



Implications of Cloud Computing to Our Environment

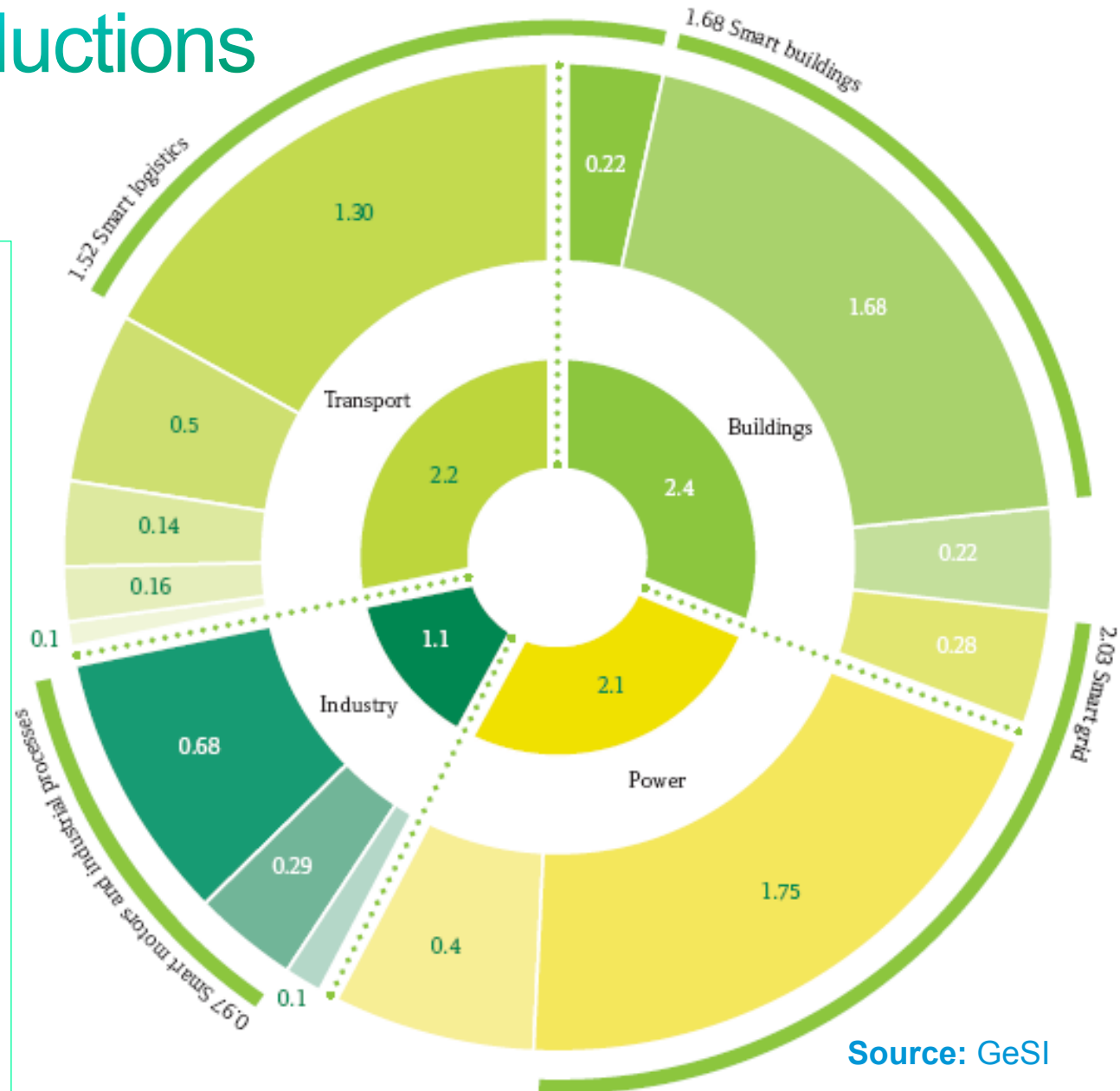
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Distinguished Consulting Engineer

