Potpourri Track
Green IT

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Agenda

- Green Drivers and Initiatives
- Energy Use
- Green Buildings and IT
- Green IT
- Datacenter Efficiency
- Travel and IT
- Green Computing
- Going Paperless
- Summary and Q&A

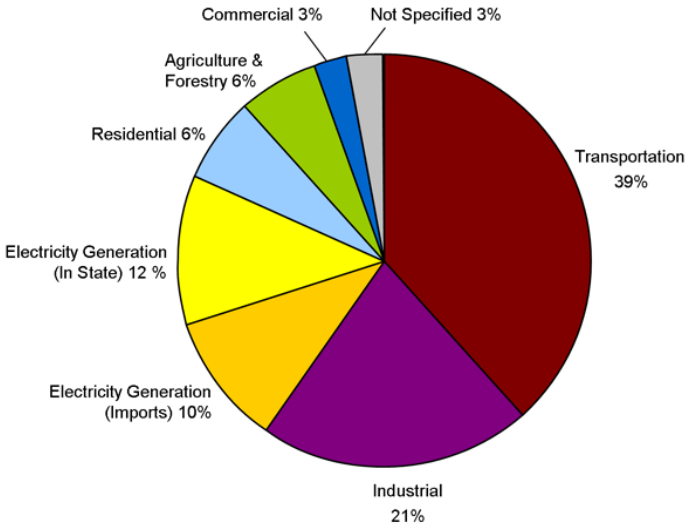
External Green Business Drivers

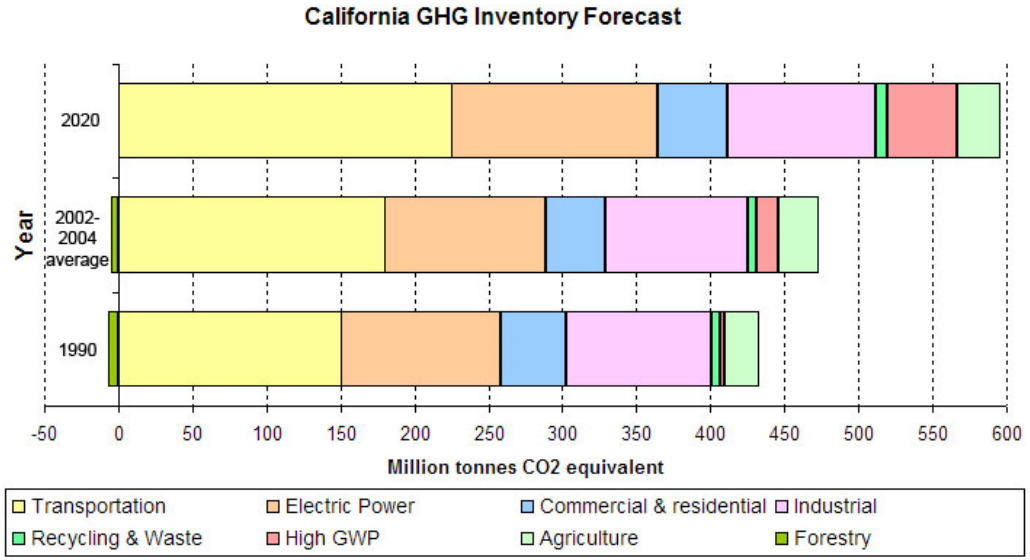
Organization Green Initiatives

- Reduce GhG Emissions
  - Reduce non-renewable energy use
- Green Buildings
  - LEED-NC/EB & CHPS (K-12) certifications
- Environmentally Sustainable Operations
  - Water, energy and materials
  - Recycling and waste reduction
  - Travel and transportation
- Green IT initiatives
- Employee and Occupant Education and Engagement

California GHG Inventory & Forecast

CARB - GHG emissions by Sector (Gross emissions: 483.9 MMT CO_2e)

