ME Seminar

Sustainable Thermal Systems for Flexible and Efficient Buildings

Anurag Goyal, National Renewable Energy Lab (NREL)

ABSTRACT

The global demand for energy use in buildings, especially for heating, ventilation and air-conditioning (HVAC), is projected to triple by 2050 leading to twice the carbon emissions compared to the current levels. Improving the end-use efficiency and providing interaction between buildings and the electric grid will be key to building resilient energy infrastructure, enable rapid integration of renewables, and minimize the environmental impact. I will present my PhD research work on compact thermally driven absorption heat pumps to reduce the electricity consumption for space-conditioning. These systems leverage microscale flow geometries to improve heat transfer performance and reduce the system footprint. As part of system development and integration with buildings, I will discuss the dynamic response of these systems under varying loads and external conditions, and development of control algorithms to optimize the performance. Finally, I will discuss my current research work at NREL on thermal energy storage systems for buildings. It involves material characterization and component- and system-scale simulation and experiments to enable the integration of thermal energy storage in buildings. These systems allow the interaction between buildings and the electric grid by providing peak-load shaving and demand shifting capabilities.

ABOUT THE SPEAKER

Anurag Goyal is a postdoctoral researcher in the Building Energy Sciences Group at the National Renewable Energy Laboratory (NREL). Prior to this, he completed his PhD in Mechanical Engineering at Georgia Tech and a bachelor's degree in Mechanical Engineering from the Indian Institute of Technology Delhi. His research interests are in the areas of heat and mass transfer, sustainable energy systems for buildings, and controls and optimization. He is a recipient of the American Society of Heating Refrigeration and Air-conditioning Engineers (ASHRAE) Graduate Student Grant-in-Aid for his graduate research, and GE's Above and Beyond Award for thermal management of high-heat flux electronics.

September 04, 2020, 3:30 pm, Microsoft Teams