

Newsletter of the  
International Energy  
Agency Solar Heating  
and Cooling Programme



#SolarHeat  
#SolarThermal  
#SolarProcessHeat  
#SolarCooling  
#SolarDistrictHeating



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## IEA SHC & IEA SolarPACES Announce Landmark Conference Collaboration in Germany for September 2026

### EuroSun2026 and the SolarPACES Conference to Run in Parallel, Featuring Joint Sessions, Shared Access, and Major Milestone Celebrations

The International Energy Agency's Solar Heating and Cooling Technology Collaboration Programme (IEA SHC) and the IEA Solar Power and Chemical Energy Systems Technology Collaboration Programme (IEA SolarPACES) have announced an unprecedented collaboration between their flagship international conferences, EuroSun2026 and the SolarPACES Conference, taking place simultaneously in Germany in September 2026.

#### SHC Members

AUSTRALIA  
AUSTRIA  
BELGIUM  
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CHINA  
DENMARK  
EACREEE  
SOLAR HEAT EUROPE  
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SPAIN  
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# Landmark Conference Collaboration

EuroSun2026 will be held in Freiburg, Germany, from 14–18 September 2026, while the SolarPACES Conference will take place in Bad NeuenahrAhrweiler, Germany, from 15–18 September 2026. The parallel timing and coordinated programming mark a major step toward deeper collaboration across the global solar thermal, concentrating solar power (CSP), and integrated energy systems communities.

The joint initiative will feature a block of shared technical and strategic sessions, livestreamed between both conferences, enabling participants at each location to engage with the same speakers and discussions in real time. The planned joint sessions will focus on high-level contributions covering main crosscutting themes such as industrial process heat and thermal energy storage, following a joint opening session.

In a further move to promote interdisciplinary exchange, registration for either conference will grant participants access to both events, allowing attendees to benefit from a broader scientific programme, expanded networking opportunities, and increased collaboration across technology areas.

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opportunities, and increased collaboration across technology areas.

“This collaboration reflects the reality that solar thermal technologies increasingly operate as part of integrated, multisector energy systems,” said Korbinian Kramer EuroSun2026 Scientific Chair. “By connecting EuroSun and SolarPACES, we are creating new opportunities for knowledge exchange at a scale that matches today’s energy challenges.”

Benedikt Kölsch and Robert Pitz-Paal, SolarPACES 2026 conference chairs, added: “Holding our conferences in parallel enables the CSP, solar fuels, and solar heating and cooling communities to learn from each other, build partnerships, and accelerate innovation together.”

The collaboration also coincides with a series of significant international anniversaries, adding a celebratory dimension to EuroSun2026. The conference will mark:

- 30 years of the EuroSun conference series,
- 50 years of the IEA Solar Heating and Cooling Programme (IEA SHC), and
- 70 years of the International Solar Energy Society (ISES)

These milestones highlight decades of international

cooperation, research excellence, and technological progress in solar energy, and will be reflected in special anniversary sessions, retrospectives, and forwardlooking discussions during EuroSun2026.

EuroSun2026 will continue its role as Europe’s leading scientific conference on solar thermal energy, covering applications in buildings, district heating, industry, and integrated energy systems. The SolarPACES Conference remains the world’s premier forum for concentrating solar power, solar thermal electricity, solar fuels, and high-temperature solar technologies.

Further information on the joint programme, streaming schedule, and registration details will be announced in the coming months, including an upcoming webinar in June.

## About IEA Solar Heating and Cooling TCP

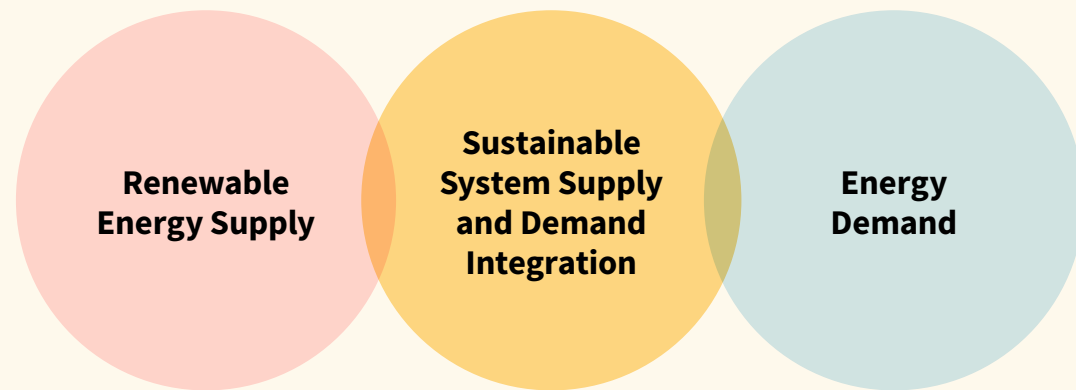
The IEA Solar Heating and Cooling Technology Collaboration Programme (IEA SHC) is the leading international research and innovation network for solar thermal technologies and sustainable heating and cooling. It has a pragmatic systems approach to support the transition towards zero-carbon integrated energy solutions. With a goal to enhance energy service delivery, advancing the use of solar technologies and fostering sustainable futures for heating, cooling, lighting, fuels, and other chemical commodities across the building, urban, industrial, agricultural, and water sectors.

## About IEA SolarPACES TCP

The IEA SolarPACES is Technology Collaboration Programme (TCP) is dedicated to advancing the development and deployment of concentrating solar power (CSP), solar thermal electricity, and solar chemical energy systems. Since its establishment, SolarPACES has provided a global platform for collaboration between leading research institutions, industry stakeholders, and policymakers. The programme focuses on improving the performance, reliability, and cost-effectiveness of high-temperature solar technologies, while fostering innovation in areas such as thermal energy storage, solar fuels, and integrated energy systems. ●



## Conference Themes



Energy Policies, Markets and Social Dimensions



ISES and IEA SHC International Conference on Sustainable and Solar Energy for Buildings and Industry  
14-18 Sept. 2026. Freiburg, Germany

▼ A Conference Of



▼ Hosted By



## Strengthening Collaboration Across SHC: Introducing the New SHC Collaboration Groups

### Why Collaboration Groups?

Over the years, SHC Tasks have delivered high impact knowledge, tools, and international cooperation. However, between Tasks, valuable expert networks can lose momentum. Collaboration Groups are designed to bridge that gap.

Their goal is simple yet powerful: to maintain a low level but continuous exchange among experts in strategically important SHC areas, keeping ideas alive, encouraging collaboration, and creating a natural pathway toward future Tasks and knowledge products.

In short, Collaboration Groups ensure that promising ideas are not lost or forgotten.

### What Makes Collaboration Groups Different?

Collaboration Groups are intentionally lighter and more flexible than Tasks or Working Groups:

- **Broad scope:** Each group focuses on a strategic SHC theme rather than a narrowly defined workplan.
- **Minimal administrative burden:** Fewer formal requirements, no extensive deliverables.
- **Ongoing continuity:** Groups are considered permanent structures, subject to an annual ExCo review to ensure continued relevance.
- **Idea incubators:** CGs provide space for discussion, networking, and early development of new concepts that may later evolve into full Tasks.

Typical activities include at least one annual meeting, continuous expert exchange, and a short annual summary report.

### Who Can Participate?

Each Collaboration Group is led by a SHC Participating Country (with the option of a coleader) and is open to all SHC members countries and sponsors. Experts from nonmember countries or organizations may also participate as Observers, subject to annual ExCo approval.

To strengthen alignment with SHC governance, each Collaboration Group includes a volunteer ExCo representative, helping ensure visibility and strategic relevance.

### Building a Long Term SHC Knowledge Network

Rather than reacting only when a new Task is proposed, Collaboration Groups establish a permanent backbone of expertise across the programme.

Current Collaboration Groups are:

- Solar Water Heating
- Solar District Heating
- Solar Neighbourhoods
- Solar Heating for Industrial Processes (SHIP)
- Solar Cooling

### Looking Ahead: Meet the Collaboration Groups at EuroSun 2026

A major milestone for the new Collaboration Groups will be EuroSun 2026, where several groups will actively present their activities, ideas, and emerging priorities. The groups include Solar Hot Water, Solar Cooling, Solar Heating for Industrial Processes and Solar District Heating. This will be a valuable opportunity for the wider solar thermal community to:

- Learn about the new Collaboration Group structure
- Engage directly with CG leaders and members
- Explore opportunities to contribute, collaborate, or propose new work

## Call to Action

### Get Involved

Collaboration Groups are open, dynamic, and driven by expert engagement. Whether you are an experienced SHC contributor or a new participant with fresh ideas, your involvement matters.

- Join a Collaboration Group aligned with your expertise
- Help shape future SHC Tasks by contributing ideas and perspectives
- Attend CG sessions at EuroSun 2026 and connect with peers across the SHC community

If you are interested in participating, leading, or learning more about Collaboration Groups, please contact the SHC Secretariat or your national SHC representative.

Together, Collaboration Groups will help ensure that SHC remains connected, innovative, and ready for the challenges ahead—not just from Task to Task, but continuously.

### Upcoming SHC Collaboration Group Meetings

Solar Hot Water - will be held on **May 20th 10-11:30 CET**

## Reflections from the Chair

### Looking Ahead (and Back)

Together Colleagues and friends of the SHC community, In 2026/2027, we celebrate the 50th anniversary of the IEA Solar Heating and Cooling Technology Collaboration Programme—a milestone that reflects five decades of international collaboration, technical excellence, and real-world impact. Since its founding, SHC has brought researchers, industry, and policymakers together to advance solar heating & cooling and related technologies for solutions that are reliable, efficient, and increasingly central to the energy transition.

That collaborative legacy is very much alive today. SHC Tasks are delivering tangible outcomes: compact and high-performance thermal energy storage concepts, solar district heating systems now operating at scale, and hybrid solutions linking solar thermal with heat pumps and district energy networks. Across buildings, industry, and communities, Task partners are moving from innovation to implementation—addressing system integration, performance assessment, and replicability to support wider uptake.

As we look ahead, SHC is also evolving to ensure our Programme is clearly understood, inclusive, and well positioned to meet emerging needs. This next chapter will be showcased at EuroSun 2026 in Freiburg, Germany (14–18 September). I strongly encourage all SHC colleagues and partners to participate—not only in the technical sessions, but especially in the SHC event on Tuesday evening, where we will highlight the Programme achievements, honour our outstanding contributors, celebrate our 50-year legacy, and set out our shared direction for the years ahead.

Thank you for your continued commitment and collaboration. The foundation built over the past 50 years is strong, and—together—we are shaping an ambitious and confident future for SHC.



**Lucio Mesquita**  
Chairman IEA SHC

## Events



### Exclusive Joint Pre-Conference Webinar

From 14-18 September 2026, Germany will host two outstanding scientific events taking place in parallel: **EuroSun2026 in Freiburg im Breisgau** and **SolarPACES 2026 in Bad Neuenahr-Ahrweiler**.

