RP1002

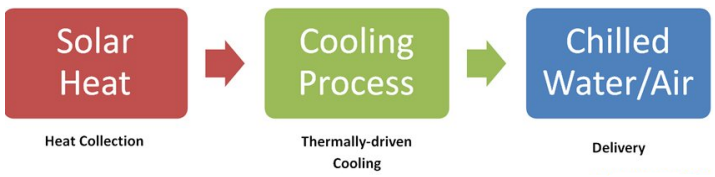
SOLAR ABSORPTION SYSTEMS FOR AIR-CONDITIONING APPLICATIONS IN LARGE-SCALE BUILDINGS

Problem

Air-conditioning accounts for at least 40% of the energy consumption of buildings in Australia and a large part of this energy is supplied by high-emission electricity, derived from fossil fuels. Therefore, the need to implement advanced new concepts in building air-conditioning systems is more crucial than ever.

Solution

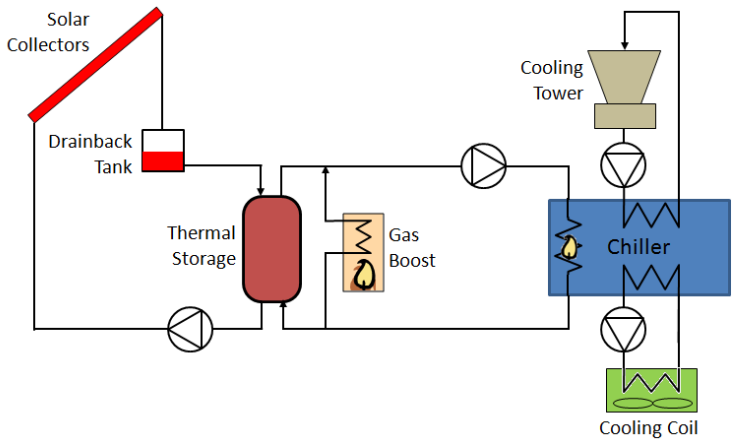
Solar thermal cooling is achieved through collecting solar thermal energy and using it as heat to drive a thermal cooling process, thereby displacing electricity consumption in cooling systems.



The aim of this project is to conduct a thermal-economic-environmental optimization of a solar-assisted multi-effect absorption cooling systems in large-scale buildings. Through analysis, development of design tools, and experimentation in Australian climate zones, this project aims to produce a data set underpinning the technologies merit for integration with buildings. Through monitoring performance and economic returns in a demonstration system, this project will reduce operational and financial uncertainties associated with solar thermal heating and cooling in Australia, thereby providing a pathway to greater utilization of this technology.

Benefits

This project will help develop tools and demonstrate how solar absorption cooling technology can be incorporated into a low carbon building design. It will also provide additional real-world performance data for these systems to be used by industry and building owners to make decisions on solar products.



Additionally, experiments will be conducted at CSIRO to determine the feasibility of next generation solar absorption cooling systems.

In brief, this project will answer the following research questions:

What climate/load regimes are suitable to solar thermal heating and cooling driven by concentrated solar thermal energy?

How can we optimize the performance of a concentrating solar thermal collector, absorption chiller system with natural gas or compression chiller backup?

How much thermal storage is needed to meet demand and maximize utilizability of the solar collector array?

How can we design solar cooling systems to provide maximum payback to customers?

Contact

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