

*Save energy. Save money.
Save the environment.*





Green IT:

Environmental Sustainability - The New Imperative

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Questions?

If you put a ton of CO₂ in a balloon, what would be the diameter of that balloon?

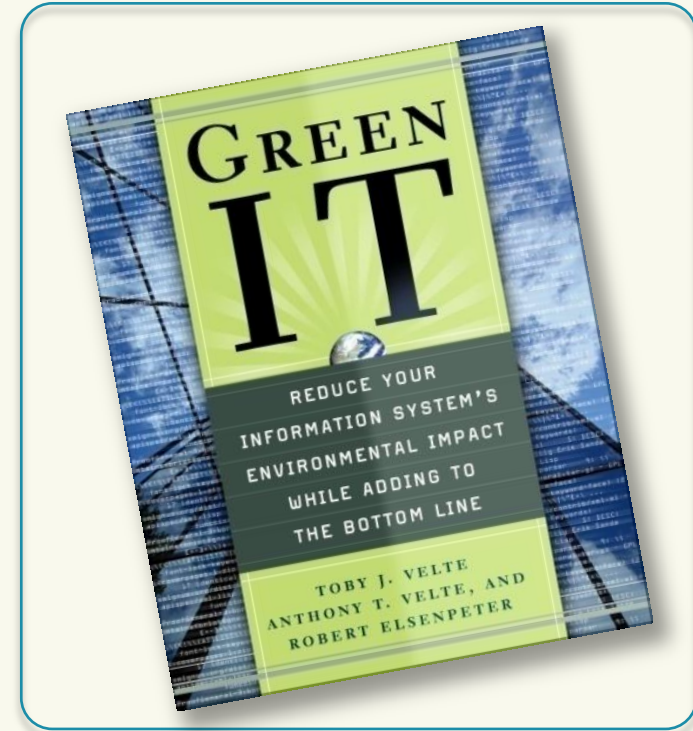
- a. 0.1 m
- b. 1 m
- c. 10 m
- d. 100 m

What is the expected increase in spending on energy over next 5 years?

- a. 50%
- b. 110%
- c. 350%
- d. 400%

Thank You!

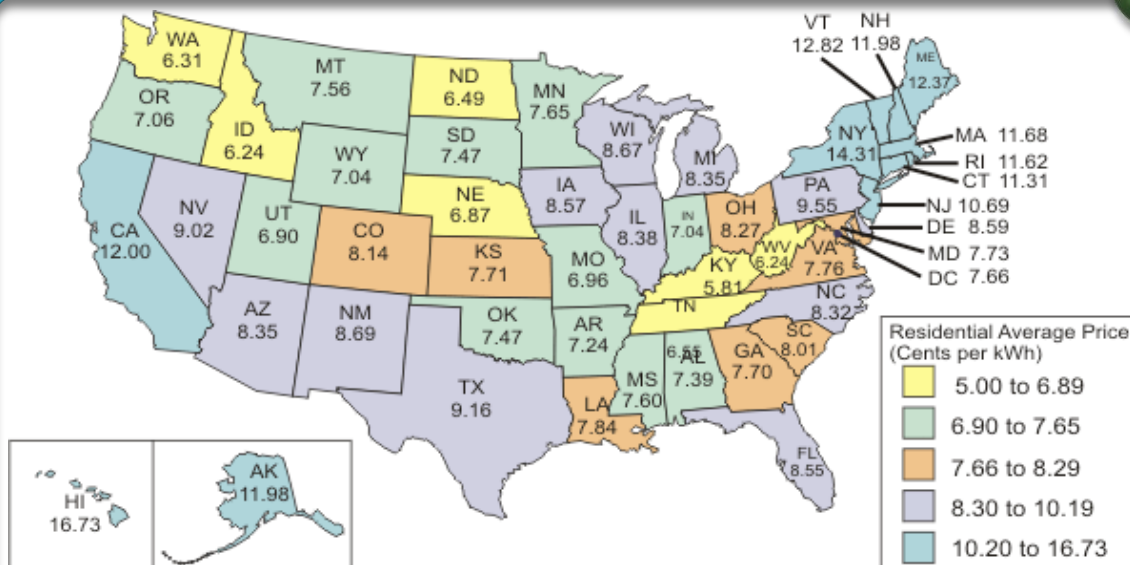
- Green IT: What is it?
- Why talking about it now?
- The Approach
- Fictional Co. Example
- Getting Started for You!
- Job #1: Baseline
- Benefits Beyond Primary Goals
- Ongoing Sustainability and Kaizen 改善



Green IT

- Climate Change
- Public Perception
- Government Involvement

Perceived	Actual
(4) More efficient car	(1)
(6) Improve insulation	(2)
(8) Eat less beef	(3)
(3) Drive less	(4)
(1) Recycle	(5)
(2) Efficient appliances	(6)
(5) Adjust thermostat	(7)
(7) Fly less	(8)



Source: The McKinsey Quarterly, October 2008, "Helping 'green' products grow"

Source: Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report."

Omaha Energy News

OPPD
Omaha Public Power District

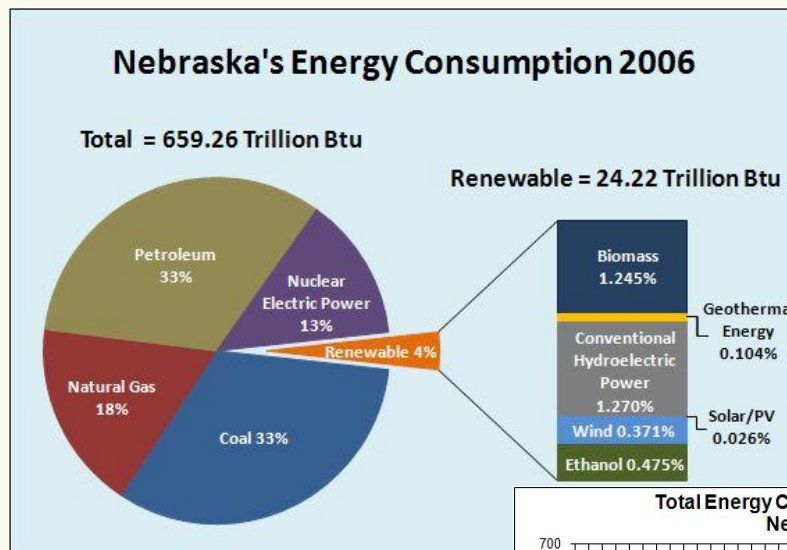
Residential Customers | Business Customers | Contractors & Developers | Aim Green®

Home > Residential Customers > Products & Services > Green Power

Green Power Program

OPPD has made some great strides since entering the renewable energy market in 2003. OPPD began with a 660-kilowatt wind generator, located at Valmont Industries Inc. in Valley, and a landfill gas-to-energy plant, at the Douglas County Recycling Disposal Facility near 216th Street and Highway 36.