Together, these conferences will unite the leading international communities in **solar thermal technologies** and **energy systems**.

To offer a sneak preview into the integrated program and joint sessions, we are pleased to invite you to an exclusive joint pre-conference webinar, hosted by experts from IEA SHC and SolarPACES.

#### What to Expect

This webinar marks the beginning of a closer collaboration between EuroSun and SolarPACES and will focus on:

#### District Heating: New Developments and a Proven Success Story

- Real-world examples demonstrating successful district heating applications
- The role of solar thermal technologies
- Lessons learned and key success factors for scalable deployment

#### Webinar Details

##### Date & Time

15 June 2026, 16:00 - 17:00 CEST (14:00 - 15:00 UTC)  
17 June 2026, 08:00 - 09:00 CEST (06:00 - 07:00 UTC)

##### Format

Online (Zoom)

##### Participation

Free of charge

The recording and presentation will be made available after the webinars.

#### Webinar Speakers

**Lucio Mesquita**  
Chairman IEA SHC

**Robert Pitz-Paal**  
Chairman SolarPACES 2026

**Magdalena Berberich**  
Management Solites

**Joakim Byström**  
CEO Absolicon Solar Collector ABC

The session will be opened by ISES and moderated by Bärbel Epp (Solrico)

#### Registration

ISES, SolarPACES and IEA SHC Solar Academy are pleased to present this webinar at two different times to best cater to our global audiences from all around the world.

The webinar on 17 June will consist of a broadcast of the presentations given on 15 June, including a Q/A session with the moderator and speakers.

[Register for the webinar on 15 June here](#)

[Register for the broadcasted webinar incl. Q/A session on 17 June here](#)

# Momentum builds for solar thermal in Poland: Major plant, new tenders and EU Project LIGHT



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▲ Kickoff meeting of the EU Project LIGHT at the Faculty of Architecture of the Gdańsk University of Technology on 10 February 2026  
Photo: K. Krzempek

The beginning of the year has brought a series of important developments for Poland’s solar thermal sector. Construction has started on the country’s largest solar district heating plant – an 12.3 MW installation in Gliwice in southern Poland (see photo) – with more calls for tenders for similar projects expected in the coming months. At the same time, Prof. Justyna Martyniuk-Pęczek from the Gdańsk University of Technology has launched the EU-funded project LIGHT, which promotes a comprehensive approach to planning and modernizing urban areas into positive energy districts. The three-year initiative will also provide the framework for the newly established Solar Neighborhoods collaboration group under the IEA Solar Heating and Cooling Programme. Although Poland only joined the programme in August 2024, it is already proving to be a highly active member.

Martyniuk-Pęczek will lead the collaboration group on Solar Neighbourhoods. She also represents Poland on the executive committee (ExCo) of the IEA SHC Programme. “In our last ExCo meeting in November 2025 we founded collaboration groups for a number of topics. These groups will activate and develop an expert network to foster joint research activities that can then lead to a proposed new task concept”, explained Ben Stinson, IEA SHC Secretary General. If you are interested in joining the Solar Neighbourhoods collaboration group, you can contact Prof. Justyna Martyniuk-Pęczek (juspecze@pg.edu.pl).

“We understand the concept of energy-positive districts not only as supporting energy transition but also contributing to health and the quality of life of residents”, explained Martyniuk-Pęczek. Hence, this approach combines energy, environmental, spatial, social and mobility goals.

One of the key elements of LIGHT will be the creation of three Urban Living Labs, where different paths for urban energy transformation will be tested and compared.

- Kartuzy in Poland will become a laboratory for energy-orientated renovation of buildings and the integration of green-blue infrastructure.
- Lund in Sweden will focus on densification and climate-neutral energy production.
- Innsbruck in Austria will develop a virtual laboratory, using parametric design to analyze urban scenarios.

### Outreach activities at PowerConnect 2026 in Gdańsk

IFurther outreach efforts to promote the Collaboration Group were carried out during PowerConnect 2026 in Gdańsk—one of Poland’s leading events focused on energy transition and innovative technologies.

During the trade fair, Martyniuk-Pęczek represented the IEA SHC Programme, highlighting opportunities for collaboration with Polish industry and enhancing the visibility of the international research network. She also introduced the Solar Neighborhoods Collaboration Group, sharing insights into interdisciplinary approaches to sustainable, energy-efficient urban development.

### Solar energy replaces 1,800 tonnes of coal for district heat in Gliwice

Progress is slow, but it is moving forward. This is especially true for the decarbonization of Poland’s vast district heating sector, which still relies heavily on coal-fired boilers. With more than 50 GWth of installed district heating capacity, Poland represents the largest district heating market in the European Union.

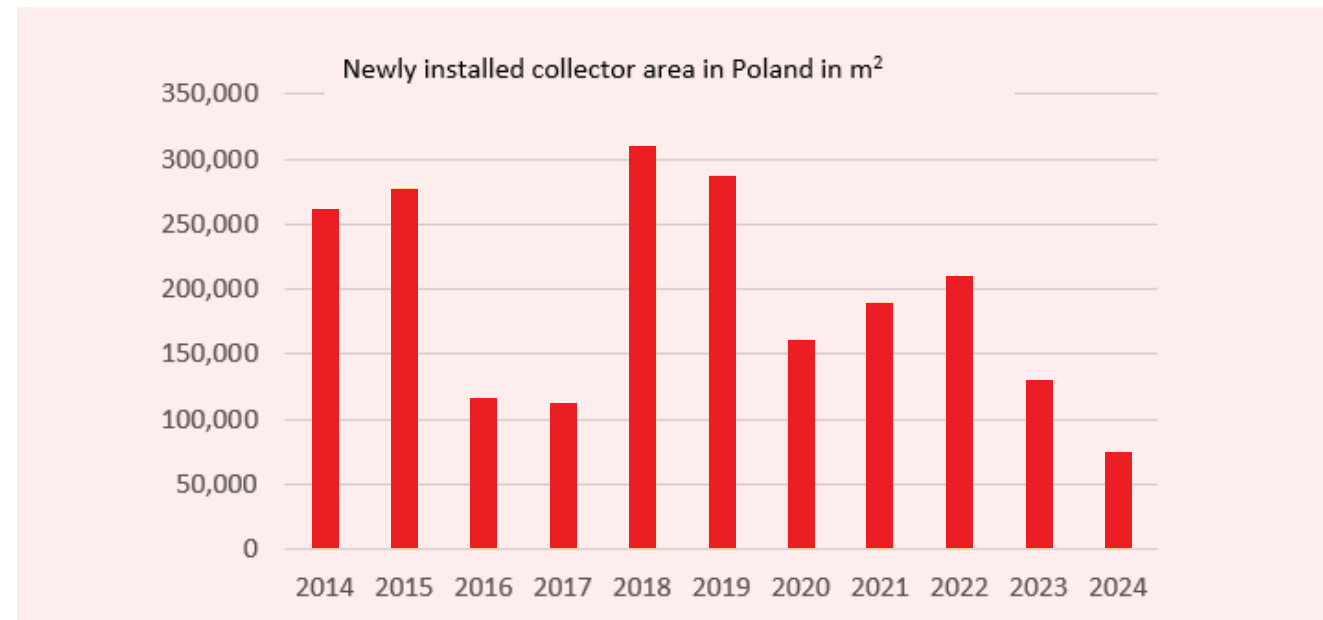
The Polish collector manufacturer Ensol, in cooperation with the Austrian project developer SOLID Solar Energy Systems, won the call for tenders of the energy utility PEC Gliwice for the construction of an 12.3 MW solar district heating plant in Gliwice, near Katowice in southern Poland. Altogether, Ensol will deliver large-format solar thermal collectors with 17.6 m<sup>2</sup> each to the construction site. These are being lifted by crane onto the preassembled mounting structures (see photo below). A 90% stake in SOLID is held by the Israeli collector manufacturer Tigi.

▼ Collector field under construction near the Gliwice coal power plant  
Photo taken from a film published in this LinkedIn Post:

[LINK HERE](#)



▲ PowerConnect 2026 Forum



**“Thanks to our efforts it will be easier for others who follow”**

When asked about the motivation behind choosing a solar district heating plant, Krzysztof Szaliński, Chairman of PEC Gliwice, pointed to its superior land-use efficiency: “An efficiency of 25% for PV compared to 80% for solar thermal makes a significant difference, especially when available land is limited. As a company operating in the heat supply sector, the greener we become, the more acceptable we are to our customers. No smoke, no emissions, no noise - just clean, green heat.”

At present, the district heating system in Gliwice is supplied by a coal-fired power plant. According to Szaliński, the integration of solar heat production will eliminate the need to burn approximately 1,500 tonnes of coal annually. The collector field is expected to cover around 22% of the domestic hot water demand for residents during the spring and summer months. In total, about 40,000 households in Gliwice are connected to the district heating network.

Szaliński also emphasized his role as a pioneer in advancing solar district heating in Poland. PEC Gliwice invested considerable time in preparing the project, including securing land, meeting compensatory tree-planting requirements, negotiating lease agreements and ensuring compliance with the city’s spatial development plans for the designated site. He noted that, as no such installations previously existed in Poland, the

administrative authorities required extensive clarification supported by clear and well-prepared documentation.

According to Szaliński, however, the most significant challenge was “obtaining environmental approvals. Interpreting and applying water law, along with broader environmental regulations, proved demanding both for officials and for us as energy-sector professionals. But thanks to this effort, it will be easier for those who follow.”

**Decline in residential solar water heaters due to a lack of subsidies and installers**

In addition to the good news from the solar district heating sector, the solar thermal market for homeowners is currently in a downward spiral in Poland. There are various reasons for this which are outlined in the report “The Heating Appliances Market in Poland in 2024” published by SPIUG, the Association of Heating Appliance Manufacturers and Importers: [\(LINK\)](#)

- The solar PV sector is booming
- There are no subsidies for solar thermal systems
- Installers who were still carrying out solar thermal installations 15 years ago are no longer active due to age, and no new installation firms are coming through.

Consequently, wholesalers are finding it difficult to recommend installers who could fit solar thermal systems. The results are shown on the graph below:

In 2024, solar collectors with a total surface area of 74,890 m² were installed, which was the lowest figure in the last ten years.

SPIUG Chair Janusz Starościk summarized the situation regarding subsidies in the annual market report as follows: “Although solar thermal collectors now occupy a more visible position in the clean air programme, the lack of specific support for hybrid systems – solar collectors in combination with heat pumps and electric or biomass boilers - remains an issue. These hybrid systems are attracting increasing interest and could offer optimal investment and operating costs for many users.”

