

## OPPORTUNITY

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

**10%**  
**OF ENERGY**  
goes to space cooling<sup>1</sup>



**32%**  
**OF COMMERCIAL BUILDINGS**  
rely on chillers to provide this cooling<sup>2</sup>

## 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&amp;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?

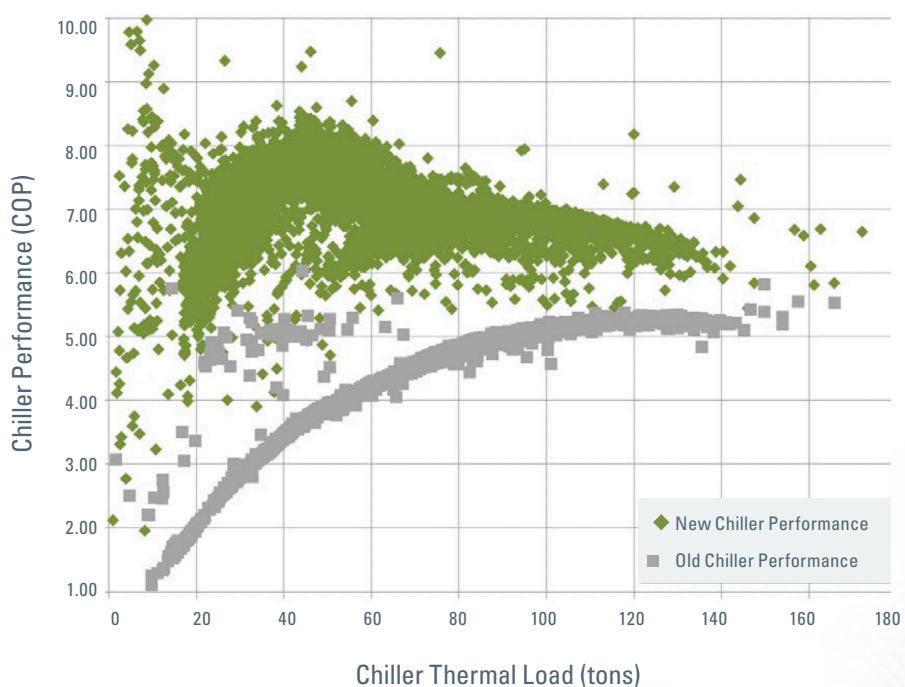
**42%**  
**ENERGY SAVINGS**  
as cooling loads decrease, efficiency increases<sup>3</sup>

**QUIET PERFORMANCE**  
allows chillers to be placed closer to occupant spaces<sup>4</sup>

**<5 YEAR PAYBACK**  
after normalizing for payment structure & utility costs<sup>5</sup>

## 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

<sup>1</sup>Variable-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 <sup>2</sup>Ibid, p.1 <sup>3</sup>Ibid, p.3 <sup>4</sup>Ibid, p.34 <sup>5</sup>Ibid, p.26