OPPD has expanded its landfill gas-to-energy plant and a wind farm partnership that will generate another 10 megawatts of green energy.



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Technology » Science & Space • Shop for Gadgets

Leaving PCs on overnight costs companies \$2.8B a year

Updated 3/25/2009 1:12 PM | Comments 430 | Recommend 141 | E-mail | Save | Print | Reprints & Permissions |

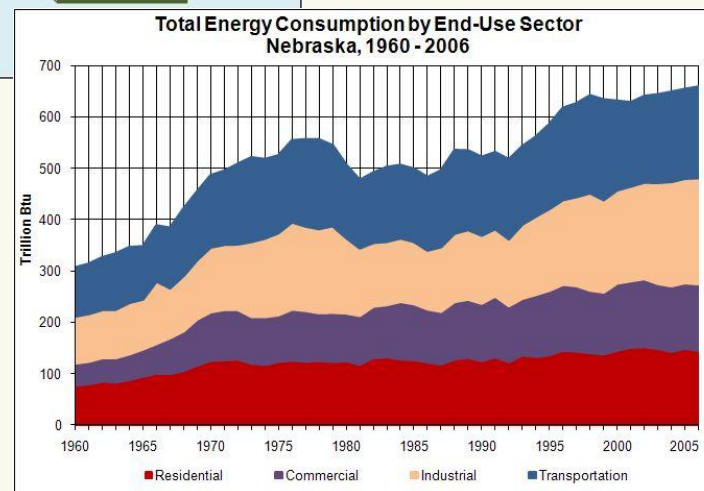
By Jon Swartz, USA TODAY

SAN FRANCISCO — Even during an economic meltdown, when companies are scrambling to cut costs, businesses are wasting billions of dollars by leaving their PCs on at night.

Omaha World-Herald

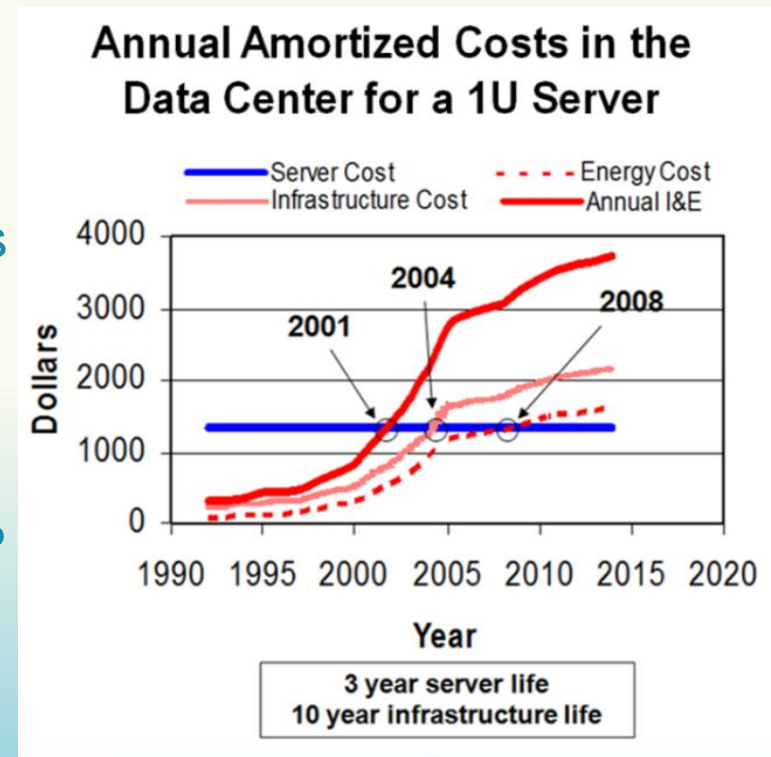
Published Tuesday August 19, 2008
Energy at center stage in House race
 BY TOM SHAW
 WORLD-HERALD STAFF WRITER

Energy independence will be a big theme for Rep. Lee Terry as he seeks re-election in the fall. Terry, a Republican, on Monday aired his first TV ad of the fall campaign. The ad shows Saudi officials at a meeting of oil-producing nations, with



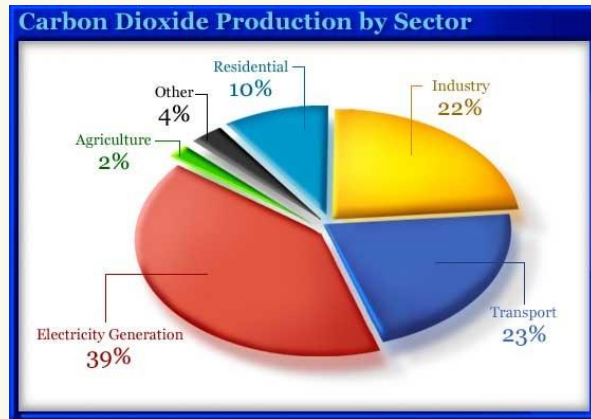
Why talking about it now?

- 10 yrs ago Power and Cooling accounted for 17% of new server cost. Today it's about 48% - International Data Corp.
- Gartner estimates 50% of datacenters by the end of 2008 worldwide can't meet the power requirements of the new high-density gear
- US businesses should expect a 400% increased spending on energy in the next 5 years – Gartner (2007)

