Practical ICT solutions to help meet ambitious 2020 climate targets while creating economic value

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HP Environmental Sustainability
Dec ember 11, 2008

“The scientific evidence is now overwhelming: climate change presents very serious global risks, and it demands an urgent global response”

Lord Nicholas Stern, Stern Review, The Economics of Climate Change, 2006

“The green economy is poised to be the mother of all markets, the economic investment opportunity of a lifetime, because it has become so fundamental”

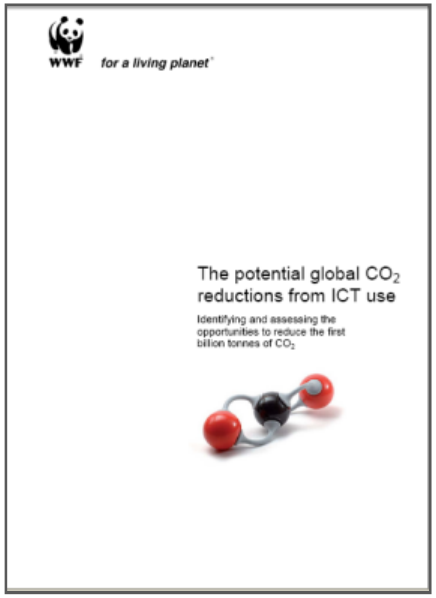
Lois Quam, managing director of alternative investments at Piper Jaffray

Practical ICT solutions to help meet ambitious 2020 targets while creating economic value

1. The ICT low-carbon opportunity
2. ICT's own footprint
3. Beyond ICT's footprint
4. Making a low-carbon economy a reality

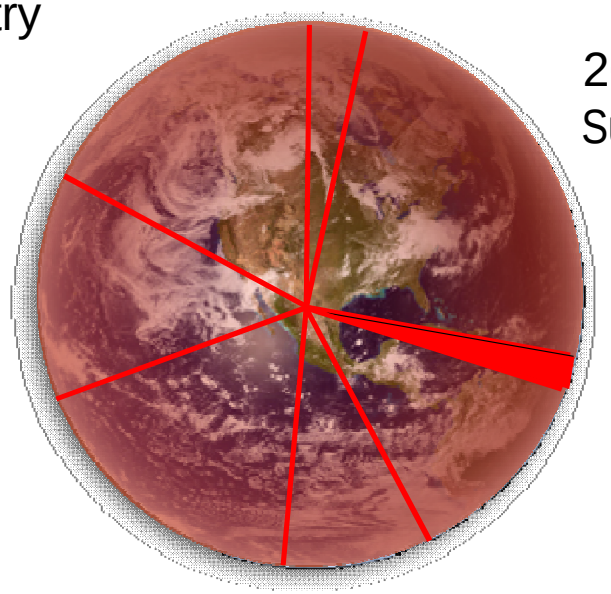
Summary

- Recent reports examine ICT's potential to enable a low-carbon economy



- ICT offers practical solutions that can enable major reductions in GHG emissions in most areas of the economy:
  - Ø Electricity grid, buildings, supply-chain and logistics, industrial processes, travel, paper value chain
- Low-carbon ICT solutions can be deployed rapidly, enabling major GHG reductions by 2020
- Low-carbon ICT solutions will enhance economic growth
- Imperative to minimize the growth of ICT's own footprint

What is the potential for IT?



