

OPPORTUNITY

RTUs condition how much floor space nationwide?

>50%

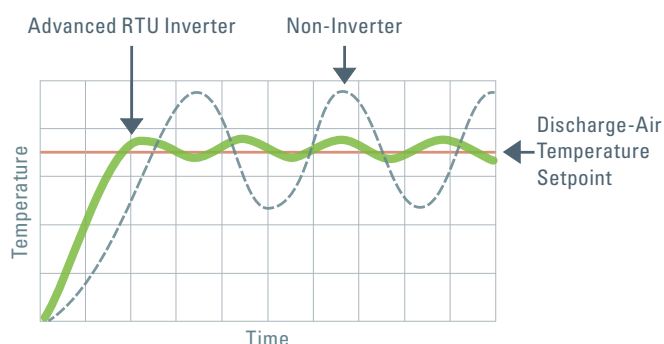
OF COMMERCIAL FLOOR SPACE IN THE U.S. IS CONDITIONED BY ROOFTOP UNITS (RTUS)¹

TECHNOLOGY

How do advanced RTUs work?

VARIABLE SPEED INVERTER
COMPRESSOR MAINTAINS AIR
TEMPERATURE SETPOINT

VARIABLE SPEED
SUPPLY FAN
RESPONDS TO
ZONE CONDITIONS



M&V

Where did Measurement and Verification occur?

PACIFIC NORTHWEST NATIONAL LABORATORY (PNNL) assessed the first RTU to meet the Department of Energy's High Performance RTU Challenge. The RTU was provided by Daikin Applied and installed in a GSA warehouse in Fort Worth, Texas. PNNL also conducted a concurrent study of the advanced RTU at two Florida supermarkets.

RESULTS

How did the advanced RTU perform in M&V?

26%
ENERGY SAVINGS

Models predicted 40% savings compared to a standard RTU²

COSTS
FOR INSTALLATION VARY

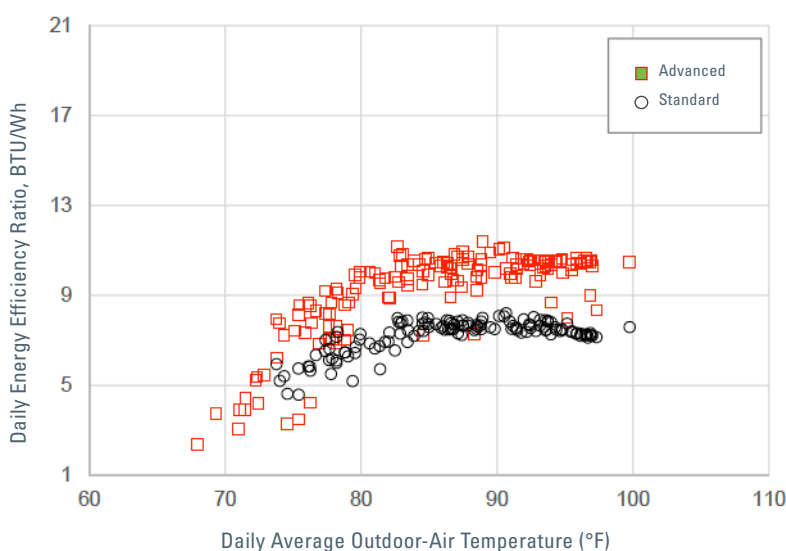
Heavier unit and different footprint may require infrastructure reinforcement or duct changes³

3.8_{YR}
PAYBACK

demonstrated at two Florida supermarkets⁴

Energy Efficiency Ratio as a Function of Outdoor Air Temperature

Advanced RTU exceeds baseline efficiency, particularly at higher outdoor air temperatures



DEPLOYMENT

Where does M&V recommend deploying advanced RTUs?

END-OF-LIFE REPLACEMENT

Modeling indicates that savings will be greatest in hot, humid climates

¹Field Evaluation of the Performance of the RTU Challenge Unit: Daikin Rebel, S. Katipaumla, W. Wang, H. Ngo, RM Underhill, Pacific Northwest National Laboratory, PNNL-26279, May 2017, p. 10 ²Ibid, p. 25 ³Ibid, p. 4 ⁴Field Evaluation of the Performance of the RTU Challenge Unit: Daikin Rebel, S. Katipamula, W. Wang, H. Ngo, RM. Underhill, Pacific Northwest National Laboratory, PNNL-23672, March, 2015, p. 4, p. 10