



Meeting of the Management Committee & Working Groups of COST Action TU1205
 "Building Integration of Solar Thermal Systems (BISTS)"

4-5 September 2014, Freiburg, Germany

Place: Fraunhofer-Institut für Solare Energiesysteme ISE

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Participants

Number	Name	Country	4/9/2014	5/9/2014	WG
1	Almeida Manuella	Portugal	✓	✓	WG1
2	Bojic Milorad	Serbia			WG3
3	Borg Simon Paul	Malta	✓	✓	WG3
4	Braganca Luis	Portugal	✓	✓	ALL
5	Buhagarian Vincent	Malta	✓	✓	WG1
6	Chemisana Daniel	Spain	✓	✓	WG2
7	Chwieduk Dorota	Poland	✓	✓	WG1
8	Coronas Alberto	Spain			WG2
9	Cristofari Christian	France	✓	✓	WG1
10	Georgiev Aleksandar	Bulgaria			WG3
11	Kalogirou Soteris	Cyprus	✓	✓	ALL
12	Kennedy David	Ireland	✓	✓	WG1
13	Kilik Muhsin	Turkey			WG3
14	Krstic Furundzic	Serbia	✓	✓	WG1
15	Norvaisiene Rosita	Lithuania	✓	✓	WG1
16	Leindecker Gerald	Austria	✓	✓	WG3
17	Notton Gilles	France	✓	✓	WG1
18	Ochoa Carlos	Israel	✓	✓	WG3
19	Platzer Werner	Germany	✓	✓	WG1
20	Palombo Adolfo	Italy	✓	✓	WG1
21	Smyth Mervyn	UK	✓	✓	WG1
22	Tripanagnostopoulos	Greece	✓	✓	WG1
23	Wansdronk Rene	Netherland	✓	✓	WG3
24	Aeleni Laura	Portugal	✓	✓	WG1
25	Agathocleous Rafaella	Cyprus	✓	✓	WG3
26	Blagojebic Mirko	Serbia			WG2
27	Cabeza Luisa	Spain	✓	✓	WG3

28	Cappel Christoph	Germany	✓	✓	WG2
29	Christofi	Cyprus	✓	✓	WG2
30	Deb Mondol Jayanta	UK	✓	✓	WG2
31	Florides Georgios	Cyprus	✓	✓	WG1
32	Keys Donal	Ireland			WG3
33	Ghosh Aritra	Ireland			WG3
34	Kosic Tatjana	Serbia	✓	✓	WG3
35	Kramer Korbinian	Germany			WG1
36	Lamnatou	Spain	✓	✓	WG1
37	Lopez Lorenzo Jose	Spain			
38	Mateus Ricardo	Portugal	✓	✓	WG2
39	McCormack Sarah	Ireland			WG3
40	Miletic Ivan	Serbia	✓	✓	WG1
41	Monteiro Da Silva	Portugal	✓	✓	WG3
42	Nikolic Danijela	Serbia	✓	✓	WG2
43	Oleary Tim	Ireland			WG2
44	Radulovic Jasna	Serbia	✓	✓	WG3
45	Ramke Stefan	Spain	✓	✓	WG3
46	Rusowicz Artur	Poland	✓	✓	WG3
47	Savvides Andreas	Cyprus			WG1
48	Tamasauskas Rokas	Lithuania	✓	✓	WG2
49	Tsioutis	Cyprus	✓	✓	WG3
50	Zacharopoulos	UK	✓	✓	WG3
51	Ayompe Lacour Mody	IE			WG3
52	Belis Jan	BE			WG1
53	Buonomano Annamaria	Italy	✓	✓	WG2
54	Costantinos Vassiliades	Cyprus	✓	✓	WG1
55	Fedrizzi Roberto	Italy	✓	✓	WG2
56	Ford Andy	UK	✓	✓	WG1
57	Shiff Galit	Israel	✓	✓	WG1
58	Vittoriosi Alice	Italy	✓	✓	WG1
59					
60					
61					

Day 1: 4th September 2014

Management Committee meeting

(All invited but only MC Members have voting right)

1. Welcome to participants

Prof. Kalogirou welcome the participants and introduce the Director of the Fraunhofer Institute for Solar Energy Systems, Division of Solar Thermal and Optics, Dr Werner Platzer who addressed the participants giving details of the ISE including its annual budget, working personnel, facilities and activities.