3% Waste & Waste water

17% Forestry

26% Energy Supply

14% Agriculture

2% I.T. production & use

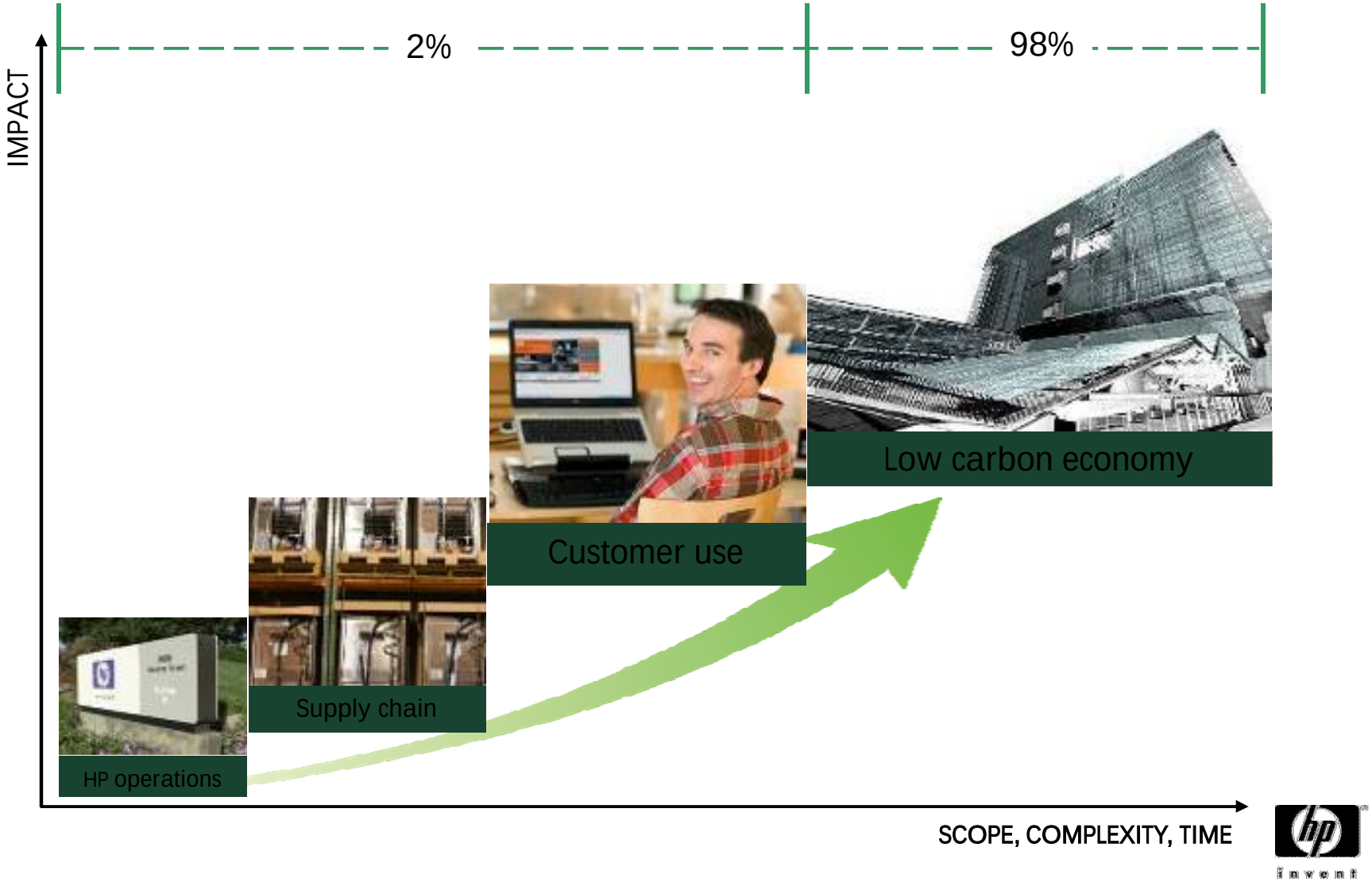
13% Transport (Aviation & shipping 5%)

19% Industry (3% Cement, 3% steel)