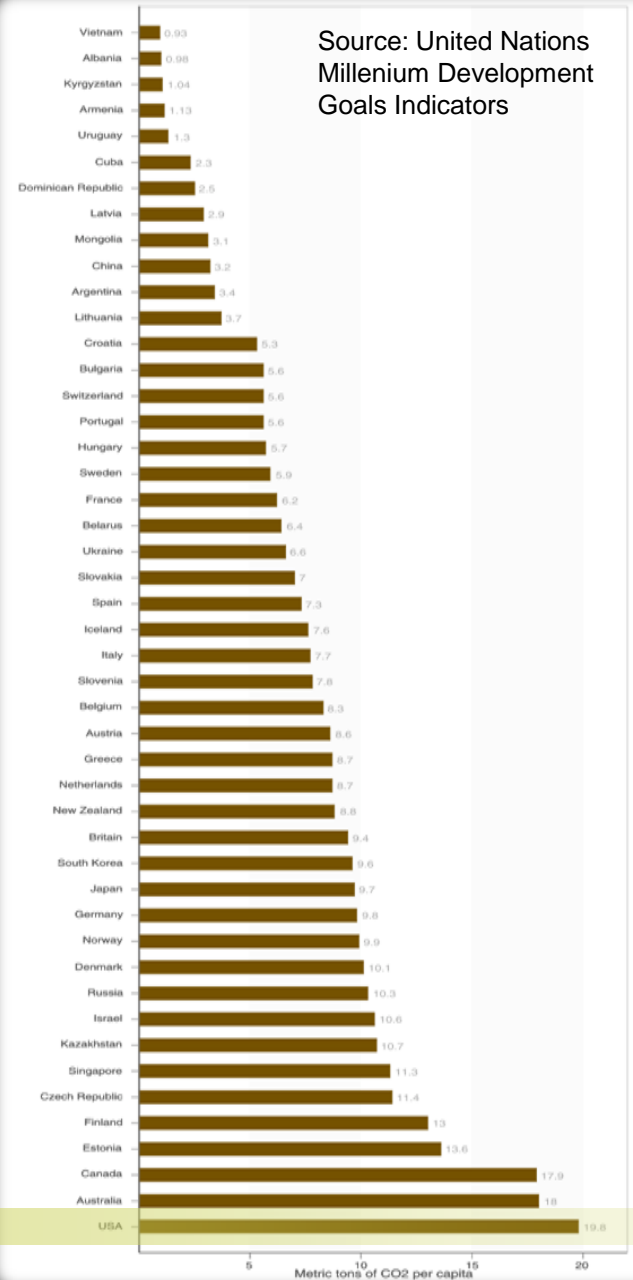


How much impact can we have?

- What is a ton of CO₂?
- Avg car about 7 tons/yr
- Data Centers –
The EPA estimates datacenters consume 1.5% of the nations power
- IT Contribution - 2% of CO₂ emissions come from IT (Gartner)
- US 7b tons in 2006 and growing
- Natural Absorption



Source: Energy Information Administration, 2008



Individual Contribution of Common Devices?



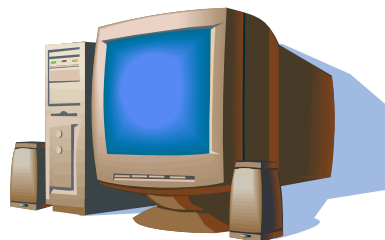
Server 1500 Watts
6.22 tons/yr



Lightbulb 100W
0.41 tons/yr



HVAC
1700W
7 tons/yr



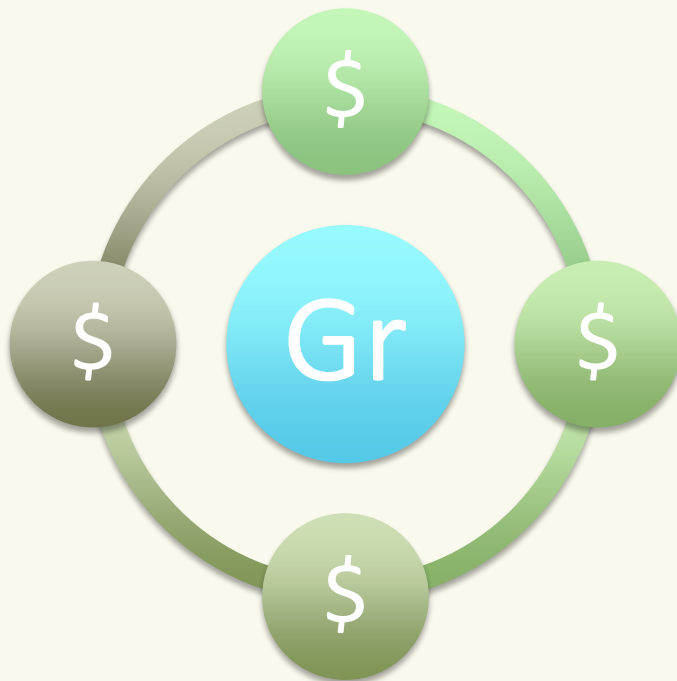
PC
240W
1 ton/yr



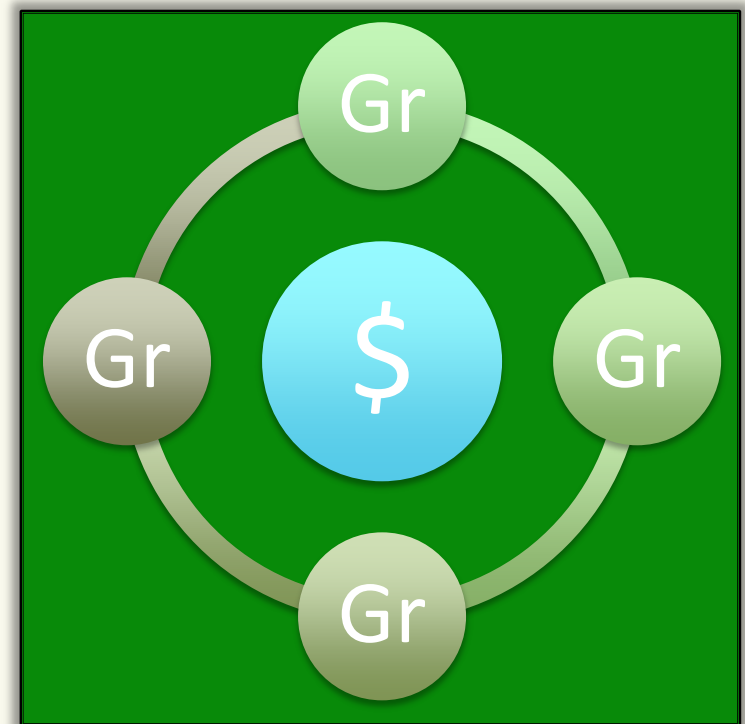
Thin Client
36W
0.15 tons/yr

Earth Friendly is Finally Budget Friendly

Organization chooses to take Green approach to satisfy corporate responsibility, regulations, corporate image.



Organization chooses to take financially advantageous approach to satisfy pressures of capitalism.





Call to Action

THIS:

- Energy is not ubiquitous and cheap
- Cradle to cradle
- Increased regulations are coming
- Increased taxes are coming

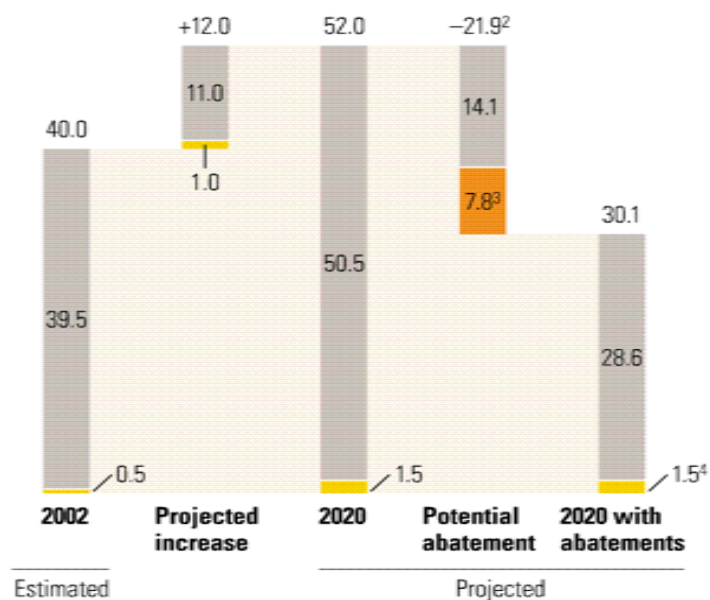
Results in...

