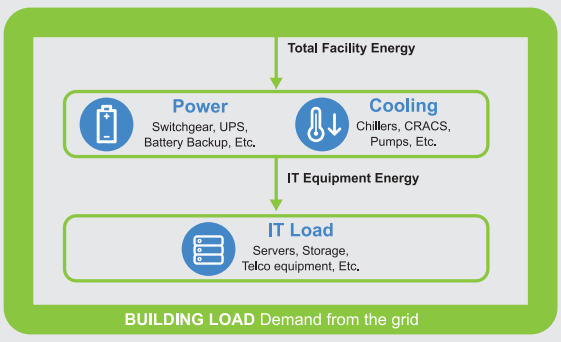
INDUSTRY FIRST:

A SELF-HELP TOOL TO MEASURE DATA CENTER ENERGY EFFICIENCY

2007

When The Green Grid published its Power Usage Effectiveness (PUE™) metric in 2007, power usage in most data centers averaged approximately 2.2.*

$$\text{PUE} = \frac{\text{Total Facility Energy}}{\text{IT Equipment Energy}}$$

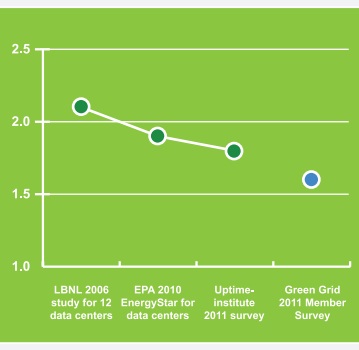


2008

2009

INDUSTRY-WIDE IMPROVEMENTS

Since publication of PUE in 2007, companies have reported a 20% drop in PUE — resulting in energy savings of $1.4 million per year for a typical 5MW data center.



2010

GLOBAL ENDORSEMENT: PUE WORKS ACROSS INDUSTRIES

To ensure uniformity of approaches for end-users, a group of leaders from across the industry met on January 13, 2010 to agree on data center energy efficiency measurements, metrics, and reporting conventions.

2011

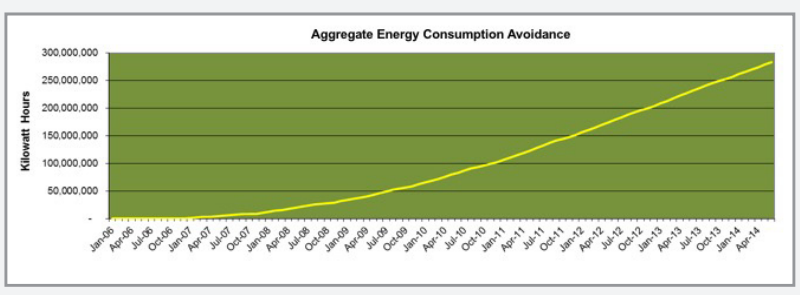
The group's first agreed-upon guiding principle:
*PUE will serve as THE preferred energy efficiency metric for data centers.***

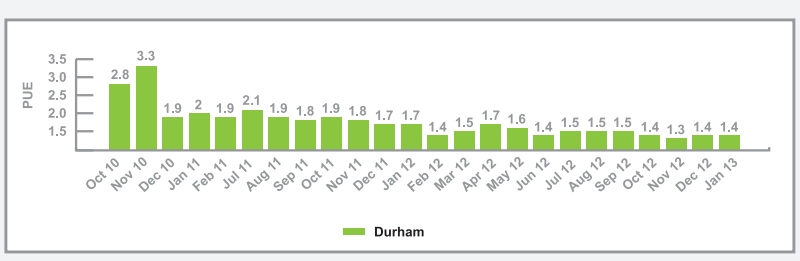
2012

TGG MEMBER ADOPTION SWELLS

- BNY Mellon saved $21M and 283M kWh (the equivalent of the annual energy consumption of approximately 26,000 US homes)
- EMC used PUE to measure the effects of different design and operational decisions within its state-of-the-art data center in Durham, NC — improving PUE by 35%, and saving 1.4 MW of power demand

2013

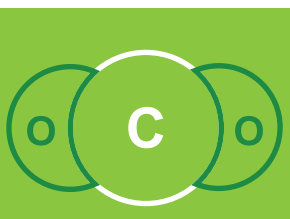




2014

2015

GOING BEYOND POWER



CUE: Carbon Usage Effectiveness — measuring the impact of carbon usage in the design, location and operation of data centers.

$$\text{CUE} = \frac{\text{Annual CO2 Emmissions by Total Datacenter Energy}}{\text{IT Equipment Energy}}$$

WUE: Water Usage Effectiveness — measuring the impact of water usage in data centers

$$\frac{\text{Annual Site Water Usage}}{\text{IT Equipment Energy}} = \text{WUE}$$

*According to 2007 measurements conducted by the Lawrence Berkley National Labs on 22 data centers
**Recommendations for Measuring and Reporting Overall Data Center Efficiency

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get connected to efficient IT