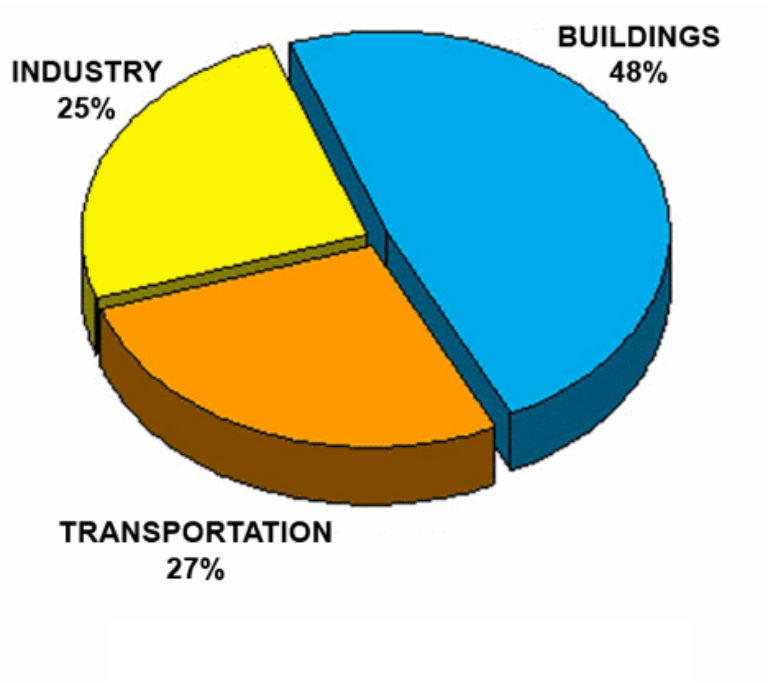




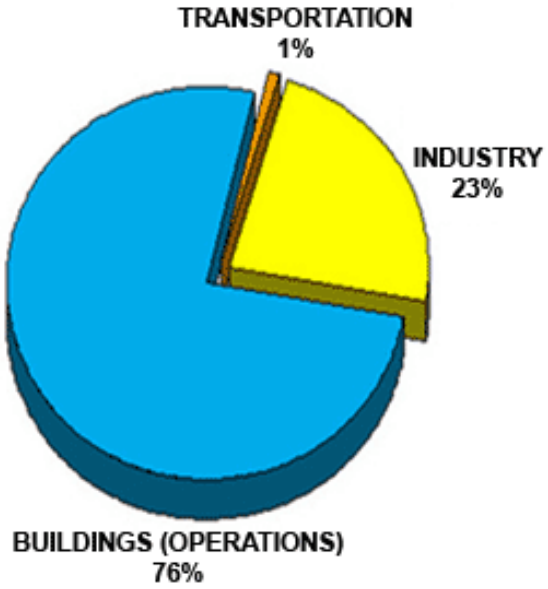
Source: California Air Resource Board

US Building Energy Use

US Energy Consumption



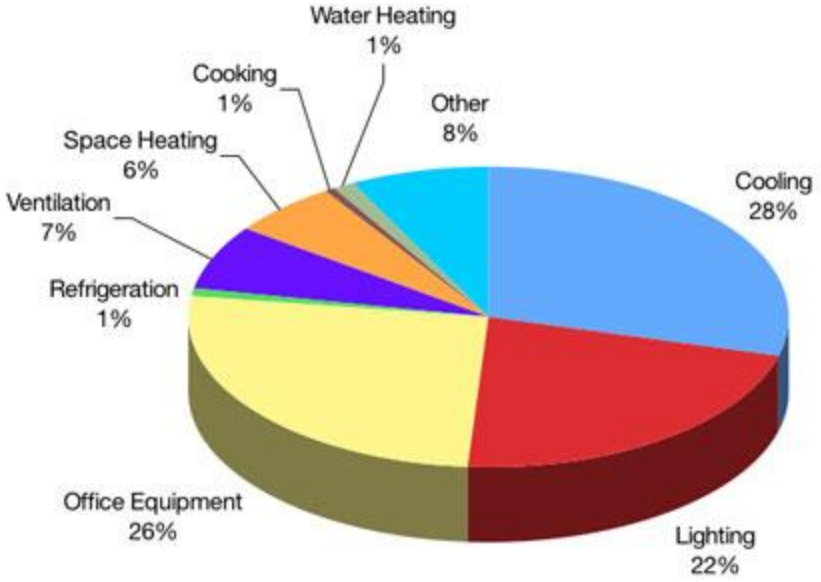
US Electricity Consumption



Source: Architecture 2030 .Based on data from the US Energy Information Administration

California Building Energy Use

Source: Energystar



Based on data from the Department of Energy, Energy Information Administration, Building End-Use Consumption Survey, 1999.

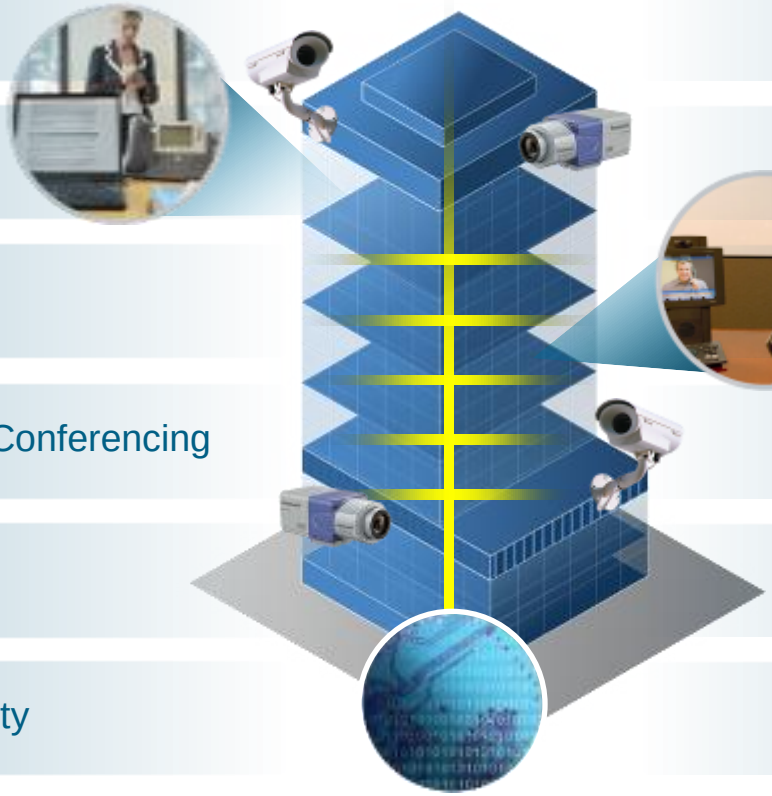
Green Buildings = Facilities + IT

- Real Time Building Management
- “One Wire” Network Convergence
- Data Center Efficiency
- User Needs (systems and services)
- User Education - Digital Signage etc.
- Video/Web Conferencing & Telepresence
- Tele-worker/Telecommuting
- Virtual Workplace

