# ENERGY STAR Certification for Data Centers

Kathy M. Diehl, Regional ENERGY STAR Program Manager
U.S. Environmental Protection Agency, San Francisco Office

Flash Memory Summit
Santa Clara Convention Center
August 10, 2011

# ENERGY STAR Certification

- Definition for Data Centers
- Scoring and Certifying Data Center
- Product Specifications
- Contacts, Websites

# ENERGY STAR Data Center Defined

Spaces specifically designed, equipped to meet needs of high density computing equipment, i.e., server racks for data storage, processing.

Typically require dedicated uninterruptible power supplies (UPS), cooling.

Functions may include traditional enterprise services, on-demand enterprise services, high performance computing, internet facilities, and/or hosting facilities.

Often free standing, mission critical computing centers.

Data center within larger building, usually own power, cooling.

Not server closet, computer training area.

# ENERGY STAR Certification

- Stand alone data centers, buildings housing large data centers can earn ENERGY STAR certification
- Data Centers in nearly every economic sector
- Use 1.5% U.S. energy, $4.5B, double next 5 years
- Improve energy efficiency (EE) 10%, power 350K homes, save $450M/yr

# ENERGY STAR Portfolio Manager

- Measure, track, benchmark energy use
- Score performance from 1-100
- Compared to building peers

SUPERIOR ENERGY MANAGEMENT
CREATES ENVIRONMENTAL LEADERS
U.S. Environmental Protection Agency

- Peer information based on Energy Consumption Survey

- Score of 75
  - performs better than 75% of peers
  - eligible for ENERGY STAR certification

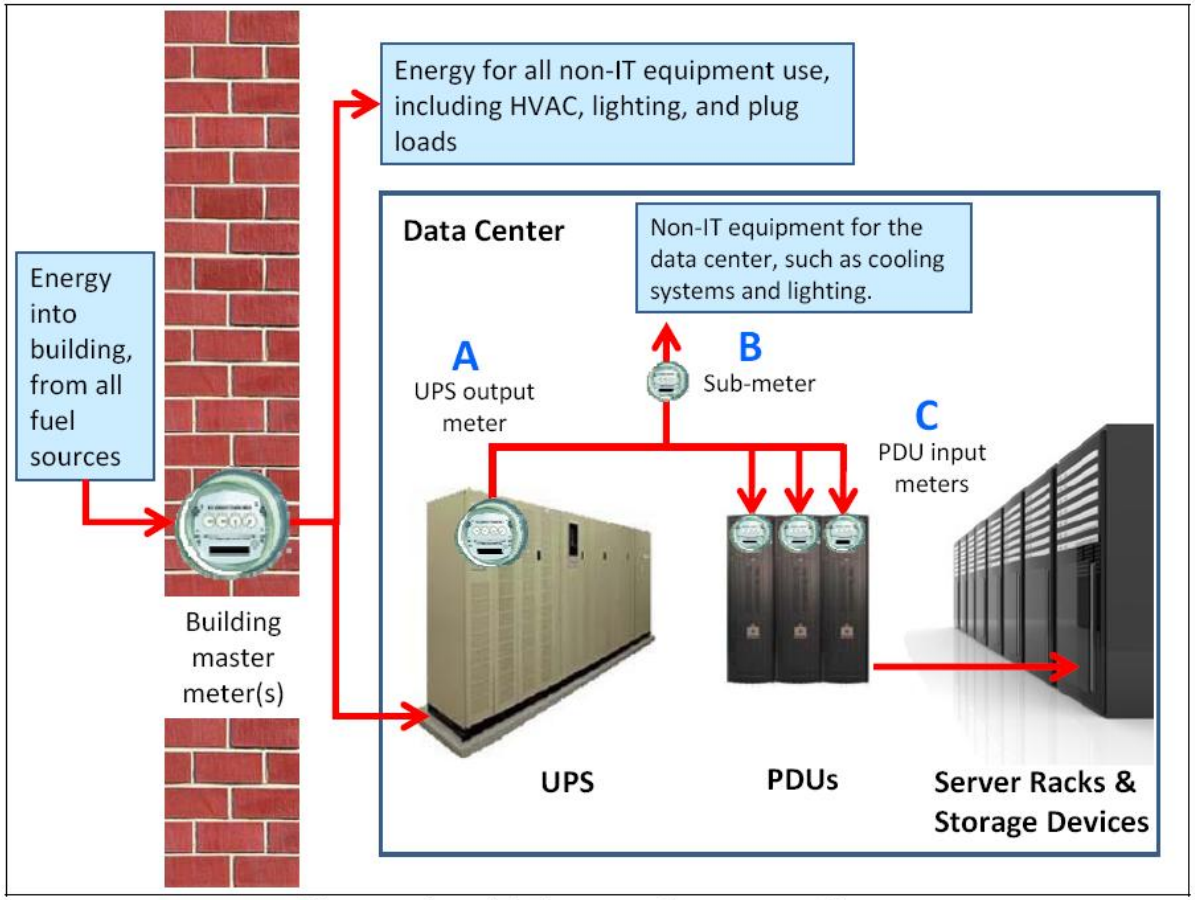
# Guiding Principles for Energy Efficiency