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Enabling Reductions



Source: GeSI

Approach to Sustainability

Operations

- EPA Climate Leader: 25% Reduction Goal
- EPA Green Power Partner
- Global IP-Based Data Tool

Products

- EnergyWise
- Adaptive Power Management
- Reduced packaging, hazardous substance use

Solutions

- Smart Grid, Converged Buildings Systems
- Cloud Computing and Virtualization
- TelePresence
- Planetary Skin

Internal & External Engagement

- Employee Collaboration (X-PRIZE, Earth Day)
- Industry Consortia (standards, policy, best practices)
- Government Partnership (UN, WEF)

Cloud Computing Implications

- **Cloud computing can avoid millions of metric tons of CO₂**
- “ A typical food&beverage firm transitioning its human resources (HR) application from dedicated IT to a public cloud can reduce CO₂emissions by **30,000 metric tons over five years**. These reductions are equivalent to the annual emissions from 5,900 passenger vehicles.
 - The same food & beverage firm transitioning its HR application from dedicated IT to a private internal cloud can reduce CO₂emissions by **25,000 metric tons** over five years. These reductions are equivalent to the annual emissions from 4,900 passenger vehicles.
 - From an economy-wide standpoint, US businesses with annual revenues of more than \$1 billion can cut CO₂emissions by **85.7 million metric tons annually** by 2020 as a result of spending 69% of infrastructure, platform and software budgets on cloud services. “
- *Acknowledgement is given to Carbon Disclosure Project and Verdantix.

Data Center Solar Power

“I love solar power, but in reflecting carefully on a couple of high profile datacenter deployments of solar power, I’m really developing serious reservations that this is the path to reducing data center environmental impact.

I just can’t make the math work and find myself wondering if these large solar farms are really somewhere between a bad idea and pure marketing, where the environmental impact is purely optical.”

James Hamilton, Amazon

<http://perspectives.mvdirona.com/>

ITU-T Some Call Outs

ITU-T SG13, WP-6 Cloud Computing

<http://www.itu.int/ITU-T/studygroups/com13/index.asp>

SG5, ICTs and Climate Change

<http://www.itu.int/ITU-T/studygroups/com05/index.asp>

JCA Cloud Computing

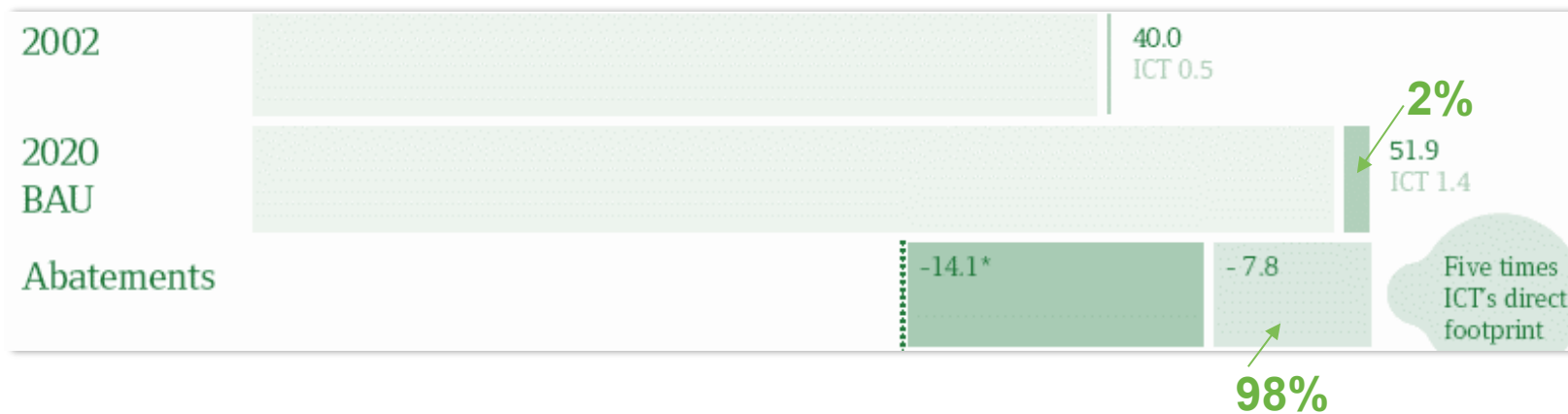
<http://www.itu.int/en/ITU-T/jca/Cloud/Pages/default.aspx>