2. The agenda of the meeting circulated by email and hard copies to all members, was adopted.

3. Minutes of the third meeting (Ajaccio, March 2014)

The minutes of the third meeting in Ajaccio were approved without any modification.

4. Short presentation of new participants.

Prof. Kalogirou introduced the new members participating in the meeting. These are:

1. Fedrizzi Robert, Italy
2. Vittoriosi Alice, Italy
3. Buonomano Annamaria, Italy
4. Ford Andy, UK
5. Shiff Galit, Israel

5. Report from the COST Office

The new Science Officer for Transport and Urban Development (TUD) domain at the COST office is **Dr. Mickael Pero** who could not be present at the meeting.

A new version of e-COST OTRR forms will be applied from next meeting and all applications would be done electronically (on-line). More information will be circulated when available.

The Action Chair presented the progress of the Action to the Annual Progress Conference that was held in Paris. Excellent comments were received for the progress of the action thanks to the report of the Rapporteur, Luis Bragança.

6. Status of Action, including participating countries:

There are 20 COST countries participating with 30 MC members and 10 substitute members. From now on new countries participation will need MC decision. There are also two non-COST countries participating:

USA (James Russell-Appalachian State University)

Canada (Andreas Athienites-Concordia University)

7. Budget status:

The First year budget was €134,000 (94.8% spent of the allocated budget)

The expenditure was:

Total for meetings € 97,090 .

Training schools (first year) € 0

STSM (first year) € 10,800 (for 6 participants).

An amount of € 7,150 is carried over for the next year

8. Critical managerial issues.

Prof. Kalogirou asked for more attention to be paid on emails concerning deadlines and gave emphasis on managerial issues concerning payments and signed OTRR forms. Reimbursement procedures: Any missing documents (tickets etc) should be scanned and sent to Mr. Tsioutis at: Charalambos.tsioutis@cut.ac.cy the soonest possible.

9. New Documents

Prof. Kalogirou asked participants who have not declared their expertise and infrastructure to do so. He will re-circulate an email with relevant forms. Also the participants must declare any projects submitted/organised based on the Action, new PhDs, new local funded research, new FP7 proposals or H2020, etc. These are very important for the progress of the Action.

10. Training school.

The first training school took place in the Fraunhofer Institute of Solar Energy Systems between 1 and 3 of September 2014. 31 students participated together with 12 trainers. At the end of the lectures a questioner was circulated. The general evaluation results concerning the impression of the event are very good (48%) and good (52%) whilst the expectations of the students concerning the event are covered: completely (28%), very much (40%), partially (32%) and non (0%).

11. Progress report of working groups.

Prof. Kalogirou gave an account of the expected deliverables for month 12, according to MoU. The general progress is satisfactory. Any delayed activities will be completed in the following month. This is allowed since better quality reports will be produced.

12. STSM status, planning of activities.

Five Short term Scientific Missions (STSM) are plant for the second year. Their overall budget is € 9,000 (€ 1800 per STSM). Until now two applications were

approved by the MC, which were pending from the first year of the Action. New applications must be submitted to the STSM manager (Gilles) and the applications will proceed through the e-cost system for approval.

13. Publications, dissemination and outreach activities

Until now deliverables were submitted by the WG2 and WG3. On every template and document the Action Logo should be used. Templates are available on the website.

14. Web news

The COST official web page is at:

http://http://www.cost.eu/domains_actions/tud/Actions/TU1205

The Action web page is at:

Web site: <http://www.tu1205-bists.eu/>

Password: cost 1234!

Any documents for the page should be sent to Mr. Costas Christofi.