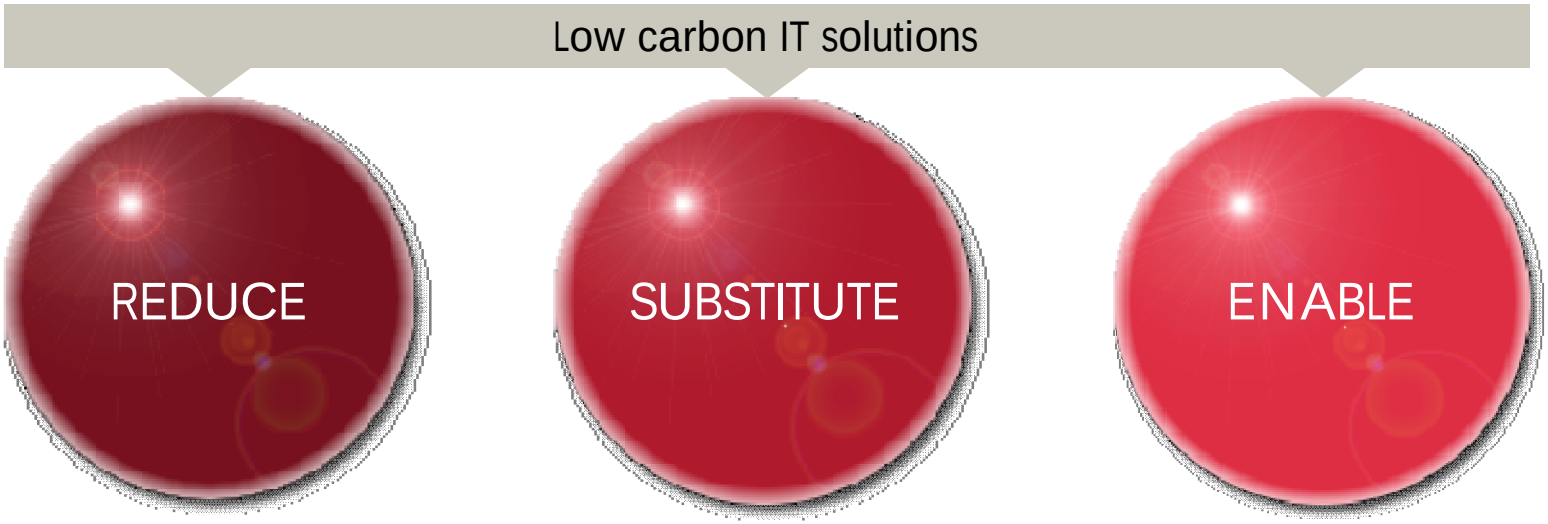
8% Residential & commercial buildings

Source: IPCC, AR4 Synthesis Report, 2007, p36; Kahn et al., 2007pp325,333; Bernstein et al/, 2007, pp461, 467

