

## Economical heating and cooling systems for low energy houses



### Austria

Austria is represented by the **Institute of Thermal Engineering** of the **Graz University of Technology** and by **Arsenal Research**

#### National team leader



#### **Ao. Univ.- Prof. Dr. René Rieberer**

Institute of Thermal Engineering  
Graz University of Technology  
Inffeldgasse 25/B  
Austria

Phone: +43-(0)316-873 7302

Fax: +43-(0)316-873 7305

[rene.riieberer@tugraz.at](mailto:rene.riieberer@tugraz.at)

<http://www.iwt.tugraz.at>

#### National team



#### **DI (FH) Andreas Zottl**

Austrian Institute of Technology  
Giefinggasse 2  
1210 Wien  
Austria

Phone: +43-(0)50550-6309

Fax: +43-(0)50-550-6613

[andreas.zottl@ait.ac.at](mailto:andreas.zottl@ait.ac.at)

<http://www.ait.ac.at>

#### Informal co-operation with the Austrian Heat Pump Associations



#### **Leistungsgemeinschaft Wärmepumpe Austria**

Meisenweg 5

A-4050 Traun

Austria

Phone: +43-(0)7229-70452

Fax: +43-(0)316-873 7305

[info@lgwa.at](mailto:info@lgwa.at)

<http://www.lgwa.at>



#### **Bundesverband WärmePumpe Austria**

Wiedner Hauptstraße 63

1045 Wien

Austria

Phone: +43 (0)590-900-3519

Fax: +43-(0)316-873-7305

[info@bwp.at](mailto:info@bwp.at)

<http://www.bwp.at>

The project is financially supported by the Austrian Ministry for Transport, Innovation and Technology



**Austrian Ministry of Transport, Innovation and Technology**

Radetzkystraße 2  
A-1030 Wien  
Austria  
Phone: +43 (0) 1 71162-0  
Fax: +43-(0)316-873 7305  
<http://www.bmvit.gv.at>



**Österreichische Forschungsförderungsgesellschaft mbH**

Sensengasse 1  
1090 Wien  
Austria  
Phone: +43 (0)5 7755-0  
Fax: +43-(0)316-873-7305  
[office@ffg.at](mailto:office@ffg.at)  
<http://www.ffg.at>

## Austria national project

The national project at Institute of Thermal Engineering of the Graz University of Technology is dedicated to the development of an integrated heat pump in the capacity range of 3-5 kW, preferentially using a natural refrigerant, e.g. CO<sub>2</sub> (R744) or propane (R290). The project comprises

- the system assessment of 3 possible system layouts
- the cycle analysis to identify the best of 3 refrigerants for the chosen system layout
- the construction of a prototype and lab-testing
- detailed simulations of the chosen system and its dynamic interaction with the heating system and the building (dynamic simulations in TRNSYS).

The system and cycle analysis resulted in a prototype concept for a CO<sub>2</sub>-B/W heat pump. The system incorporates a horizontal ground collector, the CO<sub>2</sub> heat pump and a buffer storage, which is connected to a low temperature space heating emission system and a plate heat exchanger for instantaneous DHW preparation. The heat pump concept has a bi-partite gas cooler, by which space heating energy can be produced in the lower part (temperature level about 35°C) and DHW energy can be reheated in the upper part to the temperature level of the DHW of about 55°C.