ICT as Part of the Solution

Global e-Sustainability Initiative

- ICT could reduce global greenhouse gas (GHG) emissions up to 15% by 2020
Five times its own footprint in 2020
- **Cisco Vision:** Make every Internet connection a greener connection



Network as the Platform

“By deploying innovative information technology and using the network as the platform for 21st century energy management, we believe we can significantly alter our greenhouse gas footprint and help our customers meet their sustainability goals.”

John T. Chambers
Chairman and CEO
Cisco



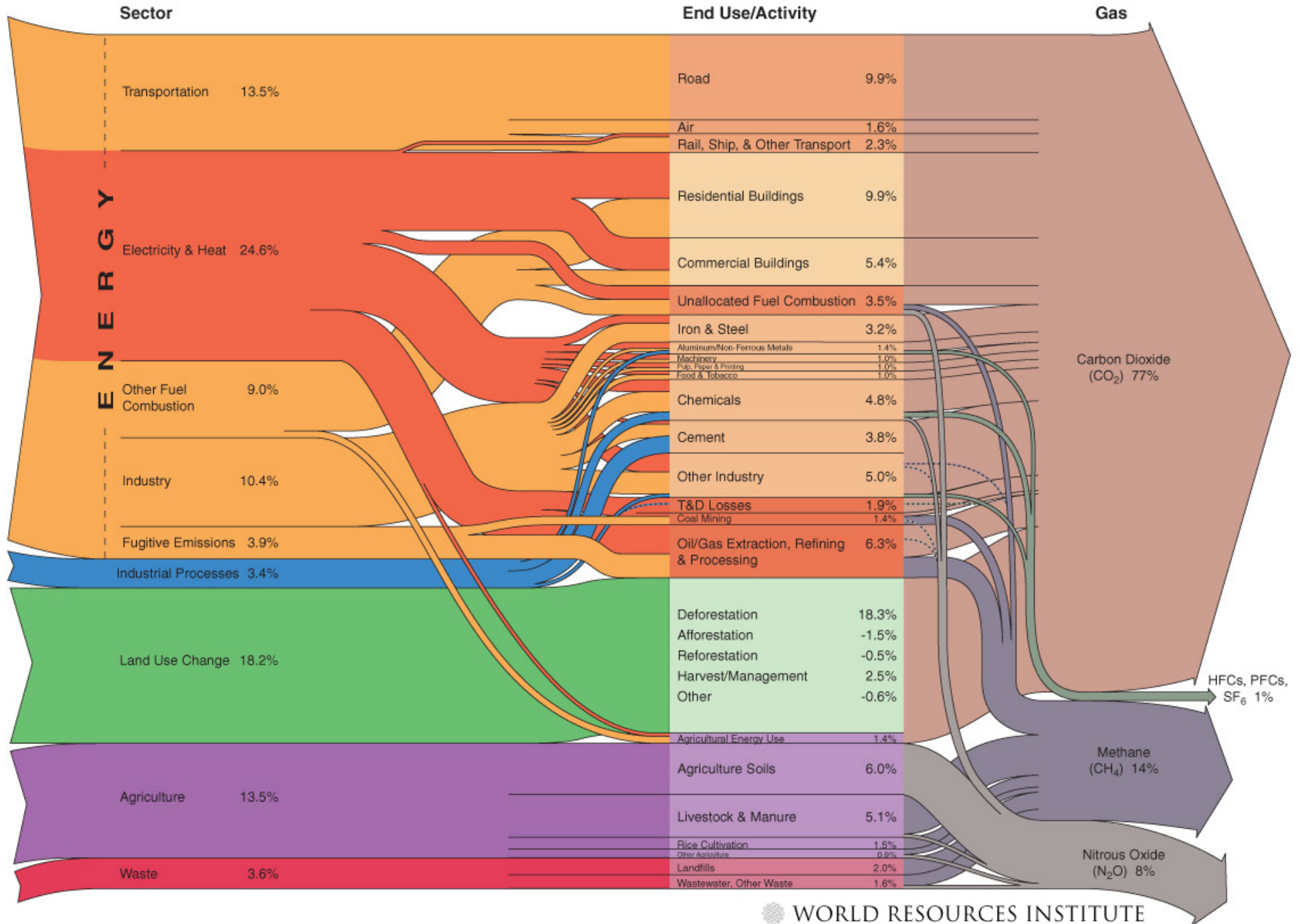
Thank you.





