

OPPORTUNITY

How much energy is used for heating in U.S. commercial buildings?

35%
OF ENERGY
GOES TO HEATING¹



32%
OF COMMERCIAL BUILDINGS

RELY ON BOILERS TO SUPPLY THIS HEAT²

TECHNOLOGY

How do Condensing Boilers save energy?

CAPTURE HEAT
THAT IS LOST THROUGH STEAM
IN CONVENTIONAL BOILERS

95%
EFFICIENCY

15% more efficient than conventional boilers

M&V

Where did Measurement and Verification occur?

PACIFIC NORTHWEST NATIONAL LABORATORY and **NATIONAL RENEWABLE ENERGY LABORATORY** measured the performance of condensing boilers provided by Harsco Patterson-Kelley and Cleaver-Brooks at both the Peachtree Summit Federal Building in Atlanta, Georgia and the Denver Federal Center

RESULTS

How did Condensing Boilers perform in M&V?

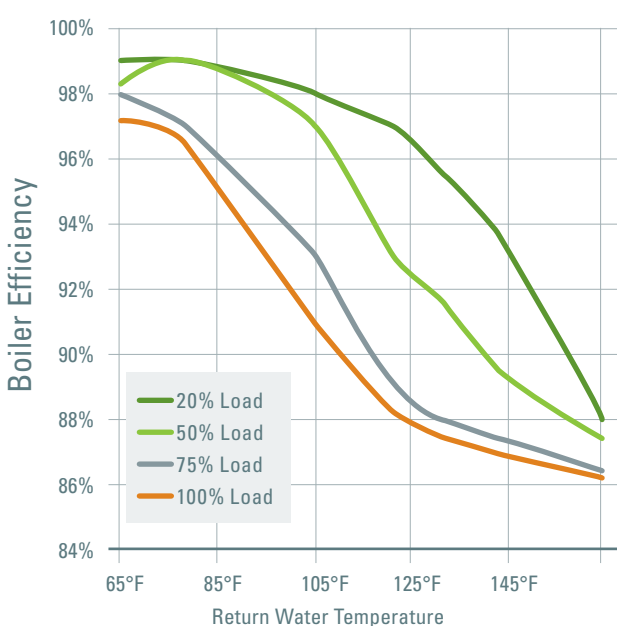
>14%
SAVINGS
IN NATURAL GAS CONSUMPTION^{3,4}

<130°F
RETURN WATER TEMPERATURE
KEY TO EFFICIENCY⁵

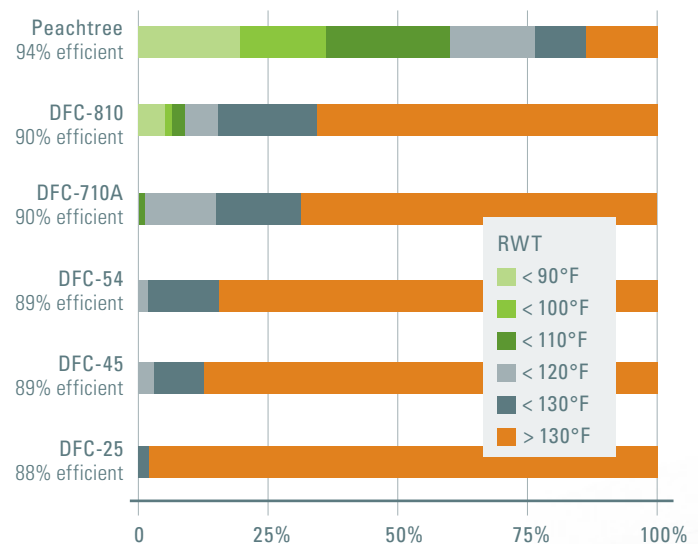
4-7 YEARS
PAYBACK AT ESTIMATED TYPICAL COST^{6,7}

Return Water Temperature Is Key to Efficiency

Lower RWT results in greater efficiencies



% of Time Spent at Different RWT



DEPLOYMENT

Where does M&V recommend deploying Condensing Boilers?

END-OF-LIFE REPLACEMENT
OF CONVENTIONAL BOILERS WITH CONDENSING BOILERS

Life-cycle cost-effective even when only 3%-5% more efficient than high-efficiency boilers

¹Condensing Boiler Assessment: Peachtree Summit Federal Building; Atlanta, Georgia. S.A. Parker, J. Blanchard (PNNL), November 2012, p.5 ²Ibid, p.5 ³Ibid, p.21 ⁴Condensing Boilers Evaluation: Retrofit and New Construction Applications. Dylan Cutler, Jesse Dean, Jason Acosta, Dennis Jones (NREL), July 2014, p.26 ⁵Ibid, p.4 ⁶Ibid, p.27 ⁷Condensing Boiler Assessment: Peachtree Summit Federal Building; Atlanta, Georgia. S.A. Parker, J. Blanchard (PNNL), November 2012, p.24