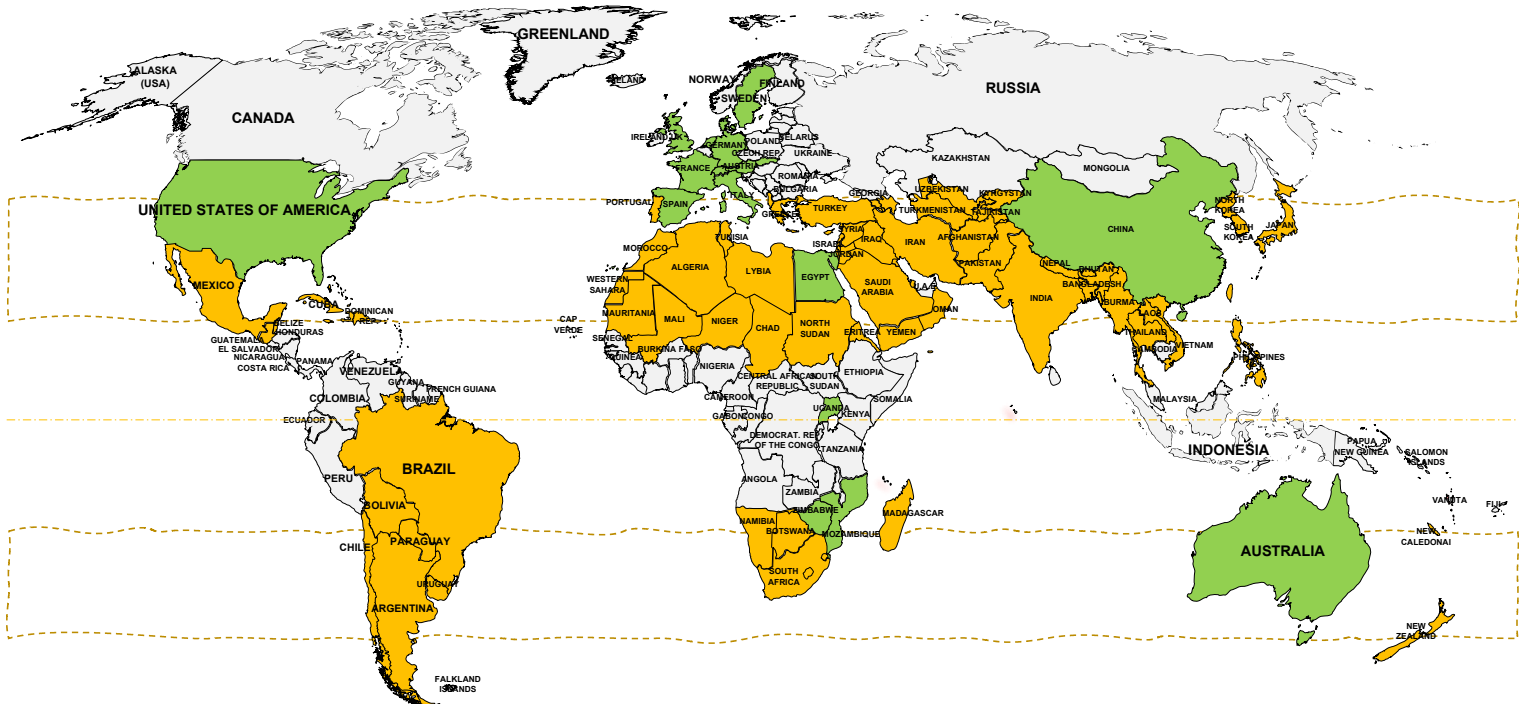




SOLAR HEATING & COOLING PROGRAMME  
INTERNATIONAL ENERGY AGENCY

# Summary Report of Task Workshops & Trainings



IEA SHC TASK 65 | SOLAR COOLING FOR THE SUNBELT REGIONS

Technology Collaboration Programme

by IEA

# Summary Report of Task Workshops and Trainings

**This is a report from SHC Task 65:  
Solar Cooling for the Sunbelt Regions  
and work performed in  
Subtask D: Dissemination**

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**Date 17 June 2024**

**Report D-D5, DOI: [10.18777/ieashc-task65-2024-0007](https://doi.org/10.18777/ieashc-task65-2024-0007)**

*The contents of this report do not necessarily reflect the viewpoints or policies of the International Energy Agency (IEA) or its member countries, the IEA Solar Heating and Cooling Technology Collaboration Programme (SHC TCP) members or the participating researchers.*

Cover photo credit: World map with Sunbelt regions (marked yellow) and the 18 countries of the participating Task 65 experts (marked green), source: Neyer Brainworks & JER

## Solar Heating & Cooling Technology Collaboration Programme (IEA SHC)

The Solar Heating and Cooling Technology Collaboration Programme was founded in 1977 as one of the first multilateral technology initiatives ("Implementing Agreements") of the International Energy Agency.