▼ **Key figures for the solar district heating plant in Gliwice. It is part of an overall EUR 86.1 million energy transition project of PEC Gliwice which also includes the construction of a 21 MW waste-to-energy plant and the storage facility** Source: PEC Gliwice

INVESTOR	PEC GLIWICE
<i>Number of Households Connected to the District Heating Plant</i>	Around 40,000 households
<i>Temperatures in the District Heating Grid</i>	Supply temperature: 65 to 90 °C Return temperature: 40 to 50 °C
<i>Size of Collector Field</i>	17,500 m2, 12.3 MW
<i>Type of Collector</i>	large-scale flat plate collectors with 17.6 m2 from Ensol, Poland
<i>EPC of Collector Field</i>	Ensol, Poland, guarantees solar yield over five years
<i>Size of Storage Tank</i>	12,000 m3
<i>Type of Storage Tank</i>	Unpressurized steel tank with a height of 37 m constructed by Bilfinger, Germany, with a capacity of approximately 700 MWh
<i>Solar Fraction During Spring &amp; Summer</i>	approximately 22 %
<i>Solar Fraction Over the Whole Year</i>	2 to 4 %
<i>Publication Date of Call For Tenders</i>	3rd September 2024
<i>Contract Signature After Tendering Process</i>	9th May 2025
<i>Total Net Investment</i>	EUR 16.2 million for collector field including heat storage and technical building
<i>Specific Solar Plant Costs</i>	914 EUR/m2 collector field
<i>Planned Commissioning of the Solar District Heating Plant</i>	June 2027
<i>Support</i>	Project financed by the National Fund for Environmental Protection and Water Management in Warsaw, partly with grants and a preferential loan

**Solar thermal market development in Poland 2014 to 2024**

Source SPIUG

**Websites Of Organizations Mentioned In This News Article:**

**IEA SHC Programme** <https://www.iea-shc.org/>

**Technical University Danzig (TUD)** <https://pg.edu.pl/en>

**PEC Gliwice** <https://pec.gliwice.pl/>

**SOLID Solar Energy Systems** <https://www.solid.at/>

**Ensol** <https://www.ensol.pl/de>

**SPIUG** <https://spiug.pl/>

**Report The Heating Appliances Market in Poland in 2024**

<https://spiug.pl/raporty/spiug-report-heating-appliances-market-in-poland-2024/r>

# TASK 69

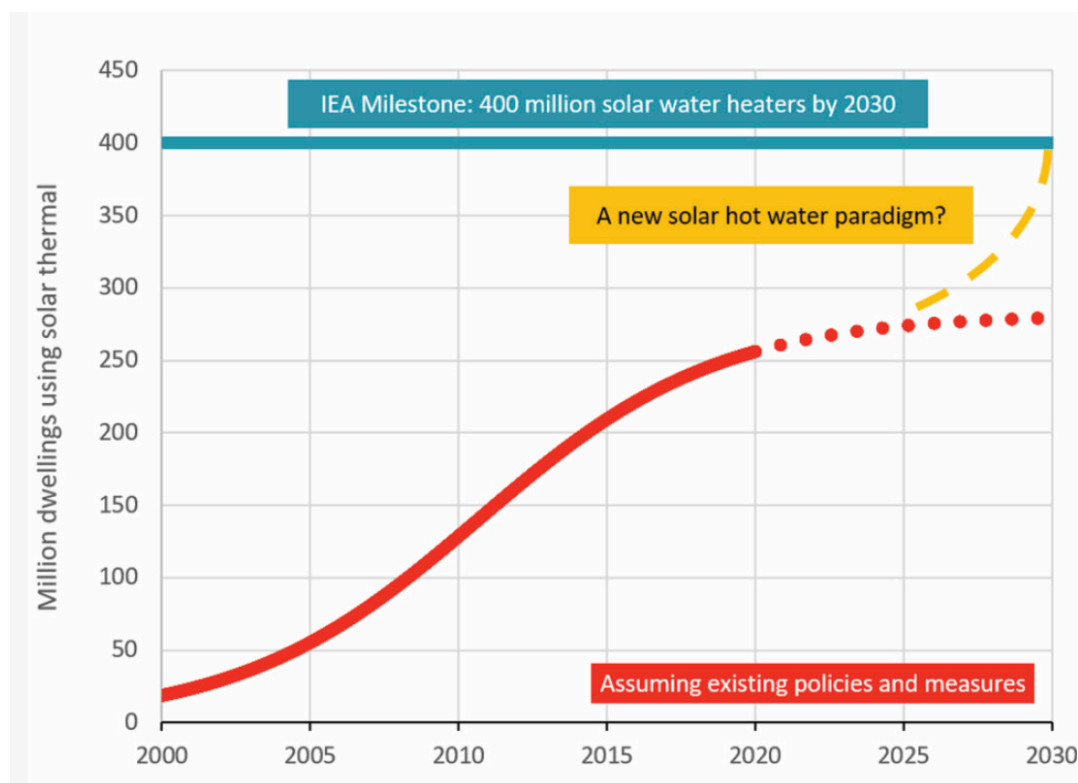
## Solar Hot Water for 2030

*In the global pursuit of energy decarbonization, domestic hot water represents one of the most persistent—yet often overlooked—challenges. While more efficient building envelopes can alleviate space heating and cooling demands, the energy required for domestic hot water (DHW) remains stubbornly steady, now accounting for 11% to 32% of total residential energy use worldwide, with some regions exceeding 50% of household energy consumption. The International Energy Agency (IEA) Solar Heating and Cooling (SHC) Technology Collaboration Programme’s Task 69, “Solar Hot Water for 2030,” has been a 3.5-year international initiative (from July 2022 to December 2025) to try to sustainably address this challenge. The Task brought together a global network of researchers and practitioners—experts from 14 countries—united by a common goal: to investigate which solar hot water technologies are most appropriate now and into 2030, considering the full spectrum of global economic development.*

*Led jointly by Prof. Robert A. Taylor of the University of New South Wales (Australia) and He Tao of the China Academy of Building Research (China), Task 69 focused on two technologies expected to play the biggest role in the solar hot water market in 2030: solar thermal thermosyphon and solar photovoltaic systems hot water heating systems.*

### Why Do We Need Solar Hot Water?

The International Energy Agency has provided the solar hot water sector with a clear mission: deploy at least 400 million residential solar systems by 2030. In their flagship Net Zero by 2050: A



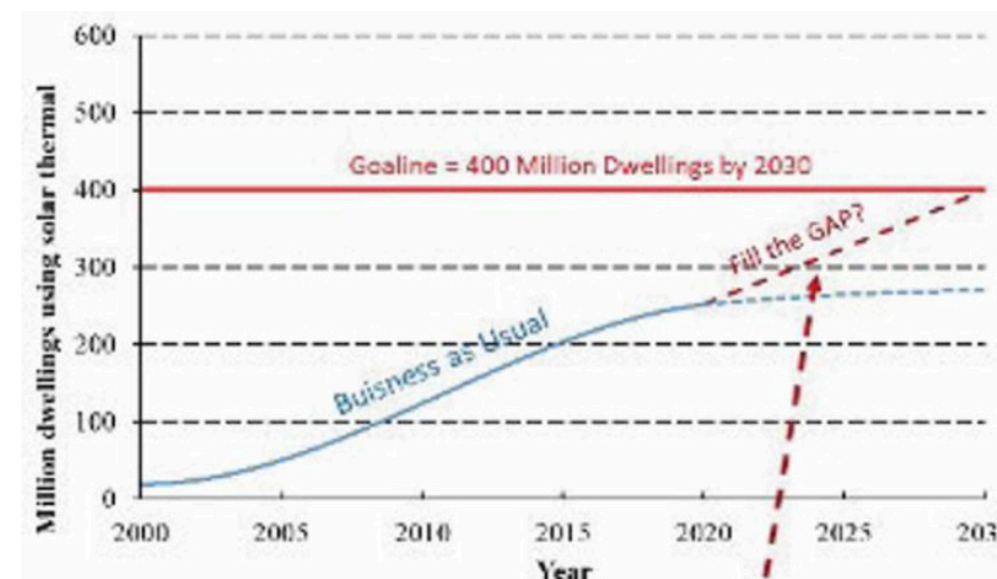
**Fig. 1.** To achieve the IEA’s 2030 milestone, approximately 300 million new solar hot water systems need to be deployed in the 2020s.

Source: 2022-07-400-Million-Residential-Solar-Water-Heaters-by-20301.pdf, Page 1

# TASK 69

Roadmap for the Global Energy Sector, the IEA states that to limit the rise in global temperature to 1.5°C, we need a “massive deployment of all available clean ... energy technologies” and “drastic and immediate technology and policy shifts” to decarbonize buildings. For the solar heating and cooling sector, this means having at least 400 million solar hot water systems in operation by 2030 and 1.2 billion in operation by 2050.

Worldwide, 250 million dwellings used solar thermal technologies for water heating in 2020. However, to reach carbon neutrality by 2050, we estimate that 170 million new conventional solar thermal technologies (e.g., thermosyphons and pumped circulation systems) and 120 million emerging solar systems (e.g., PV-driven systems) are needed. Hot water demand is continuously growing globally, and many IEA SHC member countries have commitments by 2030 to encourage a higher fraction of their energy production to come from solar technologies. At present, 16% of residential energy consumption in IEA countries goes to water heating. However, the solar share of this is low—only 2.1% of space and water heat demand was met by solar thermal in 2018.



**Fig. 2.** Millions of dwellings using solar thermal. The horizontal red line represents the IEA target for 2030, the blue curve represents business as usual, and the dashed lines show future trends.

Source: 2022-07-Solar-Hot-Water-for-2030-Project-Kicks-off-in-July.pdf, Page 1



*“We tend to forget about hot water as a critical part of the energy mix...until we are forced to take a cold shower! We are now in the early stages of a seismic shift in how we make and use energy - so, for me, this new IEA SHC Task 69 on Solar Hot Water for 2030 is all about making sure hot water is not forgotten during our society’s transition to a sustainable energy system.” — Robert Taylor, Co-Task Manager*

## TASK 69

To be in line with the Sustainable Development Scenario (SDS), the share of clean energy technologies needs to exceed 50% of new heating equipment sales by 2030. Task 69 was initiated to address this gap, aiming to accelerate innovation, improve performance and reliability, and support the integration of solar hot water technologies into real-world systems across diverse economic and climatic contexts.

### Objectives and Scope

The Task was structured around four core Subtasks, each addressing a critical dimension of solar hot water deployment:

#### Subtask A State-Of-The-Art And Operating Environments In Different Regions

Collecting data on regional hot water loads, reviewing installed technologies, and identifying best practices and barriers to adoption across global markets.

#### Subtask B Thermosyphon hot water systems

Evaluating the technical and economic potential of thermosyphon systems, investigating failure modes, improving durability and reliability, and quantifying energy savings and GHG reductions.

