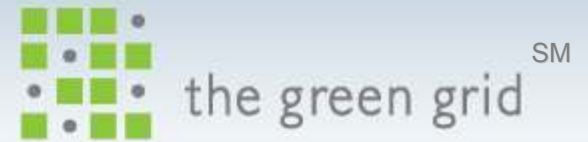


# Global Perspectives in Energy Efficiency

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John Tuccillo, APC  
A Director of The Green Grid

# Global Perspectives on Energy Efficiency

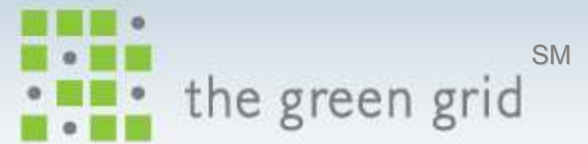


- Unique opportunity to learn from government officials around the globe

What we hope to discover:

- What are the shared roles of government and industry organizations?
- Updates on progress-to-date
- Identify next steps on how the two work together
- Further the cause of energy efficiency

# Introduction of Panelists



- Moderator:
  - Paul McGuckin, Gartner Institute, Research Vice President
- Panelist:
  - Andrew Fanara, EPA, ENERGY STAR® Product Specifications Development Team, Product Development Team Leader
  - Paul E. Scheihing, DOE Industrial Technologies Program, Technology Manager
  - Anson Wu, representing EU CoC, Data Centres Product Manager, AEA
  - Nobuaki Arima, Ministry of Economy, Trade and Industry (METI), Deputy Director, Information and Communication Electronics Division.

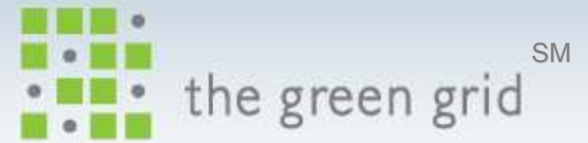
## Global Trends: Government Initiatives to Reduce Energy Use in Data Centers

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Andrew Fanara, Environmental Protection Agency (EPA)  
Climate Protection Partnership Program  
ENERGY STAR

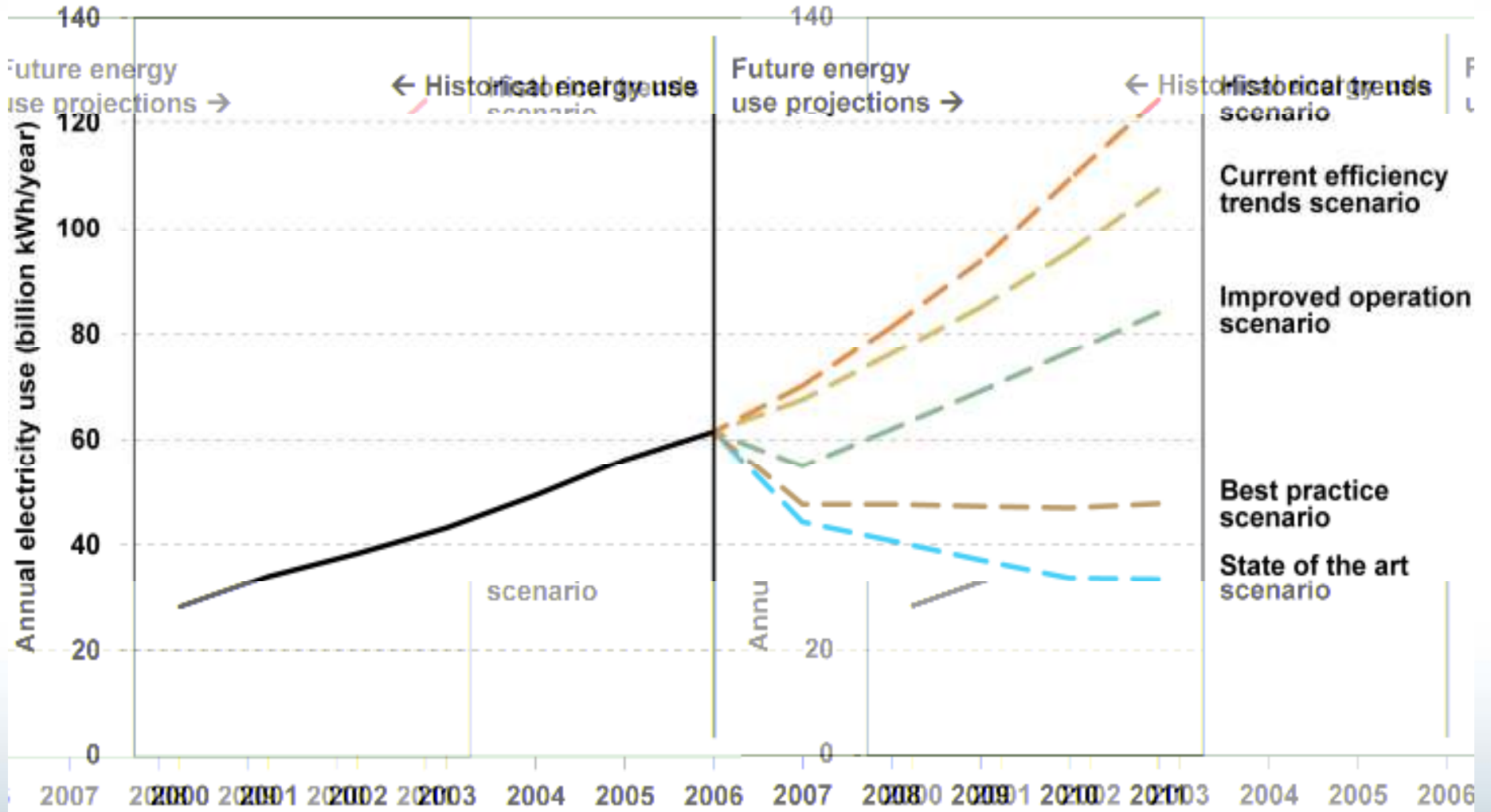
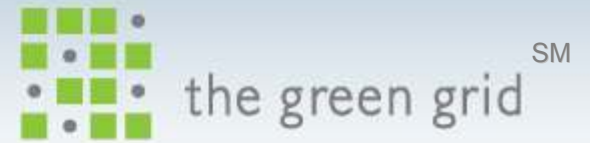
[fanara.andrew@epa.gov](mailto:fanara.andrew@epa.gov)

# Global Interest: Data Centers

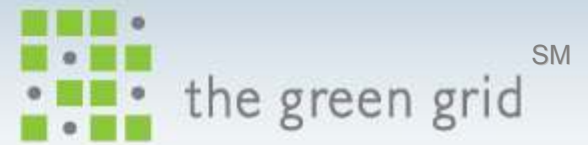


- Services provided by data centers are in global demand
- Need for increased capacity and strain on electricity supply is a worldwide issue
- Public and private sectors under pressure to improve energy security and reduce carbon emissions
- IT market is global -- technology & best practices sharing, harmonization opportunities can be shared

# Comparison of Projected Electricity Use All Scenarios 2007 - 2011



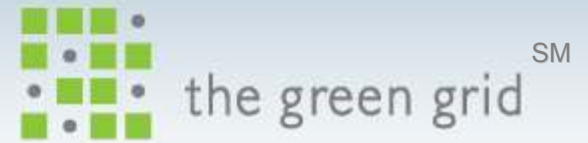
# Australia – Dept. of Environment & Water Resources



- Equipment Energy Efficiency Program Committee
  - Includes New Zealand representatives
  - Regulatory and voluntary market intervention programs
- Energy Efficiency in Government Operations (EEGO) Policy 2006
  - Requires government departments and agencies to report annual energy usage and to commit to energy intensity portfolio targets along with other e-e commitments
- **Goal:** Agencies must develop strategies for energy efficiency in govt. operated data centers with an expected 20% improvement over 5 years

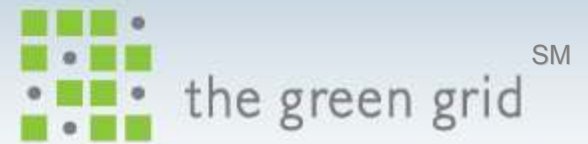
# Datacenter Project

## Key elements



- 3 stage process involving issue papers, case studies and final report to government to lay out plan to achieve 20% goal
  - Targeted completion Q4 / 2008
- Developing MEPs for CCU and CRAC Units
  - Targeting Q1 - Q2 / 2008 for proposal & industry consultation
  - Regulatory impact statement
- Expressed intent to use ENERGY STAR building and product metrics

# India



**Primary Objective:** Assist in market transformation and capacity building for energy efficiency in Indian buildings for high tech industries starting with data centers

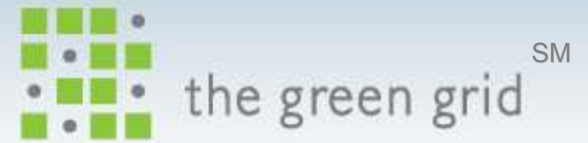
- Asia Pacific Partnership on Clean Development (APP)
  - Building & Appliance Task Force (BATF)
- Project Description
  - Funding from the US Department of Energy (DOE)
  - Partnership with US Agency for International Development (USAID)'s ECO-III Project

# India Project Goal



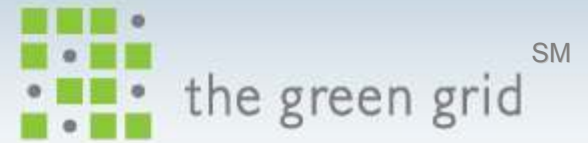
- To assess the state of the art for energy efficiency in Indian data centers and to identify opportunities for improvement
- Activities included:
  - Meetings with Indian government agencies, NGOs, industry organizations, industry leaders, and USAID
  - Site visits to three data centers in Bangalore (India's "Silicon Valley")
  - Organization and participation in a half-day brainstorming meeting with government and industry to establish an efficiency initiative
  - Organization and participation in an all day awareness building workshop

# Barriers to Energy Efficiency



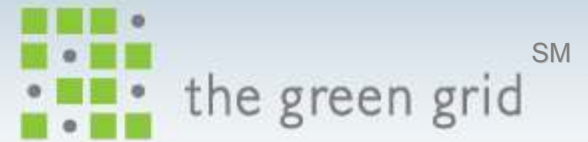
- Barriers to improving Indian data center efficiency identified at half-day “charette”:
  1. Lack of awareness
  2. Lack of technical expertise (capacity building)
  3. Lack of institutional framework (e.g. to share information and to develop a value proposition)
  4. Lack of energy benchmarking
- Universal agreement on the need to establish an industry led initiative to address barriers:
  - Government and international organizations could play a catalytic role and provide technical resources for such an initiative

# Recommendations



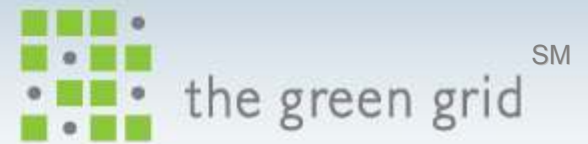
- Recommendations fell into five main categories:
  1. Create Information/Awareness Framework
  2. Perform Capacity Building/Training
  3. Establish an industry forum to facilitate capacity building and to stimulate peer to peer exchanges of information (lessons learned)
  4. Develop Performance Indicators and Benchmarking Framework
  5. Create Regulatory, Standards, and Incentives Framework
- In addition, India specific technical research and development needs were identified.