- Whole new outlook on IT is needed
- Create a holistic plan/timeline
- Go after big \$\$\$ while building a solid base
- Don't forget biggest challenge
- Plan for 改善!

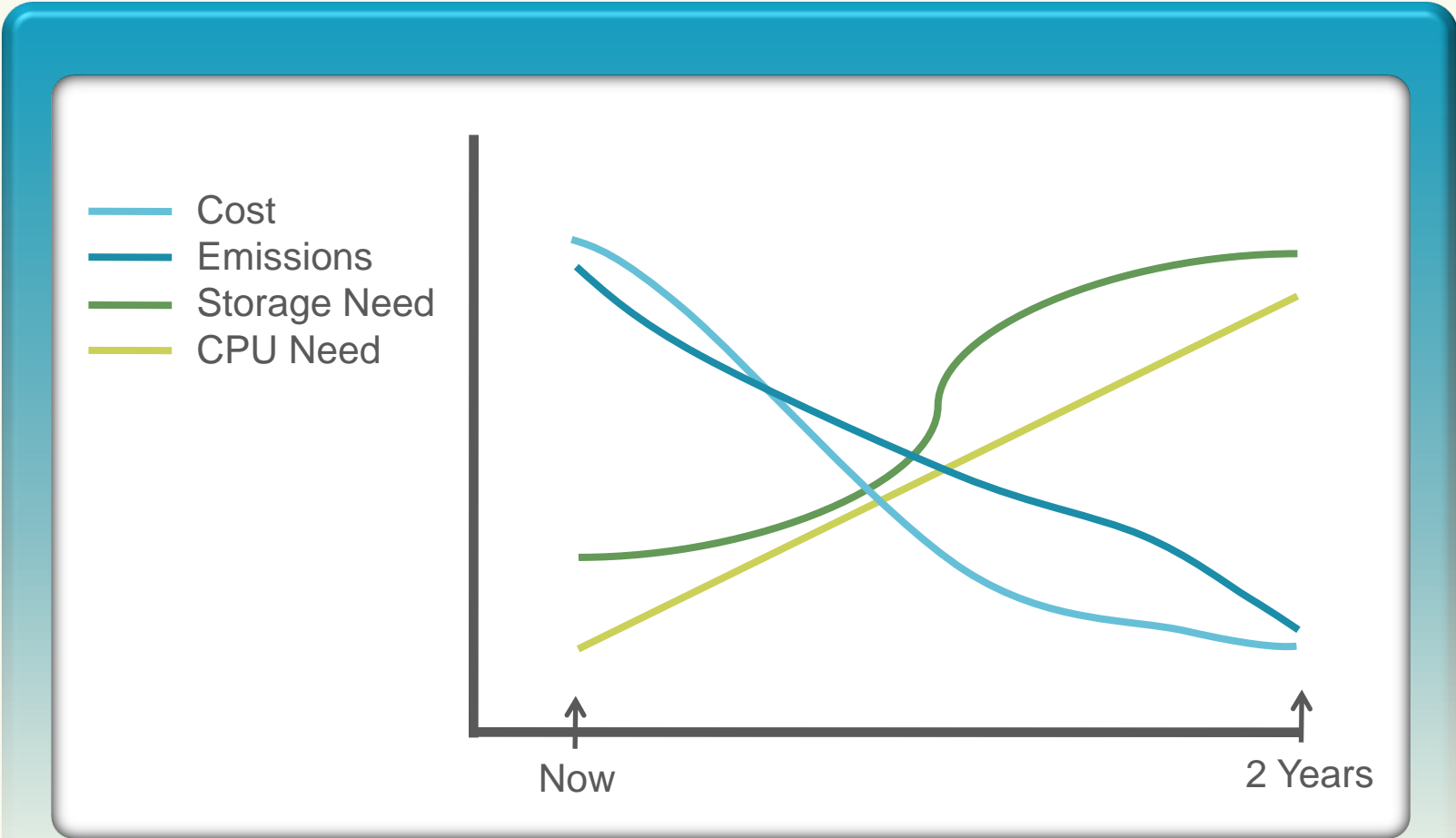
The Opportunity

Greenhouse gas emissions, metric gigatons of carbon dioxide equivalent (GtCO₂e), %

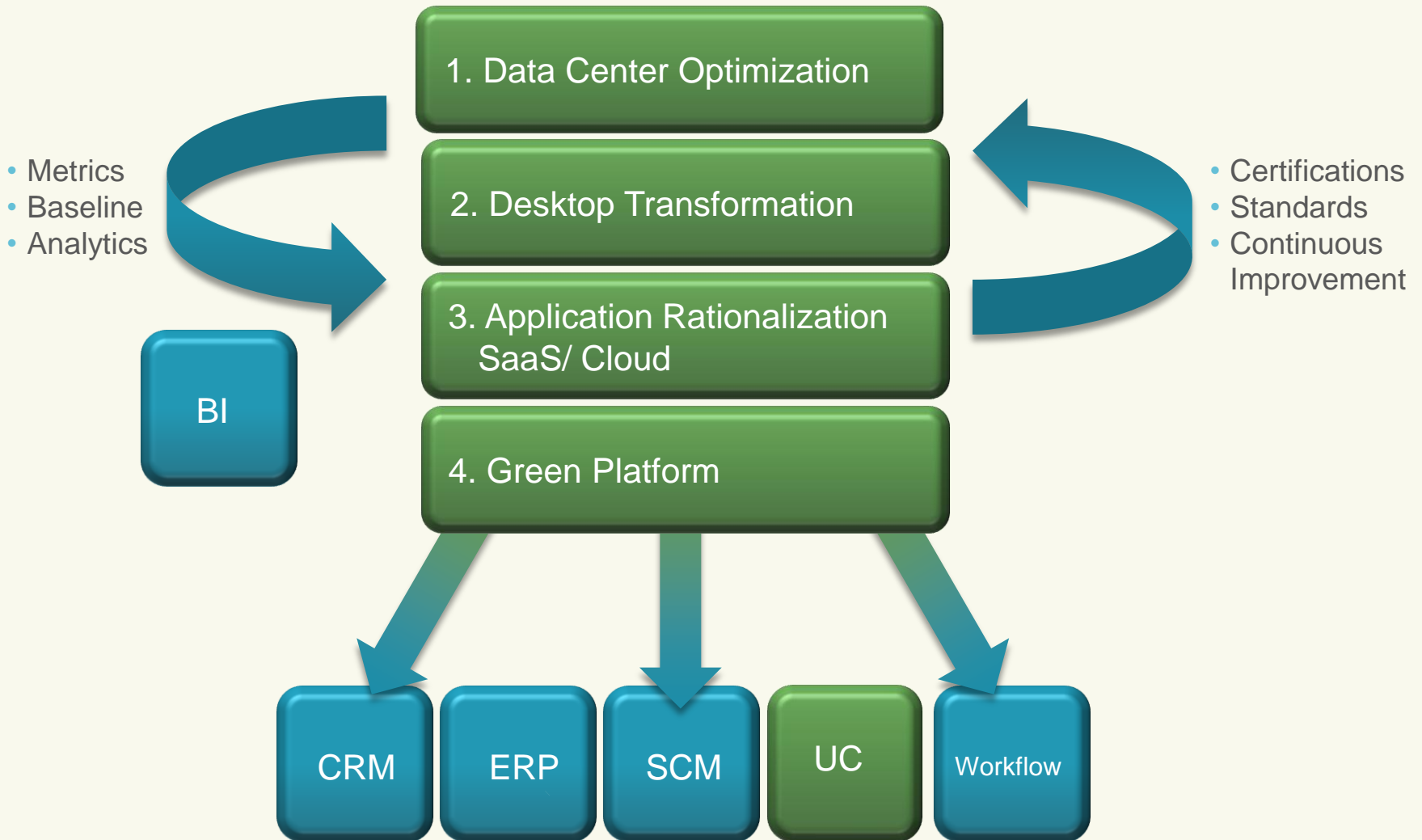
- Emissions related to information and communications technologies¹
- Potential emission abatement enabled by information and communications technologies, selected measures



