Advanced Research Projects Agency • ENERGY

BEETIT PROJECT

UNIVERSITY OF FLORIDA

MEMBRANE-BASED ABSORPTION REFRIGERATION SYSTEMS

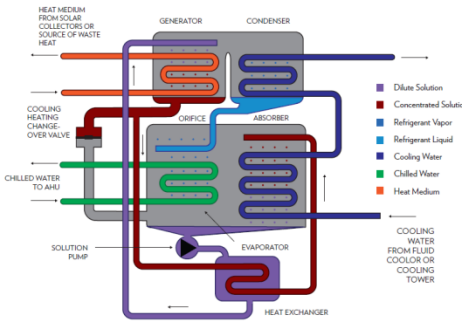
PROJECT TITLE:	Nanoengineered Membrane-Based Absorption Cooling for Buildings Using Unconcentrated Solar & Waste Heat		
ORGANIZATION:	University of Florida (UFL)	LOCATION:	Gainesville, FL
PROGRAM:	BEETIT	ARPA-E AWARD:	$1,000,531
TECH TOPIC:	Thermal Energy Utilization	PROJECT TERM:	9/1/10 – 8/31/12
WEBSITE:	www.arpa-e.energy.gov/ProgramsProjects/BEETIT.aspx		

CRITICAL NEED

Buildings currently account for 72% of the nation's electricity use and 40% of our carbon dioxide emissions each year, 5% of which comes directly from air conditioning. Current building cooling systems run on electricity and use synthetic fluids, leading to large energy consumption and greenhouse gas emissions. Thermally driven absorption heat pumps—which transfer heat energy from one location to another in a cooling and heating system—offer independence from electricity supply constraints because these technologies can be powered from the combustion of natural gas and solar and waste heat. In addition to providing efficient space cooling and heating, these heat pumps can heat water. The development of these promising systems for smaller residential markets has been hindered by the lack of efficient and economical heat exchangers.

PROJECT INNOVATION + ADVANTAGES

UFL is improving a refrigeration system that uses low quality heat to provide the energy needed to drive cooling. This system, known as absorption refrigeration system (ARS), typically consists of large coils that transfer heat. Unfortunately, these large heat exchanger coils are responsible for bulkiness and high cost of ARS. UFL is using new materials as well as system design innovations to develop nanoengineered membranes to allow for enhanced heat exchange that reduces bulkiness. UFL's design allows for compact, cheaper and more reliable use of ARS that use solar or waste heat.



IMPACT

If successful, UFL would help development of an inexpensive, high performance heat-powered refrigeration system for cooling buildings.

- SECURITY: Waste heat or solar heat-based technology for air conditioning would help reduce reliance on fossil fuels—or strengthening U.S. energy security.
- ENVIRONMENT: Greater use of heat-based technology for air conditioners would reduce greenhouse gas production related to electricity generation and could increase demand for solar power—increasing use of renewable energy for cooling.
- ECONOMY: Widespread adoption of this technology could reduce energy consumption for air conditioning of buildings—providing consumers with cost savings on energy bills.
- JOBS: As new technologies develop, there will be new job opportunities in the design, installation, testing, and maintenance of efficient heating and cooling systems.

CONTACTS

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