# Awareness Workshop



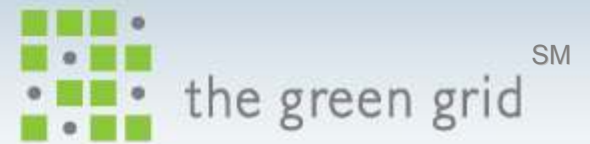
- 65 Attendees representing a broad spectrum of the private and public sector
- 3 Technical Sessions
  - 1<sup>st</sup> Session reviewed market & trends and benchmarked performance, and described IBM's Project Big Green
  - 2<sup>nd</sup> described international best practices in data center design and operation, looked at data center power optimization in two Intel India data centers, and presented a case study of efficiency at India's Network Appliance.
  - 3<sup>rd</sup> covered HP's Dynamic Smart Cooling application in India (1st full scale application in the World), energy efficiency from APC, and information resources.
- Included an interactive panel discussion on a national data center efficiency initiative

# Observations



- Data centers appear to be consistent with world wide trends
  - Some included international state-of-the-art efficiency technologies
- Indian-only companies (non-multinational companies including data center owners, designers, and builders) need access to unbiased information and industry forums
- The Indian IT/data center industry is poised to take on a leadership role in establishing an energy efficiency initiative

# More Information



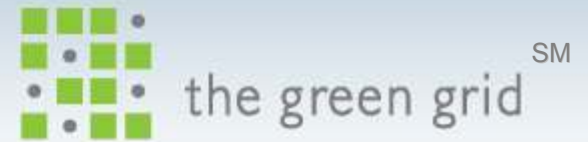
- Dale Sarter, LBNL [DASartor@LBL.gov](mailto:DASartor@LBL.gov)
- <http://hightech.lbl.gov/DC-India/India-datacenters.html>

# China



- Staggering economic growth coincident & dependent on increased development of new datacenters
  - Serious electricity supply and quality issues
- Pressure to reduce emissions and pollution
- EPA's Goal: Develop project to transfer knowledge to build data centers of the future -- not of the past
- Workshop held in Beijing December 2007
  - Industry experts provided an overview of issues, products, technologies, and best practices to China National Institute for Standards (CNIS) staff

# China-Next Possible Steps



- Establish local network of government (CNIS) & industry contacts
  - Building design, utilities, customers, IT, site infrastructure etc.
  - Leverage knowledge and financial resources locally and regionally
  - Share situational analysis & facility best practices information
- Identify existing & planned data center projects to highlight as flagships
- Work with Chinese government to identify needs for building codes industry standards
  - Similar to ASHRAE or other building code standards

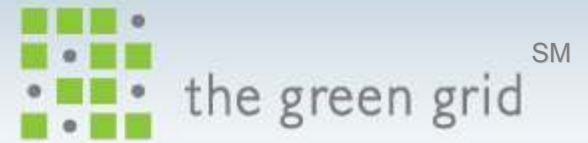
# US - EPA Report to Congress



## Trends in Data Center Energy Use

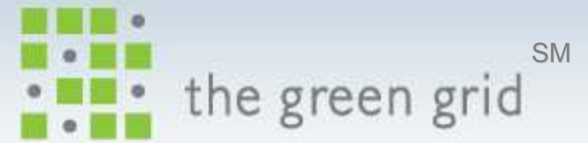
- Sector consumed about 61 billion kWh in 2006
  - Equates to **~1.5%** total U.S. electricity consumption and **~\$4.5 billion**
  - Federal sector: ~6 billion kWh and ~\$450 million
- Projected to increase to 100 billion kWh in 2011
  - Equates to **~2.5%** of total U.S. electricity consumption and **~\$7.4 billion**

# Key Report Recommendations



- **Standardized performance measurements for IT equipment and data centers**
  - ENERGY STAR label for servers, considering storage and network equipment
  - Development of benchmark/metric for data centers
- Encouragement of private and public organizations and the creation of incentives to pursue efficiency options
- Information on best practices
- Research and development
- Federal facilities show leadership

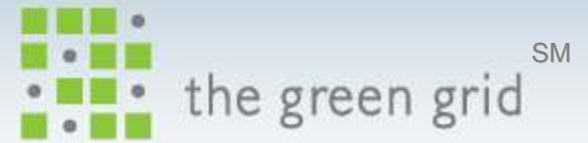
## Leadership by US Government



### EPA National Computing Center RTP, NC

- 95,322 gross square feet, 46 Billion Btu/year
- LEED® silver certification in 2005
- Solar roof system and street lighting
- Energy efficient lighting in facility
- Building automation system, outside air economizers, variable speed HVAC systems
- **Energy audit scheduled for first week in February**

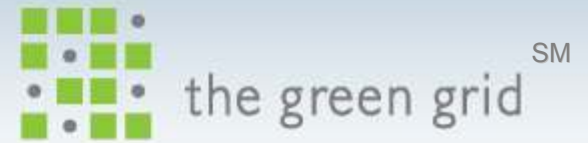
# ENERGY STAR for Servers



Server energy demand **drives DC power and cooling needs**

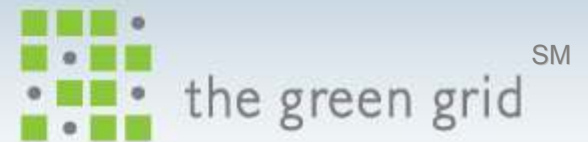
- **Goal:** Create protocol to measure server energy efficiency to allow fair competition
- Technical specification would have several key elements:
  - Definitions of product types eligible for ENERGY STAR
  - Test procedure for energy efficiency and computing performance
  - Performance levels representing most efficient models available in the market today
  - Road map for future specification requirements (Tier 2)

# Specification Timeline



- Goal:** Finalized Tier 1 spec before end of 2008 & lay ground work for Tier 2
- EPA released draft framework document July 2007
- **Draft 1 specification release targeted for Feb 7**
  - Stakeholders will have 3-4 weeks to comment
- Draft available at:  
[www.energystar.gov/productdevelopment](http://www.energystar.gov/productdevelopment)

# US - Energy Supply Environmental & Climate Pressures



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### Business Updates

- Metro One names new CEO 1:49 p.m. PT
- Nike names new president for Jordan Brand 12:36 p.m. PT
- Rents in Western Cities 12:01 a.m. PT
- More Entries

### More Business Blogs

- At Work

## PacifiCorp labels coal a no-go for new plants

Going green - The utility says its long-range plans will look elsewhere for resources to generate electric power

Friday, December 07, 2007

TED SICKINGER  
The Oregonian Staff

PacifiCorp has backed away from plans to build any new coal plants within the next 10 years, conceding that coal no longer can overcome tightening regulations and environmental opposition.

In recent filings and communications with regulators in Utah and Oregon, the Portland-based company said three coal plants included earlier this year in long-range resource plans and subsequent requests for proposals were "no longer viable options."

PacifiCorp cited as reasons for its decision: The likelihood of national carbon emissions legislation, which it said makes accurate cost projections and risk assessment for coal plants "futile," and the fact that most of the coal plants proposed around the United States recently have been canceled, denied permits or been involved in protracted litigation.

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• How Does it Work?



# North America – Utility Programs



- U.S. & Canadian utilities pursuing data center programs
  - Motivated by grid capacity, peak demand, reliability concerns, regulatory uncertainty, higher feedstock prices
  - **PG&E, Austin Energy, Efficiency Vermont, Energy Trust of Oregon, Sempra, SCE, BC Hydro with programs**
  - **Others showing considerable interest -- Xcel Energy, NYSERDA, Wisconsin Focus on Energy**
    - Contacts: Jason Erwin [Jerwin@cee1.org](mailto:Jerwin@cee1.org)  
Mark Bramfitt [MJB9@pge.com](mailto:MJB9@pge.com)
- Utilities funded research by 80 PLUS to extend incentives to data enterprise servers
  - Contact: Ryan Rasmussen  
[rrasmussen@ecosconsulting.com](mailto:rrasmussen@ecosconsulting.com)

# US – International Collaboration

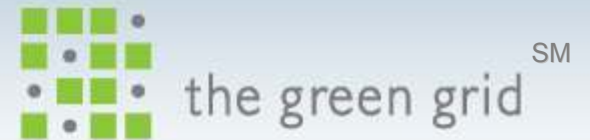


- Initial focus on information and data sharing
  - Characterize domestic market opportunities and barriers to efficiency
- Encourage country counterparts to consider:
  - Cost effective *Bottom up* and *top down* EE strategies
    - Adoption of ENERGY STAR IT specs & data center rating tool, system upgrades etc.
  - Take a leadership role by implementing solutions in government facilities
  - Engage utilities sector to create programs and incentives for data center efficiency measures

# Takeaways



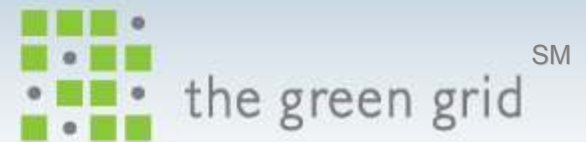
- Rising global concern over energy supply, security and climate change
  - US electricity demand growth - 1.8% / Off a huge base
  - Large transmission and generation investments in an uncertain economic environment
  - Economy needs standard metrics and energy transparency to prevent “green washing”
- Financial and reputational risk associated with status quo
  - Boardrooms, investors, and customers taking notice of energy cost and carbon footprint
  - Energy efficiency a 1st resource in any action plan
- DCs a key economic and CO2 reduction opportunity
- Contact: [fanara.andrew@epa.gov](mailto:fanara.andrew@epa.gov)



