U.S. EPA Activities for Servers and Data Centers

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Topics

1. EPA report on energy impacts of servers: Highlights & Conclusions
2. ENERGY STAR program for servers
3. ENERGY STAR performance specification for data centers

Public Law 109-341: EPA Report

- **Purpose: assess energy impacts <u>on</u> and <u>from</u> datacenters, identify energy efficiency opportunities, and recommend strategies to drive the market for efficiency**
- Chapters/Topics:
  - Trends in growth and energy use of servers and data centers
  - Potential energy and cost savings due to improved energy efficiency
  - Electric utility impacts from server and data center energy efficiency
  - Potential impacts of energy efficiency on performance, reliability
  - Role of fuel cells and distributed generation in data centers
  - Barriers to implementation of energy efficiency
  - Recommendations for incentives and voluntary activities

Study Goals and Expectations

- Inform Congress & other policy makers of important market trends, forecasts, opportunities
  - Understand the impact energy consumption is having on datacenters and its implications for national energy consumption
- Identify and recommend potential short and long term efficiency opportunities and match them with the right policies
- <u>BUT</u> … the identification of areas for additional strategic research was <u>*outside the scope*</u> of the report

Study Highlights: Draft

- Including storage and network equipment, total 2006 power use associated with servers and data centers is ~1.5% of total U.S. electricity consumption

- Projected to increase to ~2.5% of total electricity consumption by 2011

- Peak load from data centers ~8 GW nationally (~16 baseload power plants)

Impact of Energy Efficiency

Energy efficiency can slow expected growth in electricity use:

- Current trends will lead to ~10% reduction
- Simple management improvements can reduce consumption by an additional 20%
- Best practices can lead to ~50% reduction

U.S. Data Center Electricity
- -
Projected Electricity Use by Scenario, 2007 - 2011
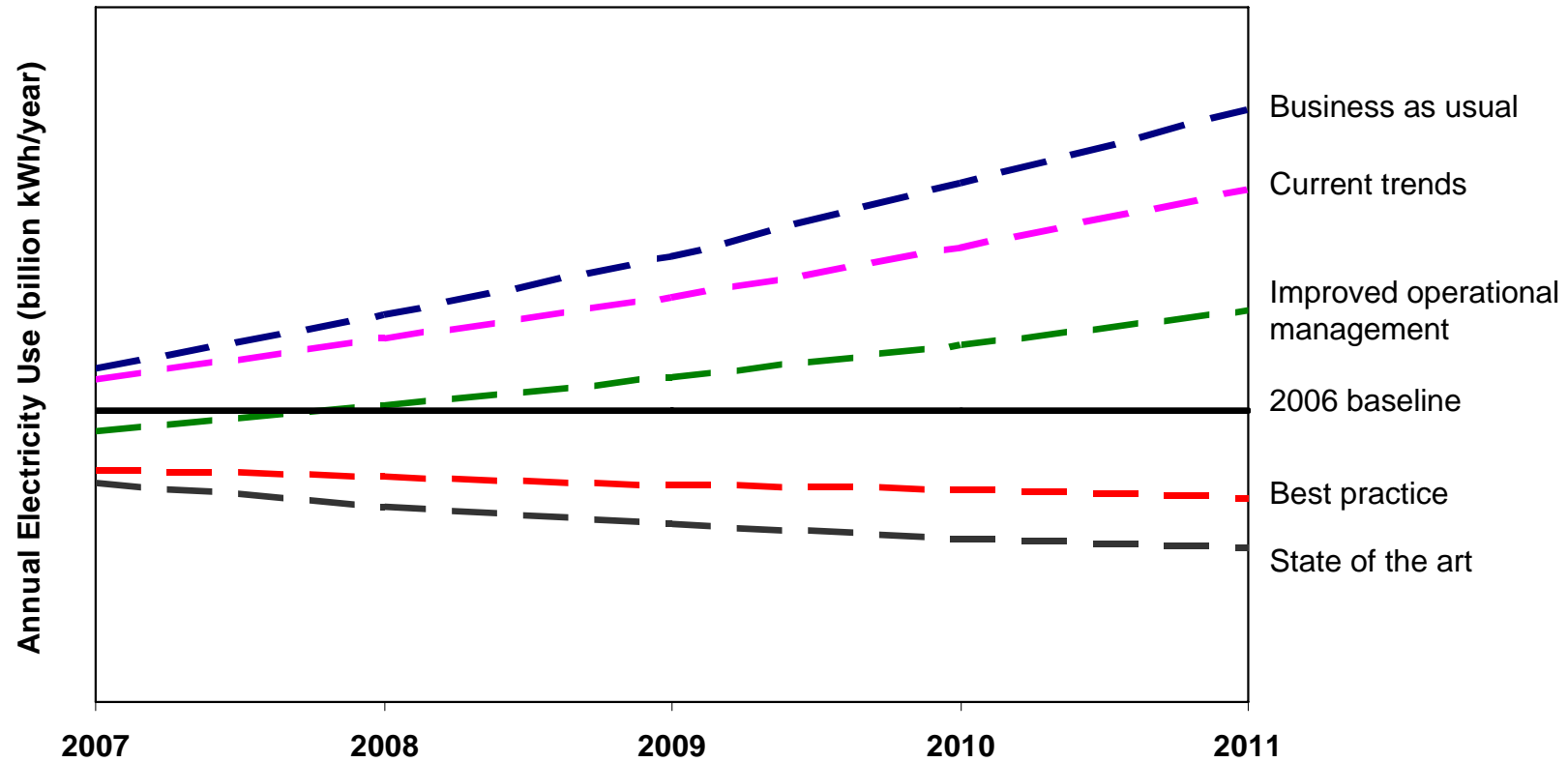
Recommendations