Goal to Reduce, Reality to Increase



Green IT Main Focus Areas



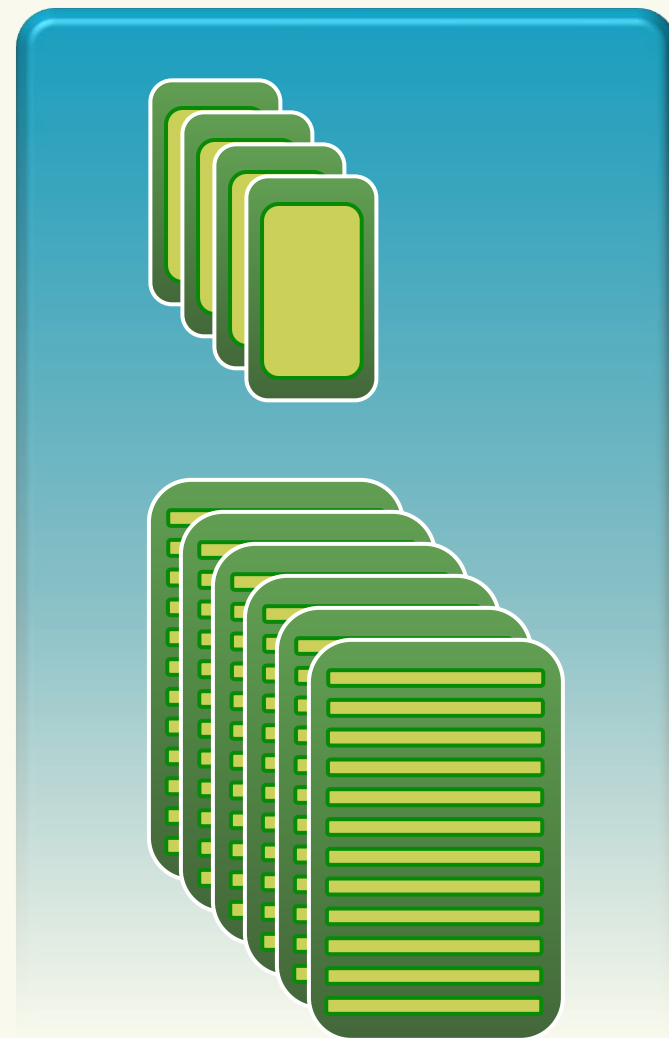
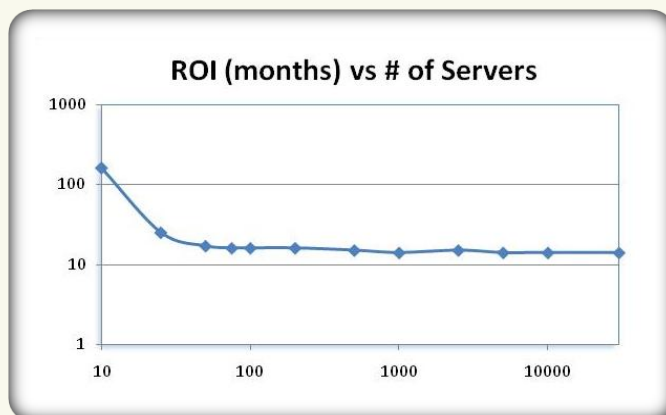


• Fiction Co. Example

- **Data Center Optimization**
 - 1000 servers total in organization
- **Smart Storage**
 - 500 TB Storage in RAID-10
- **Unified Communication**
 - Technology deployed to 10,000 users
- **Desktop Transformation**
 - 10,000 PC's
- **Application Portfolio Management**
 - 300 Applications In Environment

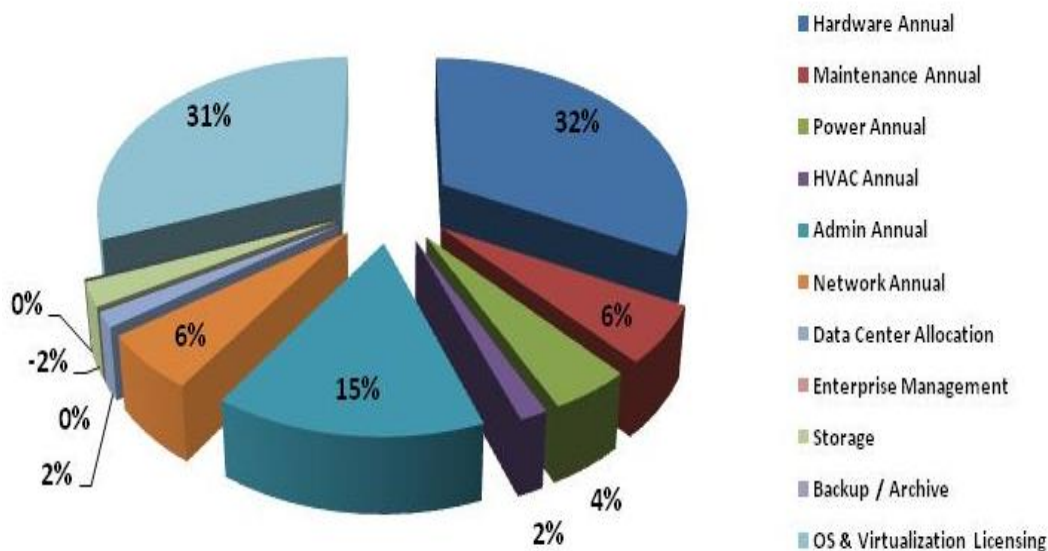
Data Center Optimization via Virtualization

