Power Management

Practical Things You Can Do to Save Energy

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Imagine…

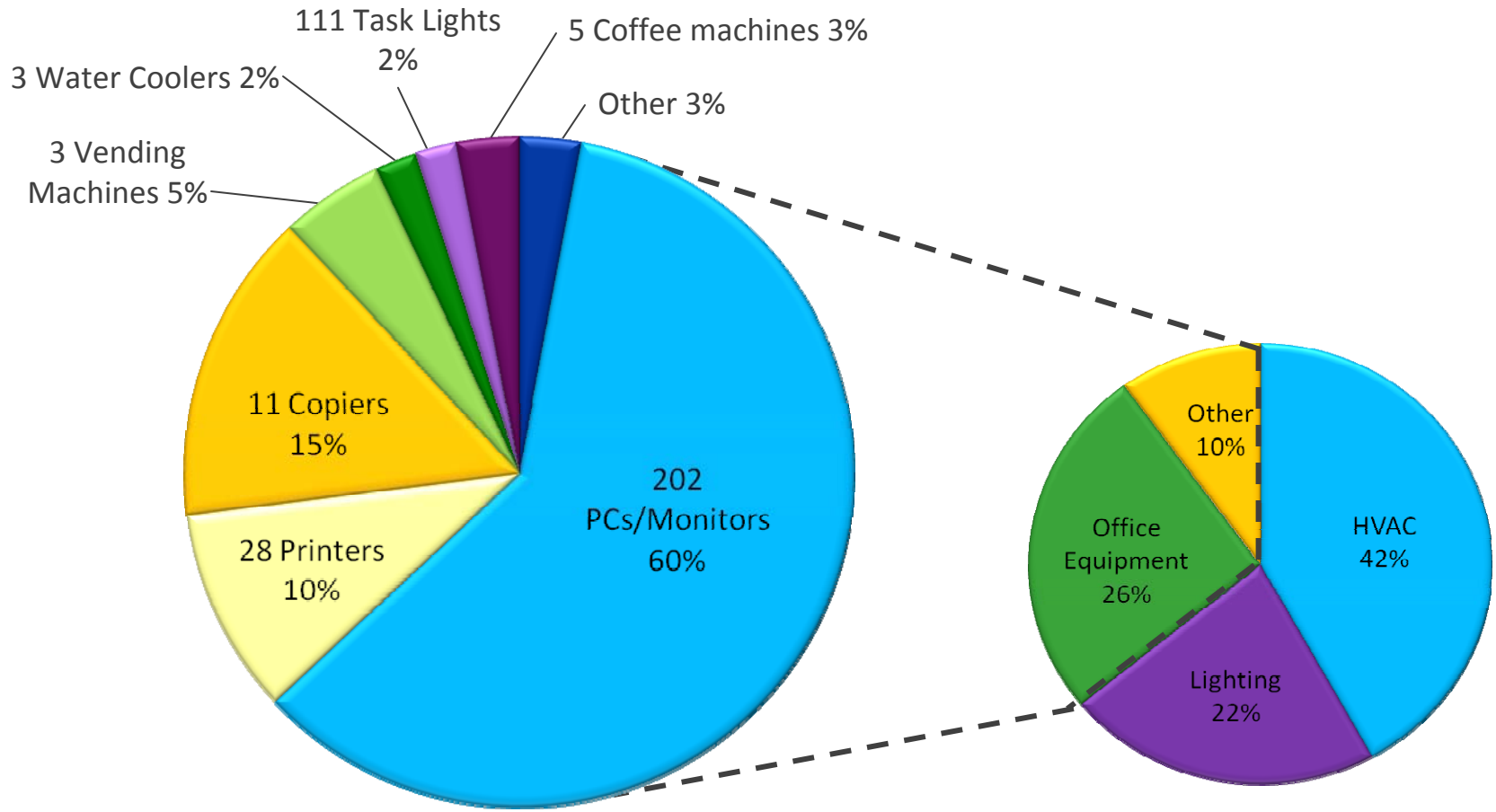

FOOD
20
THE UNITED STATES OF AMERICA
20
THE UNITED STATES OF AMERICA
57475A

IT Energy Savings: 4 Opportunities

1. ***Power-manage networked computers***
2.
3.
4.

