

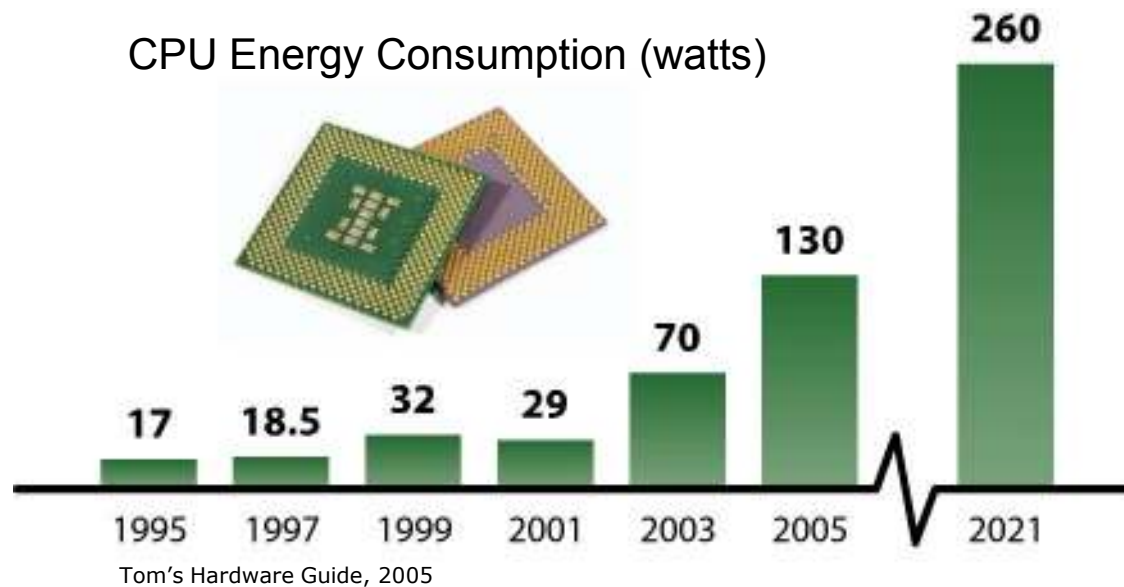
# Green PCs: Power Management is not just for Servers

