Data Centers & Servers Workshop

National Coordination of a Data Center Energy Efficiency Framework to Enhance Efficiency Programs

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Attendee Introductions

- Name?
- Organization, role?
- Familiarity with data centers?

Workshop Agenda

- Introductions & Overview
- Mapping Data Center Efficiency Efforts & Market Trends to the Efficiency Program Framing Efforts
  - *Questions & Answers*
- Small Group Activity & Reports
- Developing an Organizing Framework: Desired Work Outputs & Questions to Address
- Short Presentation of LBNL Data Center Efficiency Work and Tour of Center - Putting Words into Action

Introduction

- Ground rules
- Background on CEE Data Centers Initiative
- Workshop desired objectives, outputs and value

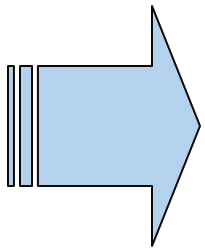
Ground Rules

- Interactive
- Flexible and focused
- Use of “parking lot”
- 100% Participation
- No such thing as a dumb question
- All perspectives are valid and valued
- Follow CEE committee conduct guidelines

CEE Data Centers Initiative

Challenges

- Need for definitions, performance metrics and test procedures
- Many, sometimes competing messages to end users
- Split incentives between IT & facility managers
- Balancing risk and business considerations – reliability, uptime, performance, etc.
- Dynamic nature of market and software and hardware operations



CEE Objectives

- Develop & support consensus-based definitions and performance specs
- Facilitate EE program industry's collective understanding of opportunity, market players & industry motivations
- Identify recommended program strategies to help move more of the market to a preferred outcome

Data Center Definitions

- "A building or a portion of building whose primary function is to house a computer room and its support areas; data centers typically contain high-end servers and storage products with mission critical functions." (ASHRAE Thermal Guidelines for Data Processing Environments, 2004)
- "Spaces specifically designed to accommodate dense arrangements of computer equipment. This currently includes telephone company "central offices" or "telcos", and computer labs. Any space where dedicated HVAC is installed to handle computing equipment load is likely to be considered a datacenter." (PG&E EE Baselines for Data Centers, 2008)

Data Center Definitions

- “A facility used to house computer systems and associated components, such as telecommunications and storage systems. It generally includes redundant or backup power supplies, redundant data communications connections, environmental controls (e.g., air conditioning, fire suppression) and security devices.” (Wikipedia)
- “A facility that contains concentrated equipment to perform one or more of the following functions: store, manage, process, and exchange digital data and information. Equipment includes computers, servers (e.g., web, application and database), mainframe computers, switches, routers, data storage devices, load balancers, wire cages or closets, vaults, and racks.” (CEE Initiative Description, Working Definition 2007)

Workshop Objectives

- To organize the data centers space in a way that allows program designers to consistently identify, address and gain significant and predictable energy savings for unique profile.
- To learn about LBL resources and current efforts to make their data centers more energy efficient.

Today's Desired Outcomes

- A set of significant differentiators (variables) and unique data center profiles that define and differentiate data centers in an actionable way.
- Specific ideas for data center program organizing framework structure and work products.
- Identify outstanding questions and information needs that should be addressed going forward to inform the development of an organizing framework and desired work products.