What is “CPM”, and why should I care?

“Plug load” in office buildings is mostly computers



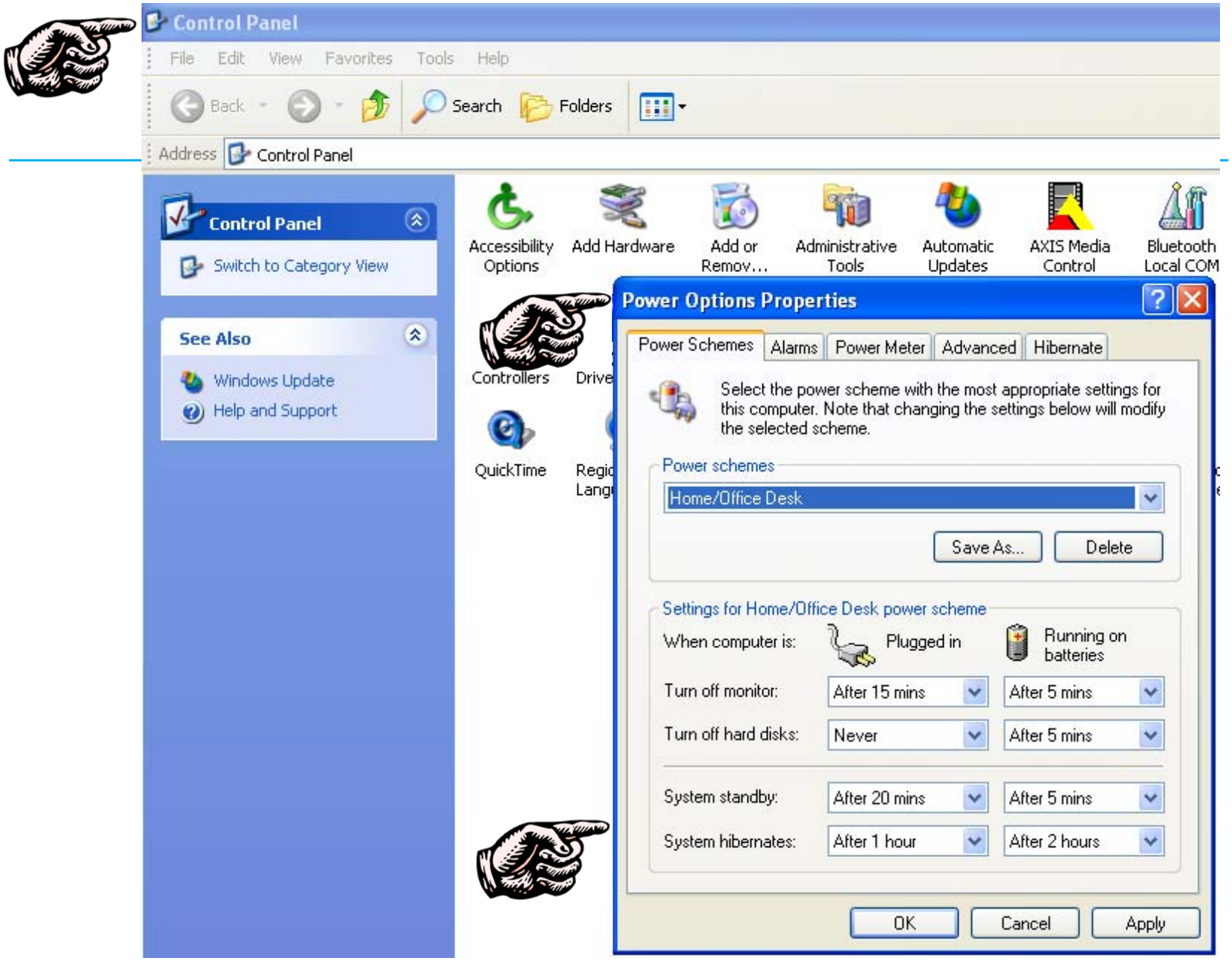
Source: The Cadmus Group (Base Case Energy Use at NYSERDA Office)