From responsibility on IT's 2% footprint to business opportunity in the 98%

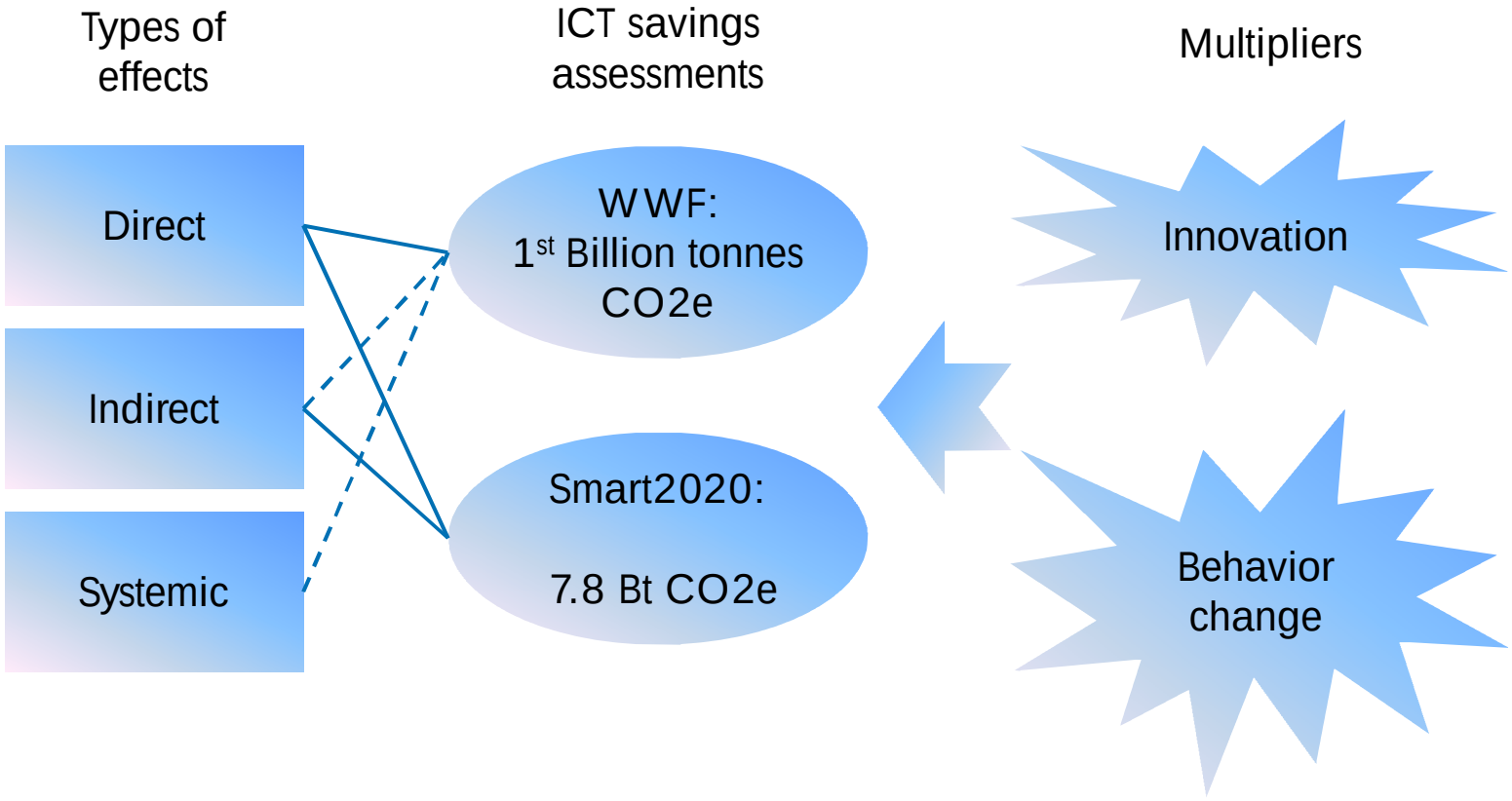


IT solutions to reengineer the economy towards low carbon



Reduce energy intensity and carbon footprint	Substitute carbon-intensive processes by low-carbon ones	Enable low-carbon economy management and lifestyle
• Energy efficiency • Resource efficiency • Paper efficiency	• Travel substitution • Dematerialization	• Monitoring, reporting, accounting, trading • Behavior change

Innovation and behavior change will greatly enhance ICT carbon savings potential



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Reduce the carbon footprint of HP operations

HP will reduce the absolute energy consumption of its facilities by 16% from 2005 levels by 2010

- IT transformation
  - Consolidated 85 data centers into 6 Next Gen DCs
- Workplace transformation
  - Teleworking and office space consolidation
  - Business travel reduction through Halo:
    HP will quadruple the number of internal studios by end of 2009
  - Employee equipment energy efficiency upgrades
  - Print transformation
- Renewable energy
  - Double HP global renewable energy use to 8% by 2012
- Employee engagement
  - "Live Green" program

Reduce Impact of HP Products and Services

- Personal computing
  - Power management
  - Energy Star
  - High efficiency power supplies
  - Low power components
  - Long lifecycle PCs
- By 2010, HP volume PCs will use 25% less energy than 2005

Energy Star TouchSmart PC

invent

Reduce and substitute materials with innovative packaging solutions

Winner of the 2008 Wal-Mart challenge:

- Reusable messenger bag made of 100% recyclable materials
- Reduces packaging materials by 97%

Reduce Impact of HP Products and Services

- Printing
  - Power management
  - Double-sided printing
  - Closed-loop plastic recycling- ink cartridges
- Goals:
  - Improve the overall energy efficiency of HP ink and laser printing products by 40% by 2011 (vs 2005)
  - Increase the amount of recycled materials used in inkjet printers by three times by 2010 (vs 2007)

Delivering Energy Efficient Solutions for the IT Power & Cooling Chain

Optimizing from chip to chiller

HP Unique

Dynamic Smart Cooling:
up to 45% cooling cost savings w/mapping

ices: Thermal Mapping
over 10% cooling cost reduction

Power Distribution Rack & MCS
15% - 20% savings on power & cooling

Data Center

Storage Thin Provisioning/Dynamic Capacity Mgt saves up to 45%

Virtualization/Consolidation:
up to 40% reduction in power cost for data centers

Manageability

Insight Power Manager & iLO 2:
10% power reduction w/regulator

BladeSystem & Thermal Logic:
25% cost savings to power & cool

Power Optimized ProLiant Servers: 18% less power

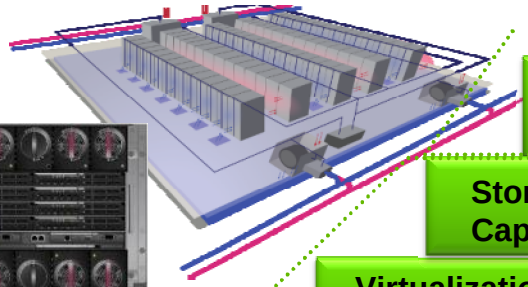
Server & Component

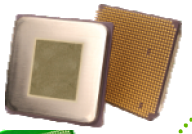
SFF Drives: 2.5" 9 watts vs 18watts for 3.5"

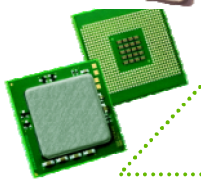
Power Supplies:
90% efficient supplies

Low Power processors:
up to half the power consumption

Up to 60% power savings







Energy Saving Solutions from the Server Chip to the Data Center Air Chillers and everything in-between

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Reduce Impact of HP Supply Chain

- Logistics
  - Modal shifts: air to sea, road to rail
  - US Smart Way
  - Packaging
- Supply chain emissions
  - CDP supply chain initiative
  - First IT company to report aggregated carbon emissions from tier 1 suppliers

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Practical low-carbon ICT solutions