**Our mission** is *To bring the latest solar heating and cooling research and information to the forefront of the global energy transition.*

**IEA SHC** members carry out cooperative research, development, demonstrations, and exchanges of information through Tasks (projects) on solar heating and cooling components and systems and their application to advance the deployment and research and development activities in the field of solar heating and cooling.

**Our focus areas**, with the associated Tasks in parenthesis, include:

- Solar Space Heating and Water Heating (Tasks 14, 19, 26, 44, 54, 69)
- Solar Cooling (Tasks 25, 38, 48, 53, 65)
- Solar Heat for Industrial and Agricultural Processes (Tasks 29, 33, 49, 62, 64, 72)
- Solar District Heating (Tasks 7, 45, 55, 68)
- Solar Buildings/Architecture/Urban Planning (Tasks 8, 11, 12, 13, 20, 22, 23, 28, 37, 40, 41, 47, 51, 52, 56, 59, 63, 66)
- Solar Thermal & PV (Tasks 16, 35, 60)
- Daylighting/Lighting (Tasks 21, 31, 50, 61, 70)
- Materials/Components for Solar Heating and Cooling (Tasks 2, 3, 6, 10, 18, 27, 39)
- Standards, Certification, and Test Methods (Tasks 14, 24, 34, 43, 57)
- Resource Assessment (Tasks 1, 4, 5, 9, 17, 36, 46, 71)
- Storage of Solar Heat (Tasks 7, 32, 42, 58, 67)

In addition to our Task work, other activities of the IEA SHC include our:

- SHC Solar Academy
- *Solar Heat Worldwide*, annual statistics report
- SHC International Conference

### Our members

|                     |                                    |                |
|---------------------|------------------------------------|----------------|
| Australia           | France                             | SICREEE        |
| Austria             | Germany                            | Slovakia       |
| Belgium             | International Solar Energy Society | South Africa   |
| Canada              | Italy                              | Spain          |
| CCREEE              | Netherlands                        | Sweden         |
| China               | Norway                             | Switzerland    |
| Denmark             | Poland                             | Türkiye        |
| EACREEE             | Portugal                           | United Kingdom |
| ECREEE              | RCREEE                             |                |
| European Commission | SACREEE                            |                |

For more information on the IEA SHC work, including many free publications, please visit [www.iea-shc.org](http://www.iea-shc.org)

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# 1 Executive Summary

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This document is the final report on activity D5 “Workshops” in Subtask D – Dissemination of Task 65 IEA SHC.

The goal of work package D-D5 was to **organize four half-day workshops** dedicated to the industrial players (manufacturers and installers, consultants, policy makers) in Sunbelt countries. This goal has been exceeded with **eleven workshops and trainings organized and conducted** for 567 participants over the four years of Task 65.

This document lists the individual workshops and trainings as well as gives general information on each of them. Detailed workshop and training agendas can be found in the Appendix.

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## 2 Introduction

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Workshops and trainings can be an important element in distributing expert knowledge around the world. Participants from Sunbelt countries were offered the following benefits through eleven different workshops and trainings conducted during Task 65 from 2020 to 2024:

1. **Skill Enhancement:**

- Manufacturers and installers, consultants, and policy makers were given the ability to learn or deepen specialized skills and knowledge.
- Current trends and best practices were taught, increasing competitiveness for local business

2. **Networking Opportunities:**

- Interaction with industry peers promoted collaboration, thus potentially inspiring new partnerships
- Access to industry experts and influencers provided valuable insights and inspiration for participants

3. **Problem Solving and Innovation:**

- Joint brainstorming and discussions led to creative solutions for specific challenges.
- New technologies and methods were introduced and can now be implemented.

4. **Adaptability:**

- Workshops empower companies to quickly adapt to market changes and technological advancements.
- Flexibility and innovation capacity were strengthened through continuous education.

5. **Quality Improvement:**

- Introduction and standardization of quality processes through training
- Improvement of product and service quality through ongoing education.

6. **Reputation and Market Position:**

- Participation in renowned IEA workshops and training enhances the company's image.
- Recognition and certificates can be used as marketing tools to gain customer trust.

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## 3 Overview of Workshops and Trainings Conducted

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A total of eleven workshops and trainings were organized and conducted by Task 65 participants and leaders. The total number of participants in these events was 567. Table 1 gives an overview of the workshops and trainings.