Source: Energy Information Administration, 2003

Energy saving features on every computer

- Automatically place inactive *computer* (CPU, hard drive, etc.) & *monitor* into low power mode
- Wakes upon mouse or keyboard input
- Built into Windows, Mac OS X, some Linux OSs
  - Called “standby” and “hibernate” on PC
  - Called “sleep” on Mac

“CPM” settings must be activated!


Control Panel
File Edit View Favorites Tools Help
Back Search Folders
Address Control Panel
Control Panel
Switch to Category View
See Also
Windows Update
Help and Support
Accessibility Options
Add Hardware
Add or Remov...
Administrative Tools
Automatic Updates
AXIS Media Control
Bluetooth Local COM
Controllers
QuickTime
Power Options Properties
Power Schemes
Alarms
Power Meter
Advanced
Hibernate
Select the power scheme with the most appropriate settings for this computer. Note that changing the settings below will modify the selected scheme.
Power schemes
Home/Office Desk
Save As...
Delete
Settings for Home/Office Desk power scheme
When computer is:
Plugged in
Running on batteries
Turn off monitor:
After 15 mins
After 5 mins
Turn off hard disks:
Never
After 5 mins
System standby:
After 20 mins
After 5 mins
System hibernates:
After 1 hour
After 2 hours
OK
Cancel
Apply

Minimizing Computer Energy Use

Minimizing Computer Energy Use

Minimizing Computer Energy Use

Why power management?

- ↓ electricity consumption by $20-100/PC/yr
- ↓ cooling loads (saves additional $3-30/PC/yr)
- ↓ peak load demand charges
- ↓ air pollution
- ↓ carbon footprint
- Executive Order 13423 requires federal agencies to activate “sleep” features

Monitor power management: no-brainer

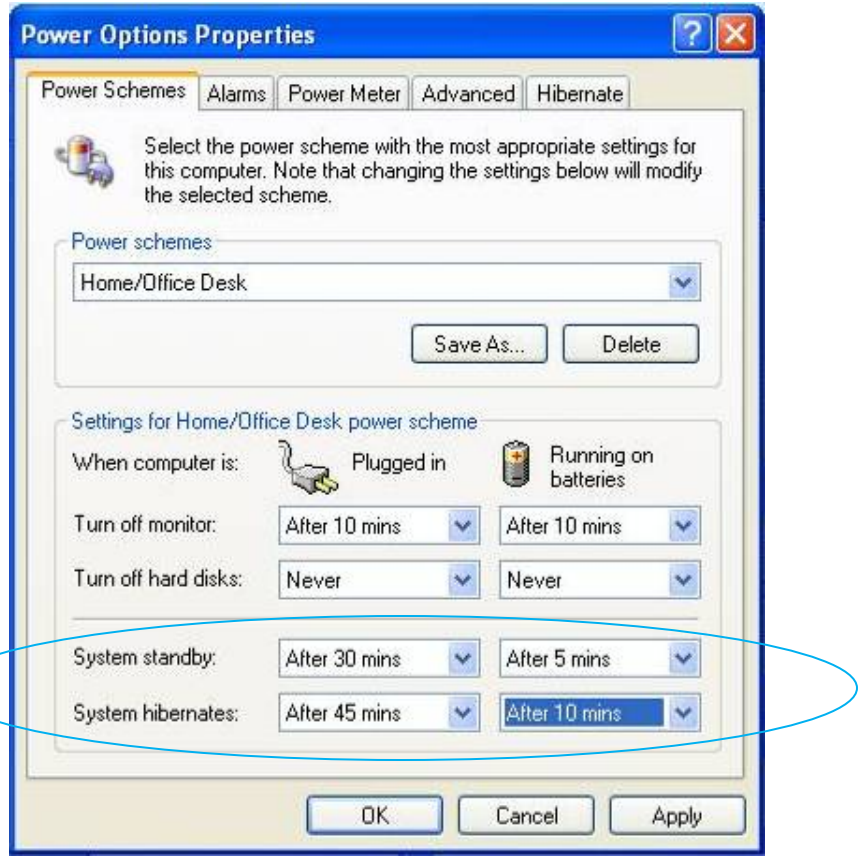
- Easy to activate
- Can't interfere with software patching
- Saves $10-35+ per monitor annually