Over 200 HP Industry Solutions today:

Examples of HP low-carbon solutions:

Business travel avoidance	Paper efficiency	Supply-chain optimization	Manufacturing efficiency	Smart Metering
Telepresence Mobility	On-demand printing	Supply-Chain Visibility	Integrated Site Management	HP AMI Center

Tele-immersive video-conferencing to reduce business travel

Telepresence: HP Halo

Halo Virtual collaboration

Halo Endpoints

- Broadcast quality video & full duplex audio
- High Definition collaboration screen
- High magnification, HD overhead camera
- Lifelike “same room” experience

Halo Video Exchange Network (HVEN)

- OC-level backbone for no-perceived delay
- Private, dedicated network
- Multipoint connection – up to four Halo locations

Halo end-to-end Managed Services

- Full installation included
- 24 x 7 Halo Concierge service
- Remote management and support – ongoing monitoring, management & calibration
- Technology refresh

Case Study: Halo in HP

HP uses its own extensive global network of Halo studios internally, to reduce travel costs, increase productivity and reduce its carbon footprint:

- Using Halo internally since 2005
- HP had over 30 studios at its worldwide locations at the beginning of 2008, and will quadruple this number by end 2009

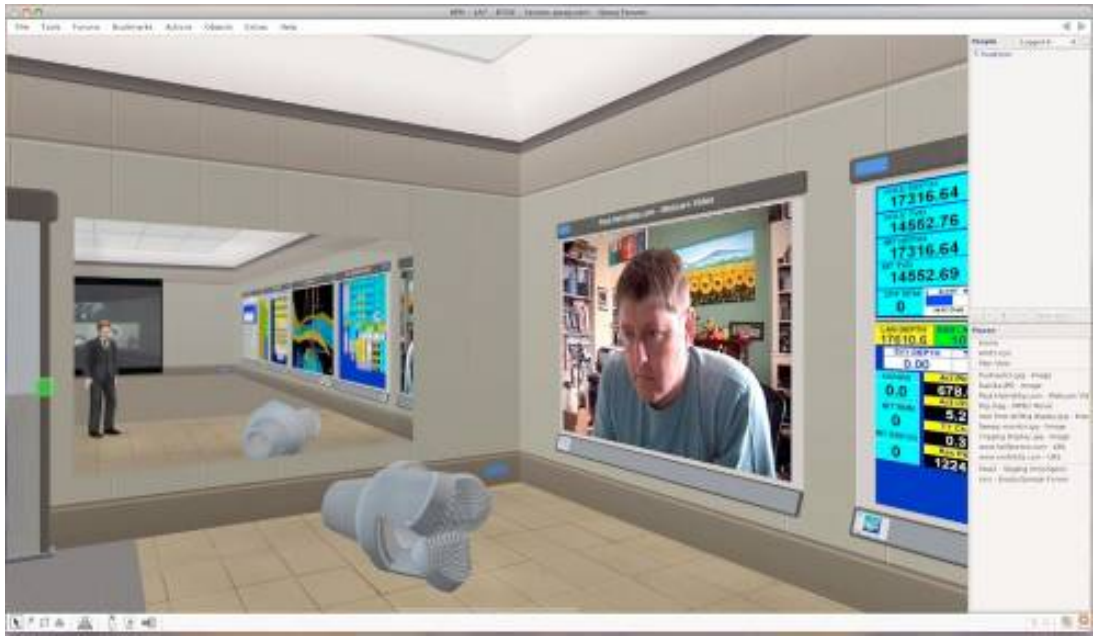
HP- IPG Business Group results

- Total airfare spend for top 250 city-pairs: -16%
- Top 250 city-pairs with Halo - 27%
- Top 250 city-pairs Non-Halo + 0%

Advanced Virtual Collaboration

Advanced Virtual Collaboration

- Exploiting techniques developed in online gaming
- Remote collaboration
- Information-rich environment
- ‘As there’ work model



Usage Models

- Rapid response to crisis management and problem resolution
- Training, knowledge and experience management
- Planning and Review

Handheld computers to optimize mobility needs

Mobile data access

Example: Groningen Police Force

Challenge

- Give community officers and youth-management officers access to regional and national databases, while they are out on the streets.
- Reduce the time and money spent on mobile telephones and walkie-talkies by providing them with a wireless, mobile solution.

Results

- Thanks to this mobile system, officers on the beat can look up information in regional and national police databases.
- As a result they need less support from employees at headquarters and at police meeting points.
- Because these meeting points have a limited contact function, there are no connections with the police network and they can be set up at low cost.

