **road mapping new generation solar cooling & heating**

Subtask D: Dissemination and market deployment (Green Chiller)

Activities :

D1 Website dedicated to the Task

D2 Guidelines and brochures

D3 Newsletters, workshops and conferences

D4 Roadmapping and lobbying actions

Subtask D: Dissemination and market deployment

Deliverables :

* D-D1: Website dedicated to the Task

* D-D2 : Best practices high quality brochure

* D-D3 : Simplified short brochure

* D-D4 : Guidelines for Roadmaps on new generation solar cooling & heating

* D-D5 : Outreach report

  - Customer and policy maker workshops

  - Organising national industry workshops, industry workshops in national languages in participating countries addressing target groups (related to Experts meetings)

  - Publishing a semi-annual e-newsletter for the industry

  - Report on lobbying actions describing all the actions and their impacts

Dissemination / Information plan

* **Website** dedicated to the Task (D)

* **Training material** for installers and planners and training seminars feedback report (D)

* Semi-annual e-newsletter for the industry (D)

* **Industry workshops** in national languages in participating countries addressing target groups (related to Experts meetings) (D)

* **Best practices high quality brochure** (D) : 30 pages

* **Simplified short brochure** (D) jointly edited by the Subtask Leader and IEA SHC program

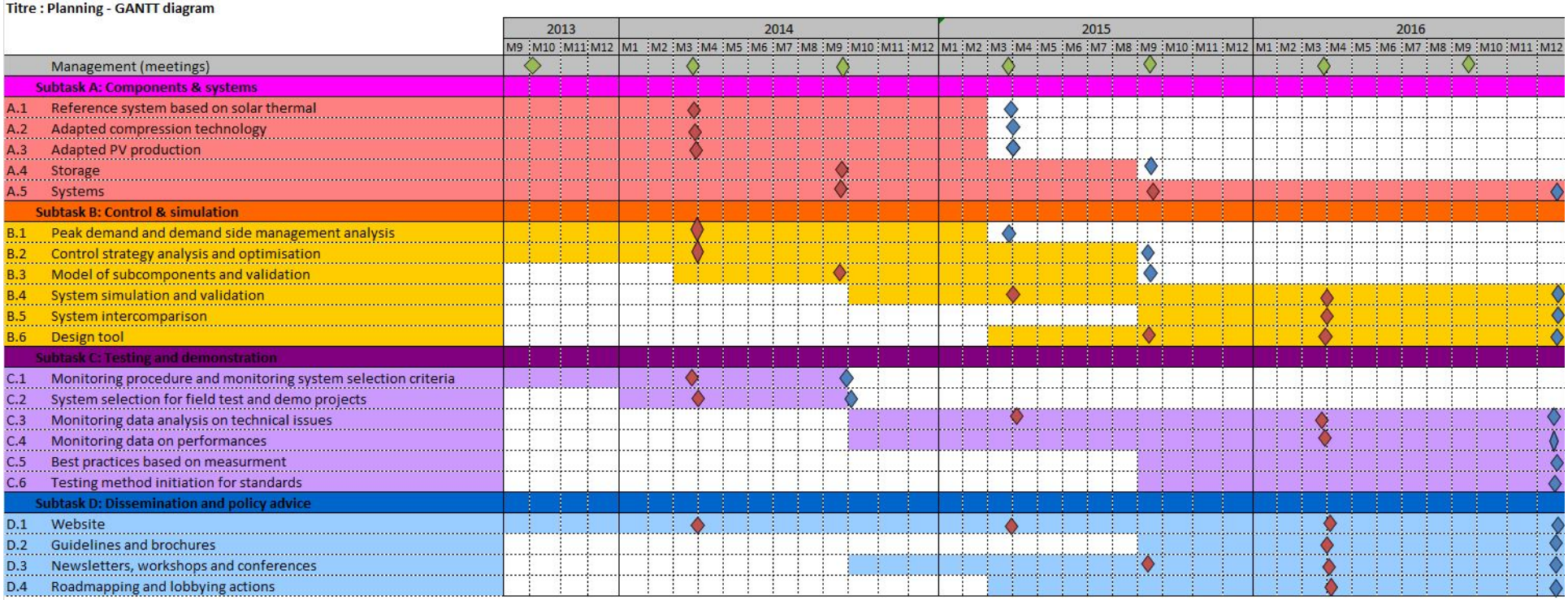
* **Guidelines for Roadmaps on New Generation Solar Cooling & Heating** (D) and possibly general international Roadmap on PV cooling & heating (optional)

