

WORKING GROUP 1: IT EQUIPMENT

This working group will discuss study tasks and information needs related to IT equipment (i.e., server components, servers, network equipment, and storage devices) in support of the following H.R. 5646 study objectives:

- An overview of the growth trends associated with data centers and the utilization of servers in the Federal Government and private sector **(Task 1)**
- Analysis of the industry migration to the use of energy efficient microchips and servers designed to provide energy efficient computing and reduce the costs associated with constructing, operating, and maintaining large and medium scale data centers **(Task 2)**
- Analysis of the potential cost savings to the Federal Government, large institutional data center operators, private enterprise, and consumers available through the adoption of energy efficient data centers and servers **(Task 3)**
- Analysis of the potential impacts of energy efficiency on product performance, including computing functionality, reliability, speed, and features, and overall cost **(Task 5)**
- Recommendations regarding potential incentives and voluntary programs that could be used to advance the adoption of energy efficient data centers and computing **(Task 8)**

Agenda

10:30-10:35	Discuss relevant study objectives and agenda for working session (5 minutes) <ul style="list-style-type: none">• Read related H.R. 5646 language• Ground rules (no selling, stay at high level, let everyone participate)• We assume that all data received are public and citable
10:35-10:40	Introductions (Name and affiliation) (5 minutes)
10:40-11:30	Estimation of growth trends and trends in IT equipment energy use (50 minutes)
11:30-12:00	Definition of plausible efficiency scenarios and estimation of cost savings (30 minutes)
12:00-12:15	Break / pick up lunch
12:15-12:35	Definition of plausible efficiency scenarios and estimation of cost savings (20 minutes)
12:35-12:55	Identification and discussion of reliability and performance issues (30 minutes)
12:55-1:35	Recommendations regarding potential incentives and voluntary programs (40 minutes)
1:35-1:45	Summarize key working group outcomes (10 minutes)

Some Key Terms (open to improvement)

IT energy load — includes servers, storage, and network equipment

Class = server class (volume, mid-range, and high-end) (per Koomey paper/IDC)

Utilization = applies most directly to processor utilization, but also covers other IT components and equipment

TOPICS OF DISCUSSION

Specific data and information requests are indicated in ***bold italics***

1) Estimation of growth trends and trends in IT equipment energy use (Task 1)

- Derive estimates of growth trends utilizing existing data sources
 - Likely trends of interest include:
 - Processor speeds, average cores/processor / processors/system / cores/system, # servers, system peak power, idle/peak power ratio, computations/watt, server power by component (memory, processor, I/O, power supply, etc.), ...
 - storage capacity, # of disks, ...
 - network capacity, # of ports, ...
 - data center floor area, average utilization, total computations done, ...
 - ***Which trends to include?***
 - ***Tables, charts, and raw data on trends***
 - ***Qualitative comments on trends***
 - ***Where are these trends headed in the next 5 years?***
- Utilize forthcoming Jon Koomey study for estimates of current server energy use
- Derive estimates for energy use by storage devices
 - ***Estimates of total storage energy use; sales/stock and power estimates***
- Derive estimates for energy use by network equipment
 - ***Estimates of total network energy use; sales/stock and power estimates***
- Determine Federal vs. non-Federal split
 - ***Estimates of federal/non-federal split by equipment, company, or industry***

2) Definition of plausible efficiency scenarios and estimation of cost savings (Tasks 2 and 3)

- Estimation of future energy use (5 years out) for several plausible future scenarios, which could include: frozen efficiency, business as usual trends, modest efficiency gains; and maximum plausible efficiency gains.
 - ***What scenarios make sense to include in the study?***
- Potential technical considerations include:
 - High performance computing versus commercial and similar applications
 - Application type (web, database, development, etc.)
 - Utilization (patterns and average percentages, by system type)
 - ***Others to consider?***
- Cost and benefit characterization
 - Benefits can include electricity savings, avoided hardware purchases, improved operational efficiencies, reduced rack/floor space needed, etc.
 - Costs can include investments in hardware and software, installation and support costs, system management costs, etc.
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 - ***Quantitative and qualitative data on costs and benefits***
- Potential cost savings disaggregation
 - Federal versus private sector
 - Regional?
 - ***Regional data on end use markets?***

3) Identification and discussion of reliability and performance issues (Task 5)

- Identification of potential issues:
 - Reliability
 - Computing functionality and features
 - Speed
 - Overall cost
- ***Input on potential positive and negative issues associated with IT equipment energy efficiency, with a particular focus on reliability***

4) Recommendations regarding potential incentives and voluntary programs (Task 8)

- Identification and discussion of possible recommendations for incentives and voluntary programs
 - Financial incentives
 - e.g., utility rebates, Federal tax deductions/credits
 - Education and training
 - e.g., datacenter operator certification
 - Industry standards
 - e.g., energy performance metrics, test procedures
 - Endorsement labeling
 - e.g., ENERGY STAR
 - Government procurement
 - e.g., EPC Act 2005 purchasing requirements
 - Government operation
 - e.g., mandatory benchmarking of Federal datacenters, pilot program implementation in Federal facilities
 - Research, development, and demonstrations (RD&D)
 - Information
 - Technical guidance, awareness campaigns, publication of benchmark data, etc.

5) Summarizing key working group outcomes for reporting at plenary session