Smart Connected Green Buildings

Information Services

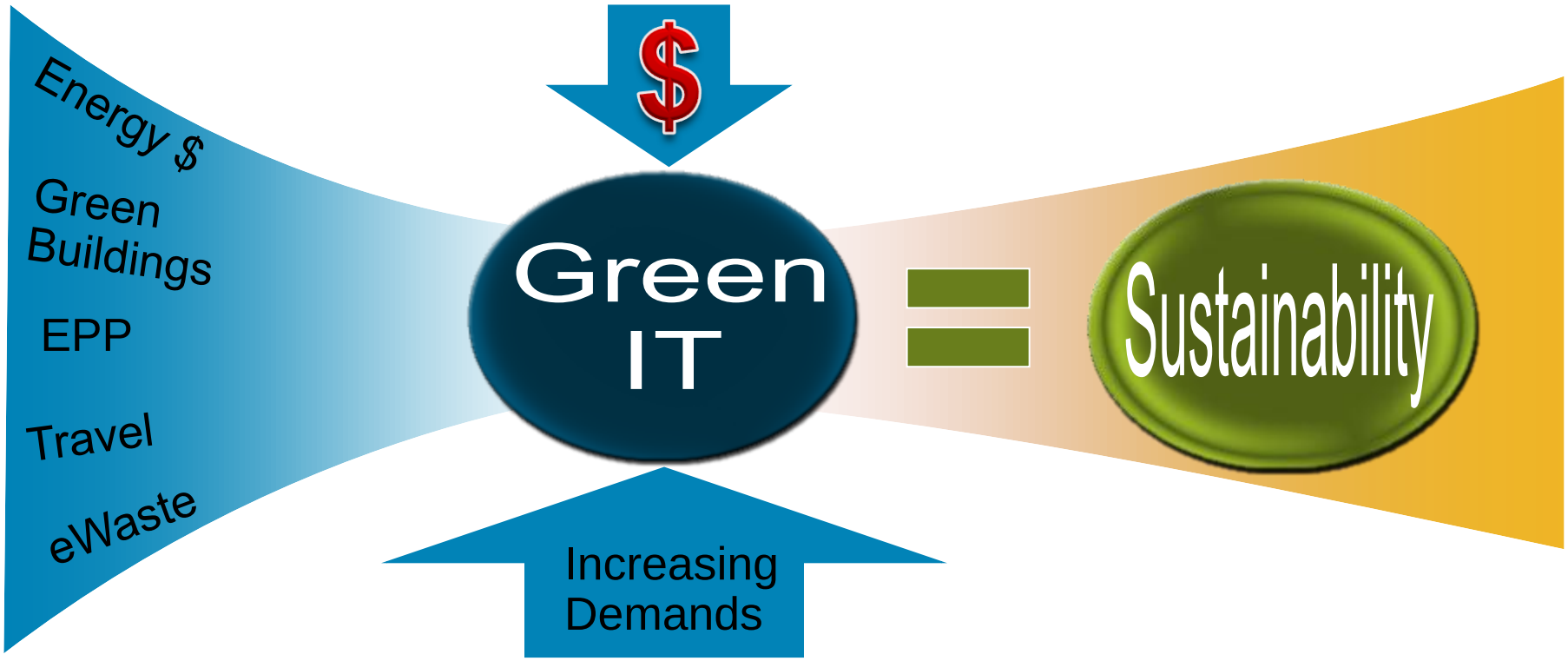
- Data Center
- Client Computer
- Mobility
- Voice/Telecom
- Voice/Video/Web Conferencing
- Telepresence
- Information Security
- Digital signage



Building Services

- Lighting
- Elevators
- Location
- HVAC
- Fire Systems
- Video Surveillance
- Access Control
- Energy Management

Drivers for Green IT



IT Green mission

Four ways to transform environmental impacts

Operations

Reducing the environmental impact and cost of operations

Architecture

Providing solutions to address green needs

Products

Selecting product that are energy efficient and reduce eWaste.

Culture

Educating occupants and employees to be green

IT Green Initiatives

IT Projects

Data Center Efficiency	Consolidation & virtualization	Cloud Computing
Convergence “One Wire”	Virtual Worker Solutions	Video and Web conferencing
Measure, monitor and manage power use	PC power use and thin clients	Retire systems
EnergyStar products	Go Paperless	Education and awareness

Data Centre Energy Use

- Data Center energy use 2% and growing at 12%/year
- Growing application requirements
- Power and cooling costs = Hardware costs by 2012
- Average server utilization as low as 6%
- Unused equipment as high as 30%
- Application usage and business value?