Table 1: List of workshops and trainings conducted in Task 65 in chronological order.

| No. | Title   | Year | Number of participants | Location                   |
|-----|---|------|------------------------|----------------------------|
| 1   | SHC Solar Academy Training for CCREEE   | 2020 | 30                     | Online                     |
| 2   | National Workshop for China   | 2020 | 100                    | Nanjing, China             |
| 3   | 1 <sup>st</sup> National Workshop for Austria   | 2021 | 23                     | Online                     |
| 4   | 1 <sup>st</sup> Industry Workshop Task 65 + HPT Annex 53                                    | 2021 | 50                     | Online                     |
| 5   | SHC Solar Academy Training for SOLTRAIN / SACREEE   | 2021 | 46                     | Stellenbosch, South Africa |
| 6   | sol.e.h <sup>2</sup> & Task 65 Public Workshop  | 2021 | 45                     | Online                     |
| 7   | ISES SHC Solar Academy Webinar: Solar Cooling for the Sunbelt Regions                       | 2022 | 197                    | Online                     |
| 8   | 2 <sup>nd</sup> Industry Workshop Task 65 and 2 <sup>nd</sup> National Workshop for Austria | 2023 | 26                     | Innsbruck, Austria         |
| 9   | SHC Solar Academy Training Course for SOLTRAIN / ECREEE                                     | 2023 | 27                     | Praia, Cape Verde          |
| 10  | SHC Solar Academy Online Training for TTMD  | 2023 | 15                     | Online                     |
| 11  | 3 <sup>rd</sup> National Workshop for Austria   | 2024 | 8                      | Graz, Austria              |

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## 4 Summary and Conclusion

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Workshops and trainings are an excellent opportunity for professionals, technicians, and students in the field of solar cooling to improve their skill sets and be able to interact with leading global experts in this field.

The original goal of having four workshops was far exceeded with a mix of online and face-to-face workshops and trainings. Most workshops in the earlier phase of Task 65 were held online due to Covid restrictions. After these restrictions had been lifted, face-to-face workshops and trainings were conducted again from 2023 onwards. This document lists the individual workshops and gives general information on each of them. All detailed workshop and training agendas can be found in the Appendix of this report.

As a result, it can be concluded that the workshops and training sessions were very successful in informing participants such as architects, HVAC engineers, mechanical engineers, designers, SHIP and HVAC suppliers, scientists, and PhD students about the latest developments in solar thermal cooling systems.

Several case studies prepared for the various workshops and training sessions showed the economic viability of hybrid cooling systems, demonstrating, for example, a payback period of under seven years. Technical and economic evaluation of solar cooling systems, in particular in-depth discussions on hybrid cooling configurations for hot climates in the Sunbelt regions, were carried out. These events highlighted the significant benefits of solar thermal cooling e.g., in reducing the load on electricity grids in general, but especially on islands with capacity issues. One grid operator highlighted that solar thermal cooling could stabilise grids by mitigating the immediate impact of fluctuating weather conditions if PV or wind generators are connected to the grid.

Participants of the trainings gained valuable insights into the sizing and costs of solar cooling systems and showed great interest in participating in the IEA SHC Task to build further knowledge and implement it in real projects. In addition, they gave positive feedback on the effectiveness of the trainings and the many new technological advances presented during the workshops.

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## 5 Appendix – Workshop and Training Program Details

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### 5.1 Trainings

#### 5.1.1 SHC Solar Academy Training for CCREEE, 10<sup>th</sup> Nov. 2020 (online)

*About 30 consultants, researchers, manufacturers, grid operators and CCREEE staff joined a two-day training course organized by the Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE) as part of the SHC Solar Academy. CCREEE, the newest member of the SHC Programme, welcomed the opportunity to learn about Austria and Greece's solar thermal work and the new SHC project, Task 65 on Solar Cooling for the Sunbelt Regions.*

The online workshop kicked off with Werner Weiss, of the Austrian company, AEE INTEC, and Vassiliki Drosou, of the Greek Centre for Renewable Energy Sources, first giving an overview of solar thermal applications used in homes, hotels, hospitals and manufacturing businesses before describing specific successful implementation strategies, support mechanisms and quality control methods.

On Day 2, the workshop participants learned about the work starting in the new SHC project, *Task 65: Solar Cooling for the Sunbelt Regions*, and state-of-the-art solar cooling. Daniel Neyer, of Neyer Brainworks based in Austria, and Uli Jakob, of German-based dr. jakob energy research, presented basic system functions and trends in solar cooling, economic and technical assessments and best practices.

“CCREEE did a great job of organizing the training. Despite the event being held online, attendees were very engaged, which prompted many in-depth discussions,” said Jakob. One benefit of solar thermal cooling, as relayed during the sessions, is that it can reduce the strain on power grids, an especially important factor on islands with capacity problems. An attendee who works for a grid operator said, “If PV or wind generators are connected to the grid, weather conditions have an immediate impact on grid stability. As soon as a cloud covers one of the smaller islands, electricity demand can grow within seconds. Solar thermal cooling could help lessen the effect of that.”