Email: c.christofi@cut.ac.cy

Presentation of Received Case Studies and Discussion (Mervyn) (all)

Mervyn mentioned that until now 90 case studies were submitted. From these, 82 were allocated a reference number and were reviewed. 60 cases are of direct relevance to the action whilst the rest are models or supporting material. The case studies were analysed according to set criteria and a template was used to extract a significant amount of data.

24 of the cases refer to air heating, 39 to water heating, 10 to combi systems. 17 are dealing with cooling and ventilation, 9 to BIPV/T and 16 to linked-auxiliary systems.

He then proceeded to review and present the systems in respect to various criteria.

Also he expressed his thoughts concerning their performance evaluation, quantitative assessment of potential, integration quality, compilation and classification, ambiguity of nomenclature and presentation of case studies.

Brainstorming Session (all)

David Kennedy coordinated a Brainstorming Session for collecting new ideas on new systems to be developed, modeling and simulation and new applications for BISTS.

The ideas were grouped together and are presented for further elaboration as follows:

IDEAS Proposed and Segmented

- System shapes, Geometry, Sizing, Effects on under performance, Levels of integration, quality of integration, Flexibility, Roof installation, integrated units, Micro collectors, PCMs, Connectivity, More and better integration with other energy sources, Large scale applications, Stand-alone systems, Retrofits, Flexible parts, components and products in solar and PV, Modular, Scale-able, Modular, Architectural aspects, Prefabrications, Element connections, BISTS for Desalination, cooling etc, Portability, Design and develop for disaster areas

in world, refugee camps etc., Transparency, Shading, Vacuum tubes, Multi use and purpose, Raw materials selection.

- Energy company links, New business interests, Energy networking, Avoid spikes in energy demand, Supply and demand combined, Seasonal, Smart grids, Funding, government funding, research funding, Finance and costs
- Benchmarking of measuring tools and software, Reliability, legal, liability, and modifications to buildings, Function for applications, Validation of models, Testing, Links to design software, Building certification, Directives, Testing, standards, on site measurements, Compare performance of systems
- Design workshops- multi disciplinary in nature, Develop skilled people, training, Dissemination- video, PP etc., Promote TU1205
- Exergy, Liquid air, Thermal mass for anti-freeze, Water absorption for cooling, Thermal mass with panels, Storage, Cooling, Climate flexibility of systems, Matrix of climate relevance, more detailed physics and science of systems,
- Better Controls for the BISTS systems, Where should the equipment be placed, Fire escapes etc.
- Recycling, dismantling, life, waste

Working Groups (1-3) Parallel Sessions

Working Group 1 - Development and characterisation of new BISTS

Working Group 2: Modelling and Simulation of BISTS

Working Group 3: Investigation of new applications for innovative BISTS

Agenda for all WGs:

1. Welcome to participants
2. Adoption of the agenda
3. Progress of deliverables
4. Distribution of tasks
5. Promotion of gender balance and of Early Stage Researchers (ESR)
6. Time-table for future work
7. Expand new ideas obtained from Brainstorming Session.

Detailed minutes of the meeting of every WG are presented at the end of this document.

Working Group 4: Taxonomy and Dissemination Activities (all)

1. Presentation of Taxonomy of systems. David presented the output of a work dealing with the Taxonomy of systems. The work is in interactive computer form presenting examples and giving details for every case.
2. Website. Prof. Kalogirou presented the updated Action web page.
3. Status of first deliverables. Soteris mentioned that the deliverables of WG2 and WG3 are ready and that the WG1 paper will be ready in the following few weeks (before the end of the month).

4. Prof. Kalogirou mentioned that a mid Action Symposium is planned for 2015 and expressed some thoughts concerning Publications, dissemination and outreach activities of the action, Inter-workgroup scientific deliverables, and promotion of gender balance and of Early Stage Researchers (ESR).

