Today’s Agenda

• Introduction

• Energy Usage in Data Centers

• Testing and Implementing Metrics
  – How do we define?
  – Where are measurements taken?
  – Does ratio work for all data centers?
  – Are there sources of measured data available?
  – How can additional data be gathered?

• Next Steps
Implementing a High Level Performance Metric

• “IT load” and “total load”
  – How do we define?
    • Predictable and intuitive
    • Non–geocentric
    • Repeatedly measurable
    • Generic
      – Equipment types
      – Technology
      – Vendors
      – Users
    • Similar to current EPA benchmarks
    • Timeframe to develop: Less than One Year
Implementing a High Level Performance Metric

- “IT load” and “total load”
  - Where are measurements taken with respect to IT equipment, power supplies, UPS, etc.?
    - What is THE significant ratio with large amount of “Data Centers” commingled with office load
    - Is the “reliability” of the supply a factor in increasing or varying the scale?
    - Is it important for location (economizer effects)?
    - How can “anybody” do it?
    - What about new Technology? (DC Power, Med voltage UPS)
    - How is it repeatable on a periodic basis without risk / high cost?
• “IT load” and “total load”

  Test for a standard
  – Does the ratio work for all data centers of any size range, mission applicability, infrastructure redundancy, location, supply voltage, energy density or other use factors?
Increasingly strident calls for Green in the data center
Focused reduction of Op-x (along with reduction of Cap-x)
How do we show progress and opportunities to deliver power efficiency
Face the woeful reality of virtualization
- A 50% reduction in the number of servers reduces power by only 25%
- The promise of virtualization to address capacity challenges will fall far short of expectation
- Increasing IT complexity and decreasing resiliency
- Virtualization technologies disintermediate the hardware and business process
Create increasingly complex data center fail-over operations
Impact of outage will be far more pervasive and less predictable
Implementing a High Level Performance Metric

• “IT load” and “total load”
  – Are there sources of measured data available for analysis?
    • Repeatable, scientific, and non-invasive
    • How can vendors help with instrumentation?
    • This is not a LEED process as it will be continuous rather than a one-time event
  – Reliability is the priority, but now efficiency is a close second…
    …or is it still on the back burner?
• “IT load” and “total load”
  – How can additional data be gathered to development performance metrics?
    • Coordination of ICE Teams
    • Vendor compliance to a “standard”
    • Industry wide measurement tool
  – Development of an EPA benchmark for Data Center efficiency rating
    • Any rate above a “Green threshold” is by definition GREEN
Today’s Agenda

• Introduction
• Energy Usage in Data Centers
• Testing and Implementing Metrics
• Next Steps
  – EPA ENERGY STAR Focus
  – DOE Save Energy Now
Next Steps

- EPA ENERGY STAR Focus
  - Formal launch by end of 2007
  - Build off of today’s discussion
  - Create actionable metrics for data center end users
    - Incorporate metrics with ENERGY STAR Tools
    - Collaborate with industry to refine and improve metrics
Next Steps

- DOE Save Energy Now
  - Take consensus metrics and use within pilot energy assessments
  - Provide feedback on usefulness of metrics
  - Incorporate metrics within DOE tools
  - Incorporate metrics within DOE training
  - Collaborate with industry on improving tools, measurement protocols, metrics and training