Most organizations already utilize MPM features – but make sure!

Computer power management: more challenging, more savings

- System Standby (S3)
  - Drops power to 1-3 W
  - Wakes up in a few seconds
  - Saves $10-40 per PC annually

  …or…
- Hibernate (S4)
  - Drops power to 1-3 W
  - Wakes up in 20+ seconds
  - Saves work if power is lost
  - Saves $10-40 per PC annually



For optimal savings & user experience, EPA recommends:

- Setting monitors to enter sleep mode after 5-20* minutes of inactivity
- Setting computers to enter system standby or hibernate after 30-60* minutes of inactivity
  - *AC* power profile on notebooks
  - Don’t bother with “Turn off hard disks”
- The lower the settings, the more energy you save

Two challenges

1. Activating sleep settings on many computers at once
2. Ensuring that sleep settings do not interfere with the distribution of administrative software updates
   - E.g., Windows security patches, antivirus definitions

Numerous solutions exist, including free software, and software tools that you may already own

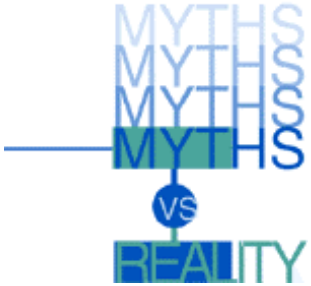
CPM offers a compelling return on investment

- Labor costs: ~ $5 / seat
  - Identifying appropriate solutions
  - Testing & troubleshooting exceptions
  - Ensuring that sleeping computers do not interfere with administrative software updates
- Software costs: ~ $0-15 / seat
  - Many solutions are free
  - Commercial solutions range from roughly $3-15 per PC
- Vs. energy savings of $120-$160 / seat

Assumptions: 1000 seats; labor costs = 2 weeks of work for one network administrator @ $2,500 per week

Myth or reality?

You'd actually save more energy – and a lot of trouble – if you simply required people to turn off their computers each night.



The verdict: myth!

- While you might save an additional watt or two by turning off a computer vs. placing it in sleep mode, forgetting to shut down your computer just a handful of times will negate an entire year's worth of incremental energy savings.
- Surveys and interviews with IT managers consistently conclude that policies "requiring" users to turn off their PCs at night result in only about 70-90% compliance.

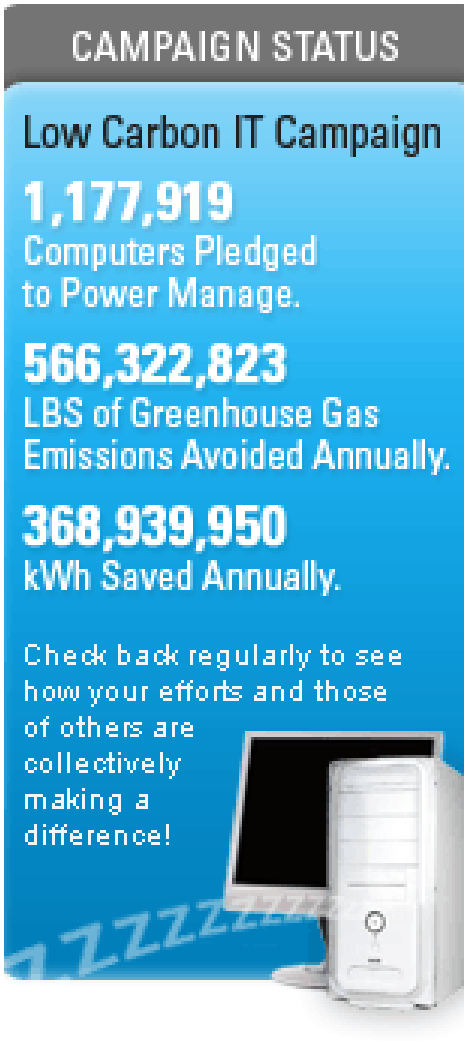
Case Study: West Hartford Public Schools