Data Center Efficiency Measurements

- Green Grid/EPA/EnergyStar
  - Power Usage Effectiveness (PUE)
  - Data Center Infrastructure Efficiency (DCiE)
- Green Grid
  - Data Center Productivity (DCP) Work in Progress
    - DCeP = useful work produced in a DC/Total Energy Used in DC
- McKinsey
  - Corporate Average Datacenter Efficiency (CADE)

PUE and DCiE Examples

$$PUE = \frac{\text{Total Facility Power}}{\text{IT Equip Power}}$$

$$DCiE = \frac{\text{IT Equip Power}}{\text{Total Facility Power}} \times 100\%$$

Example:

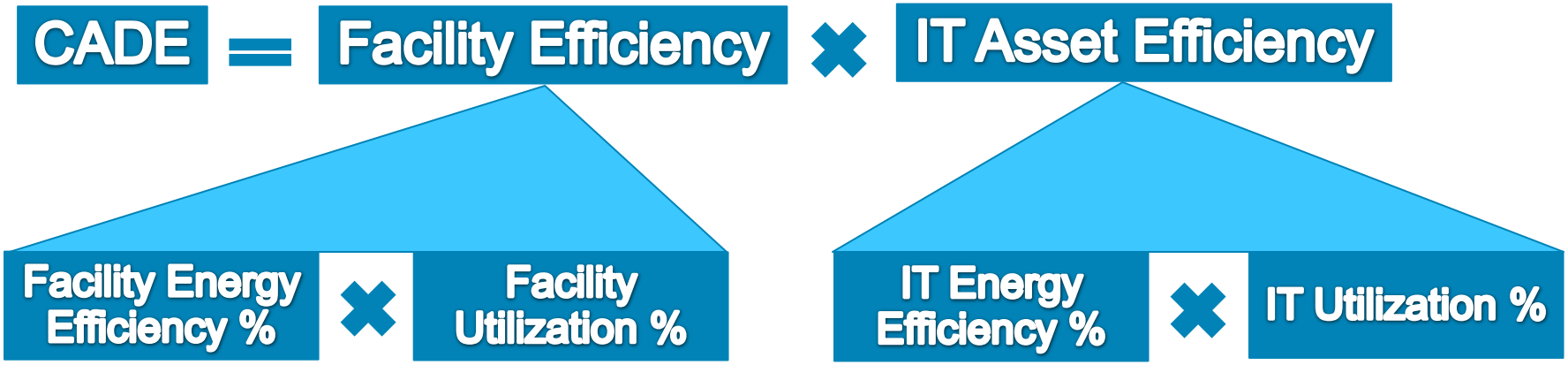
PUE=100000kW/50000kW=2.0

DCiE=(50000kW/100000kW)*100%=50%

PUE	DCiE	Efficiency Level
3.0	33%	Very Inefficient
2.5	40%	Inefficient
2.0	50%	Average
1.5	67%	Efficient
1.0	83%	Very Efficient

Based on information from Green Grid and 42U

CADE Example



Example:

FE=(ExU)

FE=(48%x75%)

FE=36%

AE=(ExU)

AE=(90%x10%)

AE=9%

CADE=36%x9%

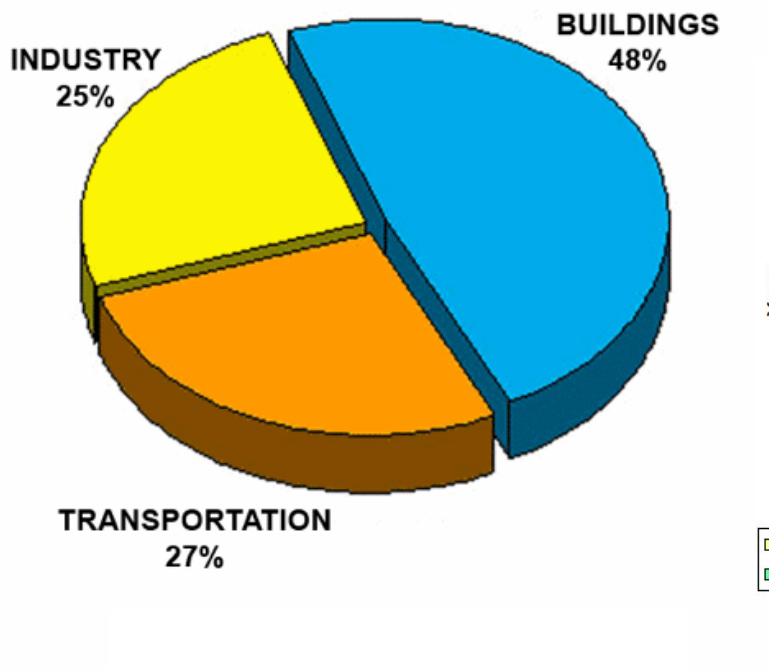
CADE=3.2%

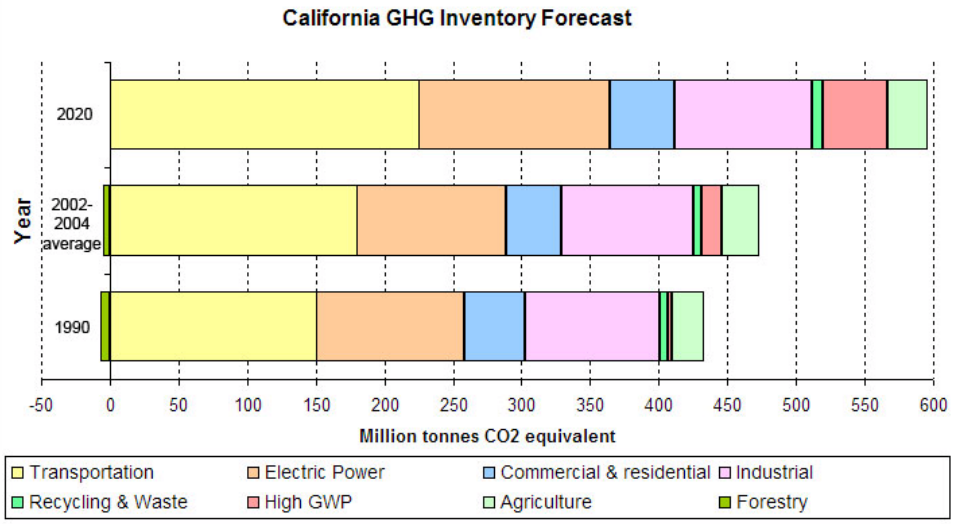
Level 1	0-5%
Level 2	5-10%
Level 3	10-20%
Level 4	20-40%
Level 5	40+%

