

Explores Life Cycle and Cost Assessment of Solar Heating and Cooling Technologies

A workshop on *Life Cycle and Cost Assessment (LCA and LCoH) of Solar Heating and Cooling Technologies* held this past October at the Technical University of Denmark drew a diverse audience of 80 in-person and online participants. Researchers, policymakers, students, and industry professionals gathered to discuss the ongoing debate surrounding the role of LCA and LCoH in shaping both political and industrial strategies.

The primary objective of the workshop was to evaluate the relationship between LCA and LCoH, two key methodologies used to assess the environmental and economic impact of heating and cooling technologies. Participants discussed how these tools can be balanced to provide a more comprehensive understanding of energy solutions. In particular, there was a focus on ensuring that future planners and decision-makers are equipped with the necessary tools and knowledge to apply these methods effectively, aligning both economic and sustainability goals.

A major theme of the discussions centered around integrating LCA and LCoH into the planning and renovation of buildings. Experts emphasized how these assessments can support the deployment of environmentally friendly energy solutions while also leveraging political frameworks to accelerate the transition to a sustainable society.

The workshop kicked off with a welcome address from Karl-Anders Weiss of Fraunhofer ISE in Germany and project leader for the IEA SHC Task on Life Cycle and Cost Assessment for Heating and Cooling Technologies (SHC Task 71). The day's agenda featured a series of thought-provoking presentations on topics ranging from EU policy to life cycle analysis in renewable energy. Presentations included:

- EU policy aspects, energy labeling, and eco-design for sustainable products (Philippe Riviere, European Commission)
- Transforming heating systems as part of the energy transition (Mihai Tomescu, European Environment Agency)
- Life cycle analysis and renewables: A growing agenda and opportunity for Solar Heat? (Valérie Séjourné, Solar Heat Europe)
- National requirements on LCA for buildings and energy systems: A view on LCoH(E) (Lau Raffnsøe, Danish Green Building Council)
- IEA SHC Task 71: Life Cycle and Cost Assessment for Heating and Cooling Technologies: Investigated energy systems and database for energy systems (Karl-Anders Weiss, ISE Fraunhofer)
- Quantifying the environmental implications of solar thermal technologies: A comprehensive examination of life cycle impacts and payback periods (Maria Zagorulko, Naked Energy Ltd., United Kingdom)



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Following the presentations, participants split into seven groups led by SHC Task 71 experts. Their task was to discuss and answer the following questions:

- How can we ensure a balanced consideration between Life Cycle Assessment (LCA) and Levelized Cost of Heat (LCoH) when evaluating energy solutions, and should these factors be given equal weight in decision-making?
- How do decisions about the vulnerability of energy infrastructure (like power and gas lines) to threats like terrorism and war impact Life Cycle Assessment (LCA) results and the Levelized Cost of Heat (LCoH)?
- How can we ensure that future planners and decision-makers are equipped to use Life Cycle Assessment (LCA) and Levelized Cost of Heat (LCoH) while understanding the challenging balance between economic considerations and sustainability goals?
- How can Life Cycle Assessment (LCA) and Levelized Cost of Heat (LCoH) be effectively integrated into the planning and renovation of buildings and building communities to promote sustainable energy solutions?
- What are the potential advantages and disadvantages of company-driven LCA (Life Cycle Assessment) databases that require paid access? What benefits might arise from an EU-financed, free-of-charge LCA database, and are there any drawbacks associated with such a publicly funded model?
- How can we effectively manage the inevitable changes in future energy systems' energy mix, and what impact will these changes have on Life Cycle Assessment (LCA) results?
- How can regulations and politics governing energy solutions in the building sector support and accelerate the transition to a sustainable society?

After lively discussions, everyone came back together to share their key recommendations, which included:

- Putting more focus on LCA and less on LCOH when designing heating and cooling systems and planning building renovations.
- Simplifying LCA results to make them easier to understand, for example, by focusing only on CO₂ emissions.
- Introducing LCA labeling of products to help consumers make informed choices.
- Developing planning and design tools for heating and cooling systems focused on both LCA and LCOH.
- Including LCA in educational curricula at schools and universities.
- Introducing CO₂ tax on all products to encourage sustainable practices across industries.
- Incorporating LCA and LCOH into the design and protection of energy grids to ensure the long-term sustainability of energy systems.

The results of the workshop will feed into the ongoing work of SHC Task 71.

The day concluded with a panel discussion featuring policymakers and industry leaders, moderated by Simon Furbo of the Technical University of Denmark (DTU).

As the transition to a more sustainable and energy-efficient society continues, workshops like this serve as critical platforms for collaboration between academia, industry, and government, ensuring that all stakeholders are aligned in the pursuit of sustainable energy solutions.

This article was contributed by SHC Task 71: Life Cycle and Cost Assessment for Heating and Cooling Technologies experts Simon Furbo of DTU, Denmark, Karl-Anders Weiss of Fraunhofer ISE, Germany SHC Task 71 Manager, and Kyra Sophie Rimrod of Fraunhofer ISE. For more information, visit the [Task 71 webpage](#).