- Challenge:
  - Monitor power management settings were not in use
  - Most PCs were not being turned off after hours
- Solution:
  - *EZ GPO* (free software from ENERGY STAR)

- Results:
  - Puts more than 3,000 computers to sleep when they are inactive
    - Monitors sleep after 30 min of idle
    - Computers sleep after 40 min
  - Avg. of $63.86 savings per PC annually

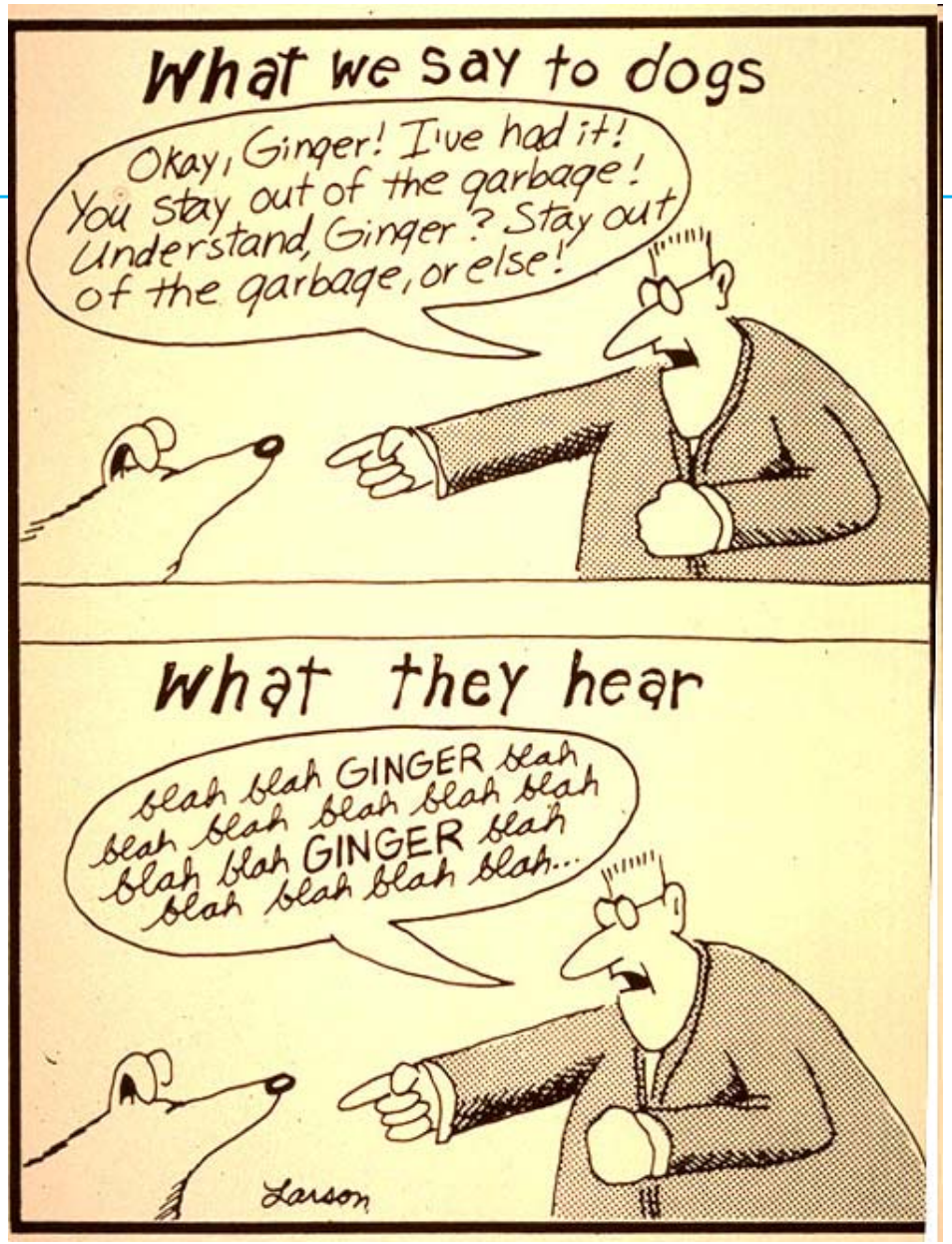
A Sampling of Local Governments Embracing CPM

