

2025 HIGHLIGHTS

Task 71 – Life Cycle and Cost Assessment for Heating and Cooling Technologies

THE ISSUE

In response to the growing urgency of environmental challenges such as climate change, biodiversity loss, and resource scarcity, governments worldwide are intensifying efforts to regulate and standardise products to mitigate environmental impact. Among the promising avenues within clean energy, solar heating and cooling systems stand out for their potential to contribute significantly to sustainable energy solutions. However, as advancements are made to increase their efficiency and affordability, it is necessary to ensure that these developments do not inadvertently introduce new environmental burdens. The heating and cooling sector, particularly air-conditioning, is witnessing rapid expansion propelled by technological innovations and increased efficiency. With this expansion comes an increased emphasis on environmental labelling tools, both compulsory and voluntary, aimed at ensuring product quality while supporting business opportunities for producers. Central to this effort is the need for standardised and reliable certification, which is essential for ensuring consumer trust.

OUR WORK

Task 71 addresses this by focusing on ecological and economic assessments and a comprehensive examination of regulatory landscapes. As countries adopt diverse approaches, including financial incentives and efficiency standards, to bolster renewable energy adoption and optimise ecological utilisation, this task aims to equip stakeholders with the insights needed to promote suitable heating and cooling solutions, both from sustainability and economically points of views.

By providing a transparent methodology to compare heating and cooling options over time, Task 71 will support international collaboration between industry and research, promoting renewable heating technologies' sustainability and ensuring a cleaner, more sustainable future for all.

Participating Countries

Australia
Austria
China
Denmark
France
Germany
Italy
Netherlands
Norway
Portugal
Spain
Sweden
Switzerland
United Kingdom

Task Period 2022 – 2025
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TASK71

KEY RESULTS IN 2025

Methodology Guidelines on Life Cycle and Cost Assessment for Heating and Cooling Technologies

A report on methodology guidelines on harmonized procedures for Life Cycle Assessment (LCA) and Levelized Cost of Heat (LCoH) calculations for solar heating and cooling (SHC) systems has been prepared. The guidelines enable consistent, transparent, and comparable environmental and economic evaluations of SHC technologies for residential, commercial, and industrial applications.

The guideline covers space heating and domestic hot water provision for residential and commercial buildings, including district heating systems as well as space heating and process heat for industrial buildings and processes.

For SHC systems for residential and commercial building application 1 kWh of useful heat delivered by the heating system, after heat storage is used as the functional unit and for industrial SHC systems 1 kWh of heat delivered to the heat distribution systems of the buildings is used as functional unit.

The functional units are the basis for both LCA and LCoH assessments, enabling harmonized evaluations of environmental impacts and economic performance. The guideline also specifies system boundaries, recommended division of the systems into sub-systems, components and energy flows, life cycle stages, allocation procedures for multifunctional systems, and recommended impact assessment methods.

By means of the methodology evaluations of SHC systems regarding sustainability and of cost-efficiency can be carried out.

Info sheets

Info sheets on design and boundary conditions for the following investigated energy systems and locations have been prepared: PVT/heat pump system for single family house in Denmark, solar-based cogeneration system for a commercial centre in Spain, polygeneration systems for multi family houses in Spain, boiler and mechanical chiller system for multi family house in Spain, district heating with solar heating system in Switzerland, gas boiler system for single family house in Germany, solar combi system with gas boiler for single family house in Germany, PVT system for single family house in Germany and district heating with solar heating system in Austria.

Fact sheets

Fact sheets on LCA (Life Cycle Assessment) and LCOH (Levelized Cost of Heat) for the investigated energy systems and locations mentioned under info sheets have been prepared.