# DOE Data Center Energy Efficiency Program

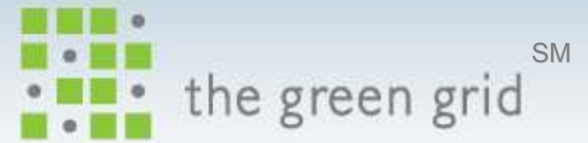
Paul Scheihing, U.S. Department of Energy  
Office of Energy Efficiency and Renewal Energy  
Industrial Technologies Program

# Industrial Technologies Program



- Working to improve the energy efficiency of U.S. industry
- The U.S. industrial sector consumes 32 Quadrillion Btu per year - almost 1/3 of all energy used in the U.S.
- Partnerships with energy-intensive industries (e.g., steel, paper, refining) are key to ITP's success:
  - 5 quads of energy savings, 86 MMTc reduction
- Data centers are an important and growing industry:
  - Consumed 1.5% of all electricity in the U.S. in 2006
  - Power demand is growing about 12% per year
  - Power and cooling systems are “industrial” in terms of scale and complexity

# Save Energy Now: Products & Services



## Tools

- Process Heating
- Steam Systems
- Plant Energy Profiler
- Motors & Pumps
- Fans



## Information

- Website
- Information Center
- Tip Sheets
- Case studies
- Webcasts



## Training

- Basic
- Advanced
- Qualified Specialist



## Assessments

- Energy Savings Assessments
- Industrial Assessment Centers



**Save  
ENERGY  
Now**



# National Initiative



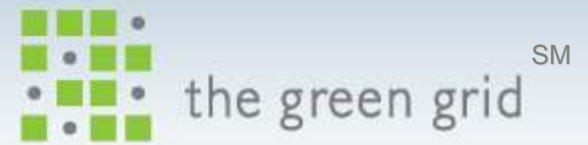
## Goal:

Drive a 25% reduction in industrial energy intensity by 2017.

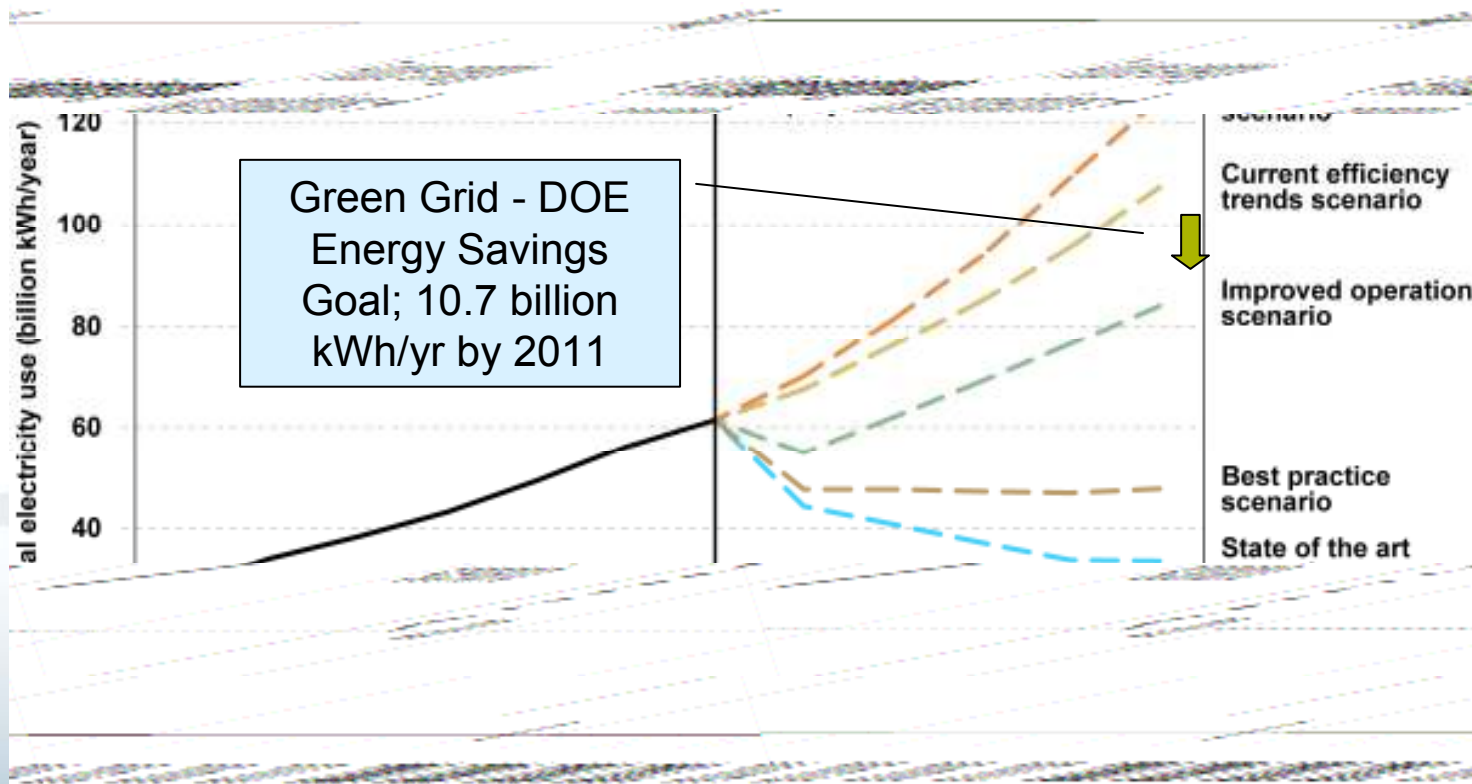
**Save**  
**ENERGY**  
**Now**

- Helps *all* industrial companies— no matter where they currently stand in terms of energy efficiency
- Provides resources to the **200,000 U.S. manufacturing plants and data centers** to identify and implement cost-effective measures
  - Energy efficiency tools and technologies
  - Assessments of energy systems
  - Training and technical assistance
  - Case studies of practices and technologies implemented in the field

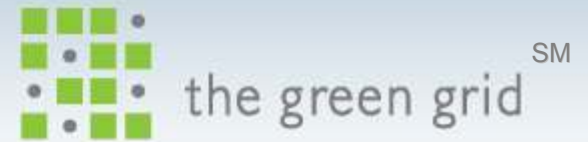
# DOE—The Green Grid Goal for Energy Savings



- Goal is 10% overall U.S. data center energy savings by 2011
  - 10.7 billion kWh
  - Equivalent to electricity consumed by 1 million typical U.S. homes
  - Reduces GHG emissions by 6.5 million metrics tons of CO<sub>2</sub> per year



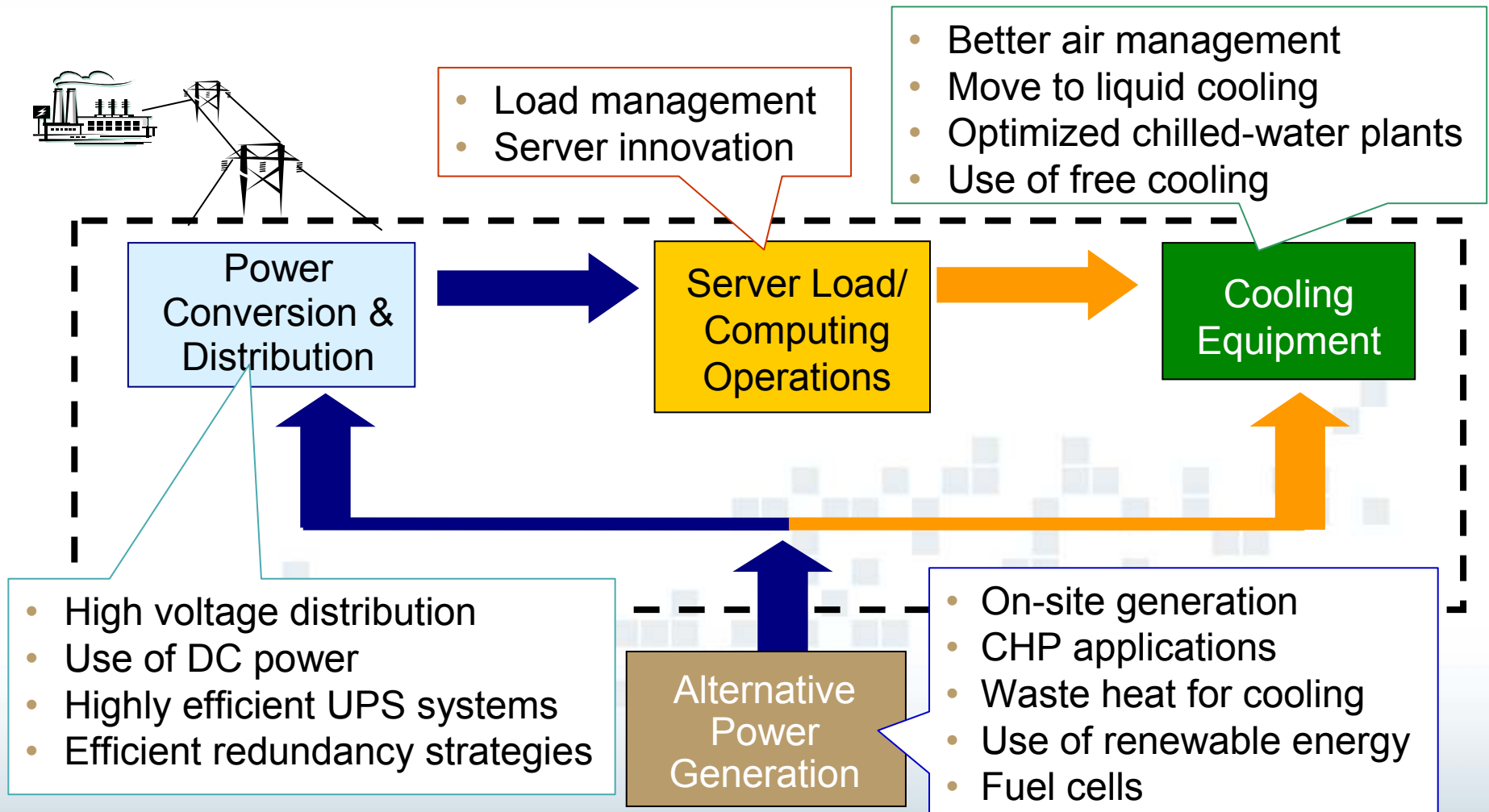
# What's Our Collective Goal?



