

VARIABLE-SPEED MAGNETIC BEARING CHILLER

OPPORTUNITY

How much energy is used for space cooling in U.S. office buildings?

10%
OF ENERGY
GOES TO SPACE COOLING¹



32%
OF COMMERCIAL BUILDINGS
RELY ON CHILLERS TO PROVIDE THIS COOLING²

TECHNOLOGY

How do maglev chillers save energy?

ELIMINATE FRICTION
WITH MAGNETIC BEARINGS
IMPROVE EFFICIENCY AT PARTIAL LOADS
WITH VARIABLE SPEED DRIVE

35%
MORE EFFICIENT
THAN FEMP-DESIGNATED HIGH-EFFICIENCY ROTARY SCREW CHILLERS

M&V

Where did Measurement and Verification occur?

PACIFIC NORTHWEST NATIONAL LABORATORY assessed the performance of a variable-speed oil-free centrifugal chiller with magnetic bearings manufactured by Danfoss at the George Howard, Jr. Federal Building in Pine Bluff, Arkansas

RESULTS

How did maglev chillers perform in M&V?

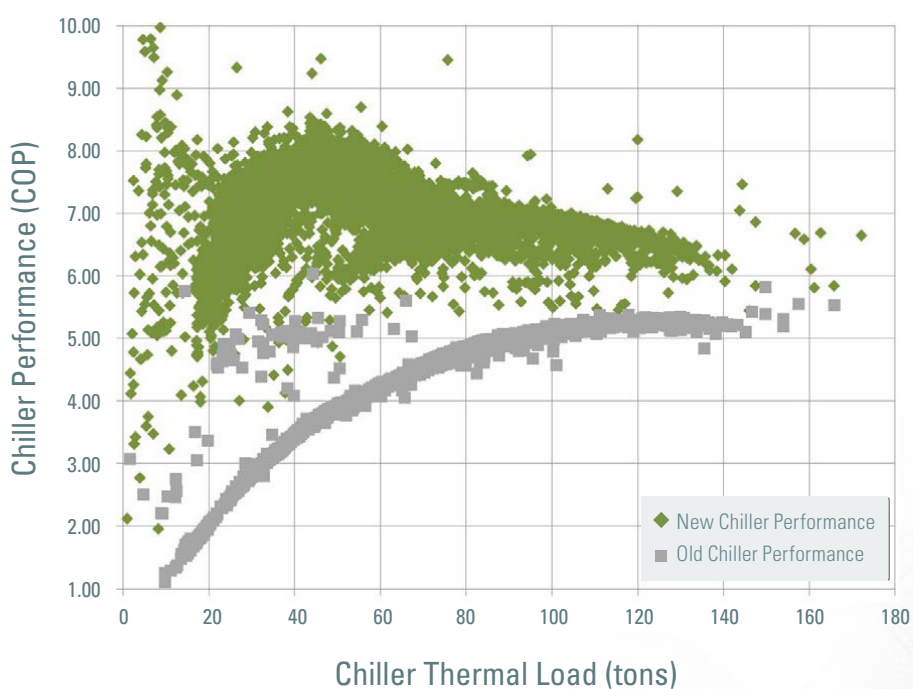
42%
ENERGY SAVINGS
AS COOLING LOADS DECREASE, EFFICIENCY INCREASES³

QUIET PERFORMANCE
ALLOWS CHILLERS TO BE PLACED CLOSER TO OCCUPANT SPACES⁴

<5 YEARS
PAYBACK
after normalizing for payment structure & utility costs⁵

Efficiency of Maglev Chiller Increases as Load Is Reduced

Maglev chiller efficiency is highest between 40 to 50 tons (27 to 33% of nominal full load)
Incumbant chiller efficiency continuously decreases as chiller load is reduced



DEPLOYMENT

Where does M&V recommend deploying maglev chillers?

END-OF-LIFE REPLACEMENT
OF POSITIVE DISPLACEMENT CHILLERS WITH MAGLEV CHILLERS

¹Variable-speed Oil-free Centrifugal Chiller with Magnetic Bearings Assessment; George Howard, Jr. Federal Building and U.S.Courthouse, Pine Bluff, Arkansas. S.A.Parker, J.Blanchard (PNNL), December 2013, p.1 ²Ibid, p.1 ³Ibid, p.3 ⁴Ibid, p.34 ⁵Ibid, p.26