- Unvirtualized cost per server: \$13,047
- Virtualized cost per Host OS: \$3,795
 - Dell PE1950 III replaced with Sun 4150
 - 750 physical servers down to 68
 - Target CPU utilization is 50-65%
 - Virtual Instances/Server ratio 12:1



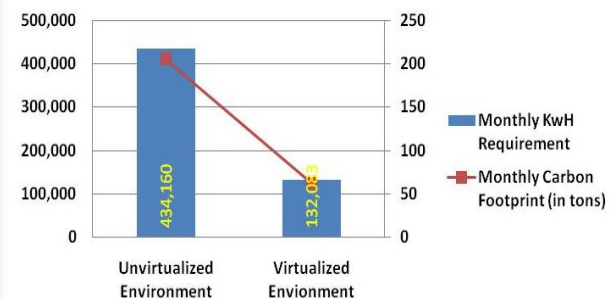
Many Factors Contribute to Savings

Savings, Unvirtualized to Virtualized



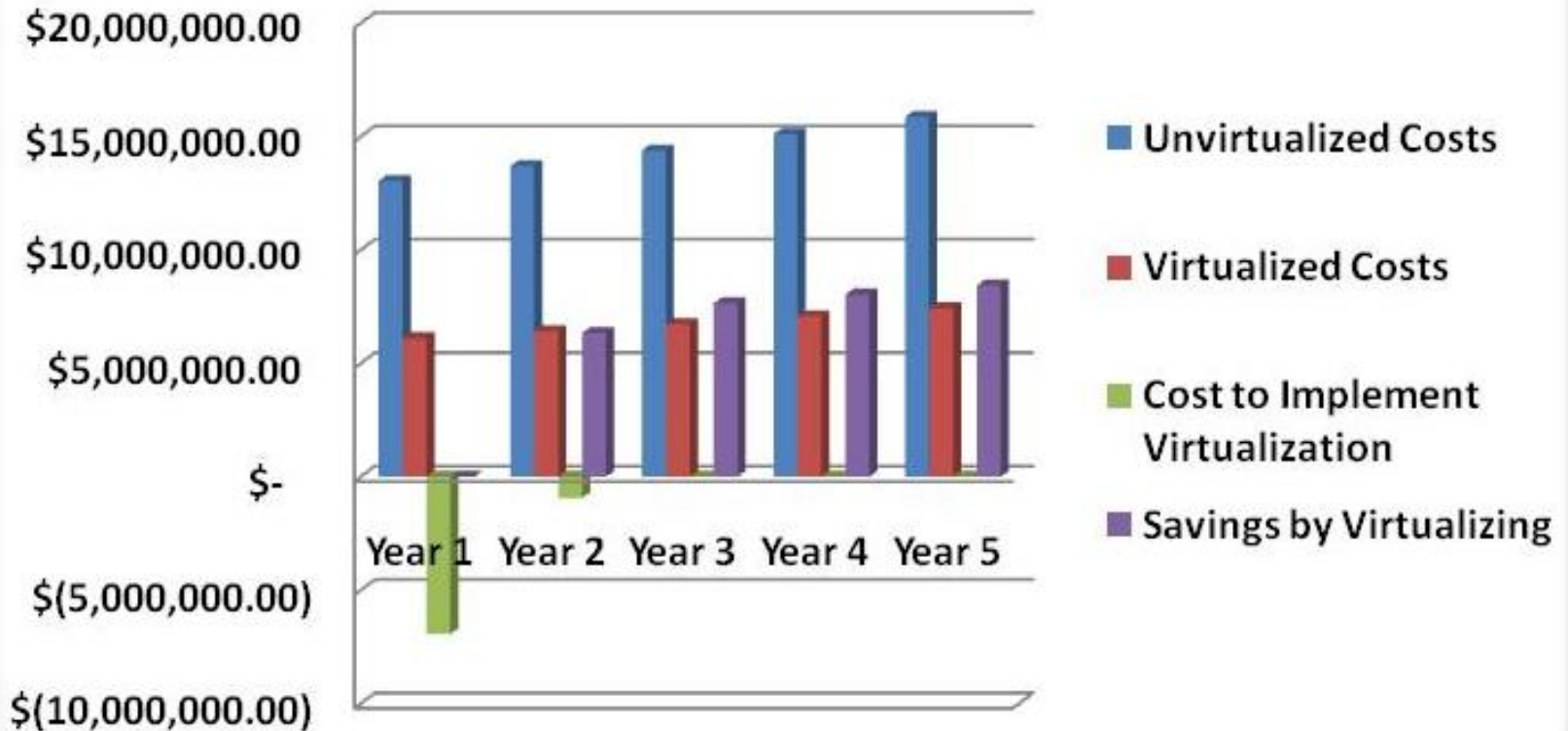
- Saves 1,700 tons of carbon emissions/yr
- Saves \$6.94M/yr
- ROI 14 months

Projected Kwh and Carbon Footprint Reduction Impact Through Virtualization, Year 1



Financial Benefits over 5 Years

Virtualization Benefit Financial Analysis



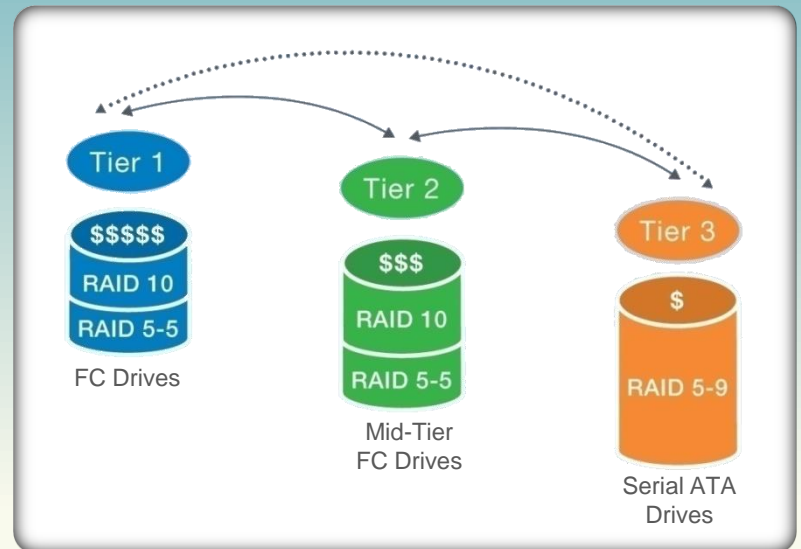
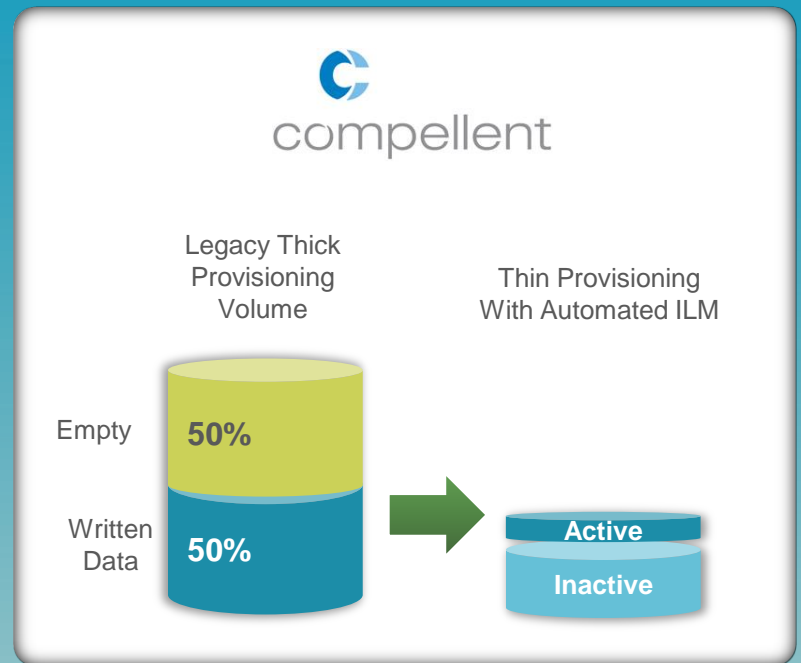
Smart Storage