Practical low-carbon ICT solutions

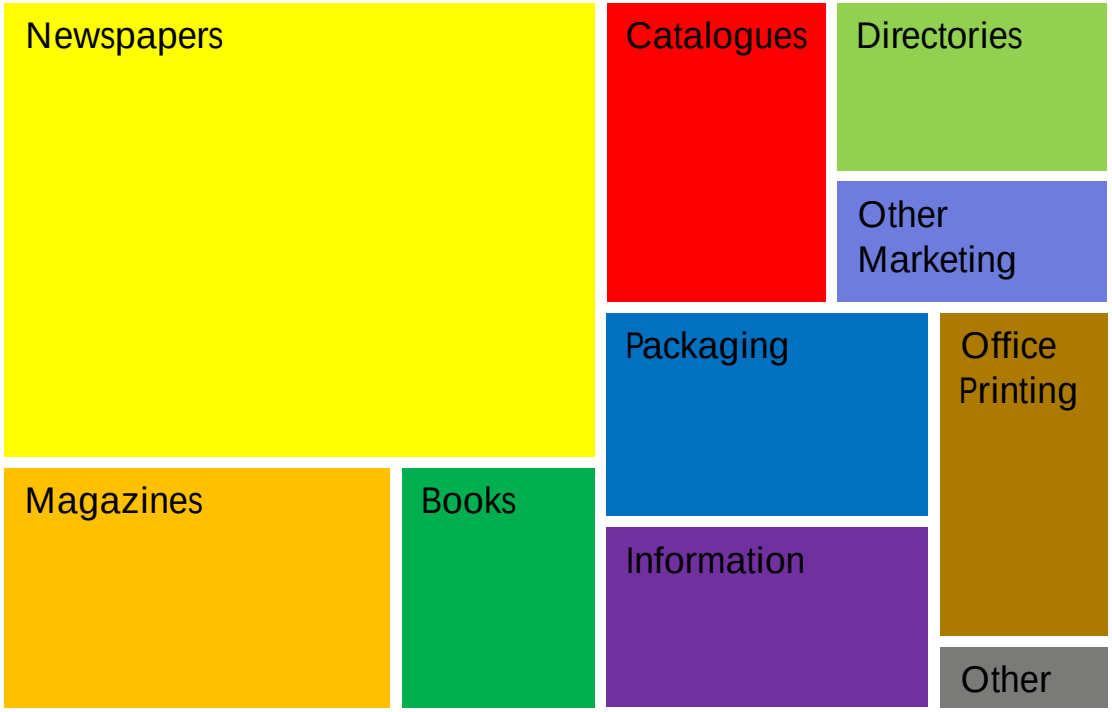
Business travel avoidance	Paper efficiency	Supply-chain optimization	Manufacturing efficiency	Smart Metering
Telepresence Mobility	On-demand printing	Supply-Chain Visibility	Integrated Site Management	HP AMI Center

The sustainability opportunity in printing

Eliminate Waste and Improve Efficiency

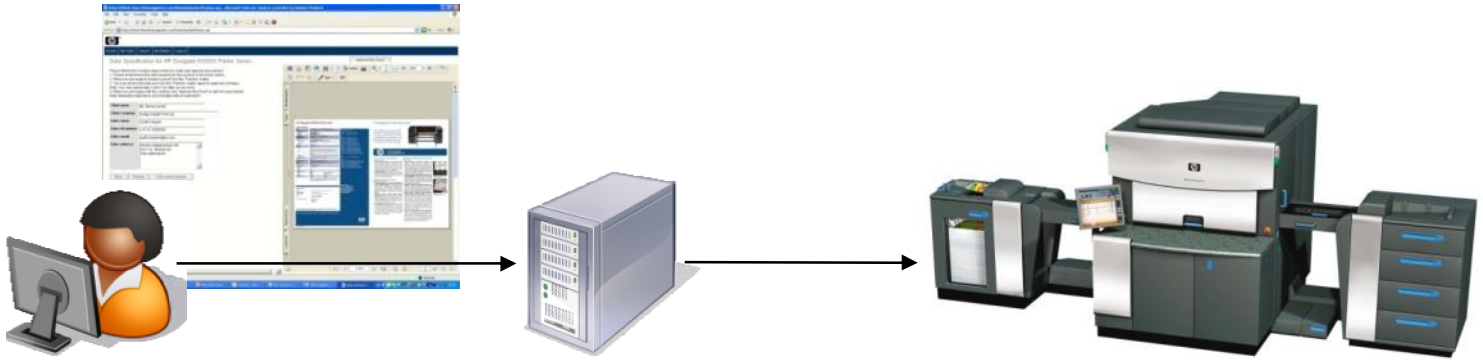
Estimated 53 trillion A4 equivalent pages world wide in 2010

- Many commercial print models generate high waste:
  - Newspapers ~ 20% unsold
  - Magazines ~ 50% unsold
  - Books ~ 30% unsold
- Digital presses far more flexible than Analog. Moving to Digital will improve efficiency thru:
  - Distribute and Print
  - Print-On-Demand
  - Targeted Content



- Potential to eliminate 110-260 million tonnes of unnecessary GHG emissions in analog printing applications (newspapers, magazines, books…).

