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A National Initiative Driving Greater Energy Efficiency in US Data Center Partners

February 2015

Better Buildings Initiative

Broad strategies to overcome persistent barriers

Developing Innovative, Replicable Solutions with Market Leaders

Better Buildings Challenge

Better Buildings Accelerators

Better Buildings Alliance

Better Buildings, Better Plants

Better Buildings Case Competition

Better Buildings Neighborhood program

Developing a Skilled Clean Energy Workforce

Workforce Guidelines

Pilot program with NIST: Training and education programs on building retuning

Making Energy Efficiency Investment Easier through Better Information

Asset Rating

Buildings Performance Database

Green Button

Data Access Map

MOU with the Appraisal Foundation

Improving Effectiveness of Federal Incentives

Federal Leadership by Example

Better Buildings Challenge

Launched December 2011

Goals:

- Make commercial, industrial buildings & multifamily housing 20%+ more efficient in 10 years
- Save more than \$80B+ for US organizations
- Create American jobs; improve energy security
- Mitigate impacts of climate change

How:

- ✓ Leadership
- ✓ Results
- ✓ Transparency
- ✓ Best Practice Models
- ✓ Recognition
- ✓ Catalyzing Action



Launched 2011, Now 200+ Partners
Commercial, Industrial, Public, Private

Represent:

3+ Billion Square Feet
\$2 Billion Private Financing
600+ Manufacturing plants
\$2 B Federal Commitment

90+ MW of Data Centers

Better Buildings Challenge Partners And Allies



Data Center Energy Context

- Data centers are an important opportunity
 - In 2013, U.S. data centers consumed about 100B kWh
 - If all data centers were more efficient, we could save \$2B annually; 20B kWh
- Better Buildings Challenge expanded to include data centers; new Data Center Accelerator
 - Federal Government, Public, and Private Sector leadership
 - 22 partners, over 90 MW committed
 - Unique opportunity – included in many other buildings
 - Small, medium and large data centers
 - Focus on infrastructure savings; 50% of energy
 - Highlight innovative and replicable solutions, leaders

Data Center Optimization

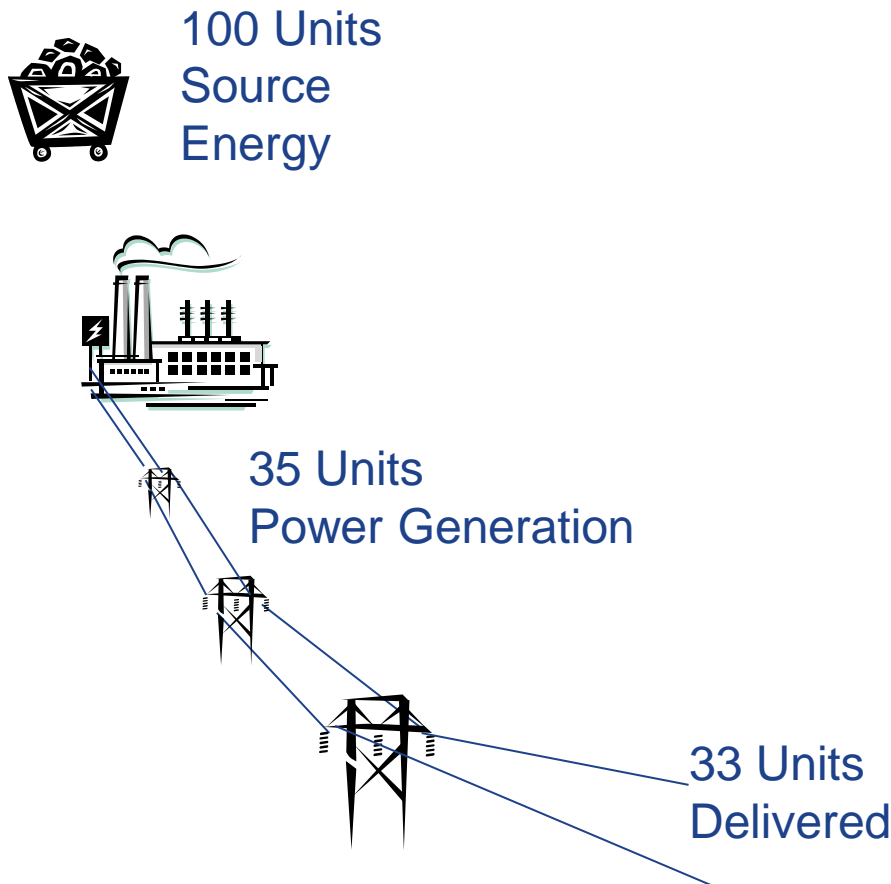
- Increased reliability
- Reduced IT equipment requirements
- Reduced facility/infrastructure requirements
- Reduced staffing/maintenance
- Typical 20% to 40% reductions in energy cost with short paybacks