Day 2: 5th September 2014

DISCUSSION ABOUT THE HANDBOOK (all)

Soteris mentioned that a Handbook must be delivered in month 46. Its specifications are given in the BISTS proposal in paragraph D3.6 and will cover the BISTS from the Architectural and Engineering aspect. After a discussion it was decided that the Handbook will have the following structure (preliminary):

1. Introduction-description of the Action
2. Classification of BISTS (case studies)
 1. Split into chapters for various issues (next slide)
3. Design Process of BISTS
 1. Architectural planning/integration
 2. Solar system design (mechanical/optical/materials, control)
 3. Modelling and performance analysis
 4. Installation options/strategies
 5. Testing (standards)
 6. Commissioning of systems
 7. Maintenance
 8. LCA (Disposal)
 9. Economics
 10. Legal issues
4. New concepts/ideas
 1. Architectural integration
 2. Testing methodologies
 3. New models
 4. New application options
 5. New materials
 6. New construction (external/internal part), different solutions
 7. Options for retrofit applications (e.g. extent SHW to space heating)
5. Supporting material
 1. Codes
 2. Web sites, etc.

This is a preliminary table of contents and will be discussed further in subsequent meetings and by the SG committee.

Group Session (All WGs)

Group discussion on status of WG plan for new systems and ideas and inter workgroup deliverables.

The WG Leaders reported on the Progress/planning of their working group as follows:

- WG1 leader presentation by Werner
- WG2 leader presentation by Daniel
- WG3 leader presentation by Aggelos
- WG4 leader presentation by David

General discussion:

Dorotta suggested that it is important to give information to the training school students concerning addresses and work details of other participants.

Management Committee meeting

(All invited but only MC Members had voting right)

Soteris mentioned that:

1. The Action Chair was invited to present the Action at the Conference: *The Cities of Tomorrow, the Challenges of Horizon 2020* – in Turin (Sept. 2014)
2. Concerning the Budget € 9,000 are allocated to five STSM (up to 31/5/2015)
3. The First year budget absorption was 94.8% and is considered satisfactory having in mind the various uncertainties
4. The new budget is about € 127,000 ($126,850 + 7,150 = € 134,000$)
5. Two meetings are planned for the second year, one about every 6-months.
6. The location and date of the next meeting is at the University of Malta, on 16-17/4/2015. Vincent will confirm the dates
7. The Action Symposium will be combined with the Euro-ELECS 2015 (21-23/7) conference. The deadline for the conference abstracts is on 30/9/2014. According to the interest, the Action Symposium will be organised as a single-day or two-day event. Therefore, the first meeting of the third year will be in Guimaraes on 20-21/7.
8. The participants in the Euro-ELECS 2015 conference will pay by their OWN MONEY for the conference registration (possibly special rate will apply). The Symposium is free for Action members and for the Conference participants. The real benefit for the participants of the Euro-ELECS 2015 conference is the payment of the air ticket that will be covered by COST, since the event will be combined with the meeting.
9. Adolpho Palomo presented the call for Energy efficient buildings: Integrated approach to retrofitting residential buildings
10. Closing

Visit to the ISE laboratories

The meeting concluded in the afternoon of the second day after all participants had a very interesting meeting at Fraunhofer ISE laboratories.

Minutes of Working Groups

The Agenda for all WGs

was: Welcome to
participants Adoption of the
agenda Objectives and
working program
Distribution of tasks
Promotion of gender balance and of Early Stage Researchers
(ESR) Time-table of work

Working Group-1

Participants

Platzer Werner (*WG Leader*)
Soteris Kalogirou
Mervyn Smyth
Georgios Florides
Yiannis Tripanagnostopoulos
Laura Alenei
Chrysovalantous Lamnatou
Christian Cristofari
Gilles Norton
Manuela Almeida
Dorota Chimeoluk
Rosita Norvaisiere
Vincent Buhagiar
David Kennedy
Aleksandra Krstic Furunzic
Palombo Adolpho
David Kennedy
Kramer Korbinian
Ivan Miletic
Costantinos Vassiliades
Ford Andy
Shiff Galit
Vittoriosi Alice

Absent
Donal Keys
Jose Santos Lopez
Alexander Georgiev
Rumen Popor
Andreas Savvides

Apologies

None noted

1. Welcome to participants

Werner welcomed the participants to working group 1 and presented the agenda. He then introduced the scope of work and objectives for the work group that would be fulfilled through the following tasks:

1. Review of the state of the art (month 12)
2. Development of new BISTS solution characterizations (months 6-18-30-42)
3. Annual training school for dissemination of expertise on BISTS development and characterisation techniques (months 18-30-42)
4. Report on the evaluation technologies available for BISTS characterisation (Month 24)

Werner stated that the main objective of the meeting was to discuss the review.