- Develop ENERGY STAR whole-building performance rating system for data centers
- Develop ENERGY STAR metrics and labeling for data center products (IT and infrastructure equipment)
- Federal government adopt best practices for data center energy management
  - Use of "energy aware" TCO methods
  - Cross-functional energy management teams
  - Procurement specifications for efficient products
  - Properly meter and account for data center electricity

Recommendations *cont.*

- Public/Private Partnerships:
  - Testing and demonstration of new technologies and practices
  - Develop and disseminate education and training materials for data center operators
- Financial incentives
  - Tax credits
  - Utility rebates
- Research and Development

EPA Report Timeline

- **February 15:** EPA hosted workshop to discuss approach and generate ideas and leads
  - Discussion summaries available on Web site
- **April 23**: Draft report released for 2-week comment period, deadline was May 7
  - Most comments available on Web site
- **Mid-Late May**: EPA to host Web conference to present findings of final report
- **June**: Final study due to Congress

ENERGY STAR for Servers

- EPA will release strawman proposal outlining key objectives and approach -- targeted for June
  - Basic req'ts for ES partners & products
  - Clearly defined products & categories
  - Testing, performance, and reporting

- EPA considering power supply efficiency & *system energy efficiency performance*
  - **Need support from industry stakeholders during process as it unfolds this year**

- <u>Initial focus will be on servers</u> but EPA also interested in other IT equipment -- storage, networking equipment, etc.

Efforts to Develop Server Performance Benchmark: SPEC

No metric available to compare server energy efficiency

- January 2006 SPEC Power and Performance Committee began development of benchmark for evaluating energy efficiency of servers

- Working prototype has been developed --- final product by the end of 2007

- More info on progress: www.spec.org/specpower

ENERGY STAR Energy Performance Benchmark for Data Centers

- Computer Data Center exists as a space type in Portfolio Manager
  - Currently no energy performance rating is available
  - Users can track total facility energy consumption over time
  - Users can add submeters to monitor specific loads within the data center (i.e. critical load)
  - Building owners and operators can track data center energy use alongside their other facilities (i.e. offices)
  - Owners and operators can take advantage of all Portfolio Manager tools and ENERGY STAR strategies

ENERGY STAR Energy Performance Benchmark for Data Centers

- EPA initiating a data center industry focus to expand current offerings
  - Agree on an appropriate energy performance metric and terminology
  - Identify data needs and data collection methodology
  - Undertake data collection effort
  - Development of benchmark
- Stakeholders meeting in Aug/Sept.

Need more Information?

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