Proposed Time schedule

IEA Task on New generation solar cooling systems

Duration : 40 months

Titre : Planning - GANTT diagram



Légende :

- Deliverable
- Semi annual Expert meetings
- Milestones

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Remarks for Discussion from FhG ISE

- Open cycles (DEC / IEC) combined with compression cooling:
  - Concepts with sorptive dehumidification of interest ?
  - Concepts with indirect evaporative cooling of interest ?
- Concept of gas-driven heat pump with solar thermal support of low-temperature source / DHW of interest ?

- Remark on scope of task: ‘food conservation not included’.

  Why not?

  Chance to develop feasible solar thermal concepts
  (results from pilot plant available {Fresnel coll. / NH3-H2O chiller / cold store} in cooperation with commercial cold store distributor)
- Remark on limit: ‘direct coupling’, especially for PV-chiller

  Why?

  Appropriate storage concepts – either thermal (sensible, latent) or electrical – and control concepts may force the use of local PV-cooling

Remarks for discussion from Fhg Umsicht

- Desire/request for the New Task: Enlarge scope to other applications than building cooling, e.g. cooling of electronic shelters, food stocks!?!

Remarks for discussion from ILK Dresden

- Desire/request for the New Task: Enlarge scope to other applications like refrigeration

Discussion of the Task Work Plan

Structure :

- **what should be in the Task**

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Discussion of the Task Work Plan

Structure :

- **what should NOT be in the Task**

Discussion of the Task Work Plan

Structure :

- priority of different work items

- time Schedule including milestones

Discussion of the Task Work Plan

Structure :

Deliverable and results

Dissemination activities

Subtask Leadership

Distribution of work: who is contributing what

Discussion of the Task Work Plan

Discussion of open questions and planning of next steps

Task name and definition

Production of first draft Work Plan and Technical Annex (main documents for the Executive Committee)

Desired Task start date and/or new planning

New Task Definition meeting

Task name : Quality assurance and support measures for Solar Cooling

Duration : 3,5 years (October 2011 – March 2015)

Subtask A: Quality procedure on component level

Subtask B: Quality procedure on system level

Subtask C: Market support measures

Subtask D: Dissemination and policy advice

PARTICIPATING COUNTRIES : Australia, Austria, Canada, Belgium, France, Germany, Italy, Singapore, South Africa, Spain and USA *(no claim for completness)*

PARTICIPATING MANUFACTURERS AND COMPANIES : Aiguasol, Climatewell, Industrial Solar GmbH, Invensor, Sortech, SOLEM, SOLID, TECSOL, Thermosol *(no claim for completness)*