It was decided by voting that on the review only a list of the names of the contributors will be seen (10 votes in favour) and not a list of names and chapter-section of contribution of each one (3 votes in favour)

Dorota suggested that a deliverable should be prepared on the subject of integrated storage

Everyone should read the draft document which was sent by email and if there are serious objections/additions on anyone's contribution, to correct it by tracking the corrections in word document and send it to Werner in 10 days.

George will pass the document through a plagiarism **checking** system and inform Werner if the document is eligible for publication.

A discussion then followed on how the collected information on every BISTS case study can be utilised and be presented in an executive document.

Alexandra and Galit took on the job to set architectural criteria for the integration of the systems to buildings.

The performance of the cases should be evaluated according to three climate types- hot, medium, cold. Werner will look into the performance issue. Also Mervin will evaluate the cases according to climate and location.

After some suggestions and discussion it was decided to add more classifications and properties on the existing analytical table and design a filtering tool that will identify the cases that match the requested criteria by the user.

Concerning the training schools, Yiannis undertook to present a suggestion on how the school will become more useful to the students and educators. He will review the syllabus and analyse the comments of the students.

Finally, concerning the task for the D1.4 evaluation, the document on characterization methods for evaluating BISTS solutions should include an overview of approaches and existing methods describe levels and scope of methods, compare pros/cons and limitations, give a geographic specific evaluation and a comparison using case studies. David will provide a template by the end of October.

Working Group-2

Participants

Christoph Maurer (Germany)
Christoph Cappel (Germany)
Danijela Nikolic(Ser)
Annamaria Buonomano (Italy)
Roberto Fedrizzi (Eurac, Bolzano)
Kostas Christofi (Cyprus)
Rokas (Lithuan)
Daniel Chemisana (Spain)
Ricardo Mateus (Port)
Jayanta Mondol (GB)

Status of Deliverables:

- D 2.1. Review of current STS modelling techniques. This review will also be submitted as a joint partner publication in a peer reviewed journal (Month 12) **DONE**
- D.2.2. Annual STSM for PhD students and Early Stage Researchers on theoretical modelling and numerical simulation of thermal behaviour of BISTS (Month 6, 18, 30, 42) **DONE for first year**
- D.2.3. Annual Training School for dissemination of expertise to PhD students and Early Stage Researchers (Month 18, 30, 42). This will include topics on theoretical modelling and numerical simulation of thermal behaviour of BISTS. **DONE for first year**
- D 2.4. Report on the validation of developed codes, both thermal and optical (Month 30). Danijela and Christoph. **YEAR 2**

D 2.4. Report on the validation of developed codes, both thermal and optical (Month 30).

- Template of the Deliverable
 - Specific requirements of BIST modelling and simulation**
 - Validation methodologies**
 - On site validation
 - Test cells
 - Laboratory

Validated models for different solar thermal integrated collectors

Building Added systems: modelling/simulation and validation
Building Integrated systems: modelling/simulation and validation
Opaque systems
Thick insulation systems
Thin insulation systems
Transparent systems

Guidelines and recommendations

- The report will be presented in the next year conferences
- First preliminary draft: End of December 2014.