Example: HP CoDEx project
Collaterals on Demand Experience



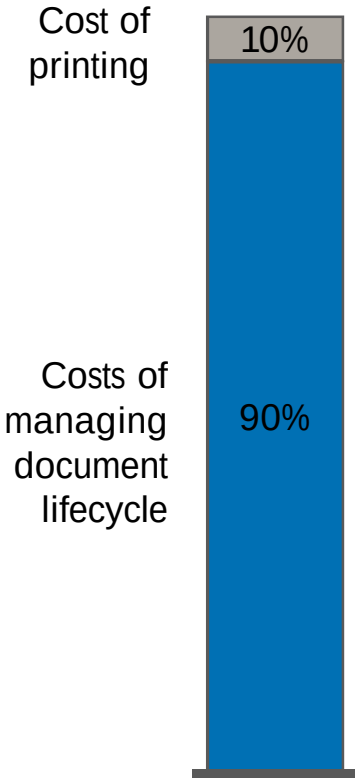
User orders and personalizes (optional) collateral online (like ordering books at amazon.com)

CoDEx system compiles personalized pdf's and routes it to the nearest Print Center to the delivery address specified in the order

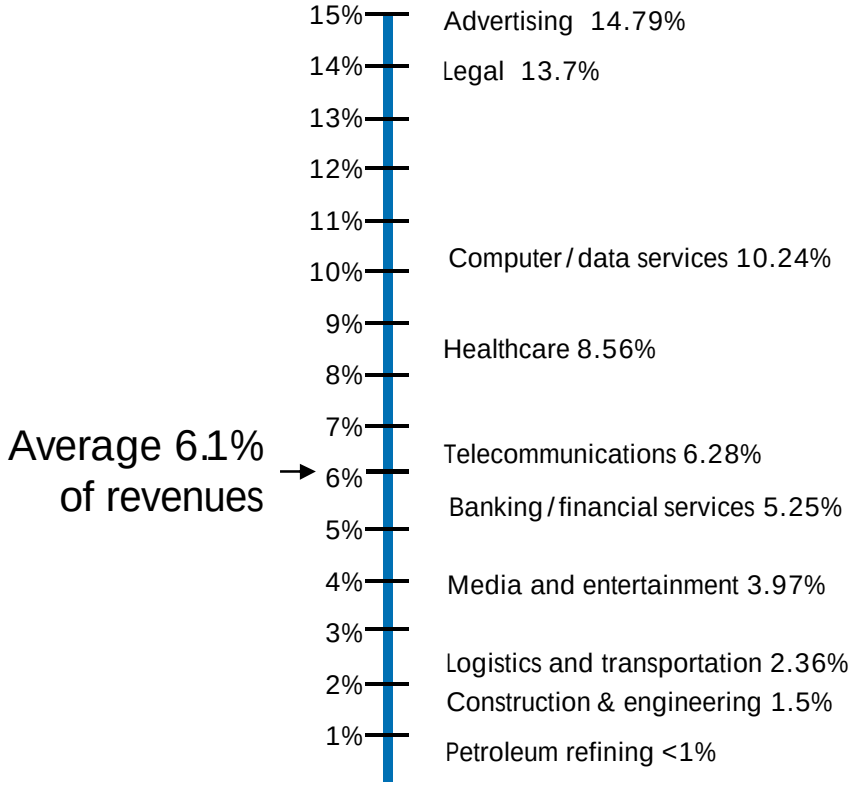
Local Print Center receives notification that order is available, downloads pdf's, prints and dispatches collateral

Enterprises spend a significant amount on printing

Enterprise printing
(office, production, commercial)