Ravi Angadi  
Sept 18 2008



# A growing problem and opportunity

- Electricity usage in the commercial sector will surge 75% by 2030

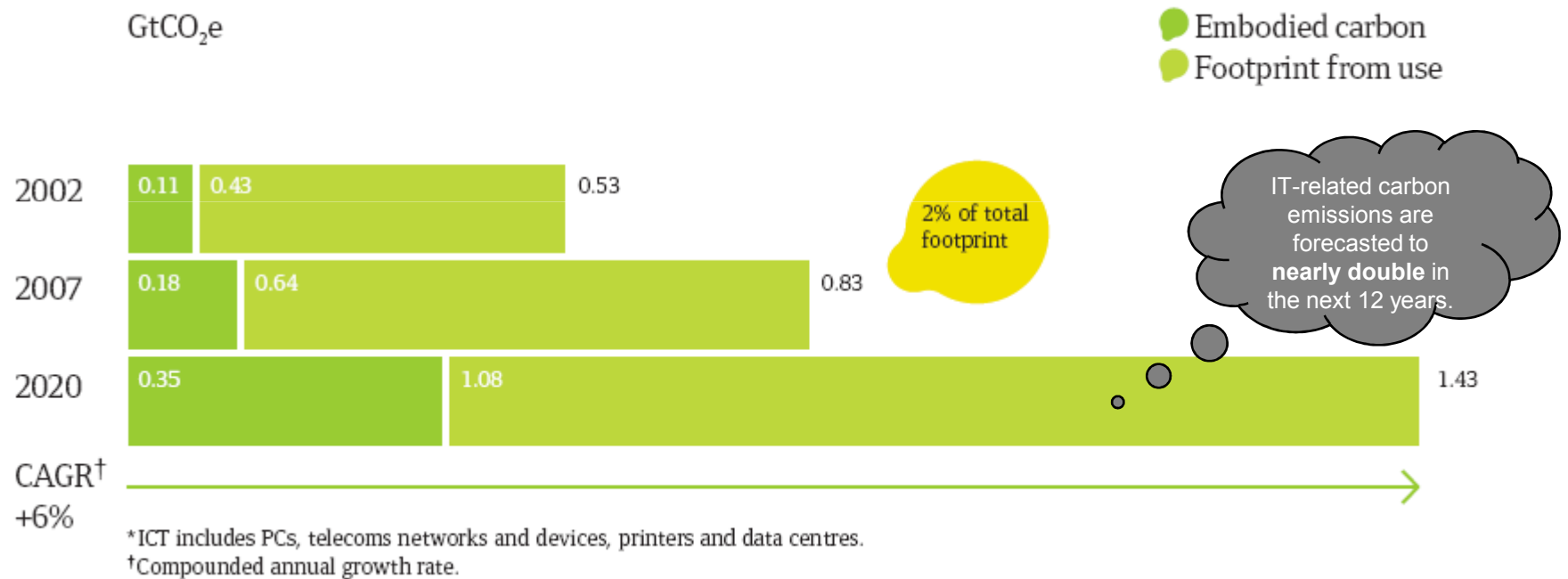


# Energy Efficiency Drivers

- High cost of energy
  - Saving money
  - Manage limited capacity
- Support sustainability initiative
  - Reduce CO<sub>2</sub> emissions / Climate Change
- Regulatory Pressures and Compliance
  - Increased pressure to report carbon footprint
  - Taxation on energy use
  - Incentives for efficiency measures

# Global ICT Footprint

## Continued growth of IT-related energy consumption



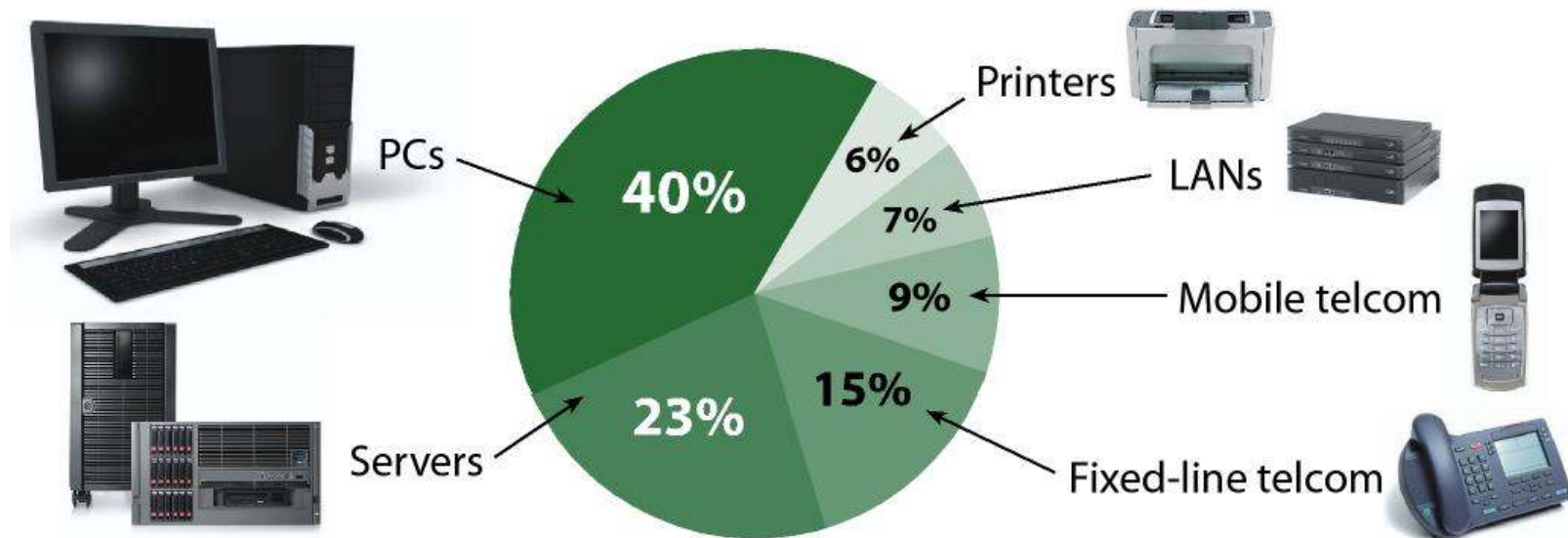
\* "Smart 2020: Enabling the low carbon economy in the information age"  
Global eSustainability Initiative

Reducing the IT Carbon Footprint

 Verdiem.