Of particular interest to attendees was a case study on the technical and economic aspects of installing a hybrid cooling system on the island of Barbados. The calculation showed a payback period of less than seven years at an internal rate of return (IRR) exceeding 13%. “For this study, we selected a 75 m<sup>2</sup> field of flat plate collectors that would drive a 15 kW ammonia-water absorption and a 15 kW ammonia vapor compression chiller in hybrid mode. The absorption chiller would deliver chilled water at 6°C as soon as the collector exceeded 200 W/m<sup>2</sup>. And if needed, a vapor compression device would meet the remaining demand. This system could be used for small office or residential buildings,” explained Neyer.

## 5.1.2 SHC Solar Academy Training for SOLTRAIN / SACREEE, 8<sup>th</sup> - 9<sup>th</sup> Nov. 2021 (Stellenbosch, South Africa / hybrid)

| <b>Monday, 8 Nov.</b> |  |
|-----------------------|--|
| 08:30 h               | Registration   |
| 09:00 h               | Welcome Remarks and goals of the training course<br>Prof. Sampson Mamphweli, CRSES, Stellenbosch University                                    |
| 09:15 h               | The SOLTRAIN program and what has been achieved so far<br>Werner Weiss, AEE INTEC  |
| 09:35 h               | The IEA SHC Technology collaboration Program<br>Dr. Karen Surridge, SANEDI and South African member of the IEA<br>SHC Executive Committee      |
| 09:50 h               | Introduction of participants and expectations  |
| 10:10 h               | Solar Heat Worldwide and the market for solar cooling plants<br>Werner Weiss, AEE INTEC  |
| 10:30 h               | Coffee break   |
| 10:50 h               | Introduction of the IEA SHC Task 65 Solar Cooling for Sunbelt regions<br>Prof Dr Uli Jakob, Dr Jakob energy research GmbH & Co. KG,<br>Germany |
| 11:30 h               | State of the Art and Future Trends Solar Cooling<br>Dr Daniel Neyer, Neyer Brainworks GmbH, Austria  |
| 12:30 h               | Lunch  |
| 13:30 h               | Basic Functions thermal cooling: chillers, heat rejection, system<br>layouts<br>Dr Daniel Neyer  |
| 15:30 h               | Coffee break   |
| 15:00 h               | State of the Art of products, systems and cold distribution<br>Dr Uli Jakob  |
| 17:00 h               | End of 1 <sup>st</sup> day   |



| <b>Tuesday, 9 Nov.</b> |  |
|------------------------|--|
| 8:00 h                 | Opening Day 2 – Revision of Day 1  |
| 8:15 h                 | Economic and technical assessment – IEA SHC Tools<br>Dr Daniel Neyer   |
| 10:30 h                | Coffee break   |
| 11:00 h                | Direct and interactive Workshop I<br>Dr Uli Jakob / Dr Daniel Neyer  |
|                        | Case studies for design / assessment for different sectors, based on IEA SHC Task 65 experts examples (Hospital, Agro-food, Hotel, Office) |
|                        | - Load analyses  |
|                        | - Specific design: SE/DE/hybrid  |
| 12:30 h                | Lunch  |
| 13:30 h                | Direct and interactive Workshop II<br>Dr Uli Jakob / Dr Daniel Neyer   |
|                        | - Unified economic, technical and environmental assessment with Task65 tools.  |
|                        | - Future perspective / boundaries for successful implementation  |
| 15:00 h                | Coffee break   |
| 16:30 h                | Best practice/boundaries and do's/don'ts<br>Dr Daniel Neyer  |
| 17:30 h                | Opportunities for active participation in IEA SHC Task 65 – Solar Cooling for the Sunbelt Regions<br>Dr Uli Jakob                          |
| 17:45 h                | Design support and financing options for solar cooling systems within the framework of SOLTRAIN.<br>Werner Weiss, AEE INTEC, SOLTRAIN      |
| 18:00 h                | End of the training course   |

### 5.1.3 ISES SHC Solar Academy Webinar, 25<sup>th</sup> & 27<sup>th</sup> Oct. 2022 (online)

In 2016, air-conditioning accounted for nearly 20% of the total electricity demand in buildings worldwide and is growing faster than any other energy consumption in buildings. The main share of the projected growth in energy use for space cooling comes from emerging economies and will more than triple by 2050 to 6,000 TWh/a. Therefore, the **IEA SHC Task 65 "Solar Cooling for the Sunbelt Regions"**, started in July 2020, is focusing on innovations for affordable, safe, and reliable Solar Cooling systems for the Sunbelt regions. The innovation is the adaptation of existing concepts/technologies to the Sunbelt regions using solar energy, either solar thermal or solar PV. Solar cooling will therefore play an important role in the decarbonization of the cooling sector using natural refrigerants, e.g. with hybrid system solutions of all kinds coming onto the market.

The webinar gives an overview of the market and technology development (Prof. Dr. Uli Jakob, JER/Green Chiller) and reports first insights from the analysis of boundary conditions and potentials for solar cooling systems within the Sunbelt region based on geographical data (Richard Gurtner, ZAE Bayern) as well as the assessment and benchmarking of solar cooling systems in general (Dr. Daniel Neyer, Neyer Brainworks).