Based on information from McKinsey / Uptime Institute

US Building Energy Use

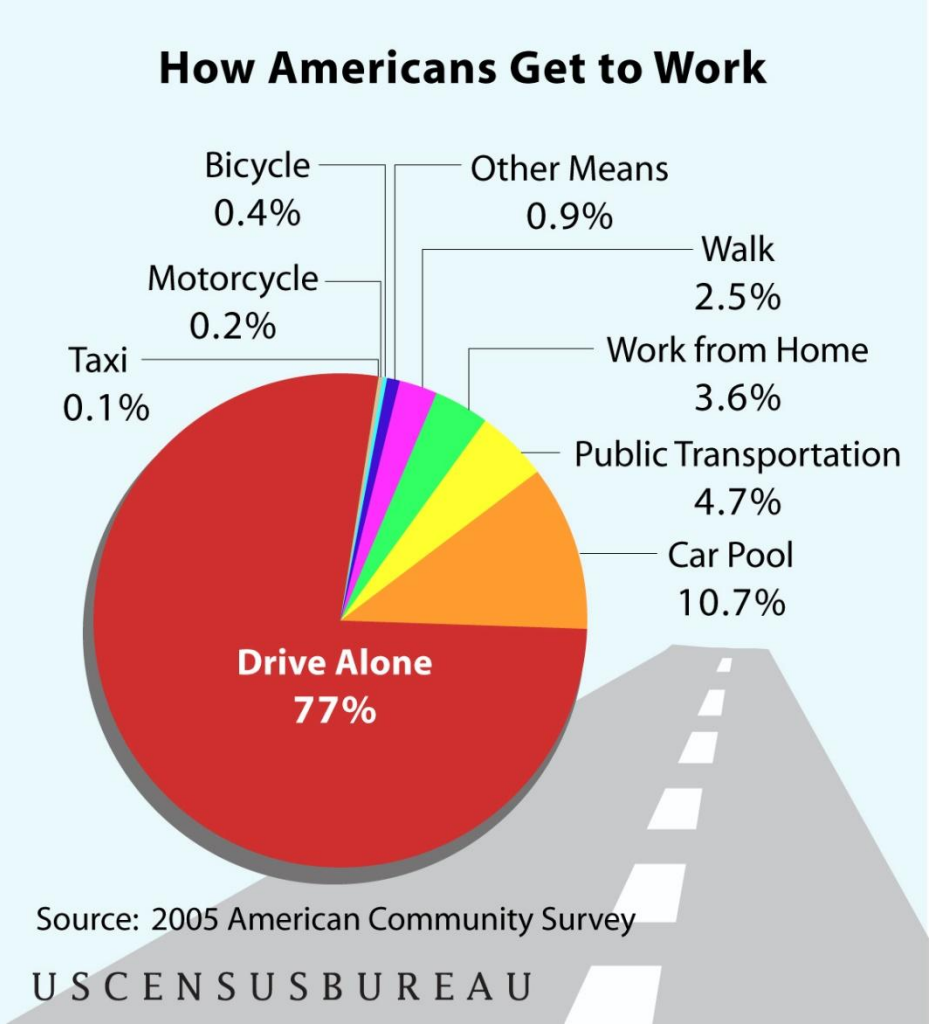
US Energy Consumption





Source: Architecture 2030 .Based on data from the US Energy Information Administration

Commute to Compute



Virtual Collaboration and Sustainability

Support environmental sustainability through smarter virtual collaboration

Communication & Collaboration

Avoided business travel	A significant % of all business travel can be replaced by virtual meeting solutions
Avoided commuting	IP Communications enables remote work with the same efficiency as in an office
Reduced office space needs	Use real-estate more efficiently with more productive remote and mobile working and hot-desking