# PCs are the biggest problem

Estimated Distribution of Global CO<sub>2</sub> Emissions from IT Devices



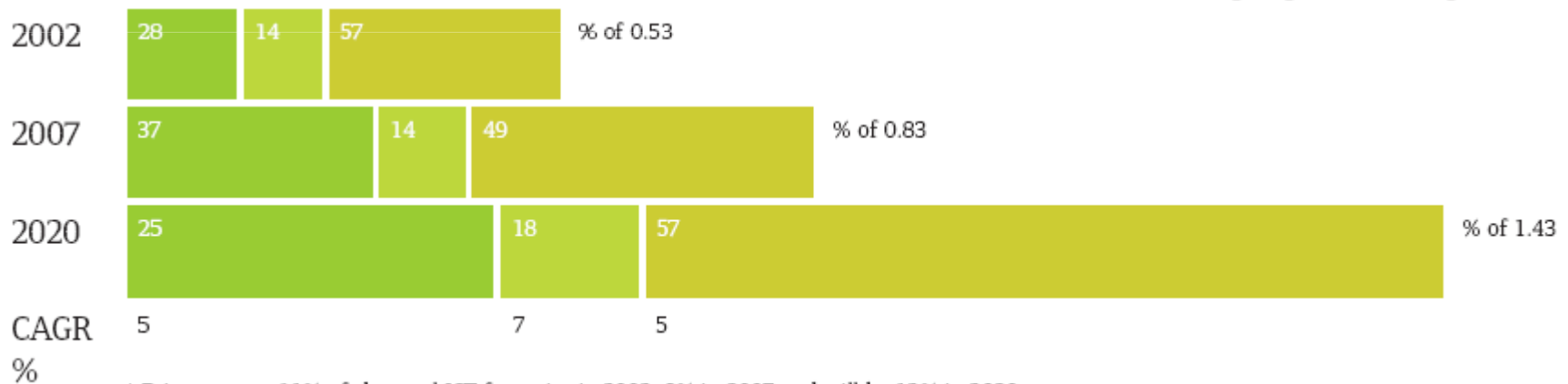
Gartner, Sept 2007

# Global ICT Footprint by Sub-sector

Fact: By 2020, PCs, Peripherals and printers will consume more energy than Telecoms infrastructure and devices and data centers combined.

Emissions by geography  
% of GtCO<sub>2</sub>e

- Telecoms infrastructure and devices
- Data centres
- PCs, peripherals and printers\*



\* Printers were 11% of the total ICT footprint in 2002, 8% in 2007 and will be 12% in 2020.

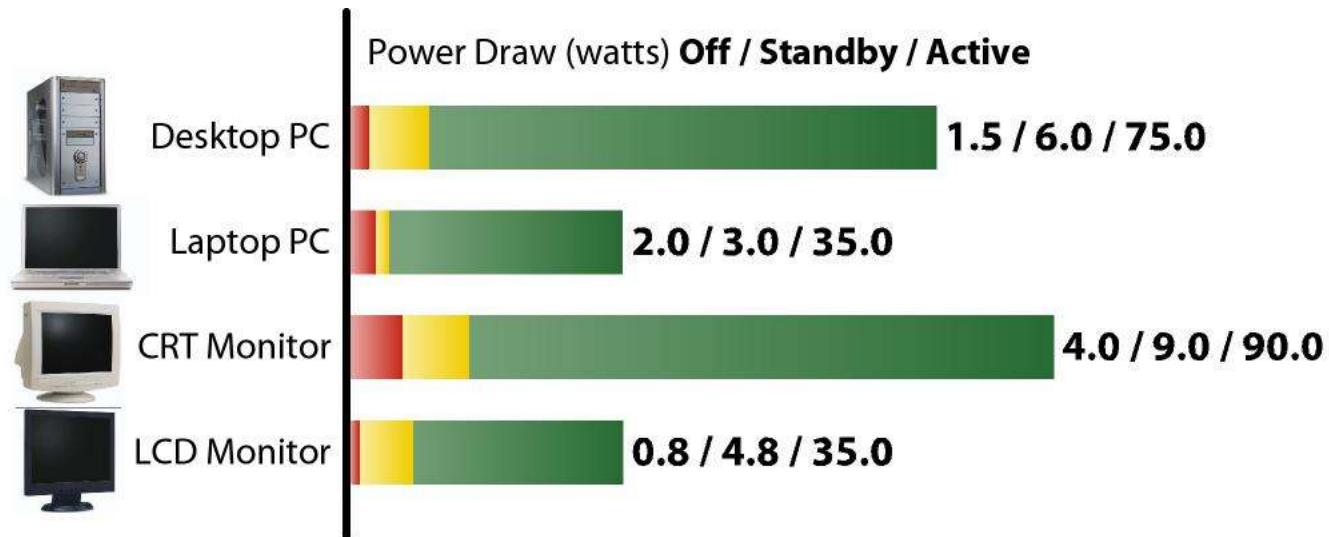
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# A growing problem and opportunity