#### Subtask C Solar Photovoltaic Hot Water

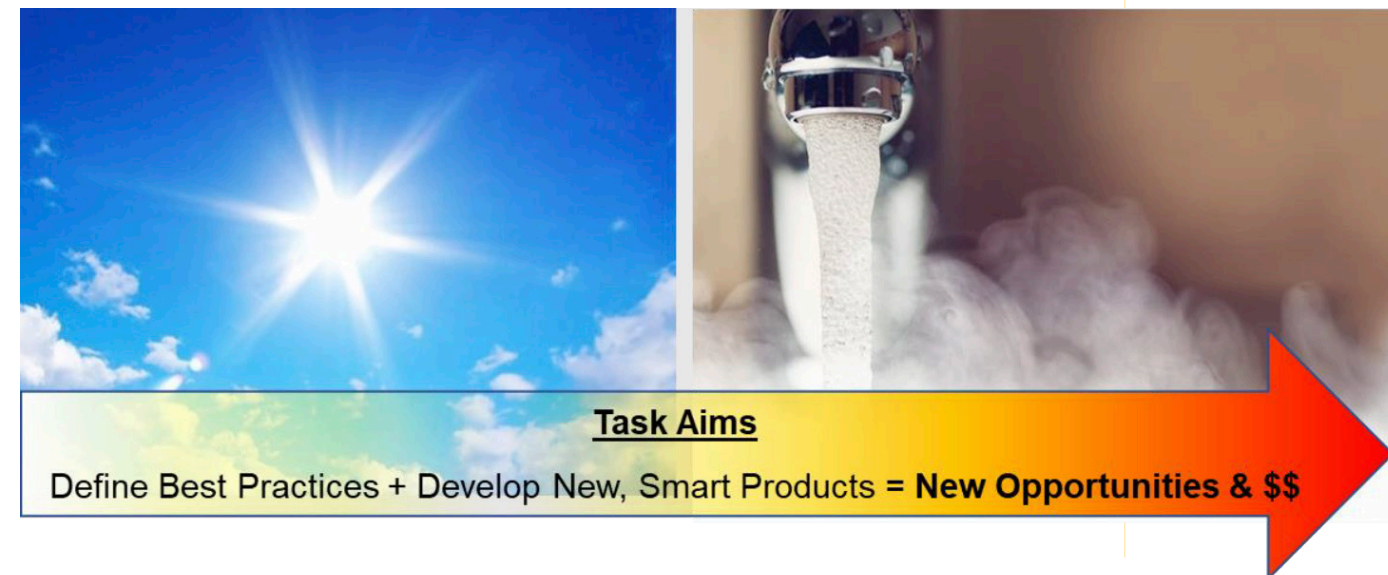
Evaluating the environmental, social, and economic implications of PV diverter and PV2Heat technologies, promoting international free trade, and harmonizing product standards.

#### Subtask D Training and standards

Developing training materials for installers and designers and recommending revisions to current standards on technologies.

▼ **Fig. 3. Graphical representation of the general Aim of the Task**

Source: SHC\_Task\_69\_Solar\_Hot\_Water\_for\_2030-Work-Plan\_1 July 22.doc, Page 3



## TASK 69

### The Task addressed key questions for the 2030 solar hot water industry:

- What is the current distribution of hot water technologies installed by region? What are the existing barriers and opportunities?
- Which technologies are expected to be installed in these regions going forward?
- What is commercially typical best practice available for thermosyphon systems and photovoltaic self-consumption water heaters?
- What are the potential advantages/disadvantages of deploying systems to integrate solar thermal thermosyphon systems and PV self-consumption systems with other energy systems?
- What are the 'most economic' and 'most efficient' options—and potential developments—for thermosyphon systems and photovoltaic self-consumption water heaters?
- How much contribution can the 'lowest carbon' options make to emissions reductions?
- What regulatory/policy frameworks exist now/are needed in the future to ensure and/or encourage these two technologies to be reliable, affordable, and clean sources of hot water?
- What minimum performance and reliability standards are in place for these technologies? What minimum performance and reliability standards should be recommended?
- What activities (e.g., training, R&D) are needed to facilitate rapid commercial manufacture/supply and deployment of water heaters in different regions across the world?

### Key Achievements

#### Subtask A State-of-the-Art and Operating Environments

Subtask A, led by Monika Spörk-Dür (AEE INTEC, Austria), produced comprehensive analyses of the global solar hot water market. The work revealed the high diversity in thermosyphon system applications through in-depth regional analysis spanning Europe, Asia (China, India, Japan), Latin America, the Middle East and North Africa, North America, Oceania, and Sub-Saharan Africa.

#### Key findings from Subtask A include:

- **Europe:** Thermosyphon systems represented 56% of new solar water heater installations in 2022, with strong adoption concentrated in Mediterranean countries (Cyprus, Greece, Turkey).
- **Asia:** In China, thermosyphon systems are primarily deployed in single rural houses and urban multi-story residential buildings. In India, the standard residential configuration is "2 m<sup>2</sup> collector area + 200 L storage tank," priced between USD 250 and USD 500.

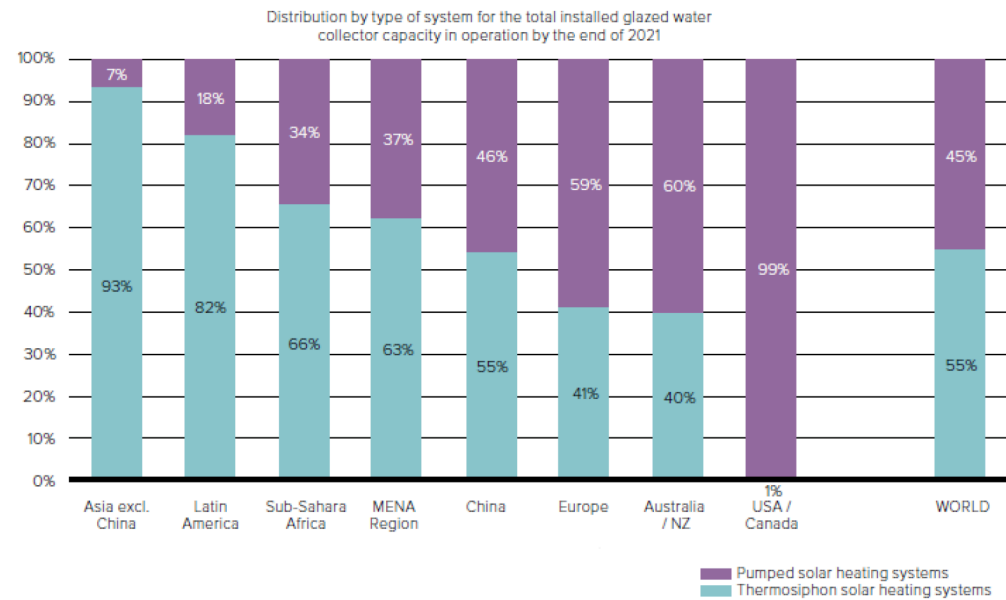


Fig. 4. Main solar water heating technologies per region

Source: T69 D A1 Report Dominant Solar Water Heating Systems V5.docx, Page 9

- **Latin America:** Thermosyphon systems are chiefly household-scale devices, with direct flat-plate units dominating in warm urban zones of Brazil and Mexico.
- **Sub-Saharan Africa:** Thermosyphon systems have become the workhorse technology for institutional and social-residential hot water, driven by cabinet directives obliging public buildings to install solar water heaters.

A side-by-side comparison study of solar hot water technologies was established at the Namibia Energy Institute (NEI) in Windhoek, comparing evacuated tube thermosyphon, flat plate thermosyphon, and PV hot water systems.

Fig. 5. Side-by-side comparison of ETC thermosyphon, flat plate thermosyphon, and PV hot water systems at NEI, Namibia

Source: 7.7\_SHC\_M98P\_Task\_69\_Taylor.pdf, Page 8



### Subtask B Thermosyphon Hot Water Systems

One of the most impactful outcomes of Task 69 was the comprehensive analysis of thermosyphon system failure modes across global markets, particularly in Sub-Saharan Africa. The Task identified 12 common failure modes spanning three phases: Components, Design & Installation, and Operation.

Table 1. Problems and Case Studies in Thermosyphon Systems

Source: T69 B.2 A survey of thermosyphon failure modes, and effects, and suggestions.docx, Page 11

FAILURE MODE	REMARKS
1 Leakage due to component failures	E.g., direct compact systems with evacuated tubes in China
2 Incorrect system dimensioning	Stagnation in summer if over-dimensioned
3 Incorrect mounting support for components	System unstable, can lead to leakages
4 Wrong positioning of pipes and components	Defying the thermosyphon principle
5 Wrong positioning of vacuum breaker	Storage can be completely emptied
6 Missing insulation	Leads to higher heat losses
7 Deterioration of insulation due to missing protection	Missing UV protection
8 Missing safety devices	Missing safety valves, pressure relief valves
9 Leakage due to missing or wrong concentration of antifreeze	Leads to freezing
10 Wrong response pressure for safety valve	E.g., 8 bar pressure for safety valve
11 Corrosion phenomena solar thermal equipment	Stress corrosion cracking in stainless steel
12 Poor water quality especially for direct systems	Scale buildup, pipe corrosion

The Task also documented emerging technologies for thermosyphon systems, including IoT-enabled smart controllers with Wi-Fi and mobile app connectivity, polymeric materials for corrosion resistance, and innovative overheating protection strategies using precise working fluid inventory management.

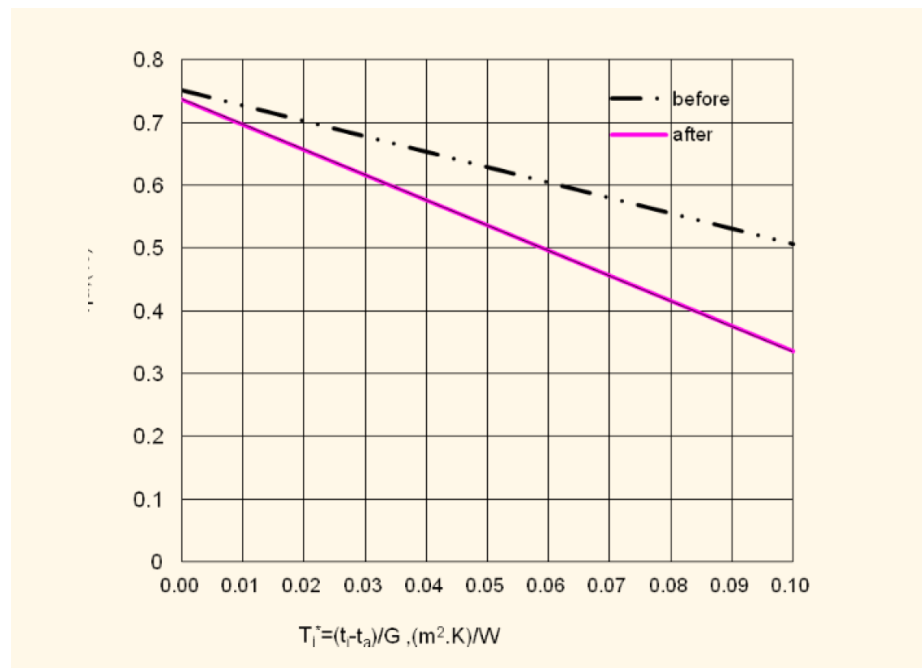
Aging exposure tests conducted by the China Academy of Building Research revealed that rubber sealing ring hardening and insulation material degradation are primary causes of increased heat loss over time. For evacuated tube collectors, heat loss coefficients increased by 63% to 235% after aging tests, highlighting the critical importance of material selection and long-term durability testing.