The webinar moderated by Bärbel Epp of the German consultancy Solrico.

#### Webinar Recordings

- OCTOBER 25 - LIVE WEBINAR AND Q&A
- OCTOBER 27 - WEBINAR REBROADCAST AND LIVE Q&A WITH PRESENTERS

## 5.1.4 SHC Solar Academy Training for SOLTRAIN / ECREEE, 10<sup>th</sup> - 11<sup>th</sup> Oct. 2023 (Praia, Cape Verde)

The IEA Solar Heating and Cooling Programme pursues a multidimensional approach to support the market transformation of solar cooling. This includes training for entrepreneurs from the installation industry and energy experts from administration at a national level. The photo shows solar cooling expert Dr Uli Jakob during a two-day specialized course on the Cape Verde islands, West Africa, in mid-October with a special focus on large-scale solar water heating and solar cooling.

"The successful training of 27 experts from five countries in West Africa was the result of a great collaborative effort between ECREEE -- the ECOWAS Centre for Renewable Energy and Energy Efficiency and the IEA SHC Solar Academy", said Werner Weiss, head of the IEA SHC Solar Academy. Weiss has received great support from Guie Guillaume Kouhie, who represents ECREEE within the IEA SHC Programme.

### IEA SHC Solar Academy profits member countries

Kouhie appreciated the high standard and very good quality of the technical training: "The professionals who took part received a lot of information that they will be able to use in their businesses", Kouhie added. He sees a great benefit from ECREEE being a member of the IEA SHC Programme if regular training courses are organized. This will mobilize researchers in the region to also join IEA SHC tasks with a special focus on the West African solar thermal sector.

Jakob described the workshop as a great success in introducing solar cooling specific topics to the ECREEE members, with many good discussions. He was also surprised about the fact that CERMI, the Center for Renewable Energy and Industrial Maintenance – which hosted the training – has a 70 kW solar cooling system installed. This was helpful for showing and explaining the various aspects of such systems.

The CERMI staff say they are satisfied with the performance of the solar thermal cooling system, which cools the conference room and other rooms in the building and is backed up by a compression chiller. The collector field consists of flat plate collectors with CPC mirrors (CPC Power ST1), a model from the former Portuguese company MCG. The supplier, however, no longer exists. <https://solarthermalworld.org/news/portuguese-car-components-supplier-enters-solar-thermal-industry/> The system has probably been in operation for 10 years because the absorption chiller was manufactured in August 2013 according to the nameplate.

**The training course received high visibility because the participants officially received their certificates at the ECOWAS Sustainable Energy Forum (ESEF 2023), which took place in the days after the training. It provided an essential dialogue platform for the main national, regional and international players in the energy sector in West Africa.** *Photo: Solar Academy*

ECREEE has been a member of the IEA SHC Programme since 2012 and serves 15 member states in West Africa as a renewable energy and energy efficiency knowledge hub – among them the two small states of Cape Verde and Guinea Bissau. ECREEE is headquartered in Cape Verde and engages 40 employees. ECREEE is part of the UNIDO-coordinated Global Network of Regional Sustainable Energy Centres (GN-SEC). UNIDO agreed to sponsor the participation fee for selected GN-SEC centres in June 2019. [Regional Sustainable Energy Centres join IEA SHC | Solarthermalworld](#)

## 5.1.5 SHC Solar Academy Online Training for TTMD, 13<sup>th</sup> - 14<sup>th</sup> Dec. 2023 (online)

IEA Solar Academy along with TTMD of Turkiye is pleased to announce a specialized online training course for professionals on **Solar Cooling and Air Conditioning**. Join other professionals to learn and discuss the state-of-the-art and basic thermal cooling functions.

### Agenda

- [Training Agenda](#)

### Registration

**Registration is required**

Email Mr. Ozan Yavuz, [ttmd.istanbul@ttmd.org.tr](mailto:ttmd.istanbul@ttmd.org.tr)

Registration fee for international participants: USD 100

### Trainers

The trainers are **Dr. Uli Jakob** of dr. jakob energy research GmbH and Task Manager of SHC Task 65 on Solar Cooling for the Sunbelt Regions and **Dr. Daniel Neyer** of University of Innsbruck, Austria who is leading the SHC Task 65 work on Assessment & Tools.

