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Carnegie Mellon Receives First Commercialized Solar Absorption Cooling System in the United States

Dedication Ceremony To Take Place 9 a.m.–3 p.m., Oct. 4 at the Intelligent Workplace

PITTSBURGH—Carnegie Mellon University's Robert L. Preger Intelligent Workplace™ (IW) has received the first commercially available solar absorption cooling system as a donation from BROAD Air Conditioning Co. The chiller will be installed on the roof of the IW and used to conduct research for environmentally sound building-cooling practices. The IW is a working laboratory for the Center for Building Performance and Diagnostics in Carnegie Mellon's School of Architecture.

"The Intelligent Workplace will study how to effectively use solar heat in the chiller for both cooling and heating a building. Our goal is that the absorption chiller will produce environmentally benign cooling as a result of our research," said Volker Hartkopf, director of the Center for Building Performance and Diagnostics. "The center aims to use the solar energy impinging on 10 percent of the roof to provide effective cooling and heating for 50 percent of the building space in the IW."

Conventional air conditioners work by using a refrigerant to cool the air contained within an enclosed system. The refrigerant is typically a form of chlorofluorocarbons (CFCs), non-renewable chemicals that harm the earth's protective ozone layer.

According to the developers, the solar-driven absorption chiller differs from conventional air conditioners in two important ways. The new system uses water as a refrigerant and does not use electricity as an energy source, relying instead on solar energy to drive the cooling process. Within the chiller, energy from the solar source heats the water so it evaporates into a gas form. Like the CFCs in the conventional system, the water vapor absorbs heat and cools the ventilation air. Lithium bromide, a salt with a strong affinity for water, acts likes a sponge and absorbs the resulting water vapor. The solution is then heated at a higher pressure to drive off the absorbed water as a vapor, which is condensed and vaporized again at a low pressure and temperature for air-cooling.

"When it's hottest, we have the most solar energy available, which we can then use to create sufficient cooling with negligible use of non-renewable resources such as CFCs. This technology has the potential to eliminate the carbon dioxide emissions equivalent of 5 million cars in the United States if it were implemented on existing commercial buildings," Hartkopf said.

In collaboration with Carnegie Mellon's Department of Mechanical Engineering, the School of Architecture will give a series of presentations on the chiller's functions and the installation to recognize the

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impact of this donation. Presentations will take place from 9 a.m. through 3 p.m., Wednesday, Oct. 4 in the Intelligent Workplace. Zhang Yue, chairman and CEO of BROAD, will be the featured speaker.

The Center for Building Performance and Diagnostics is dedicated to the research and demonstration of advanced building systems and their integration for total building performance. It is located on the fourth floor of Margaret Morrison Carnegie Hall on Carnegie Mellon's campus.

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Note to Editors: Photos of the cooling system installation are available by request.