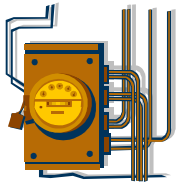
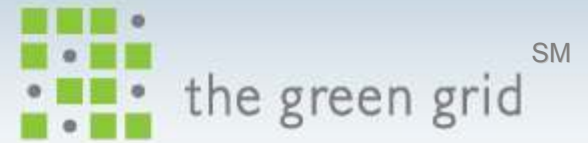
By beginning of 2011 (3 years, 3 months from now):

- 3,000 data centers will have completed awareness training through classes or webcasts via our partners
- 1,500 mid-tier and enterprise-class data centers will have applied the assessment protocols and tools to improve data center energy efficiency by 25% (on average)
  - 200 enterprise-class data centers improve energy efficiency by 50% (on average) through aggressive measures such as accelerated virtualization, high-efficiency servers, high-efficiency power systems (e.g., fuel cells), optimized cooling, and combined heat and power systems
- 200 qualified specialists will be certified to assist data centers

# Tools and Metrics Help to Find Energy Efficiency Opportunities



# Vision for Energy Efficiency in Data Centers



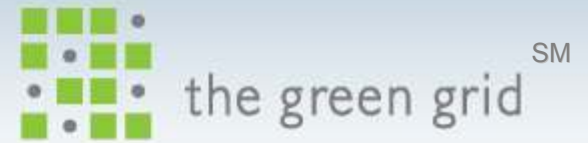
- Establish **metrics** for overall data center energy intensity
  - IT and infrastructure
  - Energy cost (\$), source energy (Btu), and carbon emissions (M tons)
  - Specified Best-in-Class targets for various types of data centers



- Create **tools and guidelines** to drive continuous improvement
- Support third-party **certification** process to validate energy intensity improvement and Best-in-Class
- Provide **recognition** for data centers that achieve a certain level of energy savings



# DOE Save Energy Now Data Center Program



## Major program elements

- Develop “DC Pro” software tool suite
- Create consensus metrics
- Create and publicize *Save Energy Now* case studies through performing pilot energy assessments
- Create best practice information and a training curriculum
- Develop qualified specialists program for data centers
- Create guidelines for “Best-in-Class” data center in various classes of data centers, including strategies for incorporating distributed generation technologies

## Industrial Technologies Program

- Tool suite & metrics
- Energy baselining
- Training
- Qualified specialists
- Case studies
- Certification of continual improvement
- Recognition of high energy savers
- Best practice information
- Best-in-Class guidelines



## Federal Energy Management Program



- Best practices showcased at Federal data centers
- Pilot adoption of Best-in-Class guidelines at Federal data centers
- Adoption of to-be-developed industry standard for Best-in-Class at newly constructed Federal data centers

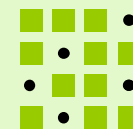
## EPA

- Metrics
- Server performance rating & ENERGY STAR label
- Data center performance benchmarking



## Industry

- Tools
- Metrics
- Training
- Best practice information
- Best-in-Class guidelines
- IT work productivity standard



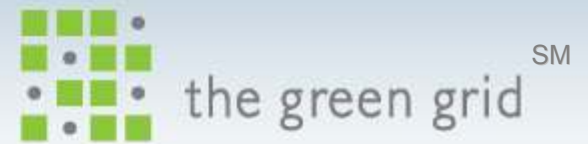
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# “DC Pro” Software Tool Suite

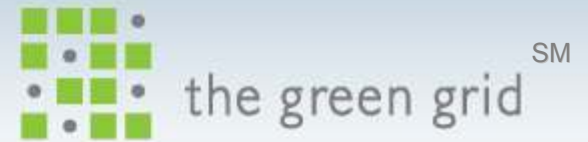


Tools to define baseline energy use of data center and identify key energy-saving opportunities

- Determine general performance of the data center
- Benchmark subsystems
- Assess energy savings potential
- Track energy intensity improvement
- Provide quantification of key metrics including cost (\$), primary energy (Btu), and carbon



# “DC Pro” – An Online Tool

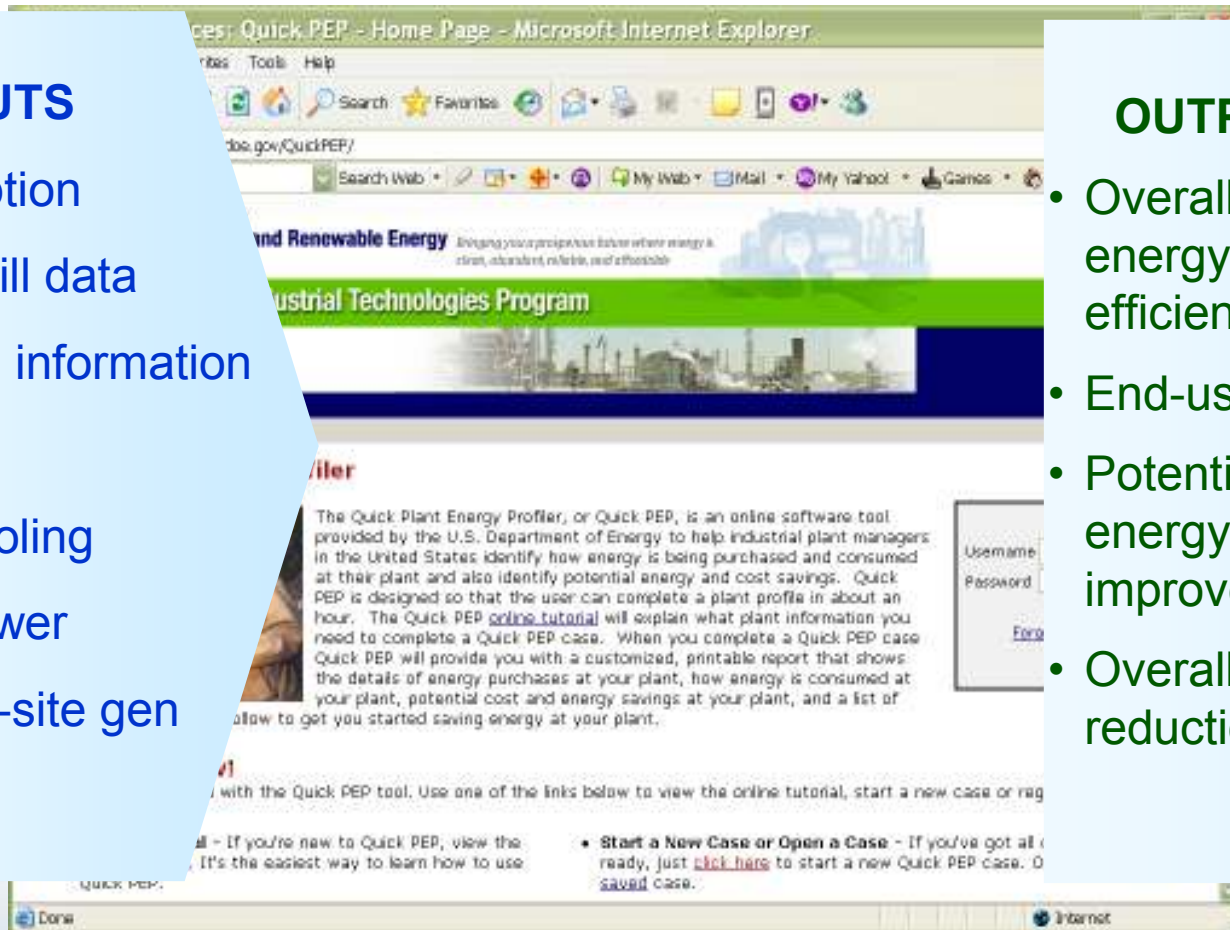


## INPUTS

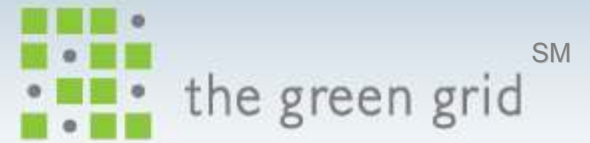
- Description
- Utility bill data
- System information
  - IT
  - Cooling
  - Power
  - On-site gen

## OUTPUTS

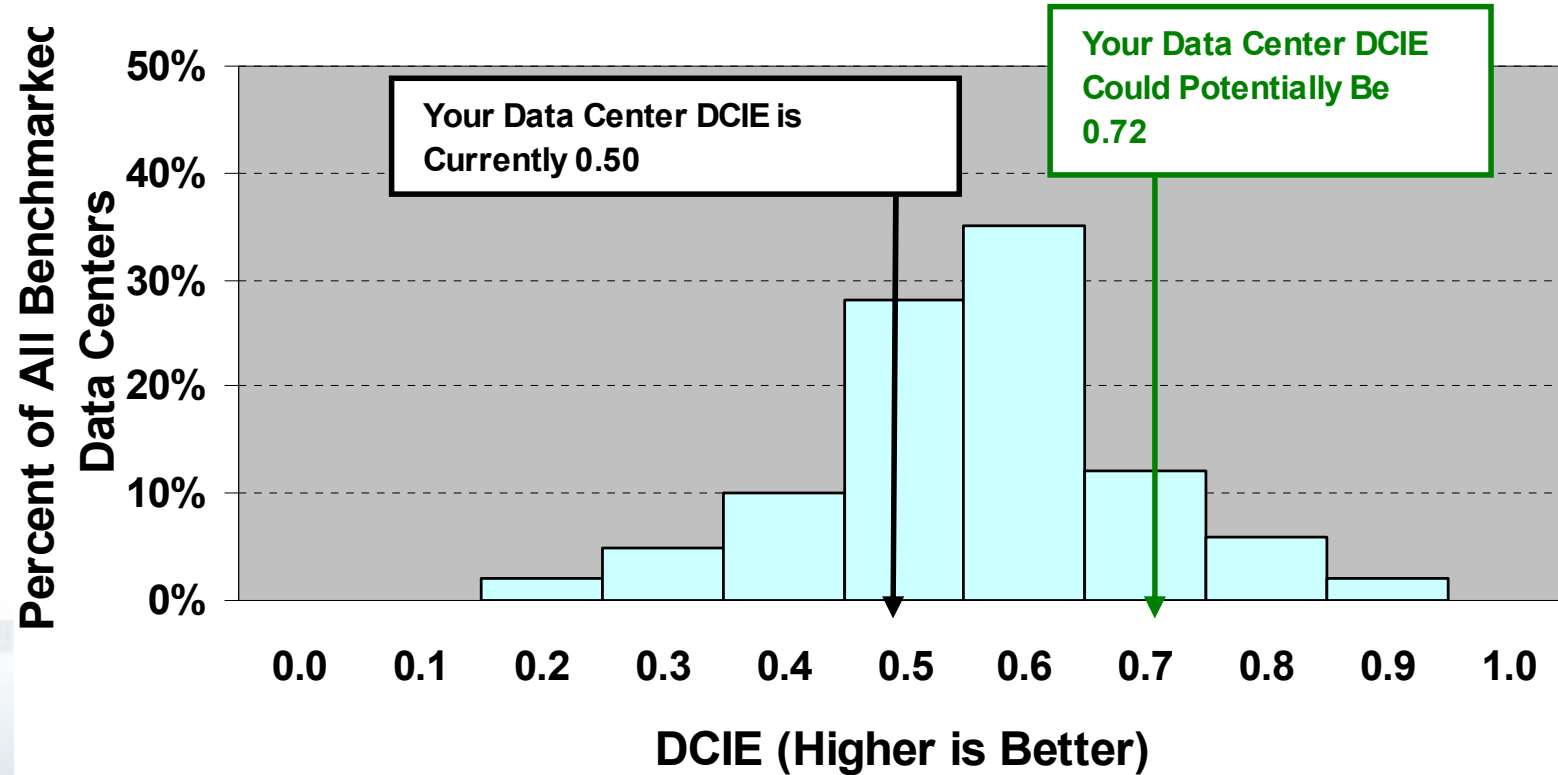
- Overall picture of energy use and efficiency
- End-use breakout
- Potential areas for energy efficiency improvement
- Overall energy use reduction potential