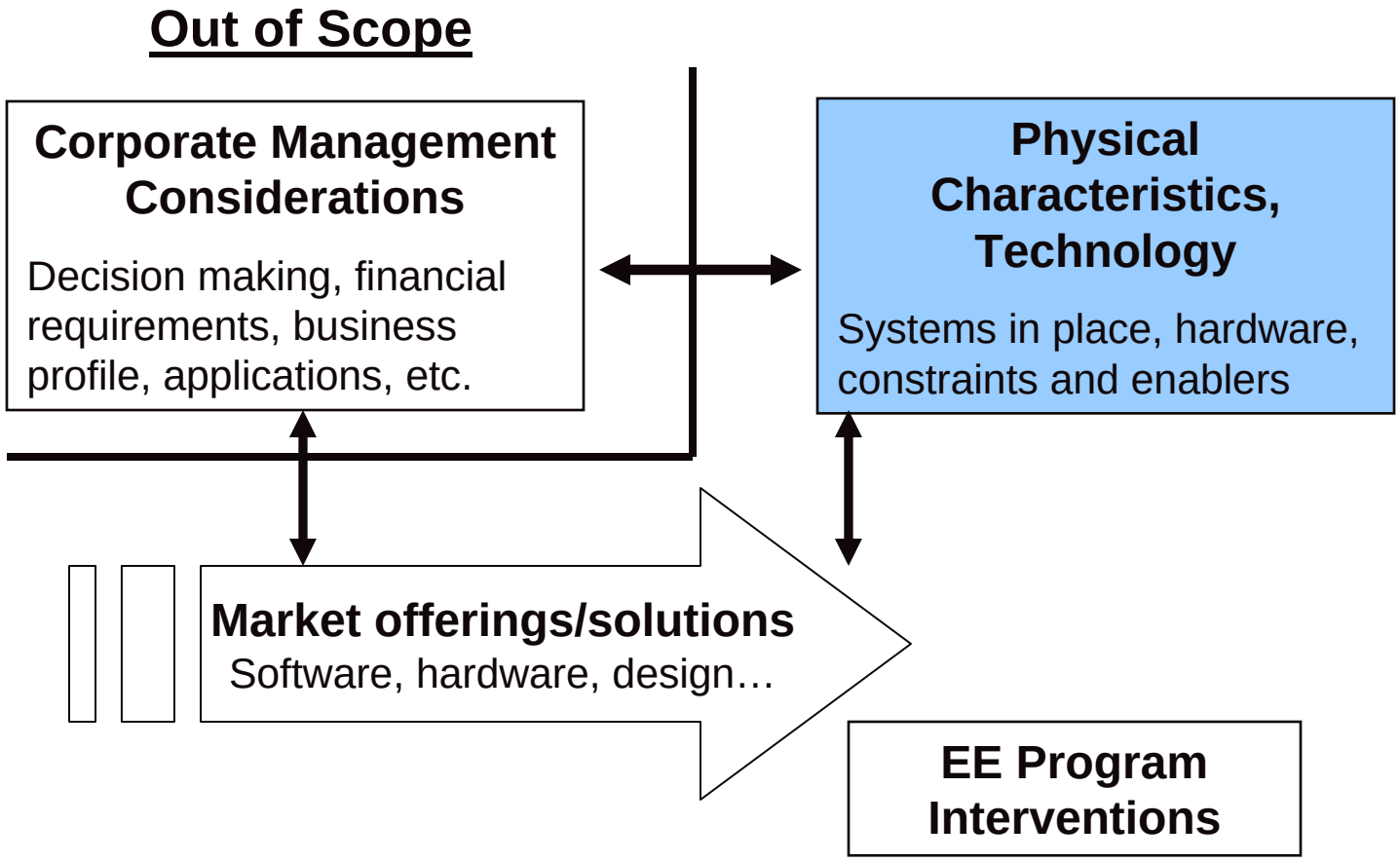
The Value

- **Basis for Market Segmentation**. Starting framework program designers can apply to characterize their markets in actionable way
- **Common Lexicon**: Establish “fruit to fruit” basis for programs to communicated and report back - compare approaches, lessons and successes
- **Inform Program Design**: Guidance around significant data center characteristics that influence program design, strategies and offerings
- **Mapping**: Link “types” to approaches to measures to M&V methodologies to savings and results.
- **Prioritization**: Inform focus on greatest savings potential.

Industry Presenter

- KC Mares
  - Co-chairs, Silicon Valley Data Center Efficiency Demonstration Program
  - Part time support at Berkeley Lab
  - President, MegaWatt Consulting

Small Group Exercise



Small Group Exercise

- Split up into groups of 5-6 people.
- Each group should identify a note taker and a reporter to report out. Each group reporters will have 6-7 minutes to report out.
- Each group has handout to help organize the brainstorming.
- Groups should follow the task outlined.

Small Group Exercise

Data Center Differentiators Previously Identified by Committee:

- Location, climate type
- Primary function
- New construction vs. existing
- “Stand alone” vs. in another building
- Size
- Redundancy requirements
- Basic configuration
- Type, capacity of cooling system
- Humidification system?
- Economizer? Type?
- UPS type?
- IT equipment types, info
- E-monitoring system?

Discussion

- Comparing and combining small group outputs
  - Are the differentiators or profiles identified consistent?
  - Areas to reconcile? Combine? Clarify?
  - Gaps, questions?
- Organizing framework
  - How should the info collected by summarized?
  - Are there work products – guidance doc, decision tree, a Web based system, – that are preferred to organize the information?
- Mapping and next steps
  - What are critical next steps to continue profiling process?
  - What information or expertise do we need to support this process?
  - What other common questions do we need answered to fill gaps?