PCs and monitors account for up to 13% of total commercial electricity consumed



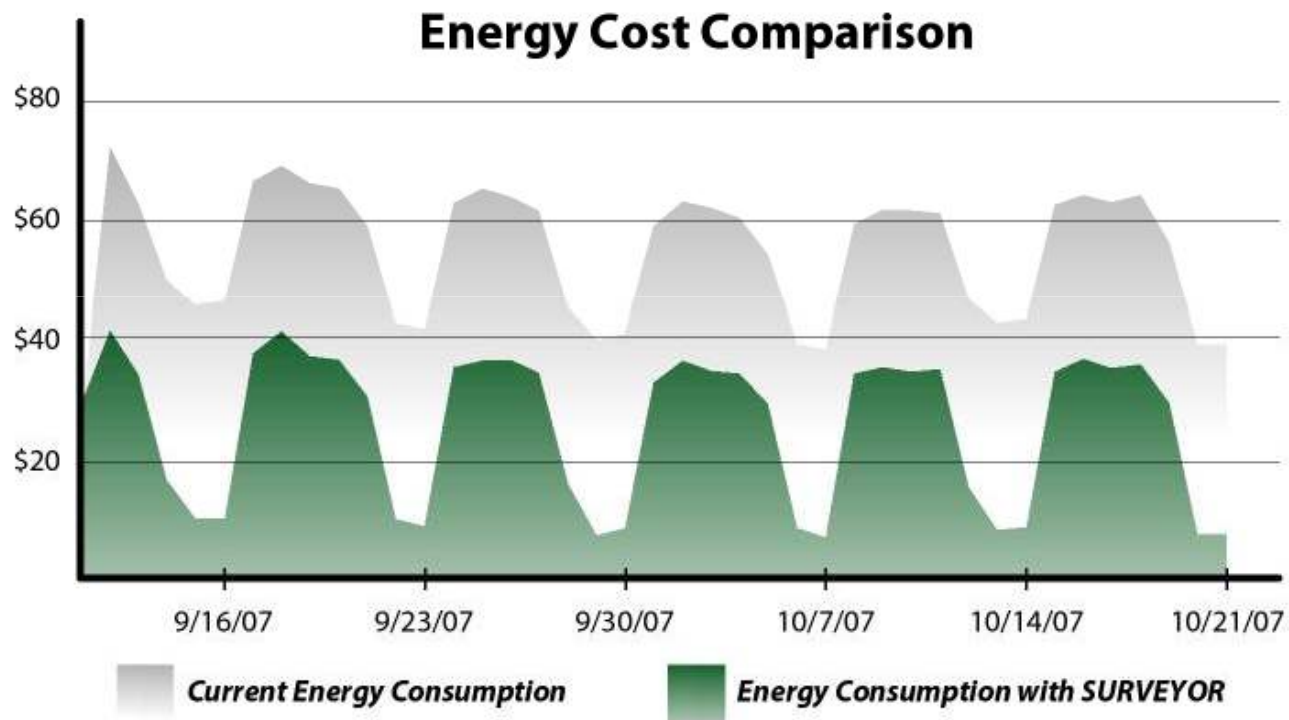
U.S. Department of Energy

# PCs: The silent killer

- **The typical PC/monitor combination uses 588 kWh of energy each year**
  - Equivalent to around 1,000 pounds of CO<sub>2</sub>
  - Two-thirds of that energy is wasted
- **Current energy management solutions aren't doing enough**
  - 80% of PC users disable their power settings\*
  - 60% of PCs are left running after hours\*