# DCIE Graphic (Rating Your DC)



## Preliminary Assessment of Opportunity



# Example “DC Pro” Recommendations

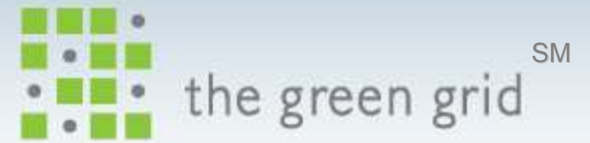


the green grid<sup>SM</sup>

## List of Actions (for Electric Distribution System)

- Avoid lightly loaded UPS systems
- Use high efficiency MV and LV transformers
- Reduce the number of transformers upstream and downstream of the UPS
- Locate transformers outside the data center
- Use 480 V instead of 208 V static switches (STS)
- Specify high efficiency power supplies
- Eliminate redundant power supplies
- Supply DC voltage to IT rack

Thank You!



Paul Scheihing, US DOE

[paul.scheihing@ee.doe.gov](mailto:paul.scheihing@ee.doe.gov)

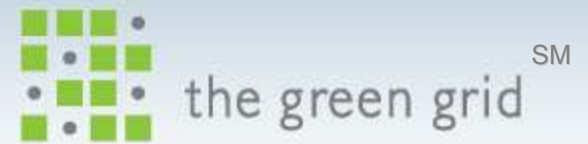
[www.eere.energy.gov/datacenters](http://www.eere.energy.gov/datacenters)

## The New European Policy for Data Centers: The Code of Conduct

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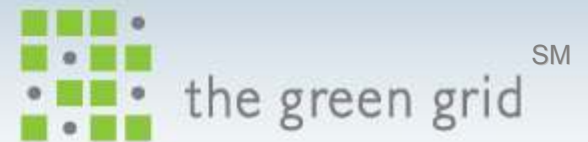
Anson Wu, UK MTP  
Paolo Bertoldi, EC JRC

# EU Codes of Conduct



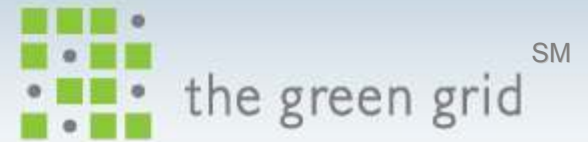
- Led by EC Joint Research Centre
- Flexible mechanism to initiate and develop policy
- Forum for industry, experts and Member States
- Open and continuous dialogue on market and product performance
- Identify and focus on key issues and agree solutions
- Set ambitious voluntary standards and commitments

# Past Successes



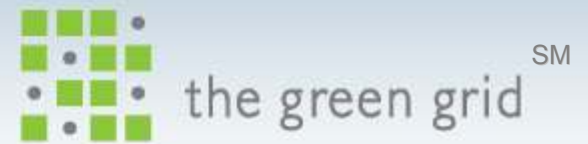
- Since 2002,
  - External power supply units
  - Digital TV services
  - Broadband
  - Uninterruptible power supplies
- Lays groundwork which has been used by other European policies

# Why Data Centers?



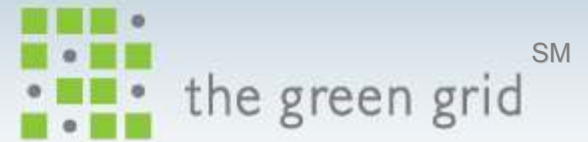
- Continuing demand for IT services
- Rising DC electricity consumption projected:
  - Western Europe: 56 TWh in 2007, rising to 104 TWh in 2020
- Expected to contribute substantially to the UK and European Union (EU) commercial sector
- Maximise energy efficiency of data centres to ensure the carbon emissions and energy consumption are mitigated

# Why a New Initiative?



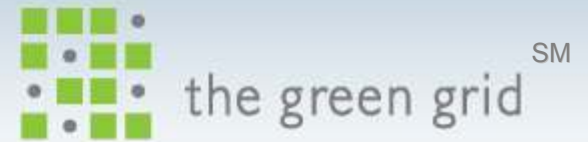
- Many activities have been initiated including EPA Energy Star, *DoE Save Energy Now*, IEE E-Server project and The Green Grid
- But no EU regulatory or voluntary initiatives addressing the energy efficiency of data centres. This creates risk of confusion, mixed messages and uncoordinated activities
- Need for independent assessment and coordination – tailored to European conditions such as the climate and energy markets regulation
- The new Code of Conduct provides a platform to bring together European stakeholders to discuss and agree voluntary actions which will improve energy efficiency

# What is the Code of Conduct?



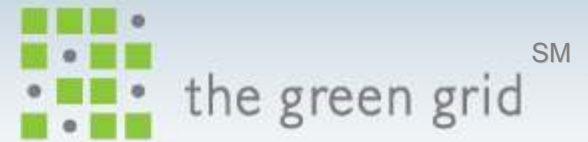
- Code of Conduct is a **voluntary commitment** of individual companies, which own data centers (owners/operators), with the aim of reducing energy consumption through the adoption of best practices leading to agreed energy saving targets in a defined timescale
- Energy efficiency targets are complemented by **general commitments** of power and energy management, switching off components not needed, and reducing energy consumption where possible

# Aims



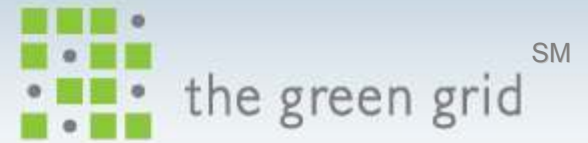
- To **raise awareness** among managers, owners, investors, with targeted information and material on the opportunity to improve efficiency
- To provide an **open process and forum** for discussion representing European stakeholder requirements
- To develop a set of **easily understood metrics** to measure the current efficiencies and improvement
- To produce a **common set of principles** in harmonisation with other international initiatives
- To **support procurement**, by providing criteria for equipment (based on the Energy Star Programme specifications, when available, and other Codes of Conducts), and best practice recommendation for complex systems
- **Set efficiency targets**, for public and corporate data centre owners and operators (targets could be differentiated according to the status of existing data centres, the geographical location, the return on investments, etc)

# Scope



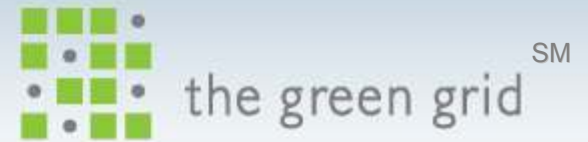
- The Code of Conduct covers:
  - “Data centres” of all sizes – server rooms to dedicated buildings
  - Both existing and new
  - IT power and Facility power
  - Equipment procurement and system design
- The Code of Conduct is for:
  - Participants: Data centre owners and operators
  - Endorsers: Vendors, consultants, industry associations

# Four Basic Scenarios

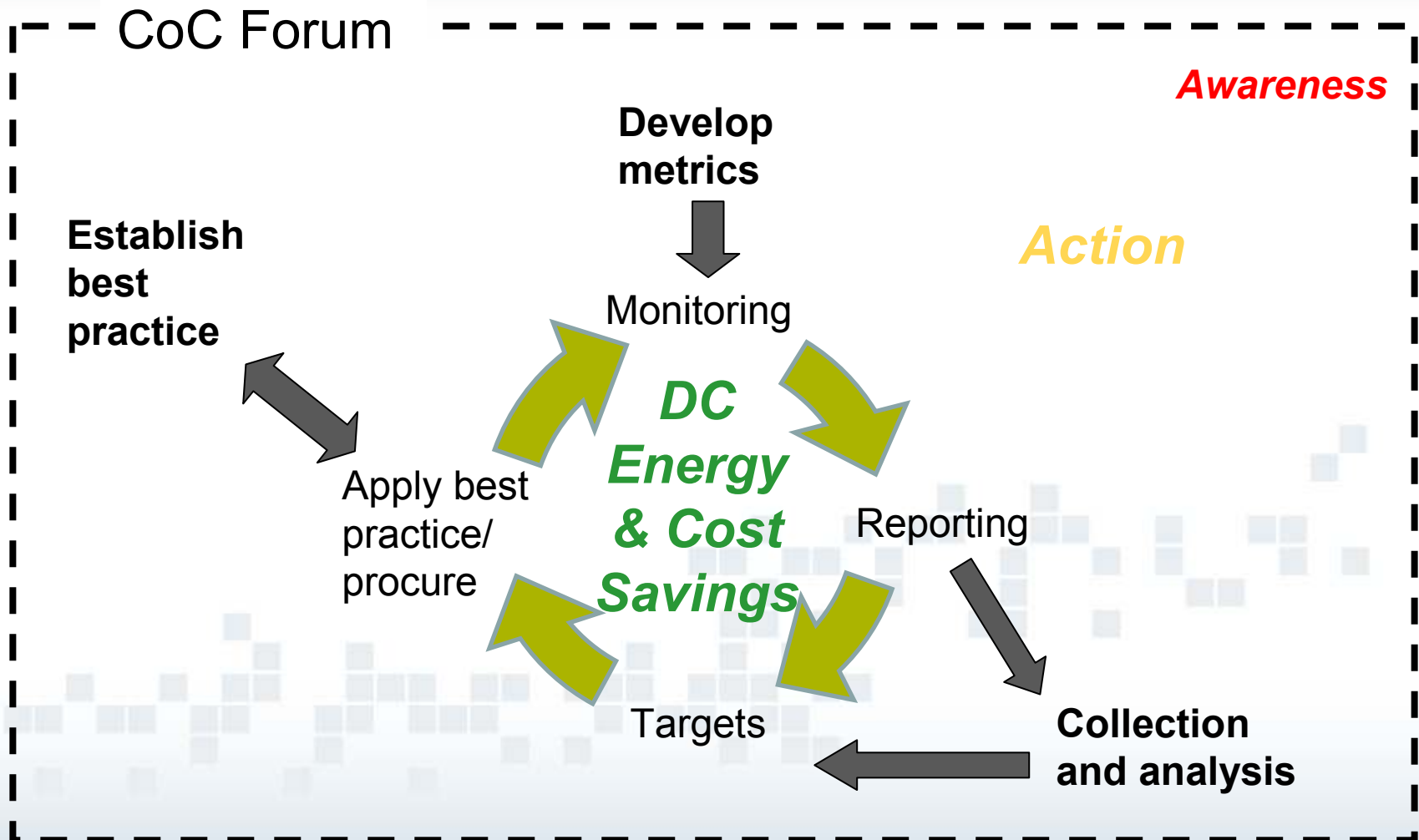


- Day to day operations (energy management)
- Normal replacement cycle/adding new servers
- Retrofit/dedicated energy efficiency programme
- Designing new data centres

