

# Press Release

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April 21, 2010  
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## Combined Heating, Cooling and Power Systems for Buildings

### Fraunhofer ISE Presents Results at a Workshop in Freiburg

Combined heat and power systems are gaining ground and co-generation units (CHP) in the small capacity range are available today on the market. Such systems supply buildings with heat while generating electricity at the same time. The electricity can be used on-site or fed into the public grid. Up to now, this technology has been restricted to the heating period, because this is the time when use of the CHP waste heat can be made. One possible solution towards a year-round, and thus more efficient, operation is the following: Through an additional, thermally driven chiller, the waste heat of the co-generation system is converted to cold, which is used to air-condition buildings. In the EU-project PolySMART 32 partners from research and industry are working on combined heating, cooling and power systems in the small and medium power range under the direction of the Fraunhofer Institute for Solar Energy Systems ISE. The results of this European-wide cooperation as well as other information in this field will be presented at a workshop on Tuesday, May 18, 2010 at the Freiburg Concert Hall.

#### Solutions in the medium and small power range

The basic principle of the combined heating, cooling and power (CHCP) systems has been well established for a long time. System concepts, however, are available only in the very large power range for industrial use and for large buildings or districts. The future of combined heating, cooling and power systems also lies in their application in commercial buildings, hospitals, small hotels and office buildings, in which both cooling and heating demands exist. The goal of the project PolySMART (**P**olygeneration with advanced **S**mall and **M**edium scale thermally driven **A**ir-

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conditioning and **Refrigeration Technology**) is to further develop the CHCP technology in the small and medium power range and to present suitable market solutions. In the four year project, the focus is on the construction, operation and evaluation of twelve actual systems each with different specifications and applications.

## **Field tests carried out with twelve demonstration systems**

The performance characteristics and operating data of the test systems were evaluated using a self-developed procedure. One of the systems was installed at the Fraunhofer Institute for Solar Energy Systems ISE in Freiburg to air-condition several office rooms with a high cooling demand. The particular feature of this system is that some of the office rooms are air-conditioned with fan-coil units during the day. In the other rooms, the CHCP is operated during the night to discharge the storage, made up of phase change materials (PCM) integrated into the ceiling. During the day, the PCM cooling ceiling is able to absorb heat without having to be actively cooled at the same time. With this procedure, it is possible to increase the hours of operation as well as the efficiency of the installed system.

The field test results showed that the system components used – especially the co-generation unit powered by natural gas and the thermally driven chiller with a cooling power from 5 kW up to 25 kW – have achieved a high level of technical maturity. The most promising economic niches for market entry exist when the system installed is to cover the base load and is supplemented by additional systems to meet the peak loads for heat (e.g. gas boiler) and cooling (electrically driven chiller). The planning and operating process involved in order to join the system components still presents a challenge. This challenge will continue to exist until a standardization for wide-range use is established.

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## **Fraunhofer ISE invites you to the closing workshop in Freiburg**

To mark the end of the project PolySMART, a public workshop will be held on Tuesday, May 18, 2010 in the Freiburg Concert Hall.

**Workshop**  
**»Combined Heating, Cooling and Power Systems«**  
**Tuesday, May 18, 2010**  
**Freiburg Concert Hall (Round Room, »Runder Saal«)**

Manufacturers, planners, energy suppliers, installers, users and other interested parties are invited to participate in this workshop. National and international specialists present an overview about the technical and economic aspects of the combined heating, cooling and power (CHCP) systems in the small and medium power range.

### **The Project PolySMART:**

In the project PolySMART, 32 partners from 11 European countries have been working together for four years. Members of the consortium include research institutes and universities as well as manufacturers of thermally driven power plants and co-generation plants. Within the framework of this project, they have worked on the further development of their products for combined heating, cooling and power (CHCP) systems.

Fraunhofer ISE directs the project and was also responsible for performing the cross-sectional analysis of the systems in the field test. The project is supported by the European Union within the 6<sup>th</sup> Research Framework Programme.

Further information about the project, the workshop program and the conditions of participation can be found at:  
**[www.polysmart.org](http://www.polysmart.org)**.

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Combined heating, cooling and power demonstration system located at Fraunhofer ISE. Two adsorption chillers, each with a cooling power of 5.5 kW, use the waste heat from a CHP driven by natural gas. The end users are the scientists at Fraunhofer ISE, whose office rooms are heated and cooled by the system. © Fraunhofer ISE

**The text and the photo of the press release** can be downloaded from our web page: [www.ise.fraunhofer.de](http://www.ise.fraunhofer.de)

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