\*Lawrence Berkeley National Labs

# How it works



Reducing the IT Carbon Footprint



# Solution Considerations

- Prerequisite – waking up the machine
  - Schedule a wakeup
  - Wake-on-LAN (*Magic Packet*)
    - Most machines come preconfigured but may need setup
    - However, requires directed broadcast
  - “*Wake-on-WAN*”
    - Establishes proxies in each subnet
    - How easy is this to setup?
  - Intel vPro
    - Out-of-band mechanism to wakeup the machine
    - Should work in a heterogeneous environment

# Solution Considerations

- **Business Continuity**
  - How do you determine the right power profiles so that end-user is not impacted?
  - Can the machine be gracefully shutdown?
  - What if the machine is should not be shutdown?
  - Can the end-user override a shutdown?
  - What if use wants to access machine remotely?

# Solution Considerations

- Desktop Administration Impact
  - Most PCs are left on to facilitate IT Admin activity
  - Is the Wakeup capability Robust?
  - Can I seamlessly apply patches, security & SW updates?
  - What if the machine goes back to sleep before I complete the update?

# Solution Considerations

- How do I know if I'm saving energy?
  - Some times my machines do not go into the lower power mode (*Insomnia*)
  - How can I continually optimize energy saving?
  - How accurate is the reporting?
  - Is savings calculated based on a reliable 'before' measurement?

# Solution Considerations

- Architecture Considerations
  - Administration
    - Reusable Policies
    - Dynamic grouping of machines
    - Centralized, real-time control of infrastructure
  - Security
    - Man-in-the-middle attacks; firewall holes? encryption?
    - Rogue scripts; certificate-based signing?
  - Single agent?

# Case Study – City Univ. of NY

Through deployment of our PC power management solution, CUNY has:

- Reduced per PC energy usage by 173 kWh / year
- With a four year projected savings of over \$2,000,000
- That is equivalent to 16,300 metric tons of CO<sub>2</sub> emissions saved\*

\*Figures calculated using EPA Greenhouse Gas Equivalencies Calculator online at <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>



# What we do

- **Verdiem** is focused on enterprise network energy management
- **Our vision:** To measure, monitor and manage the global carbon footprint of IT devices worldwide

**SURVEYOR cuts your PC energy costs by as much as 60 percent**

# Sample Savings Report

## Summary of Annualized Energy Consumption Data

	Annual Per PC Average	All 47,157 PCs
Baseline Energy Consumption	826.5 kWh	38,972,967 kWh
Energy Consumption with SURVEYOR	382.0 kWh	18,013,407.7 kWh
Energy SAVINGS	444.46 kWh	20,959,400 kWh
Greenhouse Gas Emission REDUCTION	606 lbs	28,567,880 lbs
Energy REDUCTION %	53.80%	

## Summary of Annualized Energy Costs

	Annual Per PC Average	All 47,157 PCs
Baseline Energy Cost	\$90.58	\$4,271,437.23
Energy Cost with SURVEYOR	\$41.87	\$1,974,269.48
Cost SAVINGS	\$48.71	\$2,297,167.75
Cost SAVINGS %	53.80%	

# About Verdiem

- **Heritage**

- Verdiem was founded in 2001 with a grant from the Northwest Energy Efficiency Alliance.
- We are the only software company solely dedicated to IT energy efficiency.

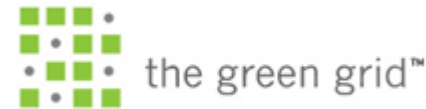
- **Credentials**

- Verdiem is funded by top-tier investors, including Kleiner Perkins.
- We have partnered with more than 20 utilities nationwide, including aggressive rebate/incentive programs specifically for SURVEYOR.

- **Cumulative Savings Worldwide**

- Verdiem has enabled customers to eliminate 473,000,000 pounds of CO<sub>2</sub> emissions.
- That is equivalent to taking 26,600 passenger cars off the road.

# World Class Partners



Microsoft® Partner Program  
Partner of the Year  
➤ 2008 Award Winner



Reducing the IT Carbon Footprint

