'Cool' idea for efficient climate control wins recognition

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A Michigan State University researcher and a colleague have won the Boston Innovation Prize for the design of a low-cost, energy-efficient method of cooling and dehumidifying residential and small commercial spaces.

Norbert Müller, assistant professor in Michigan State University's Department of Mechanical Engineering, and John Barrie, of the Appropriate Technology Collaborative in Ann Arbor, Mich., collaborated on the award-winning project.

"The technology used for this air conditioner is radically different," Müller said. "We are using the most natural refrigerant, water."

Muller said the project is part of a broader context of his research to reduce energy consumption and that the award is an acknowledgement of the progress that has been made.

The Innovation Prize was developed by the Barr Foundation, a private family foundation committed to enhancing the quality of life for citizens in the Boston area, and the Cambridge Energy Alliance (CES), an organization that seeks to reduce the carbon footprint of Cambridge, Mass., in the next five years.

Müller and Barrie were awarded $30,000 for the cooling technology they submitted as part of the contest. It was one of 38 submissions reviewed by a panel of national experts.

"We looked at a number of impressive designs, but this one really stood out because of its potential to consume significantly less energy and reduce peak demand compared to standard air conditioners," said Kendra Tupper, a member of the panel of judges and a senior consultant at the Rocky Mountain Institute.

The air conditioner uses water vapor as the refrigerant. When water vapor is used this way it is referred to as R-718. Water vapor can be more efficient than traditional refrigerants, but engineering the compressor is difficult and expensive, Muller added.

"In Europe where there are high energy costs, water vapor is used as a refrigerant in large projects," Muller said. "The economics of making a smaller scale R-718 compressor have, in the past, proven to be prohibitive."

Müller invented a way to make an economical compressor that is small and lightweight by designing a novel turbo compressor woven out of high-strength fibers with an integrated motor.

"It gives wonderful control. It's efficient and compact," said Müller, who points out that up to 30 percent of U.S. electricity is used for cooling and air conditioning. "Another plus for the new R-718 technology is that by experience it is surprisingly quiet."

Barrie is an architect and industrial designer. He and Müller have teamed up for other grant proposals.

"I work to develop and promote innovative sustainable technologies," said Barrie. "My contribution to this project is as a consultant on how air conditioning functions in the real world."

Müller and Barrie want to develop prototypes of the air conditioner as

additional funding for development becomes available.

Source: Michigan State University