In the area of GHG reduction, the Task developed a China-specific assessment methodology. Through long-term testing of 15 solar thermal system configurations, the average daily GHG reduction was found to be 0.33–0.75 kg/m<sup>2</sup> for compact (open) systems and 0.14–0.50 kg/m<sup>2</sup> for pressurized (closed) systems.

Fig. 6. Rooftop natural circulation solar water heater and its intelligent controller

Source: T69 B.1 Report of thermosyphon system potential 1.docx, Page 7 (Source: Ma Guangbai, QIT)





**Fig. 7. Thermal performance change of evacuated tube collectors after aging test**

Source: T69 B.3 Report on durability and reliability improving research and technical results 2.docx, Page 7



**Fig. 8. Testing platform at the Clean Thermal Energy Carbon Emission Test Center, Jiangsu Province, China**

Source: 2024-12-Task69-Solar-Hot-Water-Systems-and-Greenhouse-Gas-Reduction-in-China.pdf, Page 1

Using the validated calculation software across 14 cities with different solar resources, the national average GHG reduction was determined to be 284.53 kg/m<sup>2</sup> annually. With China’s total installed solar thermal collector capacity of 545 million m<sup>2</sup>, this translates to an annual GHG reduction of 155 million tons—equivalent to offsetting the entire carbon emissions of more than 19 million people in China.

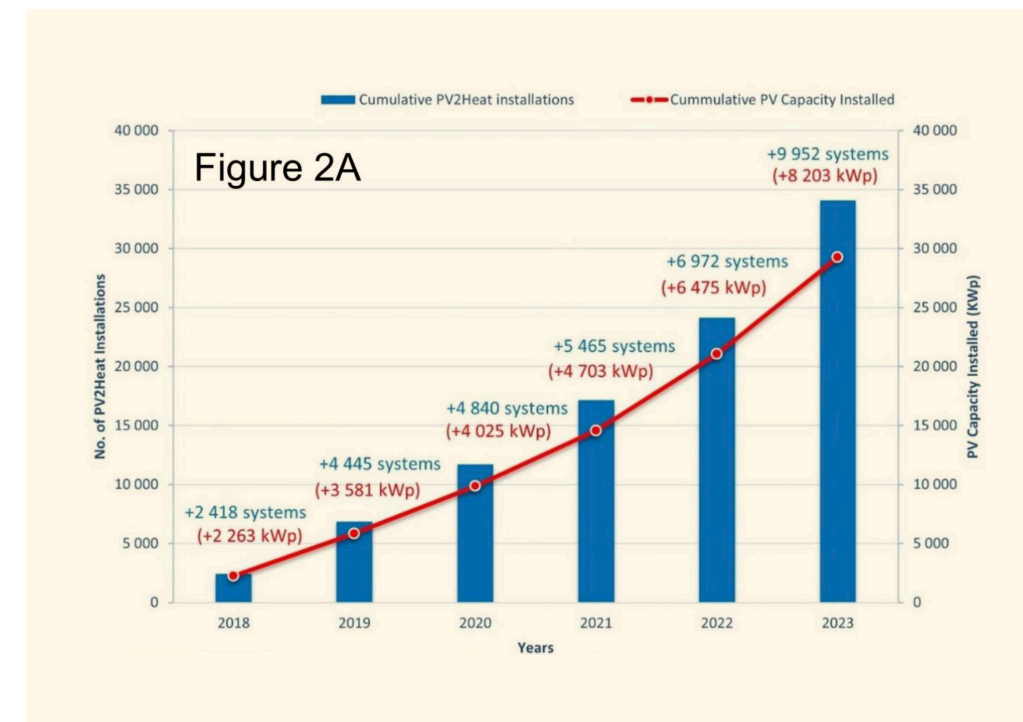
Type	Sample	Testing Results	Testing Results	Calculated Results	Deviation
		Avg. Daily Heat Gain (MJ/m <sup>2</sup> -d)	Avg. Daily GHG Reduction (kg/m <sup>2</sup> -d)	Daily Heat Gain (MJ/m <sup>2</sup> -d)	
Compact (open)	1	3.62	3.62	3.19	11.9%
	2	3.18	0.51	2.97	6.6%
Pressured (closed)	14	0.86	0.14	0.84	1.2%
	15	1.76	0.28	1.71	2.8%

**Table 2. Comparison of simulated and tested average daily heat gain**

Source: 2024-12-Task69-Solar-Hot-Water-Systems-and-Greenhouse-Gas-Reduction-in-China.pdf, Page 2

**Subtask C**  
Solar Photovoltaic Hot Water

Subtask C produced the first comprehensive survey of PV hot water technologies, including PV2Heat systems, PV diverters, smart hot water tanks, and PV-driven heat pump water heaters. The Technology Brief “The Emergence of PV Hot Water Systems” documented market development trends, including the remarkable growth of PV2Heat systems in South Africa, where installations quadrupled from 2,418 systems in 2018 to 9,952 systems in 2023.



**Fig. 9. Growth of PV2Heat market in South Africa between 2018 and 2023**

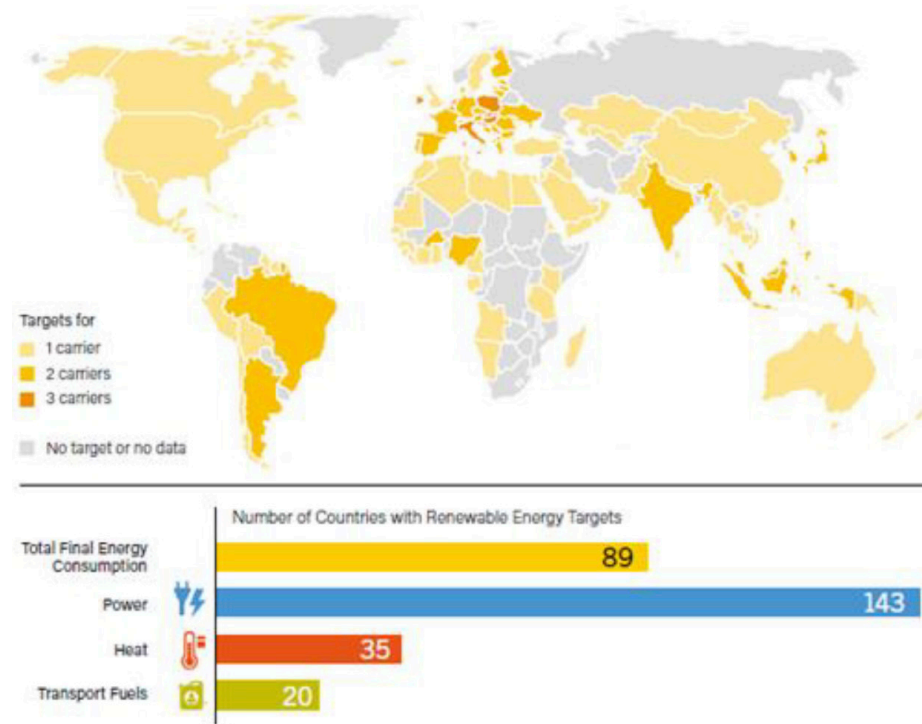
Source: IEA-SHC-Task69-C.3\_23-PV-Hot-Water-Technology-Brief.pdf, Page 4

The Task also produced a comprehensive Policy Initiatives report (Deliverable C.5) analyzing the policy landscape for PV hot water systems across multiple countries. Key findings revealed that only 35 countries have renewable energy targets regarding heat demand, while 143 countries have renewable energy targets in power demand. The survey of IEA-SHC experts showed that 80% of respondents without existing hot water policies identified a need to include PV hot water, heat pumps, and other renewable options.

Three peer-reviewed journal publications emerged from Subtask C, covering PV hot water system modeling, optimization, and grid integration.

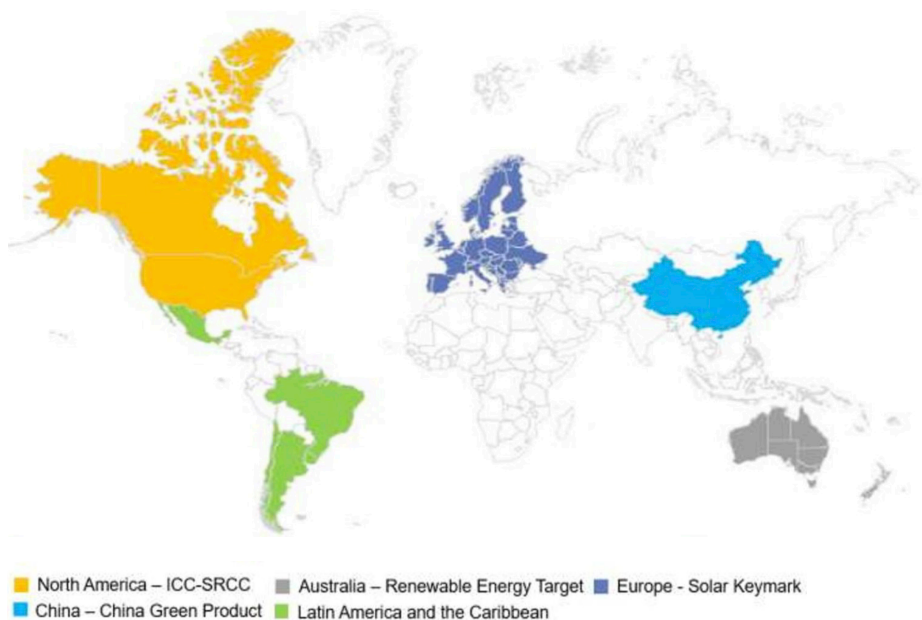
Another key factor for PV-driven hot water systems is that hot water tanks represent one of the cheapest forms of energy storage for times when PV electricity production (locally and regionally) exceeds demand. As such, hot water may yet have a big role to play in the energy transition as a low-cost and reliable form of demand side management for soaking up solar energy rather than curtailing it.

# TASK 69



## Subtask D Training and Standards

Subtask D delivered a comprehensive global assessment of solar hot water standards and certification networks. The report “Solar Hot Water Standards and Certifications – Pathways to 2030” documented certification schemes including Solar Keymark (Europe), SRCC (North America), SHAMCI (Arab region), and China Green Product certification.