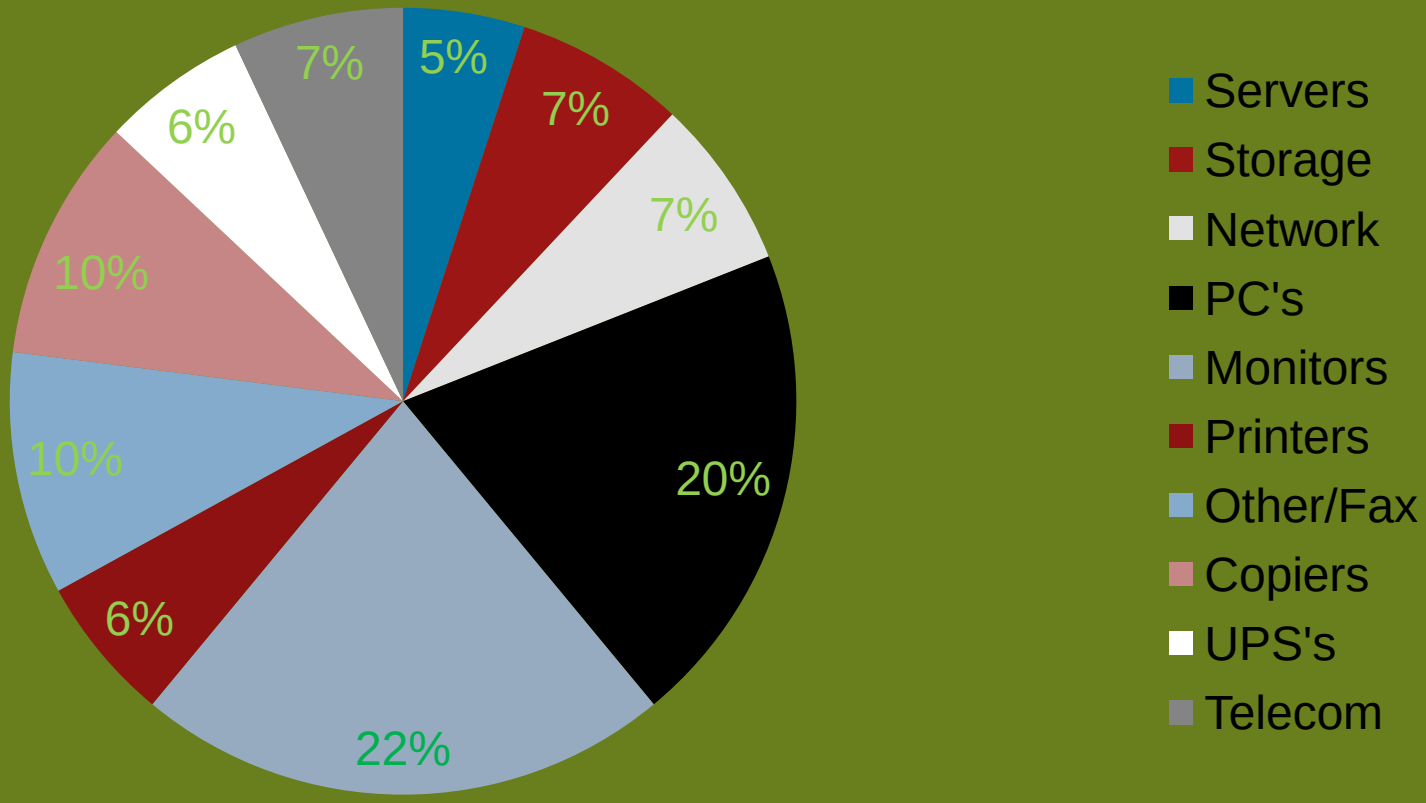
Continuity of Operations

Green Computing Goals

- The goals of green computing are to reduce the use of hazardous materials, maximize energy efficiency during the product's lifetime, and promote recyclability or biodegradability of defunct products and factory waste.
- Green Lifecycle - Design, Manufacturing, Use, Disposal

IT and Office Equipment Energy Use

How to measure IT and office systems Energy Use?



Based on Roth et al 2002 data (US)

PC Energy Example

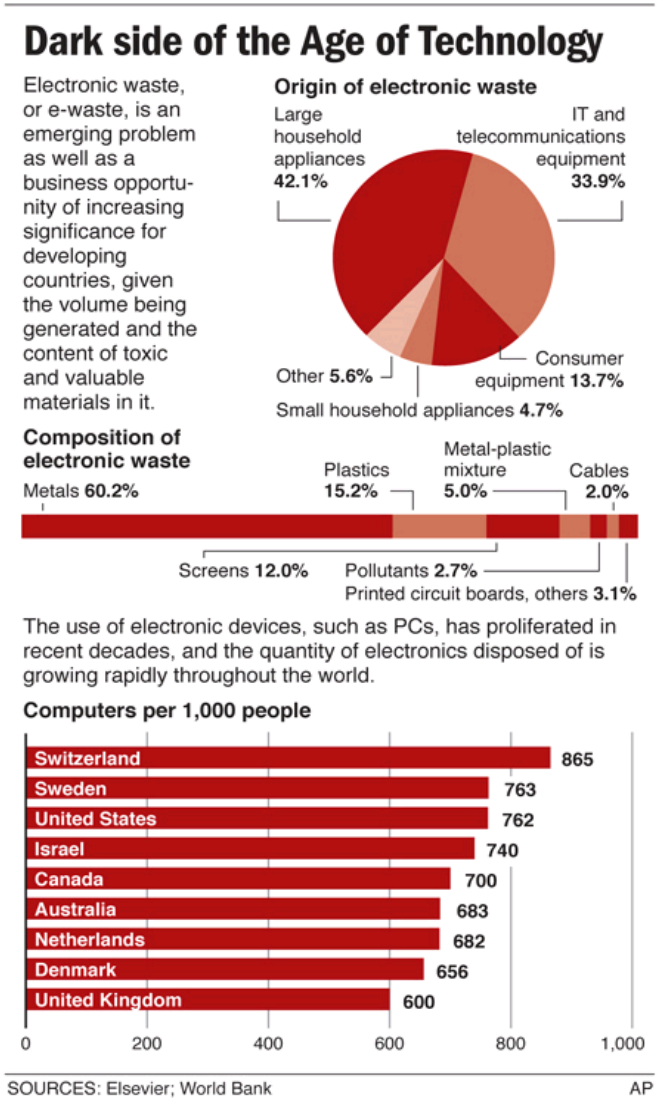
Device	Watts	Cost at $0.1/kWh	Hours / Day	Cost/Yr/Dev	Qty	Cost/Year	Hours off	Savings $	Weekend+ Hols Hrs/Yr	Savings $	Total Savings
CRT	130	$ 0.0130	24	$ 113.88	1000	$ 113,880	12	$ 40,560.00	2616	$ 34,008.00	$ 74,568.00
LCD	65	$ 0.0065	24	$ 56.94	0	$ -	12	$ -	2616	$ -	$ -
PC	120	$ 0.0120	24	$ 105.12	1000	$ 105,120	12	$ 37,440.00	2616	$ 31,392.00	$ 68,832.00
TC	50	$ 0.0050	24	$ 43.80	0	$ -	12	$ -	2616	$ -	$ -
Totals						**$ 219,000**		**$ 78,000.00**		**$ 65,400.00**	**$ 143,400.00**

