



Foto: Eurac Research/Ivo Corrà

RESEARCH TOPIC

Sustainable Heating and Cooling Systems

We develop efficient systems
for heating and cooling buildings and districts

Sustainable Heating and Cooling Systems

We deal with:

- Heating and cooling systems for buildings
- District heating and district cooling networks
- Energy Efficiency in industrial plants

Detailed Description

Our researchers in the field of sustainable heating and cooling systems study efficient solutions for buildings, industry and districts, focussing on the integration of heat pump systems in a variety of applications.

In the residential and tertiary sector, heat pumps—integrated within systems that also use solar collectors or photovoltaic panels—are used to cover heating and cooling loads in different environments.

Heat pump systems can also be effectively used in the industrial sector for recovering low-temperature waste heat for production processes that require hot water or steam.

Furthermore, using the same heat pump systems, low temperature waste heat from industrial sites and other urban sources (for example, waste heat from supermarket refrigeration systems and data centres) can be suitably recovered in new generation district heating networks.

Thanks to the skills of our researchers, industrial partners can benefit from technical support during the design and launch phases of new technologies and from specialist advice during the simulation and monitoring phase of their solutions. Public partners and administrations can benefit from our experience analysing the interaction between demand and the production of thermal energy relating to a single building or a district.

We provide two laboratory infrastructures: the Energy Exchange Lab reproduces on a small scale the operation of a district heating and cooling network and enables the study of optimum management for the transfer of heat from/to multiple sources/users. The laboratory also tests heat generation units and thermal exchange substations up to 50 kW.

The Heat Pumps Lab can test single air/water or water/water units up to a power of 400 kW, air/air or water/air units up to a power of 25 kW and entire plants with a capacity of up to 50 kW.

Some of our latest achievements

In recent years, our researchers have coordinated and/or participated in numerous research and innovation projects funded by the European Commission, focussing on the use of heat pump systems in the retrofit of residential and tertiary buildings. The research group also coordinates two projects aimed at the design, as well as the control of waste heat recovery solutions in low-temperature district heating networks.

The services we offer:

- Development of heat pump systems aimed at coverage of heating and cooling loads, including plant layout and advanced controls
- Development of heat pump systems aimed at the recovery of low temperature heat on industrial sites and in district heating networks
- Laboratory tests of heat pumps, thermal exchange substations and systems