# TASK 69

The Task also developed and delivered multiple training sessions, including:

- On-site workshop at the SSBI conference in Lianyungang, China (50 on-site experts + 1,500 online participants)
- Training session in Windhoek, Namibia (September 2025)
- Solar Academy webinar (September 2024)

The success stories report (Deliverable D4) documented ten success stories from around the world, including the Solar Keymark in Europe, Australia’s Component Testing and System Simulation (CTSS) approach, the SOLTRAIN+ program in Southern Africa (which has trained over 5,000 people), China’s comprehensive standard system, and successful market transformations in Brazil, Mexico, Chile, Barbados, and the SHAMCI initiative in the Middle East.

## Looking Ahead

Although Task 69 has officially concluded (with a six-month extension to December 2025), its legacy continues. The insights and tools developed during the Task lay the foundation for future innovation in solar hot water. Key areas for continued focus include:

- **Scaling up production** of advanced thermosyphon and PV hot water systems
- **Harmonizing international standards** for PV2Heat and solar thermal systems
- **Integrating smart controls and IoT** for predictive maintenance and optimized performance
- **Bridging the gap** between laboratory research and market deployment in developing economies

**Fig. 12. Solar hot water training sessions: Lianyungang, China (left) and Windhoek, Namibia (right)**

Source: 7.7\_SHC\_M98P\_Task\_69\_Taylor.pdf, Page 18



## Final Thoughts

The answer is simple: because domestic hot water is essential to daily life, and its decarbonization has been overlooked for too long. Without cost-effective, reliable, and scalable solar hot water solutions, the full potential of renewable energy in the building sector cannot be realized. Task 69 has demonstrated that both thermosyphon and PV hot water systems offer viable pathways to meet the 2030 targets—but only if supported by appropriate policies, standards, and training.

By developing comprehensive market analyses, identifying failure modes and solutions, improving durability and reliability, quantifying GHG reduction methodologies, and fostering international collaboration, the Task laid critical groundwork for integrating solar hot water systems into residential, commercial, and industrial applications worldwide. Its outcomes not only addressed technical challenges but also helped bridge the gap between innovation and market readiness—making solar hot water a key enabler of climate-neutral energy solutions.

Task 69 demonstrated that solar hot water is not just a technical possibility—it is a strategic necessity and a big opportunity for the future of sustainable energy systems. Through international collaboration, rigorous testing, and knowledge sharing, the Task helped move solar hot water technologies closer to real-world deployment.

### Take-away messages on Solar Hot Water:

- ✔ **Solar hot water is essential** — for maximizing the value of solar energy in the building sector, where DHW accounts for an increasing share of energy consumption—from 11% to over 50% depending on region.
- ✔ **Thermosyphon systems** — remain the most widely deployed solar hot water technology globally, with significant potential for improvement through smart controls, polymeric materials, and better installation practices. The identification of 12 common failure modes provides a roadmap for quality improvement.
- ✔ **PV hot water systems** — are rapidly emerging as a cost-effective alternative, particularly in markets with high PV penetration, offering advantages in freeze protection, grid flexibility, and integration with other electrical loads.
- ✔ **Standardization and harmonization** — are vital to accelerating innovation and building trust across the industry—particularly for PV2Heat systems, which lack international testing standards.
- ✔ **Training and certification** — of installers are critical to ensuring system reliability and durability, as demonstrated by success stories from Australia, Brazil, Mexico, and the SOLTRAIN+ program in Southern Africa, where over 5,000 people have been trained.
- ✔ **GHG reduction quantification** — must be region-specific. China's example shows that with 545 million m<sup>2</sup> of installed collectors, annual GHG reductions reach 155 million tons—offsetting the emissions of 19 million people.

**Task 69 Participants:** Australia, Austria, Canada, China, Denmark, Greece, Italy, Norway, Portugal, Switzerland, GN SEC (Zimbabwe, Botswana, Lesotho, Namibia, South Africa), United Kingdom

**Task Duration:** July 2022 – December 2025 (extended by 6 months)

**Task Managers:** Prof. Robert A. Taylor (UNSW, Australia) & He Tao (CABR, China)

For more information: <https://task69.iea-shc.org/>

## INTEVIEW

# Robert Taylor



*Prof. Robert A Taylor's has served as an Academic at the University of New South Wales since 2011. His main research interest is in the development of 'next generation' solar and thermal energy systems. Drawing on the fields of heat transfer and nanotechnology, he is researching new/novel components, fluids, materials, and systems to increase the utilisation of solar energy in society. As such, his main goal is to provide a more efficient and more economic coupling between solar energy and useful thermal and/or electrical energy.*

### Why was a project like this needed?

**???? ????? (???)**: This Task was needed because domestic hot water is a major—and growing—source of energy use and emissions that has been consistently underestimated. In many regions, it now accounts for a quarter or more of household energy demand, yet policy, standards, and innovation efforts have focused far more on space heating, cooling, and electricity. At the same time, the IEA, and many local regions, have set netzero targets. Achieving this will require hundreds of millions of solar and solar-enabled hot water systems to be installed around the world by 2030. Task 69 was created to close the gap between that ambition and the reality on the ground.

### How has the Task's work supported capacity and skill building?

**???:** Capacity building was central to the Task. We worked not only on technology assessment, but on understanding why systems succeed or fail in real markets. Identifying common failure modes in thermosyphon systems was particularly important, because it showed how much system performance depends on installer skills, standards, and training. Through workshops, regional training sessions, and collaboration

with programmes like SOLTRAIN+, the Task helped strengthen local expertise, especially in emerging markets where solar hot water can deliver the greatest social and economic benefits.

### What is the future of solar hot water?

**???:** I see a very strong future for solar hot water systems, but it will not be a simple continuation of the past. Thermosyphon systems will remain essential—particularly in regions where affordability, simplicity, and reliability are paramount—but they will increasingly be smarter, more durable, and better standardised. At the same time, PV-based hot water systems will continue to grow rapidly in markets with high PV penetration, because they integrate naturally with electrification and offer valuable grid flexibility. Importantly, I think solar hot water is evolving from a stand-alone technology into an active component of future energy systems. Hot water storage is emerging as one of the lowest-cost forms of thermal energy storage available, allowing excess solar electricity to be absorbed rather than curtailed. With improved controls, digital monitoring, and stronger installer training, solar hot water systems can deliver reliable service lifetimes while also supporting

demand-side management and emissions reduction goals.

### What is the status of applications using solar hot water systems?

**???:** The most widely deployed hot water systems are still conventional gas and electric hot water system, but solar thermal represents a long-standing and reliable solution (both pumped and thermosyphon systems) which has wide deployment in most countries in the world. Additionally, in almost every country some fraction of the electricity supplied to electric water heaters comes from PV generation, so almost every electric water heater is-by default using some solar energy... but there a several technologies and policies that can be used to boost this dramatically which are emerging.

### What were the benefits of running this as an IEA SHC Task?

**???:** The IEA SHC framework was critical to the success of this work. It allowed us to bring together countries at very different stages of market development, to share data openly, and to look at technology, policy, and training together rather than in isolation. It also ensured that our findings were aligned with global perspectives and trends and our work with industry experts has made the outputs directly relevant for industry and policymakers.

INTEVIEW

**Was there one result that surprised you?**

???: Two things stood out. First was how often system underperformance comes down to very basic issues like installation quality and materials durability, rather than limits of the technology itself. That really reinforced the importance of standards and training. First was the sheer scale of emissions reductions already being delivered by solar thermal—China alone is avoiding well over 100 million tonnes of CO<sub>2</sub> per year through existing installations and by how much potential there is for further reductions if we can utilise PV energy with hot water to help balance the grid and to get the most out of solar and hot water equipment.

**What is a Task success story from an enduser or industry perspective?**

???: A strong success story that was studied in the Task is the SOLTRAIN+ programme in Southern Africa, which has trained thousands of installers and helped build reliable local solar hot water markets. Another is the rapid development and uptake of PVdriven hot water systems in places like China and in South Africa, showing that relatively simple, reliable, affordable, and (perhaps) “smart” technologies can scale very quickly.

**Will we see more work in this area in the IEA SHC Programme?**

???: Absolutely. Task69 showed that solar hot water is not a mature problem that has been “solved”—it’s a strategic opportunity that must continue to “evolve”. There is clear momentum for further work

▼ Namibia Solar Tours – 22-25 September 2025, Windhoek, Namibia



▼ Task Meeting In China – 11-12 October 2024, Lianyungang, China



on PVtoheat technologies, smart controls, durability and quality assurance, and the role of hot water as a flexibility and storage asset in future energy systems. I fully expect solar hot water to remain an important focus within the SHC Programme as part of the upcoming Collaboration Group on Solar Hot Water.

Towards Unified Metrics of LCA and LCoH for Heating Technologies



*Karl-Anders Weiß has spent the past three years intensively working on the life cycle and cost assessment of alternative heating technologies. The researcher from the German institute Fraunhofer ISE has lead Task 71 of the IEA Solar Heating and Cooling Programme on this very topic, which has now concluded after three years. The most important milestone: the researchers developed a harmonised method for calculating both the environmental impact (life cycle assessment = LCA) and the levelised cost of heat (LCoH) of heating systems. This method was applied to various heating technologies, including gas boilers, heat pumps, PVT combined with heat pumps, and biomass combined with solar thermal systems. In this article, Weiß outlines and explains the key takeaways from Task 71 and announces several upcoming publications, which will be released gradually on the Task 71 website under the “Publications” section. <https://task71.iea-shc.org/publications>*

**1. The regulations aimed at reducing greenhouse gas emissions and/or fossil fuel consumption in heating systems vary widely from country to country and need to be harmonised.**

Task 71 provides an overview of regulations for energy-efficient buildings and residential heating systems across ten countries, as presented in the report “Regulations for Heating Systems – National Situation and International Overview”, which is already available for download (link). Denmark, for example, has set a cap of 30 kWh/m<sup>2</sup> per year for energy used in heating, ventilation, cooling, and domestic hot water. France applies a primary energy consumption coefficient to define the maximum allowable total energy use of a building. In Germany, new heating systems must include at least a 65% share of renewable energy (a regulation which has changed by the ne government in May 2026.). In an upcoming position paper, the Task 71 researchers call for greater harmonisation of regulatory frameworks - at least across Europe - to make it easier for heating equipment manufacturers to meet requirements in different markets and, as effect, reduce costs for consumers. In the position paper it says:

“Task 71 delivers a practical foundation for making heating technologies comparable on both environmental and economic grounds. The real impact now depends on consistent data from manufacturers and broader alignment of regulations across markets.”