500 TB Storage

- Use Thin provisioning and Automated Information Lifecycle Management
- Only allocate the physical space if and when the data is actually written
- Volumes can still be allocated arbitrarily large but without the fear of waste
- Physical storage is only added if needed

Savings

- 1.4MW Traditional vs. 0.15MW Thin
- Includes UPS, Cooling
- Footprint reduction by 87%
- \$152k/yr in power/cooling
- 953 tons/yr vs. 103 tons/yr





Unified Communications

10,000 users given Instant Messaging, web/video conferencing, voice calls, and unified messaging

- Increased productivity 10M year (time)
- Shorten sales cycle 1.1M
- Reduced flights impact is about \$9.3M
- Reduced voice costs 300k
- Reduced infrastructure 230k
- Cost \$7.6M

Environmental Impact

- 2.4x ROI
- Flight reduction 10% to current travel
- 10M fewer miles flown or 1,700 tons CO₂



Desktop Transformation

10000 Desktops (Assumptions)

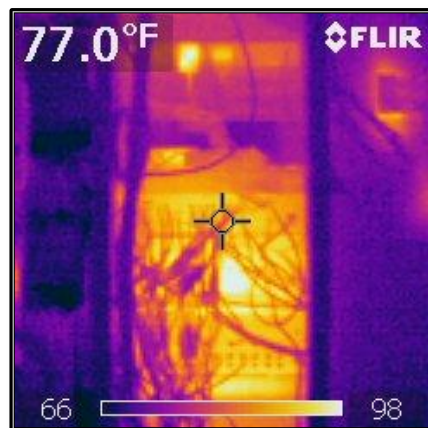
- 400W for standard PC vs. 60W for thin client
- 240W average burn vs. 36W
- Cost is \$870 for each
- 10% less support cost for thin
- Maintenance costs 5% less for thin
- Management costs 15% less for thin

Difference from using standard PCs to Thin Clients

- \$2.52M/yr in power for PCs vs. \$378k/yr for thin clients
- TCO \$11.6M/yr vs. \$6.8M
- ~10,000 tons of CO₂ emissions for PCs vs. ~1,500 tons for thin clients

ROI & Benefits Summary

- Security
- Standardization
- Simplification
- Legal/Regulations Compliance
- Increased IT Flexibility
- Allows for Future Growth
- Reduce Ancillary Infrastructure/facilities costs
- Corporate Responsibility
- HR, PR Lift



	Annual Savings (\$US Million)	Carbon Emission Reduction tons/ yr
Data Center	\$6.94	1,700
Storage	\$0.15	850
Desktop	\$2.14	8,454
Unified Comm	\$9.30	1,700
Total	\$18.53	12,704

Start with Audacious Goals

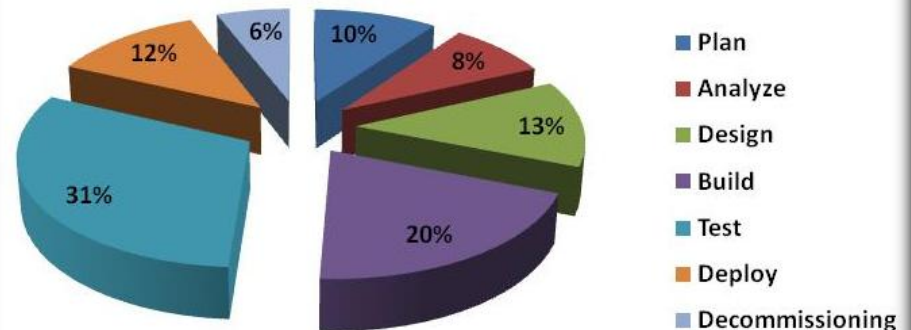
BASELINE: Can't manage what you don't measure

- Find business drivers
- Harvest existing metrics
- Put other metrics into place
- Define success criteria

ASSESS OPPORTUNITIES

- Servers
- Desktops
- Applications
- Programs/Process

High Level Work Plan & Resource Breakdown



Use a Phased Approach

Initial engagement is high-level study of Green IT impact

Phase 1 –
ROI Benefits Case



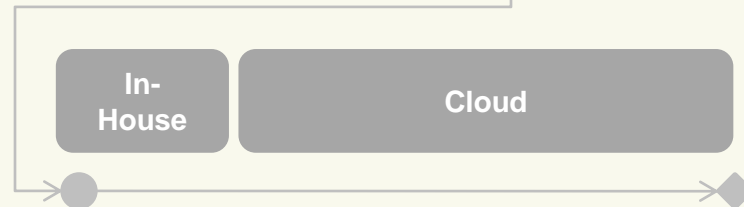
- Green IT Plan and Hard ROI #'s
- Green IT options
- Timeline
- Business Case

Phase 2 –
Pilot & Deployment



- Deployed and ROI Realized
- May start additional Phase 2 work
- Migrate effort to Phase 3