Client Hardware & Power Management

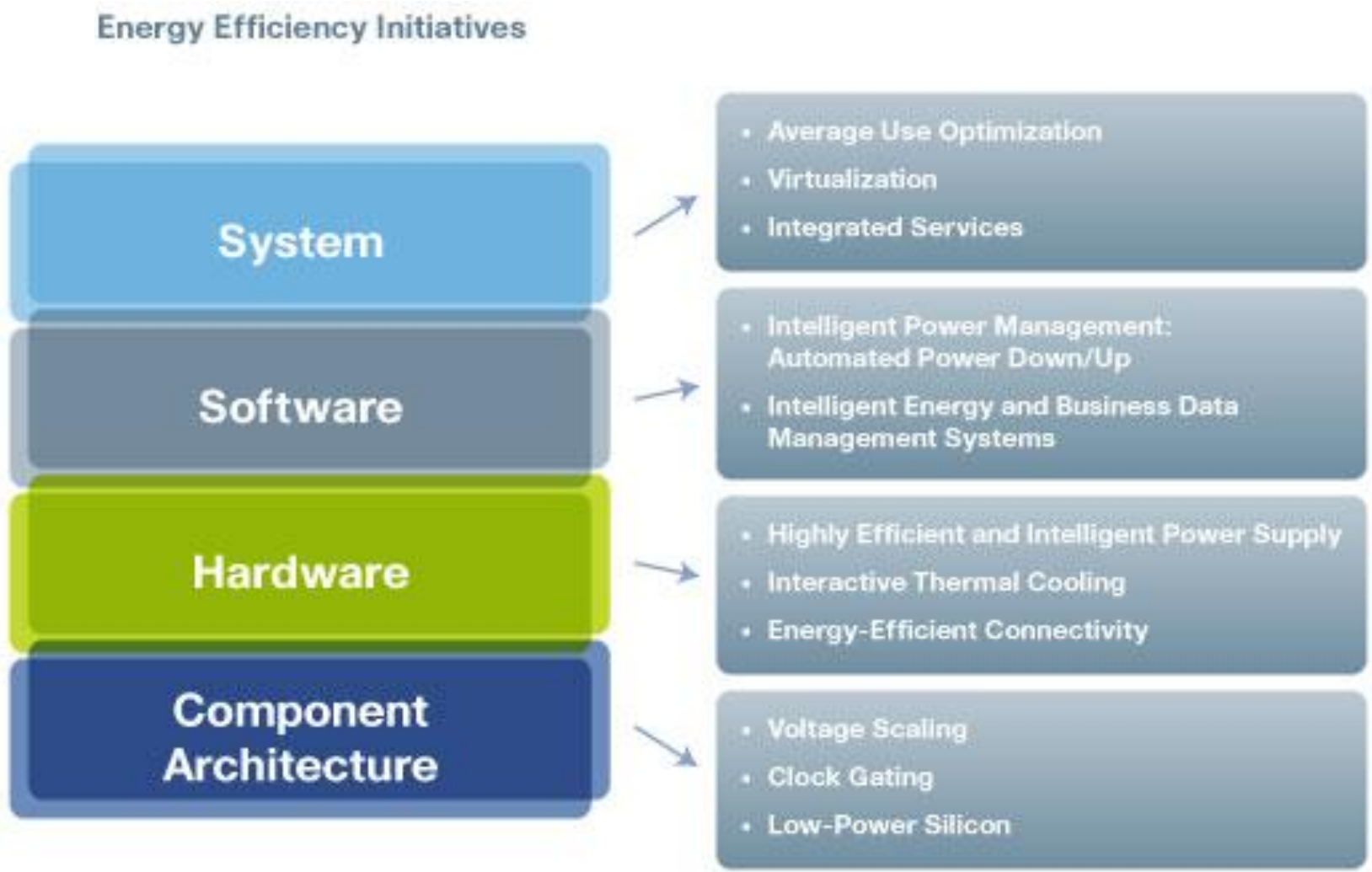
- PC Power Management/Insomnia PC's
- LCD's vs. CRT's
- Energy Star monitors and computers
- Thin/zero clients with virtual desktop interface (VDI)
- "EnergyWise" network reporting and power management of PoE and IP connected devices
- Sleep/Suspend vs. Screensaver
- Software updates?
- Remote access to systems?