KARL-ANDERS WEISS

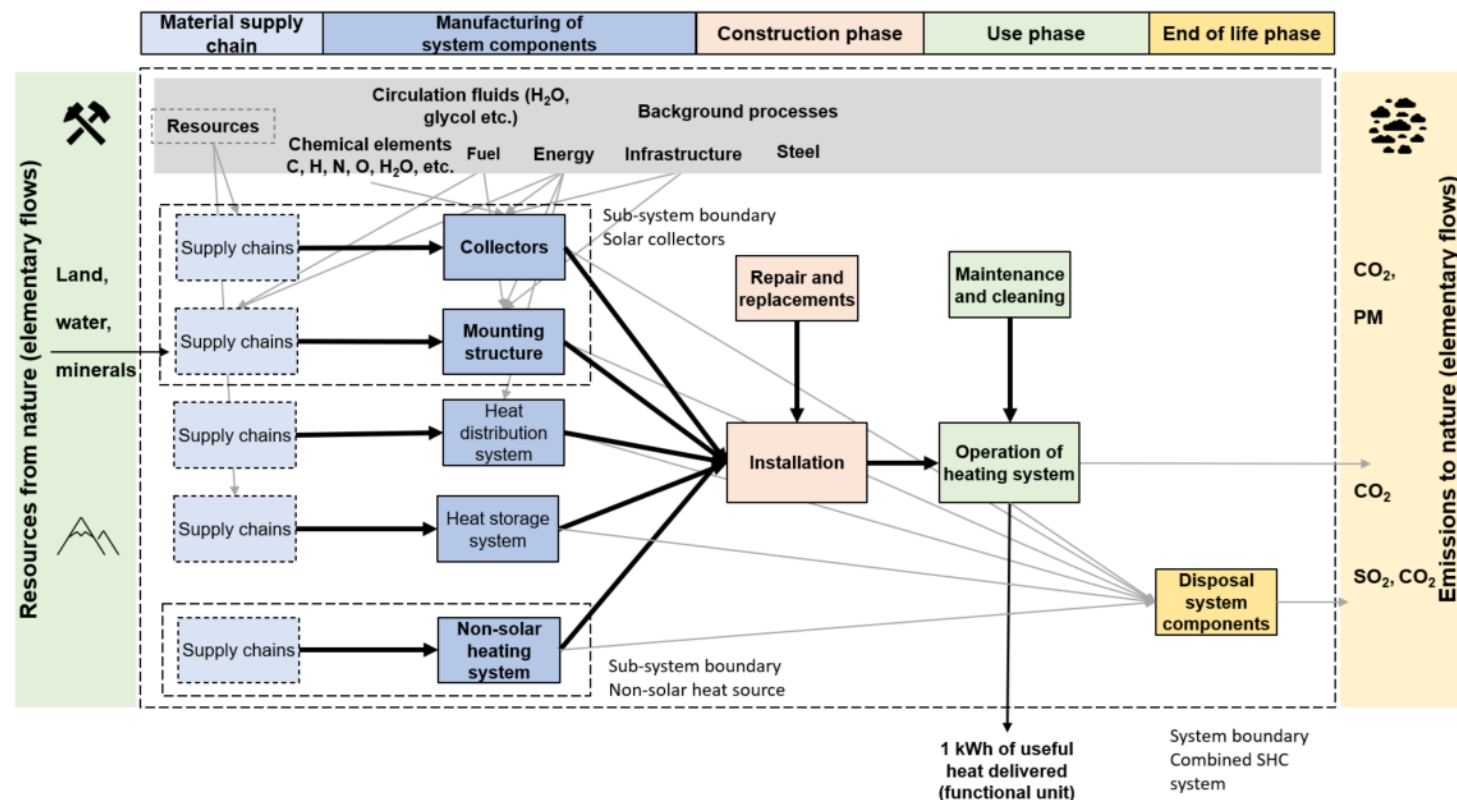
# TASK 71 Main Takeaways

## 2. The ecological and economic assessment of heating systems must be integrated into a single evaluation framework.

This principle lies at the core of Task 71. The outcome is a comprehensive 50-page guideline (to be published soon) that details methodologies for both life cycle assessment and the levelised cost of heat (LCoH). Both approaches are based on a shared, generic description of heating systems and standardised load profiles for various use cases. The guideline also defines system boundaries and recommends structuring systems into subsystems and components. For LCoH, it further provides detailed equations for calculating costs across different system types and configurations

*“As an international expertise-based institution with the goal to support ecologically and economically sustainable heat supply we strongly recommend harmonizing regulations and reporting formats for the heating sector to support and accelerate the transformation of the heat supply for domestic buildings. We see internationally agreed formats to supply data describing heating systems as well as heat demand of buildings as an essential and easy to realize step to reduce the overall effort related to the fulfillment of regulations.”*

▼ Generic system model for a heating system that consists of a solar thermal system together with a non-solar heating system as support. The environmental impact is assessed along the whole lifetime of the product including the material supply, manufacturing, construction phase, use phase and end of life phase Scheme: ZHAW University, Switzerland



▼ Standardised load profiles developed within Task 71 and to be published as individual infosheets on the Task 71 publication page <https://task71.iea-shc.org/publications>

# TASK 71

## 3. The methodology enables a consistent comparison of the environmental impact across a wide range of heating systems.

Task 71 researchers did not limit their work to solar thermal systems; they also analysed technologies such as gas boilers, heat pump systems, and hybrid solutions including biomass combined with solar thermal or PVT combined with heat pumps. A key objective was to collaborate with experts from other IEA Technology Collaboration Programmes (TCPs) focusing on these technologies. Weiß and his international colleagues reached out to the Photovoltaic Power Systems Programme (PVPS), Heat Pumping Technologies (HPT), and District Heating and Cooling (DHC) TCPs. While all three recognised the value and relevance of the approach, their level of involvement varied: the DHC TCP closely supported the drafting of the methodology guideline, experts from PVPS exchanged directly with the authors of the guideline and the HPT TCP was consulted internally via Fraunhofer ISE Freiburg.

## 4. Based on the harmonised methodology for calculating environmental impacts and the levelised cost of heat (LCoH), heating system manufacturers are now expected to provide reliable product data.

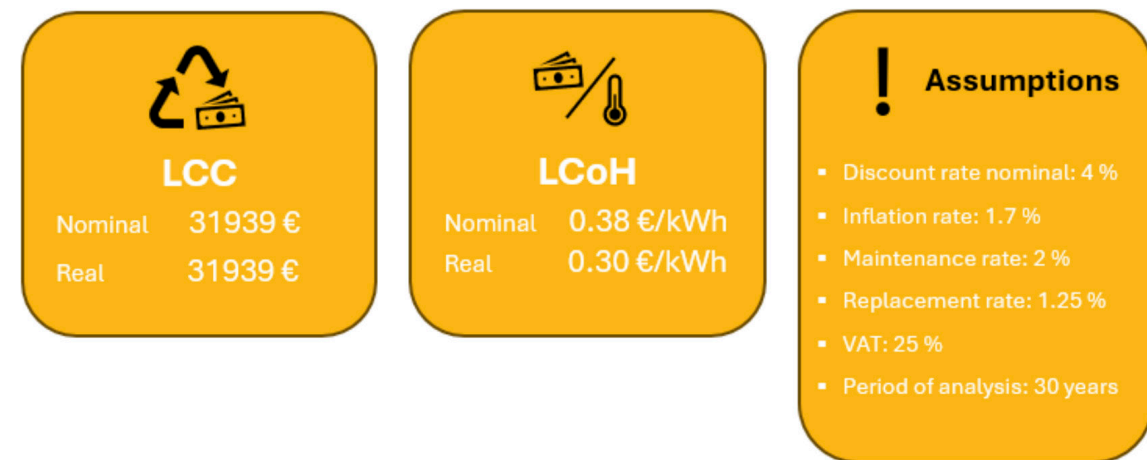
Within Task 71, researchers developed typical load profiles for ten different demand cases (see table). These load profiles - provided partly as Excel files and partly as text documents - are being gradually published on the Task 71 website as Info Sheets. Weiß emphasised that, going forward, heating system manufacturers will need to supply detailed product data so that investors and public authorities can accurately compare the environmental performance of different heating systems.

COUNTRY	DEMAND CASE	LOAD
1 Austria	District heating	heating: 7700 MWh/year
2 Denmark	Low energy single family house	heating: 7.1 MWh/year
3 China	Public Building, Tibet	heating: 5.2 MWh/year
4 Germany	New single-family house	heating: 9.6 MWh/year
5 Germany	Existing single-family house	heating: 23.5 MWh/year
6 Portugal	Domestic hot water demand SFH	heating: 1.8 MWh/year
7 Spain	Reference load profile of a commercial center	cooling: 6412 MWh/year
8 Spain	Reference load profile of a 12-dwelling building	heating: 70 MWh/year, cooling: 14 MWh/year
9 Spain	Reference load profile of a 50-dwelling building Spain	heating: 292 MWh/year, cooling: 58 MWh/year
10 Switzerland	New single-family house	heating: 24.3 MWh/year

## 5. Discount rate and inflation have a significant impact on the results von LCA and LCoH

Task 71 researchers are currently developing so-called fact sheets that present economic and environmental performance results for selected, generically defined heating systems and load profiles. These fact sheets are designed to be easily understood by investors. The key parameters underlying the calculations are clearly summarised in an Assumptions box, allowing readers to grasp the main inputs at a glance.

▼ The figure shows the results of the environmental impact assessment for a PVT and heat pump system applied to a low-energy single-family house in Denmark. Source: Task 71.

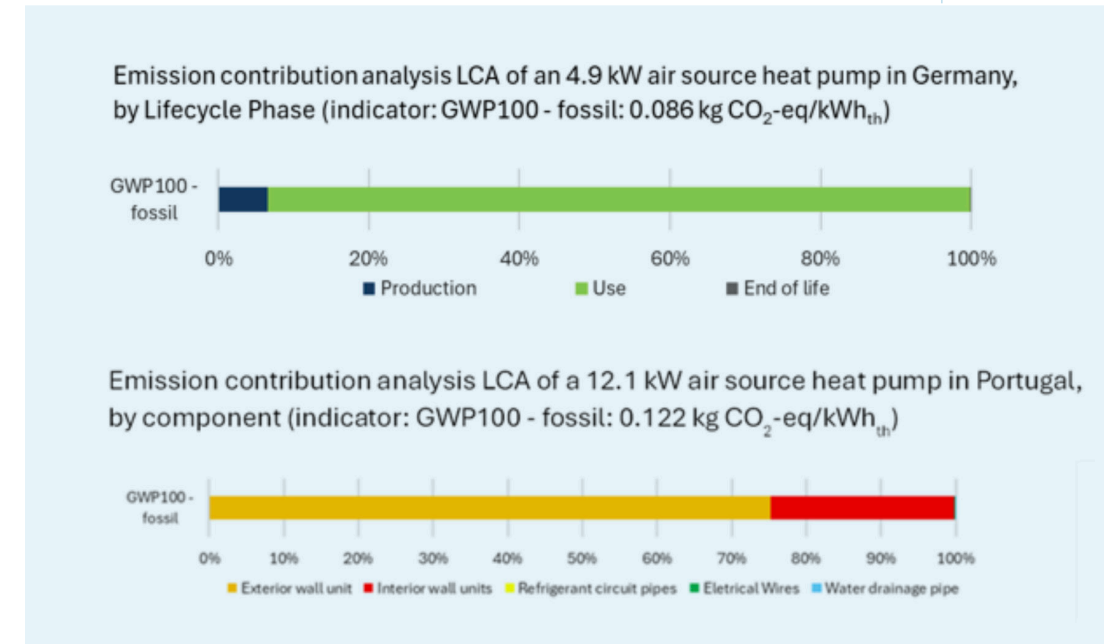


## 6. Graphical representation of emission contributions has a central role in the fact sheets

The results of LCA include more than ten indicators, as listed in Table 9 of the methodology guidelines. These include metrics such as human toxicity, ozone depletion, land and water use, as well as the resource use of minerals and metals. However, the key indicator is CO<sub>2</sub>-equivalent emissions called Global Warming Potential (GWP), which are given a central role in the fact sheets.