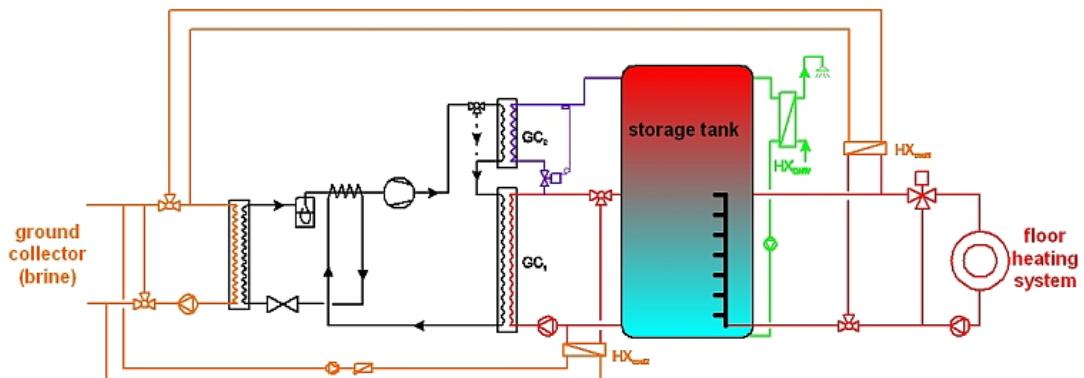


Fig.1 Concept of the Austrian prototype 5 kW CO<sub>2</sub>-B/W heat pump (source: Heinz and Rieberer, 2010)

This configuration also enables a simultaneous space heating and DHW operation. Moreover, a passive and active cooling function can be realised by an external hydraulic. Also a simultaneous active cooling and DHW operation is possible. Results of the project are described in detail in the final report on prototype systems. The system concept is depicted in (Fig. 1).

The Austrian Institute of Technology AIT (formerly arsenal research) joined the Austrian team in 2008 for field monitoring of combined operating heat pump systems for space heating and DHW. 9 systems have been field monitored. Moreover, two ground-coupled compact units with horizontal collector for the functions space heating, DHW, ventilation and passive ground cooling have been in field monitoring for one year. Summarising results on the field tests are documented in the **final report on field monitoring** and as **Best Practice** sheets.

Activities are supported by the Austrian heat pump associations LGWA and BWP concerning the market survey and the heat pump statistics.

## Austrian links



### Austrian Ministry of transport, innovation and technology

The Austrian ministry of transport, innovation and technology supports the research projects in the field of energy technologies and sustainable buildings.

Information at

 <http://www.bmvit.gv.at/>



### Klimaaktiv

Klimaaktiv is a program to reduce the CO<sub>2</sub>-emission.

Among other technologies, research and implementation of energy efficient buildings and heat pump systems are supported by the program.

Information on the heat pump activities within the program at

 <http://www.klimaaktiv.at/article/archive/14283/>

Information on the building activities within the program at

 <http://www.klimaaktiv.at/article/archive/15115/>



### Haus der Zukunft

"Haus der Zukunft" (engl. "Building of Tomorrow") is a subprogram of the Austrian R&D Program on Technologies for Sustainable market diffusion of components and construction methods for dwellings and office buildings which correspond to the principles of a sustainable technology development.

Information at

 <http://www.hausderzukunft.at>



### Energiesysteme der Zukunft

"Energiesysteme der Zukunft" (engl. "Energy Systems of Tomorrow") is a subprogram of the Austrian R&D Program on Technologies for Sustainable Development and focuses on the development of new technologies and concepts for a flexible and efficient energy system based on renewable energy sources.

Information at

 <http://www.energiesystemederzukunft.at>



### Austrian Energy Agency

The Austrian Energy Agency is the Austrian energy research and policy institution in which the federal and the provincial administration and some fifty important institutions and corporations from a variety of economic sectors co-operate.

Information on

 <http://www.energyagency.at>



## **IG Passivhaus Austria**

The IG Passivhaus Austria is an information network on passive houses in Austria by regions and as a central organisation. Objectives are information dissemination, know-how exchange and networking as well as quality management.

Information on

Information on the building activities within the program at

 <http://www.igpassivhaus.at/>



## **Austrian Institute of Technology**

The Austrian Institute of Technology runs a development and test centre for heat pumps. Activities include among others the quality testing of heat pumps, education and certification of installers as well as monitoring of heat pump systems.

Information at

 <http://www.ait.ac.at/>

## **IEA HPP Annex 32**

IEA HPP Annex 32 is a corporate research project on technical building systems with heat pumps for the application in low energy houses.

The project is accomplished in the Heat Pump Programme (HPP) of the International Energy Agency (IEA).

Internet: <http://www.annex32.net>

