EURAC research

SOLAR THERMAL COOLING TEST FACILITY

Innovative lab facility for test, analysis and design of thermal cooling and heating systems

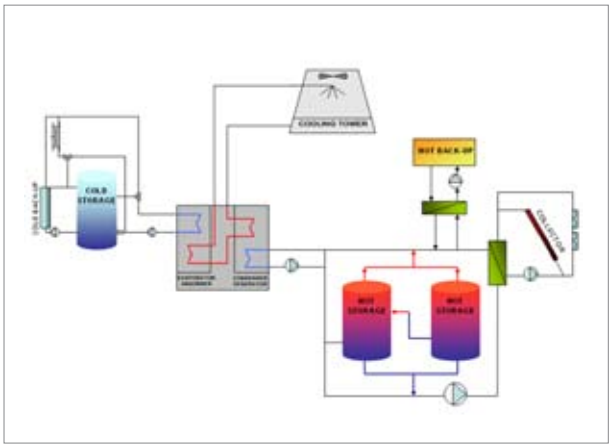
Solar thermal cooling test facility

HARDWARE DESCRIPTION

EURAC research designed and set up an innovative test rig, which enables the analysis and modeling of complex thermally driven, solar-assisted installations for the production of space heating, cooling and domestic hot water.

The test facility is designed to reproduce both steady and transient conditions. Behavior and power of an installed collector field can be replicated and boosted by electric heaters, which can simulate desired heat sources as well as load curves. This flexibility allows the **testing of** different chiller sizes and types **(absorption / adsorption) under reality-close conditions**.

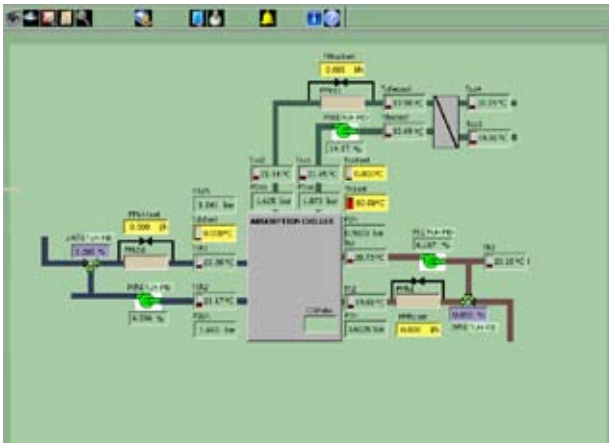
The modular design of the test bench permits testing the chillers intensively as a single component or in combination with other specific components such as:
· Heat rejection systems (dry air coolers, wet cooling towers, “hybrid” coolers).
· Energy storages (hot/cold water tanks of different size, Phase Change Material storages)



Scheme of the test facility with the thermally-driven chiller as core component

STAKEHOLDERS

The services provided through the test facility are offered to:
· **Manufactures of thermally-driven chillers** interested in assessing and optimizing the performance of their products or in the development of control strategies for specific conditions.
· **System suppliers** interested in developing thermally-driven heating and cooling systems as packaged solutions with experimentally validated performances.



View of the software interface for detailed facility monitoring and control

SOFTWARE SUPPORT

EURAC research supports the experimental studies through numerical simulations performed in TRNSYS, Matlab or EES.
These tools might be used in either ways:
· for designing a new plant configuration through dynamic simulations to be subsequently assessed experimentally
· for developing, on the basis of the experimental evidence, a reliable model of the thermally driven chiller as a component or integrated in a system.

Overview of the test facility

SPECIFICATIONS OF THE TEST FACILITY

	Rated Power (kW)	Limit Temp (°C)	Mass Flows (m3/h)	Volumes (m3)
Chiller	up to 20		up to 9	
Heat Rejection system	6 - 60	45	up to 9	
Driving temperature circuit (generator)	10 - 40	140	up to 10	
Chilling demand	up to 20	30		
Boiler	35 gas	85		
Cold Water Tanks		100		0 - 1
Hot Water Tanks		100		0 - 1,5

RELATED ACTIVITIES

Furthermore, EURAC's Institute for Renewable Energy is active in applied research in the fields of energy management in buildings and photovoltaic systems. This includes:

· Development of active solar buildings and net zero energy buildings
· Energy-efficient refurbishment of historical buildings
· Control assessment and optimization of installed complex energy systems
· Development of building-integrated photovoltaic solutions
· Quality control of photovoltaic systems and modules

In-depth monitoring of pilot plants with detailed, dedicated simulations are carried out in all sectors.

Main building of EURAC research in Bolzano

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Research programs in which the EURAC is active:

Intelligent Energy Europe