Bar charts illustrate how different contributions - such as raw materials and component manufacturing of the heating system - affect the Global Warming Potential (GWP100) indicator (see figures below). The first bar shows a 4.9 air source heat pump in Germany. The production-based emissions are related to the phases of the life of the product (total: 0.086 CO<sub>2</sub>-eq/kWh<sub>th</sub>). The production phase has a small impact compared to the use phase, where fossil-fuel based electricity is used to run the heat pump.

The second bar chart represents the carbon footprint for a 12.1 kW air source heat pump in Portugal. Here the emission contribution along the whole lifetime is related to the components of the system (total 0.122 kg CO<sub>2</sub>-eq/kWh<sub>th</sub>). In this diagram, the exterior wall unit has the largest carbon footprint because it consumes most of the electricity over the year.



In sum, Task 71 delivers a practical foundation for making heating technologies comparable on both environmental and economic grounds. The real impact now depends on consistent data from manufacturers and broader alignment of regulations across markets. If that happens, the methodology can move from theory into everyday decision-making - giving investors, planners and engineers a clear, common basis to choose more efficient and sustainable heating solutions.

▲ The figure presents results from two fact sheets describing the environmental impact of heat pump systems in Germany and Portugal. The German system shows a lower GWP100 (fossil) indicator. This is due to the fact that the German system delivers a much higher annual thermal energy output (9,563 kWh for heating and hot water) compared to the Portuguese system (1,237 kWh for heating and cooling), which means that the relative share of production-phase impacts allocated to each kWh of thermal energy are higher in the Portuguese system. Additional differences may be explained by the difference in the system scale and the applied electricity mix in the use phase. Source: Task 71.

### Websites of organizations mentioned in this news article

- IEA Solar Heating and Cooling Programme: <https://www.iea-shc.org/>
- IEA SHC Task 71: <https://task71.iea-shc.org/>
- IEA Photovoltaic Power Systems Programme (PVPS): <https://iea-pvps.org/>
- IEA Heat Pumping Technologies (HPT): <https://heatpumpingtechnologies.org/>
- IEA District Heating and Cooling (DHC):
- ZHAW: <https://www.zhaw.ch/en/university>

## Introducing the PolyGen Alliance: Advancing Polygenerating Solar Collectors



The pursuit for solar energy technologies with higher conversion efficiency and reduced land use is driving the development of polygenerating solar collectors, an emerging field within solar energy technologies.

The Polygenerating Solar Collector's Alliance (PolyGen Alliance) has been established as a collaborative initiative focused on advancing multi-product solar technologies. While significant progress continues at the single product and component level, key challenges exist in multi-product collector design and assessment, scalability, and practical deployment. The PolyGen Alliance aims to foster a space for collaboration and knowledge exchange across research and industry in cross-cutting topics related with polygenerating collector development, including

- Modelling and simulation approaches to predict multi-physics behavior, including methodologies, protocols and tools;
- Experimental methodologies and protocols for testing and validation, including performance metrics;
- Life cycle and cost assessment;
- Legislative and regulatory frameworks.

The success stories report (Deliverable D4) documented ten success stories from around the world, including the The Alliance builds on the work of the EU-funded project SPECTRUM, which is developing next-generation solar collectors capable of delivering heat, electricity, and hydrogen, while also supporting industrial wastewater remediation.

### A platform for integration and practical exchange

The PolyGen Alliance takes a collector-level perspective, focusing on how technologies work together in real applications. It connects stakeholders working on: visibility and trust it creates.

- Polygenerating solar devices and PVT systems;
- Solar-to-X processes;
- Industrial solar applications;
- Integration with water and wastewater systems.

Designed as a lightweight and flexible initiative structured around knowledge exchange, the Alliance enables open discussion of research gaps and technical challenges, comparison of approaches and alignment of methodologies.

A core objective of the Alliance is to bring together researchers working in polygenerating solar collectors, helping to bridge the gap between research, innovation and implementation. The initiative also seeks to connect with existing efforts, including the IEA Solar Heating and Cooling Technology Collaboration Programme, contributing to ongoing discussions on advanced solar systems and their applications.

### Looking ahead

Following its official launch in March 2026, the PolyGen Alliance is now moving towards broader engagement and community building. By fostering dialogue across disciplines and sectors, the Alliance aims to support the next generation of integrated solar energy systems, contributing to a more efficient, flexible, and sustainable energy future.

### Interested in joining or learning more?

Follow updates via the SPECTRUM project channels:

**Website** <https://project-spectrum.eu/>

**LinkedIn** <https://www.linkedin.com/company/spectrum-eu/>



## “Solar Thermal, A Made In Europe Clean Tech”: Solar Heat Europe Launches A New Campaign to Showcase Europe’s Manufacturing Strength

12th February 2026  
Brussels, Belgium

Solar Heat Europe launches today “Solar Thermal, a Made in Europe Clean Tech”, a new campaign highlighting Europe’s homegrown solar thermal technologies as a pillar of the continent’s energy independence and industrial competitiveness. With over 100 manufacturing sites across Europe producing solar thermal collectors and related components, the sector represents a long-established European success story built on a strong network of SMEs and recognised as a strategic industry under the EU Net-Zero Industry Act.

Solar thermal technologies manufactured in Europe create thousands of skilled jobs, meet high quality standards and are exported worldwide. They deliver a secure, affordable, resilient and reliable source of energy for citizens, businesses and industry, while slashing emissions and reducing dependence on imported fuels.

As the EU accelerates its efforts to reinforce its energy security and scale up domestic clean tech production, the purpose of this campaign is to position solar thermal as a ready-to-deploy EU-made solution for decarbonising heating and cooling, a sector that accounts for nearly half of Europe’s energy needs.

Running from February 2026, the campaign’s flagship output will be a series of video interviews with CEOs of European manufacturers, alongside on-site visits to production facilities. All content will be published on Solar Heat Europe’s website and shared on LinkedIn under #SolarThermalMadeInEurope.

By highlighting Europe’s industrial leadership and innovation in solar thermal, Solar Heat Europe aims to secure stronger recognition, protection and policy support for the sector as a cornerstone of Europe’s clean energy transition.

### The campaign seeks to:

- Showcase Europe’s solar thermal manufacturing base
- Position solar thermal as a strategic EU-made clean technology
- Raise awareness among EU and national policymakers and encourage policy action to boost the demand for solar heat solutions

## Thank you to our valued Partners

“With this campaign we aim to showcase the EU-made nature of the solar thermal sector while demonstrating the strength of its manufacturing base across the continent. With the right policy measures and strong policy support that EU and national Authorities should give to the solar thermal sector, this industry can scale rapidly, create local jobs and deliver affordable and clean heat”

VALÉRIE SÉJOURNÉ  
Solar Heat Europe’s Managing Director

### In case of media enquiries or requests for corporate materials, please contact:

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**Alba Garriga**  
Communications Officer  
alba.garriga@solarheateurope.eu



▲ Solar Thermal: A proud EU-made technology. More than 100 manufacturing sites across Europe

## Partners

Thank you to our valued Partners



*If you are interested in partnering with the SHC please email Ben Stinson*

**BEN STINSON, Secretariat**  
secretariat@iea-shc.org

# IEA programme

# SHC

The International Energy Agency was formed in 1974 within the framework of the Organization for Economic Cooperation and Development (OECD) to implement a program of international energy cooperation among its member countries, including collaborative research, development and demonstration projects in new energy technologies. The members of the IEA Solar Heating and Cooling Agreement have initiated over 70 R&D projects (known as Tasks) to advance solar technologies for buildings and industry. The overall Programme is managed by an Executive Committee while the individual Tasks are led by Task Managers.

### Current Tasks and Task Managers

#### Efficient Solar District Heating Systems

Dr. Klaus Lichtenegger  
BEST - Bioenergy and Sustainable Technologies GmbH  
Graz, AUSTRIA  
klaus.lichtenegger@best-research.eu

#### Solar Hot Water for 2030

Dr. Robert Taylor  
University of New South Wales  
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Prof. He Tao  
China Academy of Building Research  
Beijing, CHINA  
iac@vip.sina.com

#### Low Carbon, High Comfort Integrated Lighting

Dr. Jan de Boer  
Fraunhofer IBP  
Stuttgart, GERMANY  
jan.deboer@ibp.fraunhofer.de

#### Life Cycle and Cost Assessment for Heating and Cooling Technologies

Dr. Karl-Anders Weiss  
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Freiburg, GERMANY  
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#### Solar Photoreactors for the Production of Fuels and Chemicals

Dr. Bettina Muster-Slawitsch  
AEE INTEC  
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#### Components for Thermal Energy Storage

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## In The Pipeline

### Follow up Task to Task 71

Life Cycle and Cost Assessment for Heating and Cooling Technologies is currently in the Task Development Phase.

### Task 70

High Comfort Low Carbon lighting, will be publishing a book in 2027. This is the 6th book in the SHC book series and we are excited to share the results with the SHC community.

### Follow up Task to Task 70

Follow up Task to Task 70 is being proposed and is currently the Concept phase.

### Follow IEA SHC on



## SOLARUPDATE

The Newsletter of the IEA Solar Heating and Cooling Programme

Vol. 81, January 2026

Prepared for the IEA Solar Heating and Cooling Executive Committee by QSBR Innovations Inc. Canada

Editor:  
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This newsletter is intended to provide information to its readers on the activities of the IEA Solar Heating and Cooling Programme. Its contents do not necessarily reflect the viewpoints or policies of the International Energy Agency or its member countries, the IEA Solar Heating and Cooling Programme members or the participating researchers.

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Technology Collaboration Programme  
by IEA