Items arising from Corsica meeting:

- Next week WG2 members will revise the "final" version of deliverable 1.-- **DONE**
- 15th April submission of deliverable 1. -- **DONE**
- Mid June to send to Daniel the doi number of the published validated codes (at collector, system or building level) — **PENDING. NEXT DATE, INCLUDING THE DRAFT: DEC. 2014**

Working Group-3

Participants

1. Gerald Leindecker – Austria
2. Rafaela Agathokleous – Cyprus
3. Charalambos Tsioutis - Cyprus
4. Carlos Ochoa – Israel
5. Simon Borg – Malta
6. Rene Wansdronk – Netherland
7. Artur Rusowicz - Poland
8. Sandra Monteiro Silva – Portugal
9. Jasna Radulovic – Serbia
10. Tatjana Kotic - Serbia
11. Luisa F Cabeza - Spain
12. Stefan Remke – Spain
13. Aggelos Zacharopoulos (AZ) – WG Leader, UK

Absent:

1. Manolis Souliotis - Greece
2. Tim O'Leary - Ireland
3. Sarah McCormick – Ireland
4. Trevor Hyde - UK

Welcome

- The chair welcomed the meeting participants

Adoption of the agenda

The meeting agenda proposed by the leader was adopted by the group members with no changes.

Deliverable D3.1

- The WG leader thanked all the members that contributed to the different sections of the deliverable. Carlos, Sandra, Rafaela (STSM) and Simon also assisted with the compilation of the different sections into the final document. The document which is around 100 pages long has been submitted to the Chair of the Action.
- Rafaela who visited University of Ulster (STSM) was able to join compile all the individual contributions in uniform documents.
- Luisa asked that people that do not participate in the Action but contributed to the deliverable should be included in the contributors list. This was agreed with the Action chair and the contributors list in the deliverable will be updated.
- The deliverable will be made available to the WG members via dropbox while the minor updates are made. It will then be uploaded to the Action website.
- Luisa has prepared two publications using D3.1 material on building integrated TES. Other members are also planning to write publications from D3.1

Deliverable D3.2 – STSMs

There are still 3 STSMs available for year 2 of the Action which will be allocated to WG2 and WG3 (WG1 has already 2 STSMs approved for this year).

WG members should plan and apply ASAP for the STSMs which should assist with either the deliverable 3.4 or with writing of journal/conference papers out of deliverable D3.1.

Annual training school (D3.3):

- The school was very successful attracting around 30 postgraduate students. The next school will take place in 2015 (3rd year of the Action).

Deliverable D3.4

- This deliverable is due in month 36. The group members need plan ahead on how they can contribute to this deliverable.
- As mentioned in previous meetings, there are already BISTS projects by some of the participants that will provide the "baseline" for this deliverable.
- Ideas for new BISTS were shared between the members. Aggelos presented an idea for BISTS based on concentrating glazing. Rene and Gerard suggested solutions for BISTS storage. The BISTS developed by the University of Stuttgart was examined.
- The BISTS review (D3.1) should help members to come up with new ideas or advances of existing BISTS.
- Three groups were formed each one with the aim to look at a particular innovative BISTS category:
 - Artur and Aggelos will try and develop a BISTS idea which involves plants.

- Simon, Sandra, Carlos will think about non-opaque BISTS.
 - Rene Stephen, Gerard will discuss/think/design storage systems for BISTS.
 - Charalambos and Rafaela will contribute through their own BISTS research.
 - Aggelos, Jasna and Tatjana will look at ideas based on glazing BISTS.
- The above groups will communicate/discuss via email/Skype etc. They should also engage in discussions with the other Action WGs on new BISTS.

H2020

- Discussed topic "**EeB 6 – 2015: Integrated solutions of thermal energy storage for building applications**". Luisa mentioned that the topic text points to solutions that require thermo-chemical storage in order to achieve higher storage densities that water can be achieved using water.
- The deadline for this topic has been moved to Feb 2014.
- The chair suggested that any interesting H2020 topics could be forwarded to the Chair who can then inform all Action members.

Activities Tracking template (AcT) form

- Aggelos presented a spreadsheet template which can be used to track all activities related to the Action and help with reporting to the COST office and planning of deliverables. The group members reviewed the template and made suggestions for improvements.