- Arlington Public Schools
- Butte County District Attorney
- CA Department of Motor Vehicles
- Campbellsport School District
- City of Fort Collins
- City of Newton
- City of Petaluma
- City of San Jose, CA
- Clear Creek Independent School District
- Coeur d'Alene School District
- County of Erie, NY
- Florida Department of Environmental Protection
- Los Angeles County Department of Public Works
- West Hartford Public Schools



Selling CPM Internally

1. Review current power settings and policies
   - Are sleep features enabled on monitors? Computers?
   - What sleep settings are utilized? (e.g., MPM only? After 1 hr?)
   - Do users leave PCs on at night?
   - Roughly how many computers and monitors are there in total?
2. Estimate savings potential at www.energystar.gov/lowcarbonit
3. Get free technical assistance
   - Take the *ENERGY STAR Low Carbon IT Campaign* pledge
4. Talk to your utility rep
5. Sell the ROI!


What we say to dogs
Okay, Ginger! I've had it! You stay out of the garbage! Understand, Ginger? Stay out of the garbage, or else!
What they hear
blah blah GINGER blah blah blah blah blah blah GINGER blah blah blah blah blah...
Larson

4 Ways to Get Everyone on Board

1. Share the savings opportunity with your management and any “friends” in finance & IT
2. *Counter technical objections with “you might be right: let’s ask an expert”*
3. *Make one modest request: join a 30-60 min. call with a vendor-neutral expert*
4. Share the credit

Why join the ENERGY STAR Low Carbon IT Campaign?

1. Access free technical expertise and assistance
2. Download free *EZ GPO* software tool
3. Estimate of your energy & carbon savings
4. Get an official certificate of recognition from EPA
5. Access materials to help publicize your efforts
6. It takes about 1 minute

Pledge here:
www.energystar.gov/lowcarbonit

IT Energy Savings: 4 Opportunities

1. Power-manage networked computers
2. ***Specify ENERGY STAR for all office equipment purchases***
3.
4.

ENERGY STAR-qualified Office Equipment






Coming soon: small network equipment, data center storage, uninterruptible power supplies, products using battery charging systems

ENERGY STAR PC vs. typical four-year-old PC

Usage Scenario	**Lifetime** savings (4 yrs) at…	
	$ 0.11 / kWh (Nat'l avg commercial rate)	$ 0.18 / kWh (Avg residential rate in NE)
CPM not utilized, PCs left on at night	$ 126.72	$207.36
CPM not utilized, but PCs turned off every night	$53.24	$87.12
New PC uses CPM, old doesn't, left on at night	$282.48	$462.24

Sources: DOE/EIA-0226 (2009/09); Office_090204rev.xls; Dell.com (new Business-Class OptiPlex™ PCs start at $432 as of 9/17/09.)

IT Energy Savings: 4 Opportunities

1. Power-manage networked computers
2. Specify ENERGY STAR for all office equipment purchases
3. ***Computer peripherals***
4.

“Smart” Power Strips can Save $10-100+ per Year

Computer, phone charger

Lighting, printer/scanner, PC speakers, backup drives, space heaters, etc.