http://www.iea-shc.org/task48/

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Structure of the Task

Subtask A
Quality procedure on component level

Subtask B
Quality procedure on system level

Subtask C

Market support measures

Subtask D

Dissemination and policy advices

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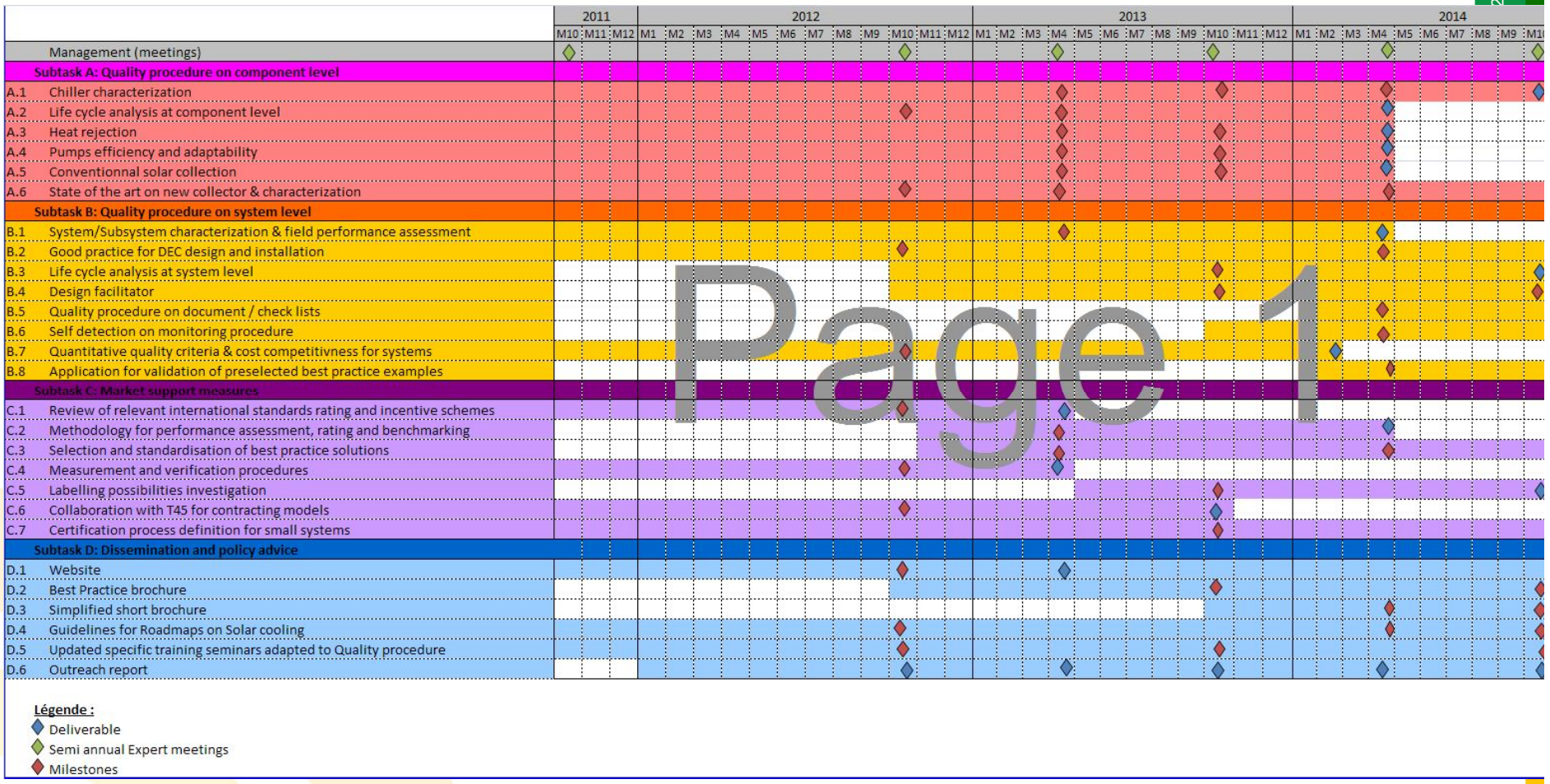
Planning