## 13 and 14 December, 2023

**Online:** GoTo Meeting CET +2  
**TTMD Turkiye**

| Wednesday, December 13th | Solar Cooling and Air Conditioning (Day 1)   |
|--------------------------|--|
| 13:00 h                  | <b>Welcome &amp; opening remarks</b> , Ms. Nermin Koroglu, TTMD President  |
| 13:05 h                  | <b>Remarks and goals of the online training course</b><br>Dr. Kemal Gani Bayraktar, TTMD and IEA SHC TCP Executive Committee Member, Turkiye   |
| 13:15 h                  | <b>Introduction of IEA SHC Technology Collaboration Program</b><br>Prof. Bulent Yesilata, Ankara Yildirim Beyazit University, TTMD and IEA SHC TCP Executive Committee Member, Turkiye |
| 13:30 h                  | Introduction of participants and expectations  |
| 14:30 h                  | <b>Introduction of the IEA SHC TCP Task 65 Solar Cooling for Sunbelt regions</b><br>Prof. Dr. Uli Jakob, Dr Jakob Energy Research GmbH & Co. KG, Germany                               |
| 14:45 h                  | Networking break   |
| 15:00 h                  | <b>State of the Art and Future Trends Solar Cooling</b><br>Dr. Daniel Neyer, Neyer Brainworks GmbH, Austria  |
| 16:00 h                  | <b>Basic Functions Thermal Cooling (1): chillers and AHUs</b><br>Prof. Dr. Uli Jakob, Dr Jakob Energy Research GmbH & Co. KG, Germany  |
| 17:00 h                  | Q&A session (1)  |
| 17:15 h                  | End of 1st day   |

| Thursday, December 14th | Solar Cooling and Air Conditioning (Day 2)   |
|-------------------------|--|
| 13:00 h                 | Opening Day 2 - Wrap up of Day 1   |
| 13:15 h                 | <b>Basic Functions Thermal Cooling (2):</b> solar collectors, storage, heat rejection, system layouts<br>Dr. Daniel Neyer, Neyer Brainworks GmbH, Austria  |
| 14:30 h                 | Networking break   |
| 14:45 h                 | <b>State of the Art</b> of products, systems and cold distribution<br>Prof. Dr. Uli Jakob, Dr Jakob Energy Research GmbH & Co. KG, Germany   |
| 15:45 h                 | <b>Case studies</b> for design / assessment for different sectors based on Task 65 experts' examples<br>(Hospital, Agro-food, Hotel, Office, Industry)<br>Dr. Daniel Neyer, Neyer Brainworks GmbH, Austria |
| 16:45 h                 | Q&A session (2)  |
| 17:00 h                 | End of the training course   |

## 5.2 Industry Workshops

### 5.2.1 1<sup>st</sup> Industry Workshop Task 65 + HPT Annex 53, 25<sup>th</sup> March 2021 (online)

#### Day 2 (25<sup>th</sup> March 2021)

12:00 Activities A1, A2, A3, A4 (Salvatore Vasta + activity leader)

14:00 *Industry Workshop Task 65 & HPT Annex 53* (Paul Kohlenbach)

14:00-14:10 *Thermal Cooling Solutions* / Frank Molter / SolarNext AG, Germany

14:10-14:30 *An overview of NIK (not-in-kind) heating and cooling technologies- challenges and opportunities* / Kashif Nawaz / ORNL, USA

14:30-14:40 *Concentrating Collectors for Solar Cooling Applications* / Siddharth Dutta / protarget AG, Germany

14:40-15:00 *A heat driven elastocaloric cooling system* / Suxin Qia / Xi'an Jiaotong University, China

15:00-15:20 *Active magnetocaloric heatpipe: New concept for caloric cooling* / Kilian Bartholomé / Fraunhofer IPM, Germany

15:20-15:40 *New exchanger technology for absorption chillers* / Amin Altamirano / LOCIE, France

15:40-16:00 *Combined vapor compression absorption solar cooling system using a CPVT collector* / Reinhard Radermacher / CEEE, Uni Maryland, USA

16:00 Coffee break

16:15 Activities B1, B2 (Wolfgang Weiss + activity leader)

17:00 Activities C1, C2 (Daniel Neyer + activity leader)

17:45 Any other business, final remarks

18:00 End of the meeting

## 5.2.2 2<sup>nd</sup> Industry Workshop Task 65, 24<sup>th</sup> March 2023 (Innsbruck, Austria / hybrid)

March 24, 2023, 10:00 AM - 12:30 PM CET - GoToMeeting, Germany  
University of Innsbruck - Fakultätsratssitzungsaal, SOWI 30G  
Innrain 52  
6020 Innsbruck  
Austria

The 6th expert meeting includes the second Industry Workshop (day 2, hybrid mode - GoTo meeting) with presentations from industry and institute experts as shown in the agenda below:

(all times below are Central European Time CET)

### Day 2 (24<sup>th</sup> March 2023)

10:00 Welcome - Uli Jakob / Green Chiller/ JER, Germany

10:00-10:15 High efficiency solar cooling using a CPVT collector - Reinhard Radermacher / CEEE, Uni Maryland, USA

10:15-10:30 Concept and initial operating experience of a PV-supported cold store with ice slurry storage and cooling - Mathias Safarik / ILK Dresden / AQVA Synergy GmbH, Germany

10:30-10:45 Upscaling solid absorption chillers - Tim Rutten / ARES-SolabCool, The Netherlands