BACK-UP

World GHG Emissions Flow Chart



Examples



What is the Smart Grid?

A digital infrastructure which uses networking technology to embed processing and communications into the analog power grid, enabling it to become more:

Observable

Full awareness of grid state - transporting sensor data and control commands

Controllable

Driving the grid to any desired state

Automated

Rapidly adapt to changing conditions without human intervention

Integrated

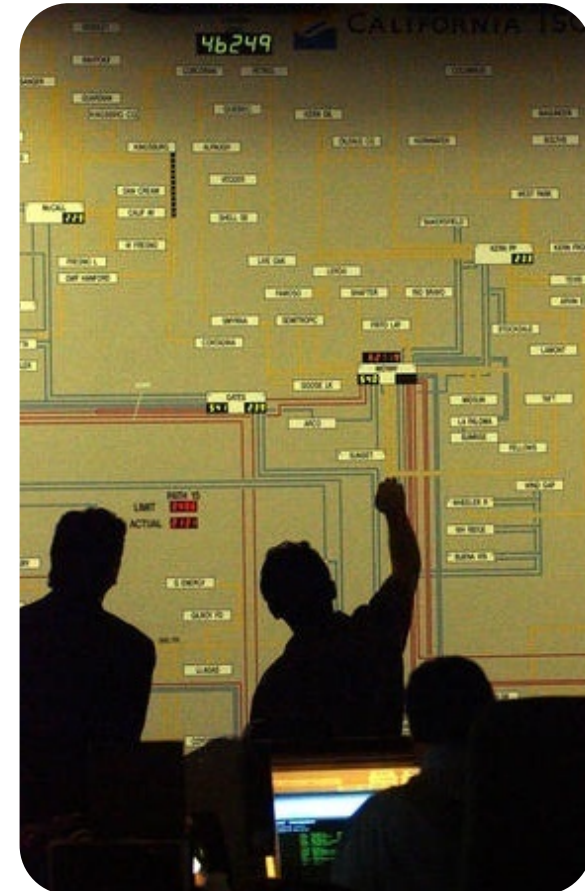
Connecting siloed utility systems and processes – full realization of business benefits

Enables Utilities to:

- Substantially increase grid efficiency and reliability
- Meet regulatory compliance
- Lower operational costs
- Create new, innovative energy service delivery

Smart Grid Enables

- **Consumer Participation:** Control over home energy management, reduction in energy use
- **Efficiency:** Improved operation of the entire power delivery chain, reducing losses
- **Renewables:** Integration of renewables like wind and solar
- **Distributed Generation:** Consumers can generate energy and put the excess back on to the power grid
- **Demand Response:** Automated, real-time distribution of energy leveling out spikes in demand
- **Grey-to-Green Transformation:** Changing the fuel mix to shift away from fossil fuels



Connected Workplace

- 40% increase in space utilization
- 40% reduction in electricity demand
- 54% reduction in IT cabling
- Significant reduction in construction materials
- Increased telecommuting
- Reduced greenhouse gas emissions



Planetary Skin: Global Collaborative Imperative

- Launched March 3rd 2009
- Partnership with NASA
- Millions of Sensors, Satellites Collect Data Everyday
- Captures, Analyzes & Interprets Global Environmental Data
- Real-time & Reliable Information
- To be used by Government, Non-Profits & Business