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Planning

		M10	M11	M12	M1	M2	M3	M4
	Management (meetings)	◆						
	Subtask A: Quality procedure on component level							
A.1	Chiller characterization							
A.2	Life cycle analysis at component level							
A.3	Heat rejection							
A.4	Pumps efficiency and adaptability							
A.5	Conventionnal solar collection							
A.6	State of the art on new collector & characterization							
	Subtask B: Quality procedure on system level							
B.1	System/Subsystem characterization & field performance assessment							
B.2	Good practice for DEC design and installation							
B.3	Life cycle analysis at system level							
B.4	Design facilitator							
B.5	Quality procedure on document / check lists							
B.6	Self detection on monitoring procedure							
B.7	Quantitative quality criteria & cost competitivness for systems							
B.8	Application for validation of preselected best practice examples							
	Subtask C: Market support measures							
C.1	Review of relevant international standards rating and incentive schemes							
C.2	Methodology for performance assessment, rating and benchmarking							
C.3	Selection and standardisation of best practice solutions							
C.4	Measurement and verification procedures							
C.5	Labelling possibilities investigation							
C.6	Collaboration with T45 for contracting models							
C.7	Certification process definition for small systems							
	Subtask D: Dissemination and policy advice							
D.1	Website							
D.2	Best Practice brochure							
D.3	Simplified short brochure							
D.4	Guidelines for Roadmaps on Solar cooling							
D.5	Updated specific training seminars adapted to Quality procedure							
D.6	Outreach report							

Légende :

◆ Deliverable

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Objectives (1 / 2)

To create a logical follow up of the IEA SHC work already carried out by trying to find solutions to make the solar thermally driven heating and cooling systems at the same time efficient, reliable and cost competitive.

1) * **Development of tools and proocedure to make the characterization of the main components of SAC systems**

2) * Creation of a practical and unified procedure, adapted to specific best technical configurations.

3) * Development of three quality requirements targets :

· - prescriptive “deemed performance” approach (<20kW): Manufacturers who offer a standard packaged solution declare the performance level of the package under certain rating constraints. This rated performance can then be used in a variety of policy interventions (eg : award of certificates, restriction on sale of low performance products, thresholds for subsidies etc).

Objectives (2 / 2)

- - prescriptive “deemed to satisfy engineered” approach (>20 kW) : Where customised solutions are more appropriate, prescribed engineering design and implementation requirements can be specified to ensure the quality of the systems from components to operation (system, installation, etc..). The ability to “qualify” and label installations can be used in a variety of policy interventions (eg : minimum requirement for subsidies, overcoming information barriers, award of points in building rating schemes etc)

- - performance-based approach (>20 kW): While the prescriptive methods described above will be useful within their field of relevance, installers/providers of Solar Thermally Driven Heating and Cooling solutions must also have the ability to innovate and offer tailored solutions outside the direct scope of the prescribed approaches. This can be achieved by allowing direct metering and verification of performance. The ability to benchmark actual performance against alternative solutions can be used in a variety of policy interventions (eg : promotion of energy performance contracting, award of certificates etc)

4) * **Production of tools to promote Solar Thermally Driven Cooling and Heating systems**

Structure

Subtask A: Quality procedure on component level

A1: Chiller characterization

A2: Life cycle analysis at component level

A3: Heat rejection

A4: Pumps efficiency and adaptability

A5: Conventional solar collection

A6: State of the art on new collector & characterization

Subtask B: Quality procedure on system level

B1: System/Subsystem characterization & field performance assessment

B2: Good practice for DEC design and installation

B3: Life cycle analysis at system level

B4: Simplified design tool used as a reference calculation tool : design facilitator

B5: Quality procedure document/check lists

B6: Self detection on monitoring procedure

B7: Quantitative quality and cost competitiveness criteria for systems

B8: Application for validation of preselected best practice examples

Structure

Subtask C: Market support measures

C1: Review of relevant international standards rating and incentive schemes

C2: Methodology for performance assessment, rating and benchmarking

C3: Selection and standardisation of best practice solutions

C4: Measurement and verification procedures

C5: Labelling possibilities investigation

C6: Collaboration with T45 for contracting models

C7: Certification process definition for small systems

Subtask D: Dissemination and policy advice

D1: Web site

D2: Best Practices brochure

D3: Simplified short brochure

D4: Guidelines for Roadmaps on Solar cooling

D5: Updated specific training seminars adapted to the Quality procedure

D6: Outreach report

Information plan

The following documentation or information measures are planned during the course of the Task (corresponding Subtask in brackets):