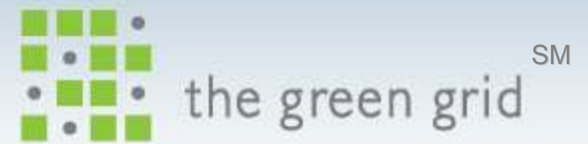
# Working Groups



- Metrics and measurements
  - How to measure and report efficiency
- Best Practice
  - Establishing guidance and support
- Data collection & analysis
  - Monitor and report on savings

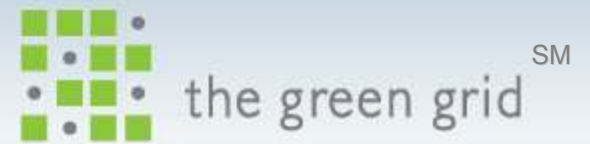


# Current Activities



- First draft of the CoC out for consultation (only general frame, no final best practice and metrics);
- Working groups established on best practices, metrics, and monitoring;
- CoC to be completed by the end of the April. And by the summer open for participants to enroll

# Thank You for Your Attention



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or

anson.wu@aeat.co.uk

or visit

[http://energyefficiency.jrc.cec.eu.int/html/standby\\_initiative.htm](http://energyefficiency.jrc.cec.eu.int/html/standby_initiative.htm)

## Green IT Initiative

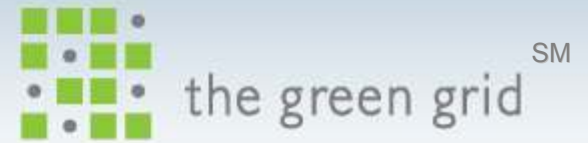
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Nobuaki ARIMA

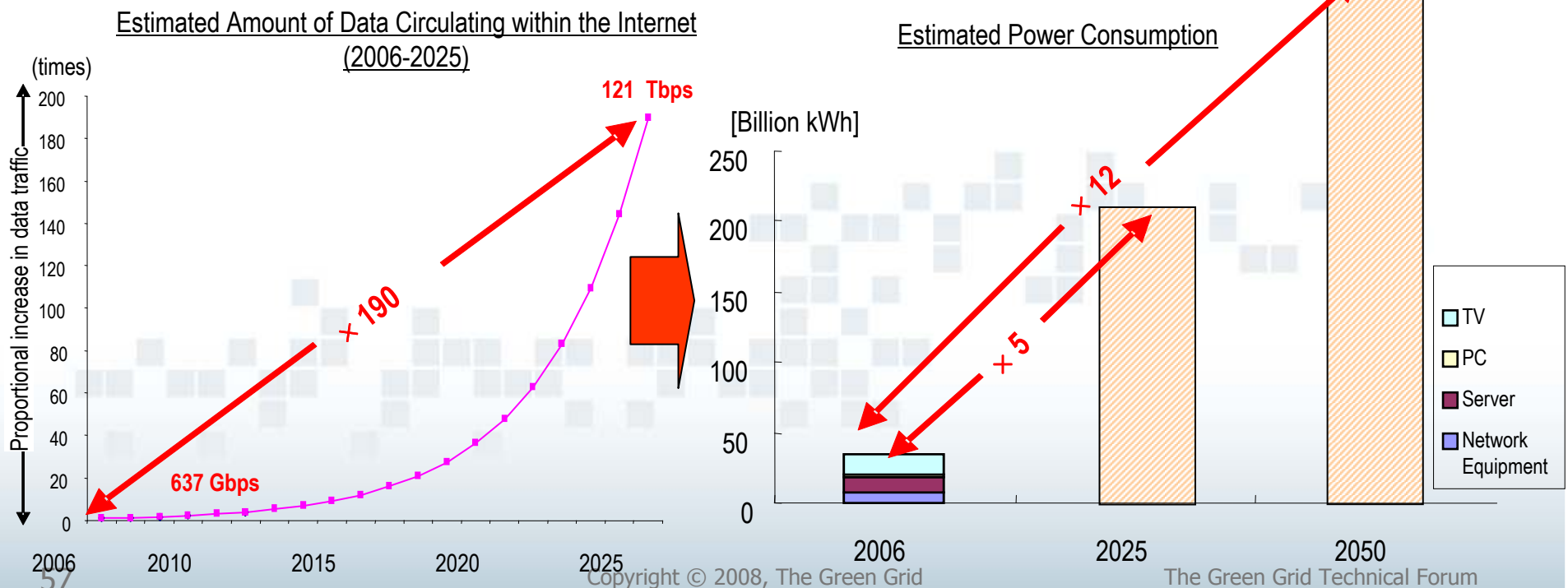
Ministry of Economy, Trade and Industry

JAPAN

# The Information Explosion and Increase in Power Consumption



- With the socioeconomic use of IT becoming standard and the employment of, for example, remote medical treatment and video conferencing becoming commonplace, large data such as high definition moving images are increasingly being exchanged across networks and there has been an explosive increase in the amount of information dealt with within society (**the information explosion**). It is estimated that by the year 2025, the amount of data being exchanged on the internet will be 100-200 times its present value.
- In order to deal with this information explosion, data processing IT devices (servers, network equipment, PCs and displays) will not only **(1) greatly increase in number**, but also **(2) process a greatly increased amount of information per device**. Both of these will result in a large increase in energy demand, making the future **rapid increase in power consumption of IT equipment a serious issue**.

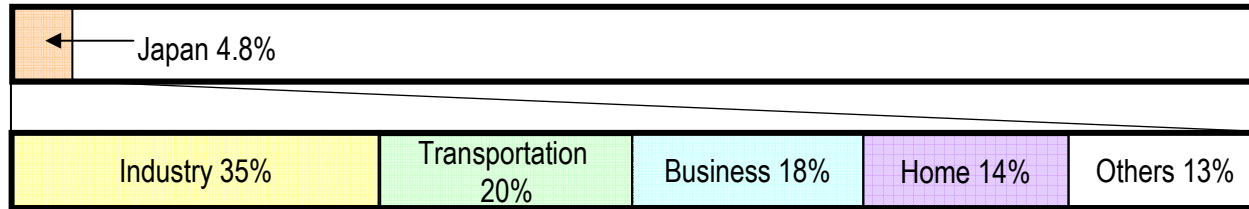


# Reduction in Environmental Load by Effective Use of IT

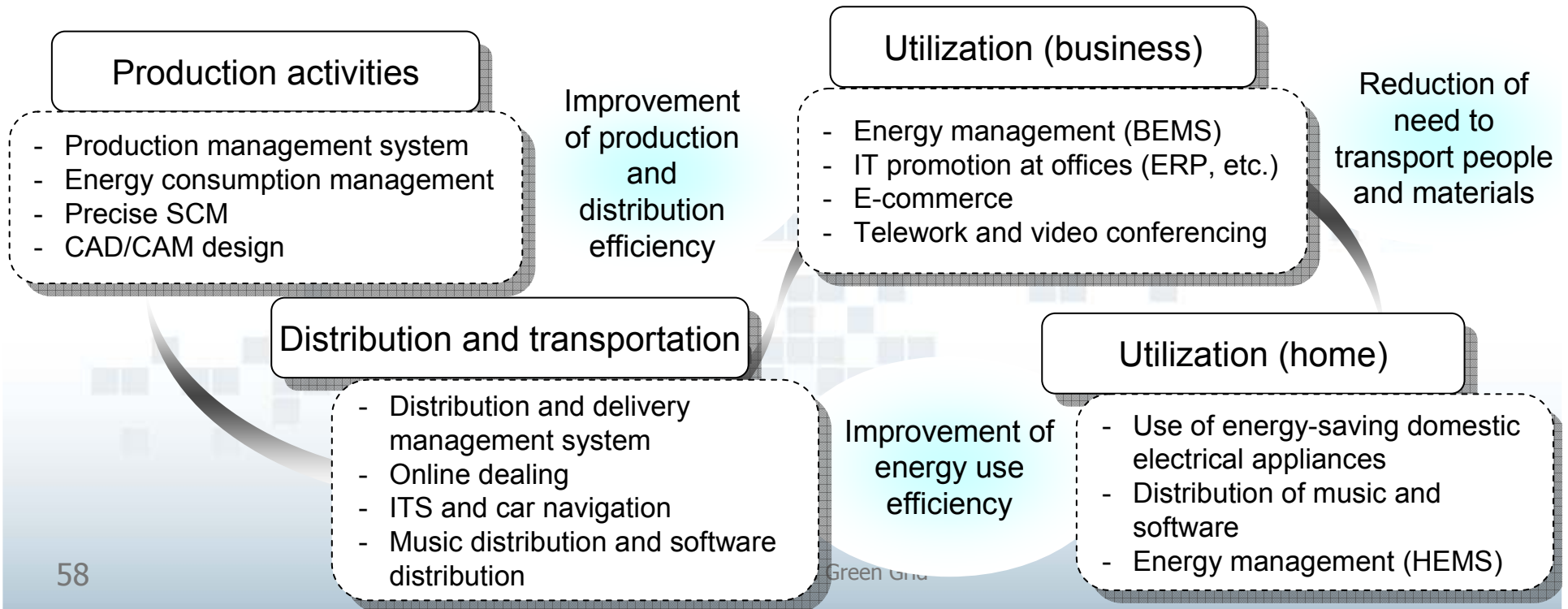
Information technologies are actively used in quite a large number of fields including industry, transportation, business, and homes and greatly help reduce the environmental burden by improving the operational efficiency of those fields.