Focus On Infrastructure Improvements

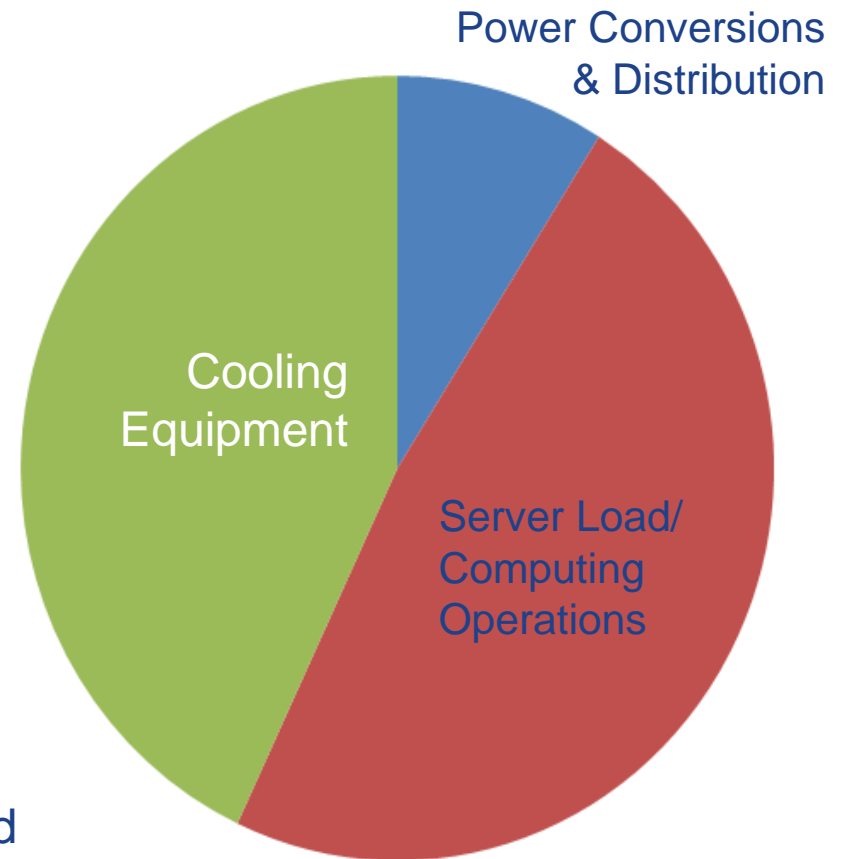
- Infrastructure energy accounts for half or more of most target data centers (less for hyper scale)
- Can be a more complex process--particularly in multi-use buildings
 - Metering and monitoring issues
 - Sizeable initial capital investment may be required
- Because IT equipment energy efficiency naturally improves with each new generation and refresh (~3 years), focusing on infrastructure

Typical Data Center Energy Usage

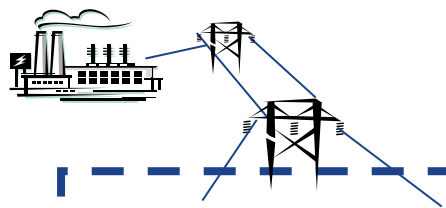
Power to the Data Center



Typical Data Center Energy End Use



Opportunities for saving energy found in many places....



- Server innovation
- Virtualization
- High efficiency power supplies
- Load management

- Better air management
- Move to liquid cooling
- Optimized chilled-water plants
- Use of free cooling
- Heat recovery

Power Conversion & Distribution

Server Load/
Computing
Operations

Cooling
Equipment

- High voltage distribution
- High efficiency UPS systems
- Efficient redundancy strategies
- Use of DC power

Alternative
Power
Generation

- On-site generation
Including fuel cells and
renewable sources
- CHP applications
(Waste heat for cooling)

Data Center Partnership: Better Buildings Challenge

Partner agrees to:

- Improve the energy efficiency of their building portfolio focusing on data centers by at least 20% within 10 years and;
- Share progress/track progress
- Showcase at least one project
- Share their Implementation Model

DOE agrees to:

- Provide technical expertise, communications support, and dedicated account manager
- Create networking opportunities to help Partners share best practices and innovative solutions
- Collaborate with Partners regularly
- Recognize Partners' progress and successes

Data Center Accelerator

Partner agrees to:

- Improve the energy efficiency of a portfolio of a single data center by at least 25% within 5 years and;
- Share progress/track progress
- Showcase a project

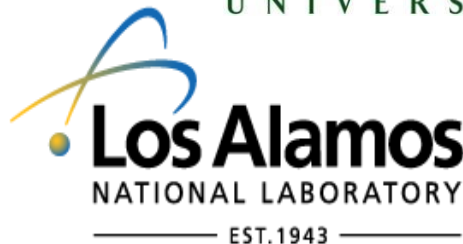
DOE agrees to:

- Provide technical expertise, communications support, and dedicated account manager
- Create networking opportunities to help Partners share best practices and innovative solutions
- Collaborate with Partners regularly
- Recognize Partners' progress and successes

What If Current Metering Is Insufficient?

- Partners must install metering as part of their participation, then track PUE using metered data
 - Within 12 months for Challenge partners
 - Within 18 months for Accelerator partners
- Partners may elect to use a baseline year within 3 years before joining, if metered data is available
- If metering is not fully implemented when joining, partners may work with DOE to identify PUE estimates that may be sufficient to establish a baseline, with the goal of moving towards full metering for subsequent data submissions

Data Center Partner Roster



THANK YOU!

To join or for more information contact
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