

OPPORTUNITY

Why is GSA interested in alternative water treatments?

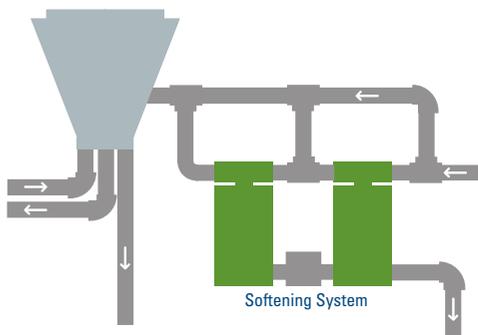
41% INCREASE IN GSA WATER RATES 2014-2017¹

TECHNOLOGY

How do these alternative water treatments work?

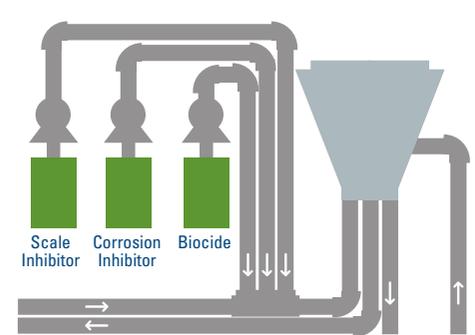
SALT-BASED ION EXCHANGE

REMOVES HARDNESS WITHOUT ADDITIONAL CHEMICALS



CHEMICAL SCALE INHIBITION

PROPRIETARY CHEMICALS INHIBIT SCALING AND CORROSION



M&V

Where did Measurement and Verification occur?

NATIONAL RENEWABLE ENERGY LABORATORY (NREL) assessed three alternative water treatment (AWT) systems at the Denver Federal Center. Two out of the three systems maintained adequate water quality.

RESULTS

How did these alternative water treatments perform in M&V?

23% WATER SAVINGS

94%-99% reduction in blowdown²

O&M VARIABLE

Chemical scale inhibition increased O&M costs, salt-based reduced them³

IMPROVED CHILLER OPERATIONS

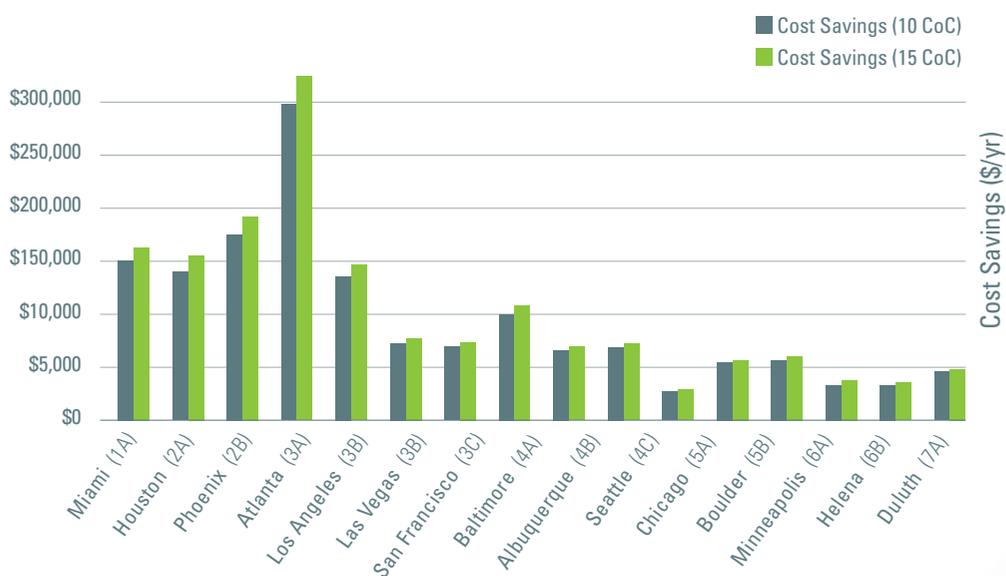
Cleaner condenser tubes, increased heat exchanger effectiveness⁴

<3 YEAR PAYBACK

@ GSA average water/sewer cost of \$16.76/kgal⁵

Modeled Cost Savings per Cycles of Concentration (CoC)

Most water savings are achieved by a CoC of 10; both systems achieved CoCs greater than 12



DEPLOYMENT

Where does the study recommend deploying alternative water treatments?

CONSIDER FOR ALL COOLING TOWERS

Both salt-based and chemical-scale inhibition systems can be retrofitted to any cooling tower.

¹Electrochemical Water Treatment for Cooling Towers, Gregg Tomberlin, Jesse Dean, Michael Deru (NREL), February 2019, p.26

²Alternative Water Treatment Technologies for Cooling Tower Applications, Dylan Cutler, Jennifer Daw, P.E., Dan Howett, P.E. Jesse Dean (NREL), February 2019, p.6 ³Ibid, p.31, 33 ⁴Ibid, p.35 ⁵Ibid, p.6