Worldwide: About 26.5 billion tons of CO<sub>2</sub>

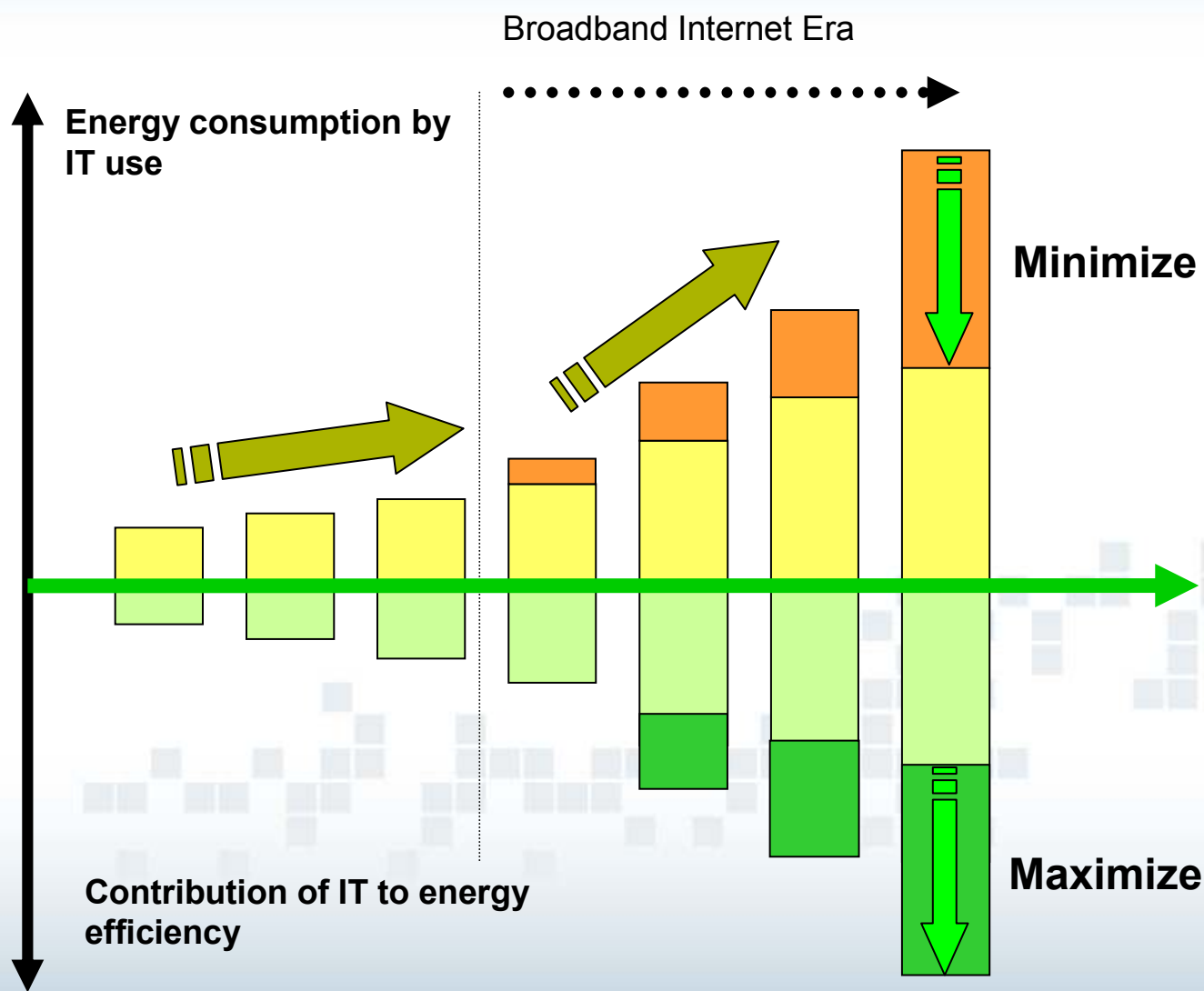
In Japan: About 1.29 billion tons of CO<sub>2</sub>



Effective use of IT greatly helps reduce society's environmental burden



# Realization of an IT Society in Harmony with the Environment



- Develop innovative energy-saving technologies  
(ex. Green IT Project)
- Promote using more energy-efficient products  
(ex. Top Runner Program)

- Improve productivity by the introduction of IT  
(ex. ERP, SCM, ...)
- Introduce IT-driven energy-saving measures  
(ex. HEMS, BEMS, ...)

# Outline of "Green IT Project"



SM

- The development of advanced energy-saving technologies, such as semiconductors and display technologies, has been supported by the collaboration of industry, academia, and government.
- In addition to existing programs, the **"Green IT Project"** will be started to develop innovative information technologies based on medium and long-term perspectives (**draft budget for fiscal 2008: 3 billion yen**).

## Green IT Project

### Internet Data Centers (iDC)



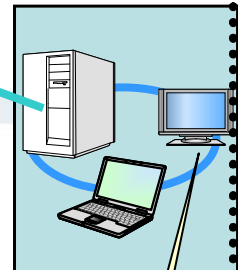
- High efficiency cooling system
- Ultra high density HDD
- High efficiency data storage system

### Organizations such as private companies and government agencies

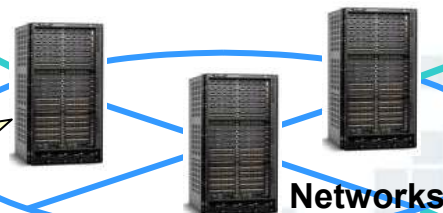


Data centers or server rooms

### Office

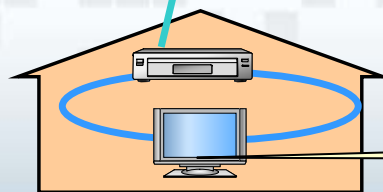


- Power consumption adjustment technology of routers in response to the amount of data traffic

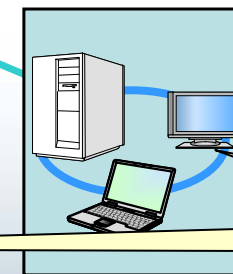


Networks  
(including the Internet)

- Energy-saving OLED technology



Homes



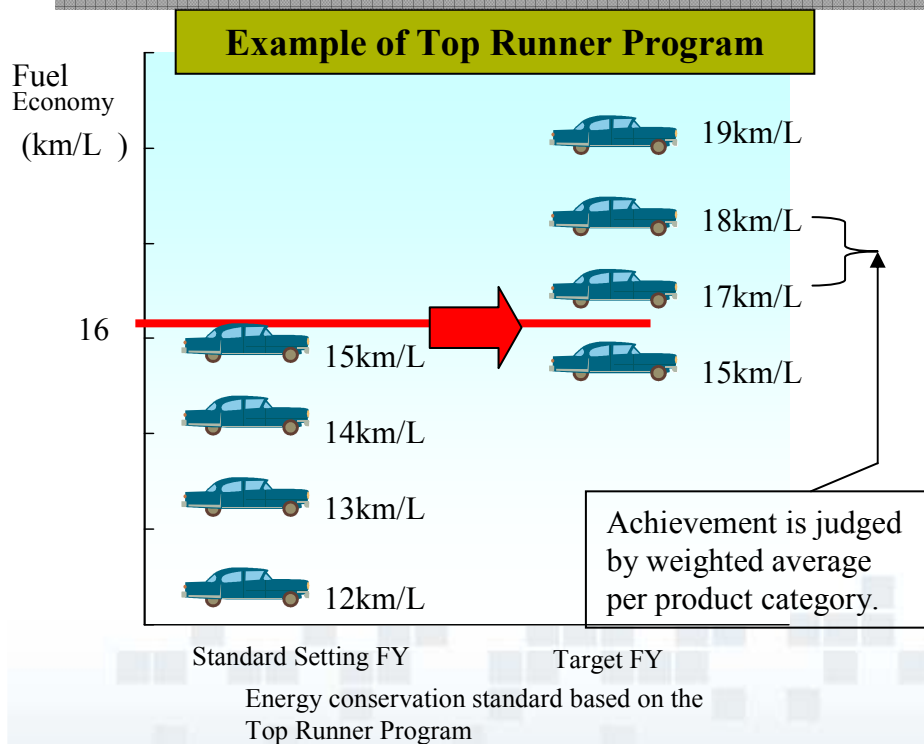
SMEs

The Green Grid Technical Forum

# Top Runner Program

SM

- The Energy Conservation Law stipulates energy conservation standards for electric appliances and motorcars according to the Top Runner Method. Manufacturers and the like have to comply with the standards, and if they don't, they are imposed recommendation, publication, order or penalty (one million yen or less).
- LCD, plasma TV, rice cookers, microwave ovens, etc., were added in FY2006, and the applicable products are 21 items at present.



## Specific Equipment (21)

- |                            |                            |
|----------------------------|----------------------------|
| 1. Passenger vehicles      | 12. Space heaters          |
| 2. Freight vehicles        | 13. Gas cooking appliances |
| 3. Air conditioners        | 14. Gas water heaters      |
| 4. TV sets                 | 15. Oil water heaters      |
| 5. Videocassette recorders | 16. Electric toilet seats  |
| 6. Fluorescent lights      | 17. Vending machines       |
| 7. Copying machines        | 18. Transformers           |
| 8. Computers               | 19. Rice cookers           |
| 9. Magnetic disk units     | 20. Microwaves             |
| 10. Electric refrigerators | 21. DVD recorders          |
| 11. Electric freezers      |                            |

\*) Routers/Switches will be added to the list soon.