Phase 3 –
Ongoing CI & Management

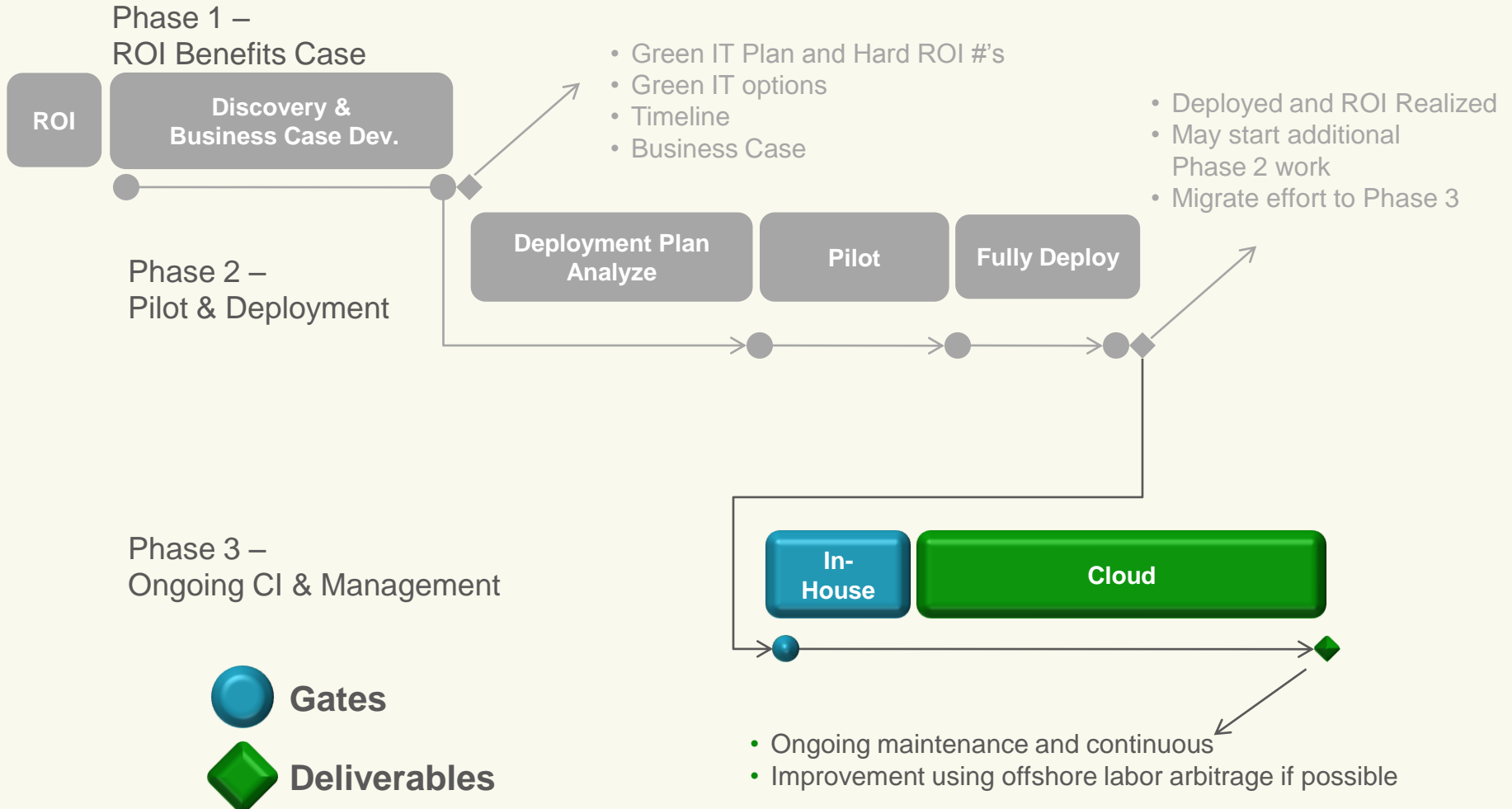


- Ongoing maintenance and continuous
- Improvement using offshore labor arbitrage if possible



Continuously Improve

Initial engagement is high-level study of Green IT impact



Partner with Others for Change

Empower Action on World Issues

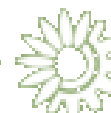
- Clinton Foundation Climate Initiative
- European Environment Agency (EEA)
- Imagine Cup

Work Together on Solutions

- Desktop Power Mgmt Tools: Verdiem, 1E
- Facilities/Operations Mgmt: Gridlogix, Johnson Controls
- Expanding IT's role: Fiat, Yello Strom



European Environment Agency



Online Calculators

Microsoft Desktop Energy Savings Calculator

To conduct a full sustainability assessment using this calculator, please take a moment to register. Registration also gives you access to the Server Energy Savings Calculator.

[Register Now](#)

Number of PCs: **500**

Power Costs **\$42,059/yr**
Power Consumed **430,494 kWh**

333.6 tons Carbon Emissions

61.1	35.8	732.0
------	------	-------

Windows XP: 33%
Windows Vista: 33%
Windows Other: 33%

50% CRTs, 50% Desktops, 50% Laptops, 50% Notebooks

Microsoft Server Energy Savings Calculator

To conduct a full sustainability assessment using this calculator, please take a moment to register. Registration also gives you access to the Desktop Energy Savings Calculator.

[Register Now](#)

Enter number of servers: **100**
Dial-in the expected consolidation rate: **60%**

Your anticipated energy savings: **\$38,272**

This amount of server consolidation will...
Reduce CO2 emissions by 305.62 metric tons per year.

This amount of server consolidation will...
Reduce emissions equivalent to those produced by 32.8 homes.

This amount of server consolidation will...
Have the same environmental benefit of planting 732.0 trees.

This amount of server consolidation is...
Equivalent to removing 56.0 cars from the road.

calculate your impact

What state do you live in?

How many people live in your household?
The calculator needs this number to figure out your individual emissions of carbon dioxide for things like household energy use.

What kind of car do you drive? Leave blank if you don't have one.
YEAR: MAKE: MODEL:

How many miles do you drive every year?
The average American drives about 12,000 miles per year.

How many flights do you take every year?
Leave blank if you don't take any flights. Count roundtrips as 2 flights.

SHORT: <input type="text" value="0"/> (1.5 hours/300 miles)	MEDIUM: <input type="text" value="0"/> (2.5 hours/800 miles)
LONG: <input type="text" value="0"/> (4-6 hours/2,500 miles)	EXTENDED: <input type="text" value="0"/> (8 hours/5,000 miles)

What is your average monthly electric bill?

What % of your electricity comes from clean, renewable sources such as solar and wind? %

What is your average monthly natural gas bill?

What is your average monthly heating oil bill?

What is your average monthly propane bill?

Your Total:
Your personal impact is:
MUCH SMALLER THAN AVERAGE
The national average is 7.5 tons per year.

Summary & Request

In Our Example:

- Consolidating servers, storage, applications, and desktops had the same impact of taking over 1700 cars off the road.
- Reduction of almost 70% in carbon footprint
- It put over \$18M back into the company
- **WHAT IS THE COST TO DO NOTHING???**
- Phased Approach Reduces Risk

Request:

- Green IT fits with the capitalistic model.
- The environment strongly impacts our buyers.
- Green IT can be tremendously profitable.
- Every organization has an opportunity and can make a difference.
- Please take just a little time to find and size yours!

TIP: Displays off nights and weekends for 1000 PC saves \$55k/yr