Monitor

Some utilities offer rebates

Consolidate Printers

- Reduce the number of devices in your printer fleet
- Ensure that remaining devices are more cost effective to own & operate:
  - Eliminate inkjet or other high-cost printers
  - Share “workgroup” printers
  - Use multi-function devices
- Benefits:
  - Cut hardware costs
  - Cut paper, ink, and toner costs
  - Reduce electricity use
  - Reduce maintenance expenses
- Representative savings run between 30 and 40 percent and can range as high as 60 percent

IT Energy Savings: 4 Opportunities

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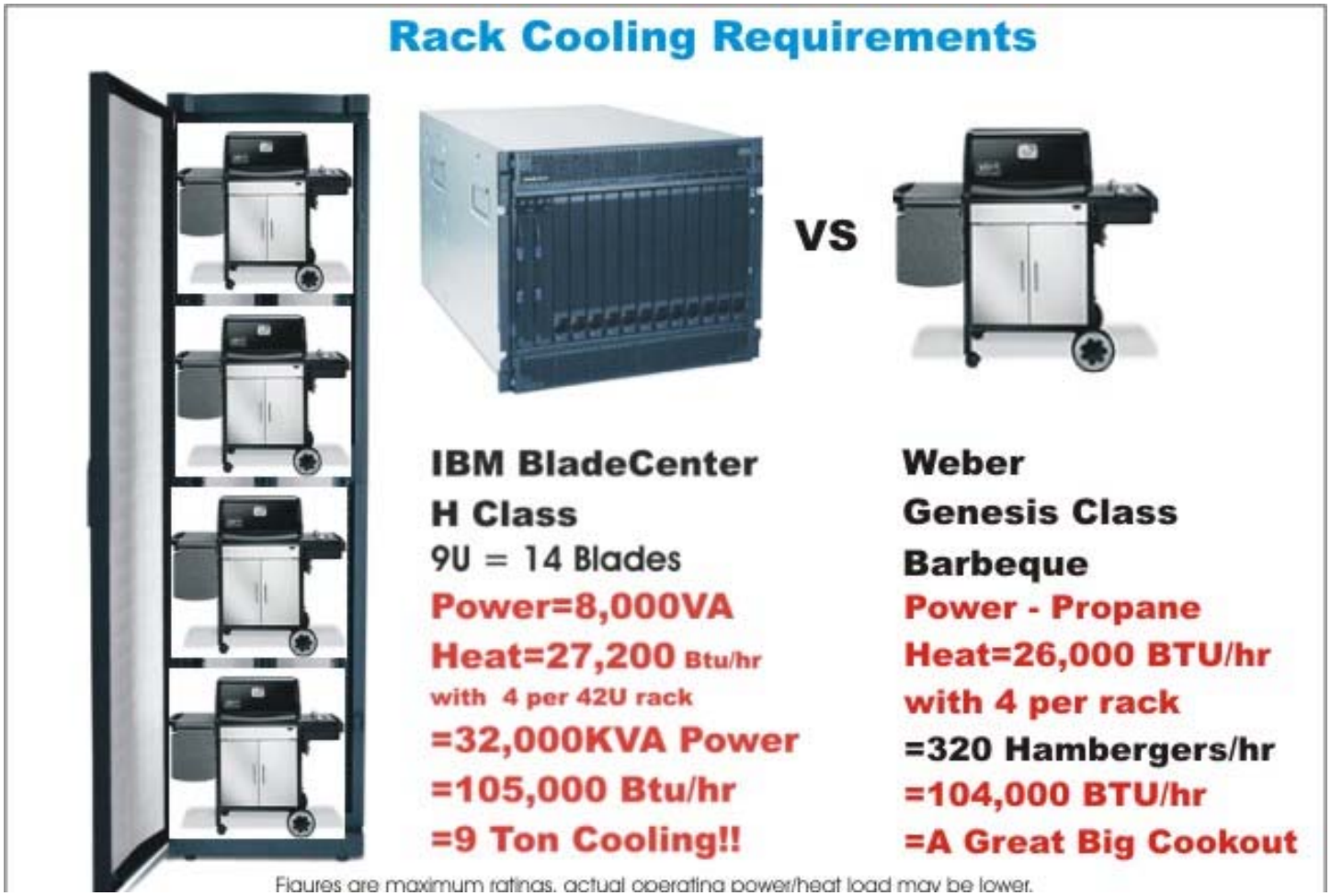
3. Computer peripherals
4. ***Data centers***