- * Report on best practices on solar collection components for quality, reliability and cost effectiveness (A)
- * Quality procedure document/check lists guidelines for solar cooling (B),
- * Self detection on monitoring procedure report (B)
- * Soft tool package for the fast pre-design assessment of successful projects (B),
- * Report and database of existing international standards, rating and incentive systems relevant to Solar Cooling (C)
- * Report on the rating, measurement and verification of solar cooling performance and quality (C)
- * Report on the selected standard engineering systems (C),

Information plan

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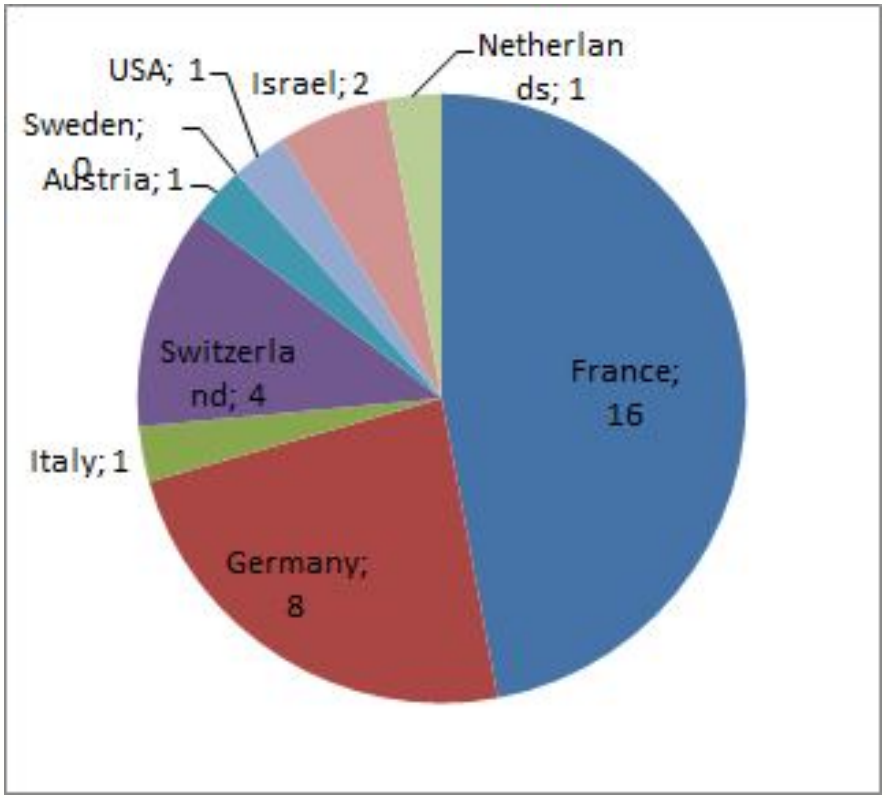
- * Report on alternative uses of the developed standards and rating framework (C).
- * Technical report about the results of the Life Cycle Assessment of Solar Cooling systems and LCA tool (A+B),
- * Website dedicated to the Task (D)
- * Training material for installers and planners and training seminars feedback report (D) ,
- * Semi-annual e-newsletter for the industry (D),
- * Industry workshops in national languages in participating countries addressing target groups (related to Experts meetings) (D),
- * Best practices high quality brochure (D) : 30 pages
- * Simplified short brochure (D) jointly edited by the Subtask Leader (Greenchiller) and IEA SHC program

* Guidelines for Roadmaps on Solar Cooling (D) and possibly general international Roadmap on Solar cooling (optional)

Possible Task Names :

1) New Generation solar cooling systems
2) …
3) ….

Meeting participation :



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