Environmental Purchasing Policy

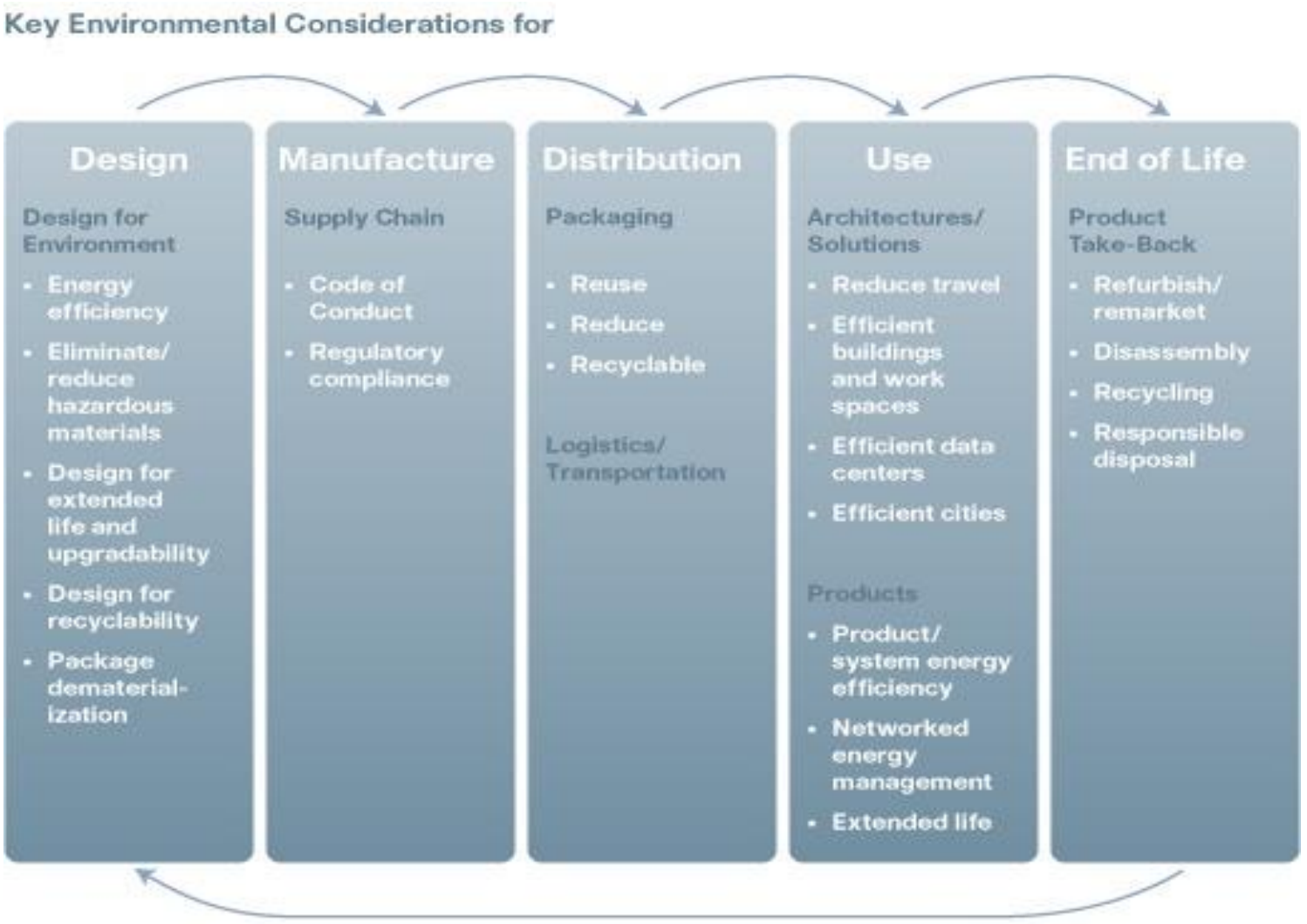
- Responsible Manufacturing
- Packaging and distribution Efficiency
- Recycled Content
- Energy Efficiency
- Low Life Cycle Costs
- Durability
- End of Life Management



IT Products – Energy Efficiency



IT Products Life Cycle



Cost of Print Per User

- Costs range from 0.06 – 0.13c per page
- Average Employee prints 10,000 pages / year
- Cost per user $600-$1300 per year
- 17% Average Waste
- Printer ink = $10,000/gallon
- 56% of 45-54 year olds print Internet content
- Printed material is less secure, storage and shredding costs as well.

Source:http://www.printgreener.com

Paperless Approaches

- Networked Fax
- Networked Multifunction devices (print, copy, fax)
- Think before you print
- Charge back/auth codes
- eEverything
- Email and data backup

Summary

- Organization Green Initiatives 
- Smart Connected Green Buildings 
- Green IT - Data Center Efficiency 
- Travel/Transportation – Commute to Compute 
- Green Computing and paperless 

Cisco Information

- http://www.cisco.com/go/csr
- http://www.cisco.com/go/green
- http://www.cisco.com/go/datacenter
- http://www.cisco.com/go/virtualdatacenter
- http://www.cisco.com/go/teleworker
- http://www.cisco.com/go/energywise
- http://www.cisco.com/go/mediator

Thank You!

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