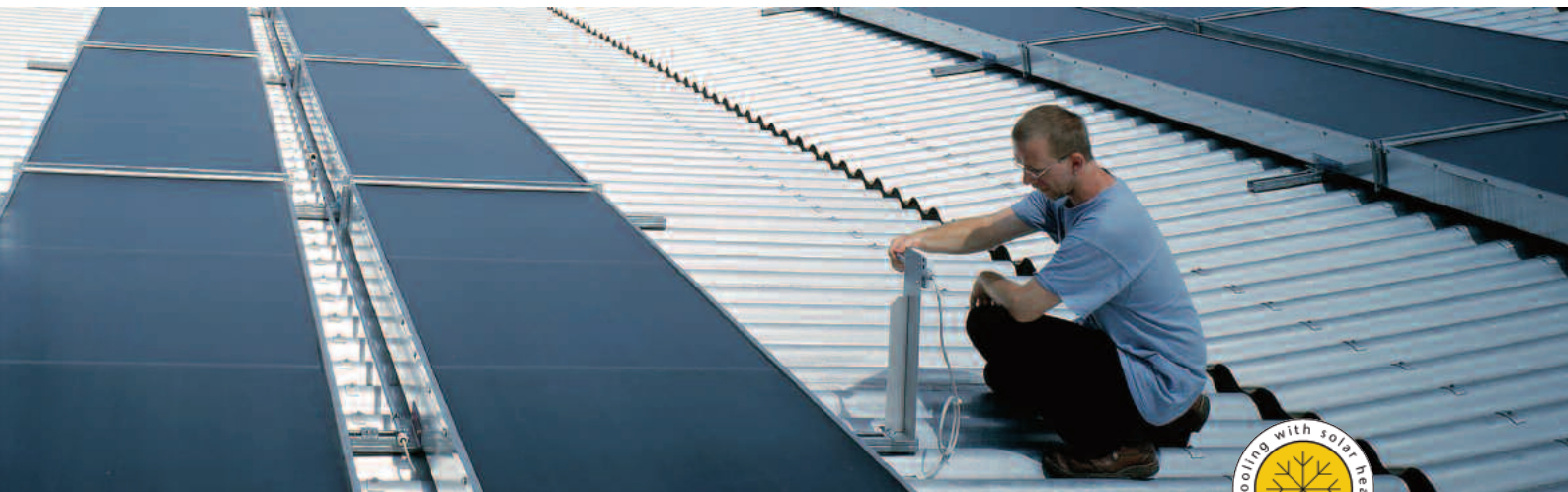


# Cooling with solar heat



Heat can be used in combination with sorption technologies to drive thermodynamic circulation processes that produce high-quality heating or cooling (thermochemical heat pump).

Here, a distinction is made between adsorptive systems that work with solids (such as silica gel and water) and systems that work with fluids (such as lithium bromide and water).

Typical temperatures for single-stage systems range from 60°C to 120°C. They are therefore ideal for operation with solar heat, district heat, waste heat from cogeneration units, or fuel cells. Because cooling is mainly needed in the summer when there is generally an excess of solar energy and waste heat available, these environmentally friendly sorption technologies (no CFCs) are ideal for air-conditioning and refrigeration.

Another advantage of these cooling systems is that in most cases they can be set to a second operational mode to function as heating systems as well. At the same time, sorption systems also offer capabilities for the efficient long-term storage of thermal energy – a major advantage of the widespread use of solar energy systems.

The technical feasibility of solar-operated systems has been demonstrated successfully in many projects in recent years. Today there are already market segments in which it makes economic sense to use these systems. Investigations reveal a large number of approaches to improvement, which if implemented would enable additional markets to be opened up to their use.

## Research and development requirements

- Material research in the field of absorbance
- For the development of small thermal cooling systems (compact, efficient heat exchangers, internal heat recovery)
- Development of electric/thermal hybrid systems
- Research into system technology for system concepts, design, controls, maintenance, and equipment management

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