ET Summit 2019

Presented by

ET CC EMERGING TECHNOLOGIES COORDINATING COUNCIL

Non-vapor Compression Systems

Future Technologies

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HVAC, Water Heating and Appliance R&D

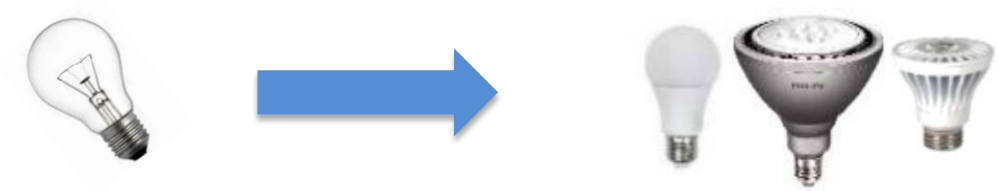
BTO's ultimate goal is to reduce the average energy use per square foot of all U.S. buildings by 50% from 2010 levels.

Currently, the United States of America's homes and buildings consume approximately 40% of the country's energy and 75% of its electricity, which costs more than $380 billion a year to power.

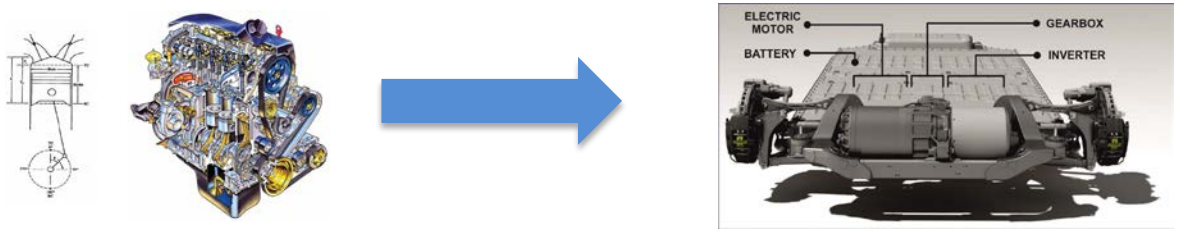
Buildings also account for nearly 80% of America's peak electricity demands. *Additionally, air conditioning dictates most of the peak power demands across the United States and, increasingly, the world.*

100 year old technologies… *paradigm shifts*

- **Incandescent light bulbs → LED lights**



- **Internal combustion engine (ICE) Cars→ Electric Cars**

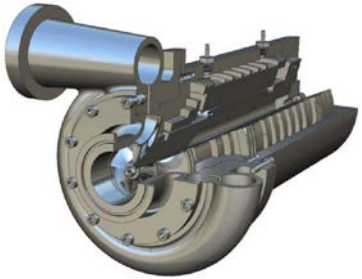


Future of AC/R: Two possible paths

The A/C industry has steadily improved the energy efficiency of A/C systems over the past 100 years—but the underlying technologies have remained fairly unchanged—relying on a vapor compression cycle that puts a fluorinated gas (a refrigerant) through phase changes.

Improving the Energy Efficiency of Cooling Technologies

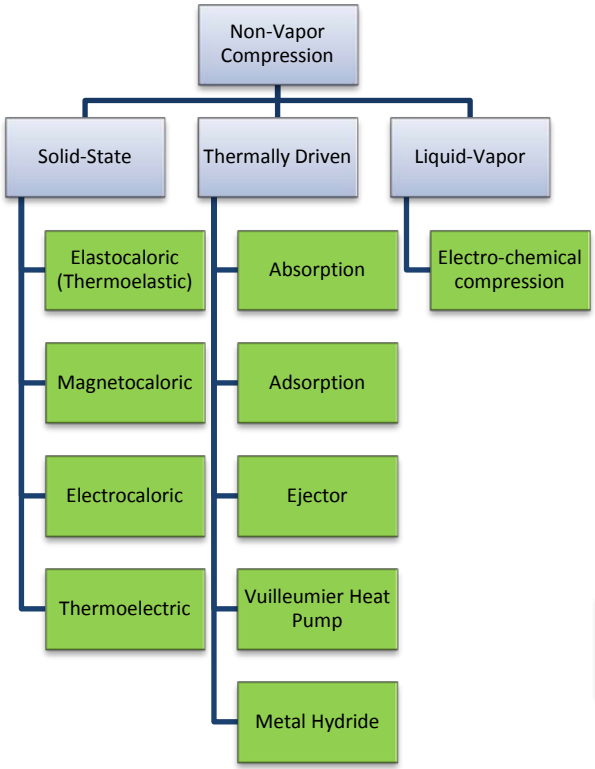
Advanced Vapor-Compression Systems – A/C technologies that significantly lower energy consumption while maintaining cost



Non-Vapor Compression (NVC) Systems – A/C technologies that do not rely on refrigerant-based vapor-compression

Heat Exchanger Research – Next generation A/C systems

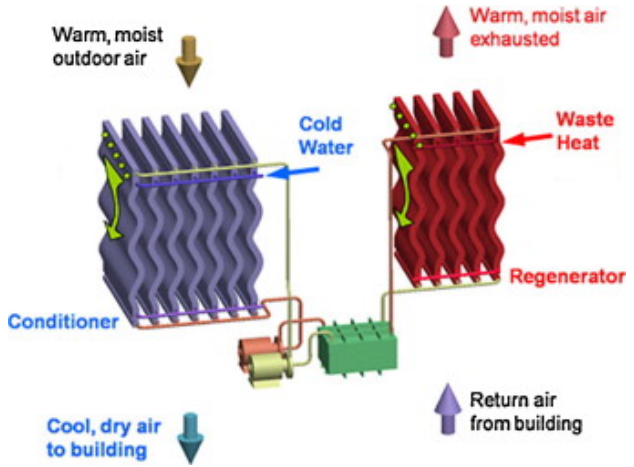
BTO Non-vapor Compression technologies



Recent BTO Funding

Hybrid Technologies

- Separate Sensible and Latent Cooling (SSLC) A/C systems for hot and humidity applications
- SSLC systems have potential to save 30% of energy when compared to a conventional baseline system
- Dehumidify air while not reaching the dew point temperature



Ionic Liquid Desiccants, *salts in liquid state at room temperature*

QUESTIONS? COMMENTS? LET'S WORK TOGETHER!

Thank You!

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http://energy.gov/eere/buildings/hvac-water-heating-and-appliances