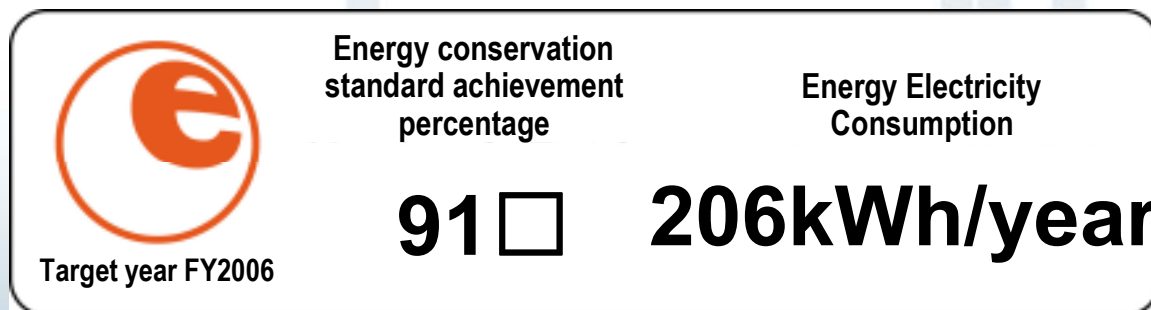
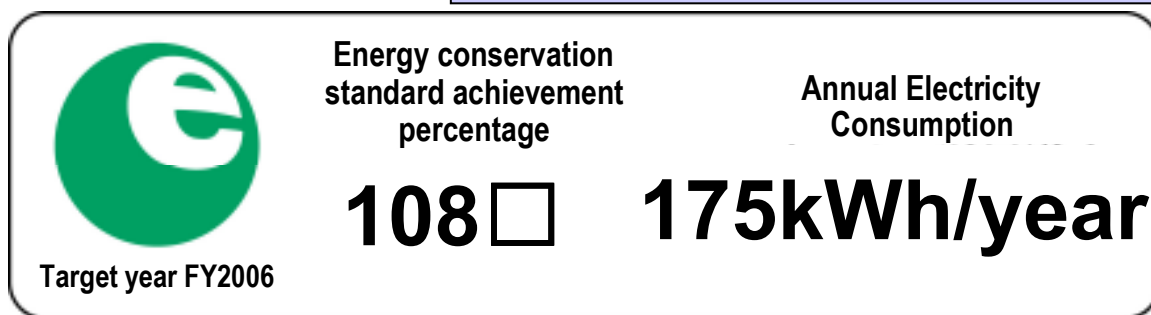
**\*Top Runner Program:** The concept of the program is that fuel economy standards for vehicles and energy conservation standards for electric appliances, etc. shall be set exactly the same as or higher than the best standard value of each product item currently available on the market.

# Energy-Saving Labeling System



- The energy-saving labeling system has been introduced to inform consumers of energy efficiency of home appliances and to promote energy-efficient products.
- As of April 2007, labeling is applied to the following 16 products: air conditioners, refrigerators, freezers, fluorescent lights, TV sets, space heaters, gas cooking appliances, gas water heaters, oil water heaters, electric toilet seats, computers, magnetic disks, transformers, DVD recorders, rice cookers and micro wave ovens.

## Examples of energy-saving labeling



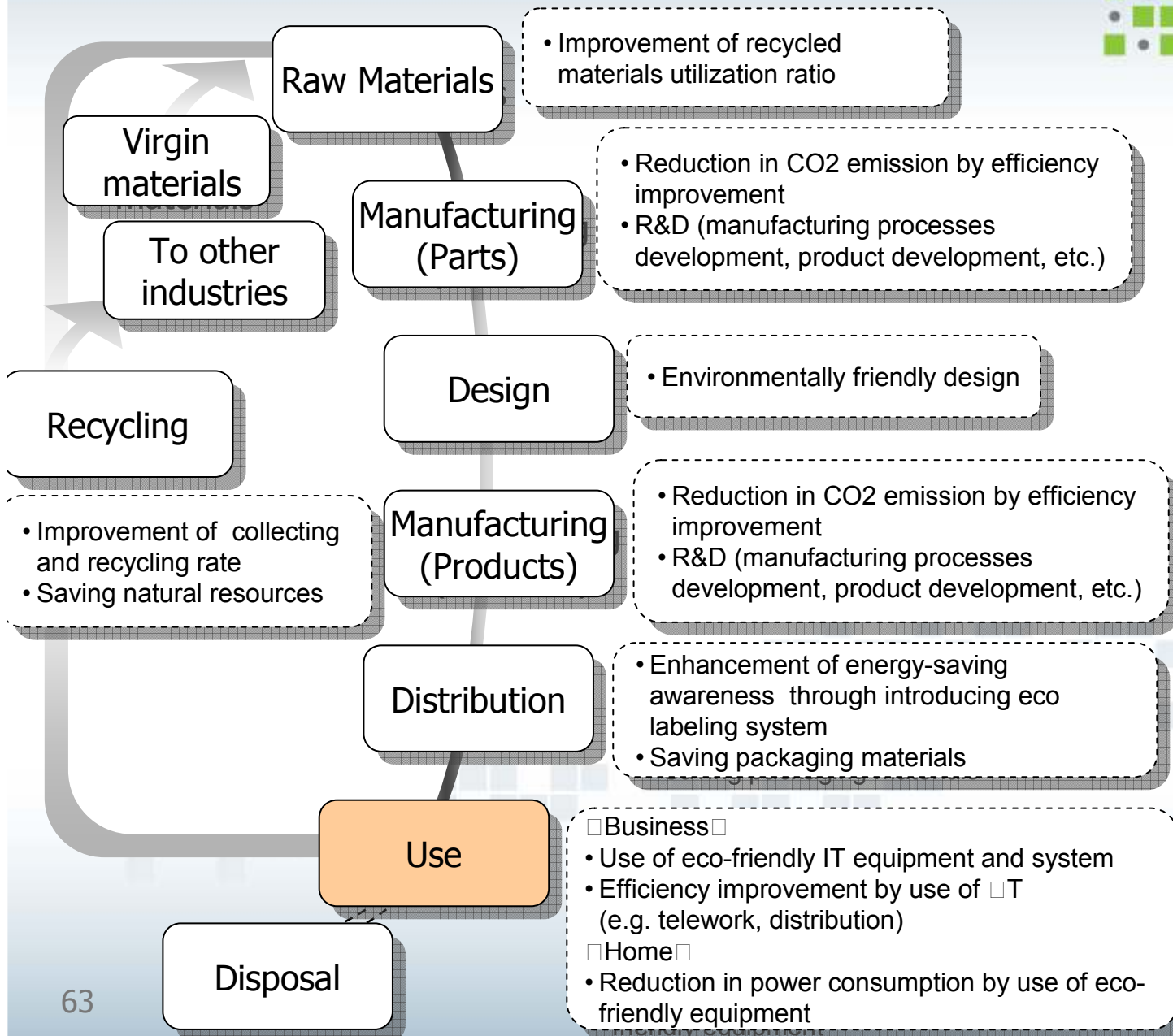
Label for the product's main unit

The Green Grid Technical Forum

# Environmental Impact of IT companies

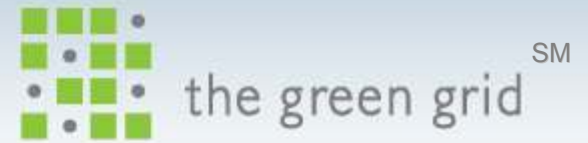


the green grid <sup>SM</sup>



**Environmental impact of IT should be measured not only at the time of its use but also through the whole product life cycle**

# Numerical evaluation of environmental contribution (P)



## Some examples of numerical evaluation under consideration

### Design

(Amount of eco-friendly products)

- X (Diminution of parts and materials) [ per each product]
- X (Energy needed to produce parts and materials)
- X (Ratio of CO2 per the unit energy)

### IT System / Infrastructure

(Operation amount of IT system users)

- X (Operation-efficiency coefficient of users) [per the unit operation]
- X (Energy consumption per the unit operation)
- X ( 1 – (Weight of efficiency by effort other than IT system) )
- X (Ratio of CO2 per the unit energy)

### Products / Parts

(Amount of sales)

- X (Energy consumption by using such products commonly)
- X (Energy saving ratio to conventional products)
- X (Ratio of CO2 per the unit energy)
- X (Contribution ratio of parts to end-products) [in case of “parts”]

### Factory (overseas)

(Amount of production)

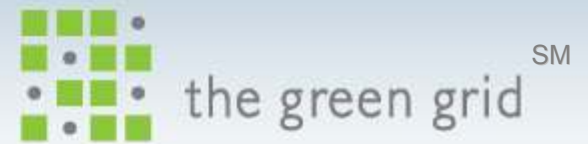
- X (Diminution of air/ water pollution compared to common local factory)
- X (Energy needed to recover from air/water pollution)
- X (Ratio of CO2 per the unit energy)

### Recycle

(Amount of recycled materials)

- X ( (Environmental load in the case of not recycling)
  - (Energy consumption of recycling)
  - + (Energy consumption of production in the case of using virgin materials) )
- X (Ratio of CO2 per the unit energy)

# Establishment of promotion organization



■ As a organization to promote “Green IT” movement, “Green IT Promotion Council” was established on February 1

- Over 100 companies and organizations participate in the council and JEITA (Japan Electronics and Information Technology Industry Association) is in charge of secretariat
- METI and other governmental organizations also participate in the council as observers



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## Green IT Promotion Council

### Technical Committee

- Discussing innovative energy-saving technologies
- Proposing new themes for national projects to the government

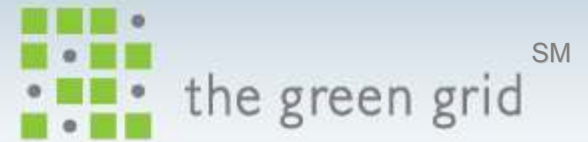
### Public Relations Committee

- Educating the importance of IT to protect environment
- Preparing for “Green IT International Symposium” held on May 29

### Research and Analysis Committee

- Visualization of environmental loads / contributions of IT to society as a whole

# Action Plan



■ Based on “Green IT Initiative” , “Green IT Promoting Council” will be launched and deepen the discussion. An international symposium will be held on the theme of “Green IT” to bring discussion outcomes as a prelude to 2008 Hokkaido Toyako Summit

□Ref.□

February 1, 2008

- **Establishment of a private consortium “Green IT Promoting Council”**

April or May, 2008

- **“The 2nd Green IT Initiative Meeting” hosted by Minister of Economy, Trade, Industry**

May 29, 2008

- **“International Symposium on Green IT”**

Strengthening collaboration with overseas companies and consortia

December, 2007

14th Conference of the Parties to the UN Framework Convention on Climate Change (COP14)

February or March, 2008

Finalize Cool Earth □ “Energy Innovative technology Plan”

June, 2008

OECD Ministerial Council in Paris  
G8 Energy Ministerial Meeting

July, 2008

G8 Summit (Hokkaido Toyako Summit)

December, 2008

14th Conference of the Parties to the UN Framework Convention on Climate Change (COP14)



the green grid<sup>SM</sup>

get connected to efficient IT