10:45-11:00 Test results of solar thermal vaccine refrigerator - Roland Kühn / Coolar UG, Germany

11:00-11:15 Last developments on solar DEC freescoo units - Pietro Finocchiaro / Solarinvent, Italy

11:15-11:30 Heat transfer solutions and solar cooling applications - Antoni Castells / Ecotherm Austria GmbH, Austria

11:30-11:45 Solar cooling by adsorption technology – System integration, application conditions and examples - Franka Kretschmer / Fahrenheit GmbH, Germany

11:45-12:00 MW scale industrial solar cooling and heating with a heat purchase agreement - Christian Holter / SOLID Solar Energy Systems GmbH, Austria

12:00-12:15 Solar thermal cooling at Camp Castor of the German army in Gao (Mali) with chilliii® Cooling Technology - Frank Molter / SolarNext AG, Germany

12:15-12:30 SolCoolDry: Ice production with an off grid system in Kenya – Challenges and achievements - Alexander Morgenstern / Fraunhofer ISE, Germany

12:30 Summary and closing words - Uli Jakob / Green Chiller/ JER, Germany

## 5.3 National Workshops

### 5.3.1 National Workshop for China, 5<sup>th</sup> Dec. 2020 (Nanjing, China / hybrid)

December 5, 2020, 2:00 - 6:00 PM CST

#### Workshop on Renewable and Clean Energy

Address: Southeast University, Nanjing, China

Interested bodies should contact by email the Task 65 expert (see contact person).

*(all times below are Beijing time (China Standard Time - CST), which is 7 hours earlier than CET)*

14:00 Open ceremony | Wang Jun | Southeast University

15:00 High efficiency solar heating cooling using resorption NH<sub>3</sub>-H<sub>2</sub>O heat pump | Dai Yanjun | Shanghai Jiao Tong University

15:30 Solar Cooling for the Sunbelt Regions - IEA SHC Task 65: Introduction and cooperation possibilities | Daniel Neyer | Neyer Brainworks, Austria

16:00 Energy Storage – technology, challenges and opportunities | Yu Zitao | Zhejiang University

16:30 Study on the solar energy photovoltaic and thermal comprehensive utilization | Wu Yingying and Ji Jie | University of Science and Technology of China

17:00 High ion flux power enhancing and magnifying devices for new generation energy conversion technologies | Zhu Bin | Southeast University

17:30 The technology challenges from deep decarbonization | Peter Lund | Aalto University, Finland



## 5.3.2 1<sup>st</sup> National Workshop for Austria, 24<sup>th</sup> March 2021 (online)

March 24, 2021, 2:00 - 9:00 PM CET and March 25, 2021, 12:00 - 6:30 PM CET  
Webinar/Virtual Meeting

The 2nd expert meeting includes the Austrian National Workshop (day 1) and the first Industry Workshop (day 2).

Furthermore, each subtask will be presented to discuss the first results and further contributions of the different participants as shown in the agenda below:

*(all times below are Central European Time CET)*

### Day 1 (24<sup>th</sup> March 2021)

14:00 *Austrian National Workshop* (agenda will be added in due course)

17:00 Coffee break

18:00 Welcome Task Expert Meeting (Uli Jakob)

Introduction of new participants

18:15 Subtasks A, B, C, D (approx. 25 min per subtask)

Subtask A: Adaptation (Salvatore Vasta)

Subtask B: Demonstration (Wolfgang Weiss)

Subtask C: Assessment and Tools (Daniel Neyer)

Subtask D: Dissemination (Paul Kohlenbach)

### 5.3.3 sol.e.h<sup>2</sup> & Task 65 Public Workshop, 2<sup>nd</sup> Dec. 2021 (online)

December 2, 2021, 8:00 - 12:00 AM CET - GoToMeeting, Germany

International Workshop on "Solar HVAC and passive solutions directing to high energy efficient buildings in hot and humid climates"

Presentations will be in English without translation

08:00–08:20 / Welcome

15:00–15:20 Chinese/Austrian project leaders | Dr. He QI | Dr. Daniel NEYER  
IEA SHC TCP | Prof. Dr. He TAO  
Austrian Promotion Agency | Clemens STRICKNER

08:20–09:20 / Invited Speakers

15:20–16:20 Building Energy Consumption Prediction based on Big Data | Dr. Yi ZHANG | Yuhang ZHANG  
Trends and development of SHC systems | Prof. Dr. Yanjun DAI  
Passive Houses in hot and humid climates | Dr. Jürgen SCHNIEDERS  
Q&A

09:20–10:00 / Optimizing of buildings towards integral solutions - Efficiency as the key to renewable energy supply | Laszlo LEPP

16:20–17:00 Q&A

10:00–10:15 / Break

17:00–17:15

10:15–10:45 / Pilot plant: design and experiences of implementation of building and solar HVAC | Bingjie YANG | Phoebe LIU