Power Usage Effectiveness (PUE) is EE Metrics
PUE = total data center energy/IT energy consumption

When calculating PUE, IT energy consumption should, at best, be measured at output of uninterruptible power supply (UPS).

- Install meter, if needed, at UPS.
- Sub-meter non-IT load supported by UPS if > 10% total.
- Limited exceptions, use PDU input when no UPS.

# Guiding Principles for Energy Efficiency




**Measuring IT Energy Consumption**

# Guiding Principles for Energy Efficiency

TOTAL ENERGY USE IN PUE

**Dedicated data center**: all energy sources at point of utility handoff to data center owner or operator.

**Data center, mixed-use building**: all energy required to operate data center: IT energy, cooling, lighting, support infrastructure

*Note: In Portfolio Manager, must enter other spaces (e.g. office), provide all energy, whole building*

# Benchmark, Score Your Data Center

| General | Space | Energy |
|---|---|---|
| • Address: city, state, zip code<br><br>• Year built | •Gross Floor Area<br><br>•IT Energy Configuration<br><br>•IT Energy Meter<br>• UPS Output Meter – 12 months of energy data<br><br>•*Optional*<br>• *IT Equipment Redundancy*<br>• *Cooling Equipment Redundancy* | • Utility Bills<br>• 12 consecutive months for each energy source (electricity, purchased chilled water, etc) |

# Earn ENERGY STAR Certification

## APPLY FOR ENERGY STAR

- Determine if building achieves score of 75 or above.

- Generate and P.E. or R.A. validates Statement of Energy Performance and Data Checklist.
  - all energy use accounted for accurately
  - building characteristics properly reported
  - building fully functional
  - indoor environment requirements met

- ENERGY STAR awarded for specific year.

# Important Deadlines for Data Centers

## ACTION REQUIRED IN MANY DATA CENTERS

- Portfolio Manager applied IT energy estimates permitted until June 2012
- Buildings without 12 months of IT energy data in June 2012 will receive “NA” for their ENERGY STAR rating
- Requirement for 12 months of measured data means meters had to be installed, readings taken by June 2011

# ENERGY STAR Product Specifications

- 1) Servers v1.0 effective, v2.0 under development, published early 2012, effective late 2012.
- 2) Storage under development, no updates.

- 3) UPS v1.0 under development, to be published, effective Fall 2011.

# Take Home Message

Summary

- Data Centers now eligible for ENERGY STAR score & certification
- Stand alone, larger buildings housing data centers
- Tools, resources measure data center EE, support improvements

Benefits

- Save energy, money, reduce GHG
- Demonstrate environmental leadership

# Contacts, Websites

- buildings@energystar.gov
- Diehl.kathy@epa.gov, 415 972-3996
- Stephenson.jenny@epa.gov, 202 343-9165
- ENERGYSTARdatacenters@icfi.com
- www.epa.gov
- www.energystar.gov/datacenters

**Servers, Storage, Uninterruptible Power Supplies :**

- Meyers.robert@epa.gov,
  202 343-9923