Server Rack vs. Barbecue



Source: NAAT

New ENERGY STAR Servers can Consume 54% Less Power

- Replacing an older server with a new ENERGY STAR-qualified model will save energy *and* deliver more processing power in the bargain

FIGURE 3: BASELINE WORKLOAD -- POWER COMPARISON AT LOAD LEVEL

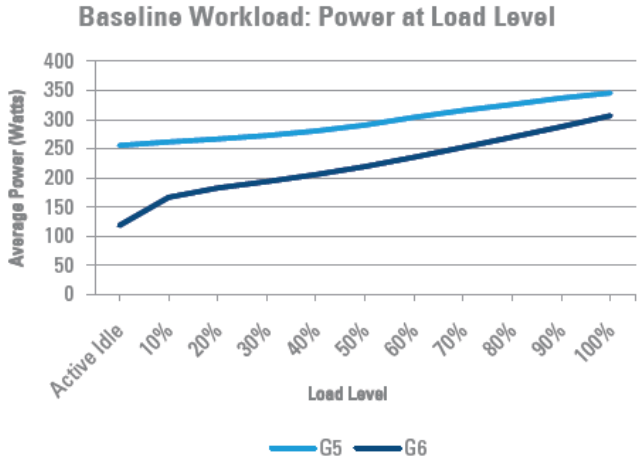
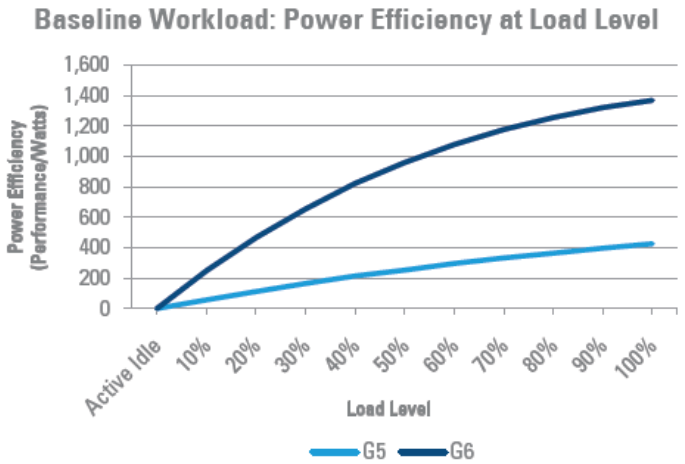


FIGURE 6: BASELINE WORKLOAD -- POWER EFFICIENCY COMPARISON AT LOAD LEVEL



Coming Soon to energystar.gov/lowcarbonit

- Non-technical descriptions of common opportunities for energy savings in data centers
- Impartial information about costs, savings, and implementation considerations

Top 12

1. Virtualization of Servers
2. Decommissioning of Unused Servers
3. Consolidation of Lightly Utilized Servers
4. Data Storage Opportunities
5. Efficient Equipment Purchase
6. Hot Aisle/Cold Aisle Arrangement
7. Containment/Enclosures
8. Variable Speed Drives
9. Housekeeping: Blanking Panels, Cabling and Gaps
10. Server Inlet Temperature and Humidity Adjustments
11. Air Side Economizer
12. Water Side Economizer

Summary

1. Power manage networked computers
2. Specify ENERGY STAR for all office equipment purchases
3. Manage computer peripheral energy consumption
4. Identify opportunities in your data centers

Contact information

- Additional information at:
  www.energystar.gov/lowcarbonit
- Contacts:
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Questions & Answers

EPA

Learn more at **energystar.gov**