17:15–17:45 Q&A

10:45–11:15 / Laboratory measurements: Hardware-in-the-Loop testing for optimized system design of solar HVAC | Manuel OSTHEIMER

17:45–18:15 Q&A

11:15–11:55 / Solar heating and cooling system, design of hybrid systems and techno-economic assessment | Dr. Daniel NEYER | Prof. Dr. Uli JAKOB

18:15–18:55 Q&A

11:55–12:00 / Summary and conclusion | Dr. Daniel NEYER

### 5.3.4 2<sup>nd</sup> National Workshop for Austria, 24<sup>th</sup> March 2023 (Innsbruck, Austria / hybrid)

March 24, 2023, 10:00 AM - 12:30 PM CET - GoToMeeting, Germany  
University of Innsbruck - Fakultätsratssitzungsaal, SOWI 30G  
Innrain 52  
6020 Innsbruck  
Austria

The 6th expert meeting includes the second Industry Workshop (day 2, hybrid mode - GoTo meeting) with presentations from industry and institute experts as shown in the agenda below:

(all times below are Central European Time CET)

#### Day 2 (24<sup>th</sup> March 2023)

10:00 Welcome - Uli Jakob / Green Chiller/ JER, Germany

10:00-10:15 High efficiency solar cooling using a CPVT collector - Reinhard Radermacher / CEEE, Uni Maryland, USA

10:15-10:30 Concept and initial operating experience of a PV-supported cold store with ice slurry storage and cooling - Mathias Safarik / ILK Dresden / AQVA Synergy GmbH, Germany

10:30-10:45 Upscaling solid absorption chillers - Tim Rutten / ARES-SolabCool, The Netherlands

10:45-11:00 Test results of solar thermal vaccine refrigerator - Roland Kühn / Coolar UG, Germany

11:00-11:15 Last developments on solar DEC freescoo units - Pietro Finocchiaro / Solarinvent, Italy

11:15-11:30 Heat transfer solutions and solar cooling applications - Antoni Castells / Ecotherm Austria GmbH, Austria

11:30-11:45 Solar cooling by adsorption technology – System integration, application conditions and examples - Franka Kretschmer / Fahrenheit GmbH, Germany

11:45-12:00 MW scale industrial solar cooling and heating with a heat purchase agreement - Christian Holter / SOLID Solar Energy Systems GmbH, Austria

12:00-12:15 Solar thermal cooling at Camp Castor of the German army in Gao (Mali) with chilliii® Cooling Technology - Frank Molter / SolarNext AG, Germany

12:15-12:30 SolCoolDry: Ice production with an off grid system in Kenya – Challenges and achievements - Alexander Morgenstern / Fraunhofer ISE, Germany

12:30 Summary and closing words - Uli Jakob / Green Chiller/ JER, Germany

### 5.3.5 3<sup>rd</sup> Austrian National Workshop, 8<sup>th</sup> April 2024 (Graz, Austria)

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#### Agenda

## 3<sup>rd</sup> IEA SHC Task 65 - Austrian National Workshop

8 April 2024 14:00-18:00, Hotel Europa Graz (opposite main train station)

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|             |   |   |
|-------------|---|---|
| 14:00-14:05 | Welcome   | Christoph Brunner<br>General Manager, AEE Intec         |
| 14:05-14:20 | Presentation of Austrian priorities for Task 65   | Daniel Neyer<br>Subtask C leader, IEA SHC Task 65       |
| 14:20-14:45 | SunBeltChiller development<br>and GIS-tool for global market analysis                   | Manuel Riepl<br>Group leader, ZAE Bayern                |
| 14:45-15:15 | LCCBA-Tool – Initial analyzes and evaluations<br>for a case study in Windhoek, Namibia  | Daniel Neyer<br>General Manager, Neyer Brainworks GmbH  |
| 15:15-15:30 | Requirements and adjustments of solar cooling<br>systems for Sunbelt regions            | Manuel Ostheimer<br>Wissenschaftliche Mitarbeiter, UIBK |
| 15:30-15:45 | Q & A session   | Uli Jakob<br>Task Manager, IEA SHC Task 65              |
| 15:45-16:00 | Pause   |   |
| 16:00-16:05 | Introduction of Task Definition Meeting<br>Solar Cooling for Emerging Economies         | Daniel Neyer<br>Subtask C leader, IEA SHC Task 65       |
| 16:05-16:30 | New Task on Solar Cooling for Emerging Economies<br>Presentation of work plan and annex | Uli Jakob<br>Task Manager, IEA SHC Task 65              |
| 16:30-17:30 | World Coffee with participants<br>Inputs/feedback on the work plan                      | Uli Jakob, Daniel Neyer, Manuel Riepl<br>Moderators     |
| 17:30-18:00 | Q & A session   | Uli Jakob / Daniel Neyer<br>IEA SHC Task 65             |
| 18:00       | End of the Workshop   |   |