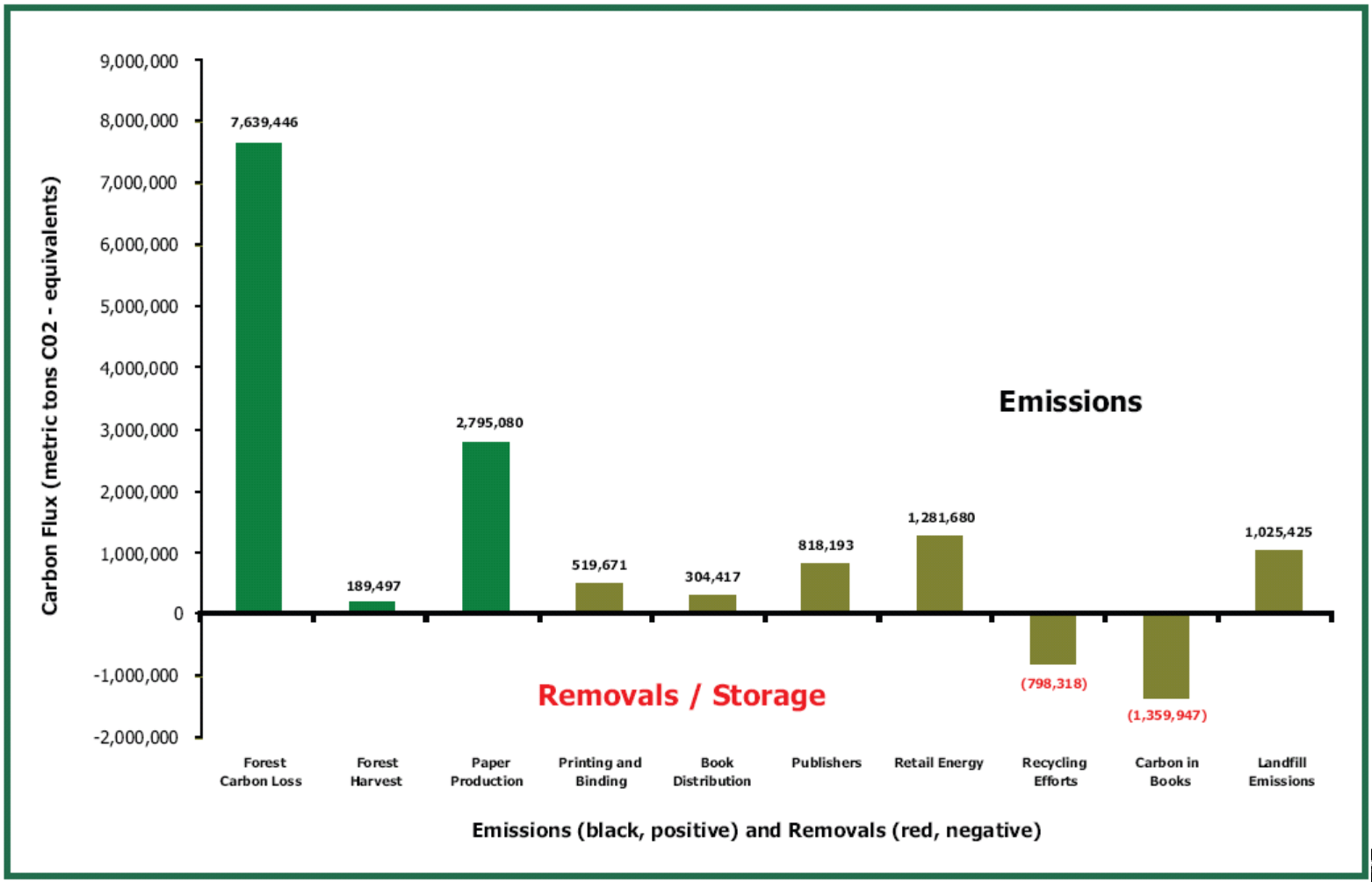


Dollars spent as a percentage of revenue
(by industry)



Largest CO2 impact of paper is in forest carbon loss

Carbon footprint of US book industry, 2006:



Source: Environmental Trends in Book Publishing, BISG Report

Example – UPS label printing

- The HP Handheld sp400 All-in-One
- UPS uses the device to scan packages, send data wirelessly, and print handling instructions directly onto the package.
- Before, it took moving trolleys loaded with thermal printers, PCs, monitors and keyboards to accomplish the same objective.
- Paper savings of >1300 tons of paper per year

"At UPS, we're always looking for process re-engineering opportunities supported by IT to help gain efficiencies, reduce cost, and meet our customers' expectations. The HP Handheld sp400 All-in-One allows us to accomplish these objectives while also significantly reducing the environmental impact of paper waste."
—Ted Abebe, Senior Project Manager, UPS

Practical low-carbon ICT solutions

Business travel avoidance	Paper efficiency	Supply-chain optimization	Manufacturing efficiency	Smart Metering
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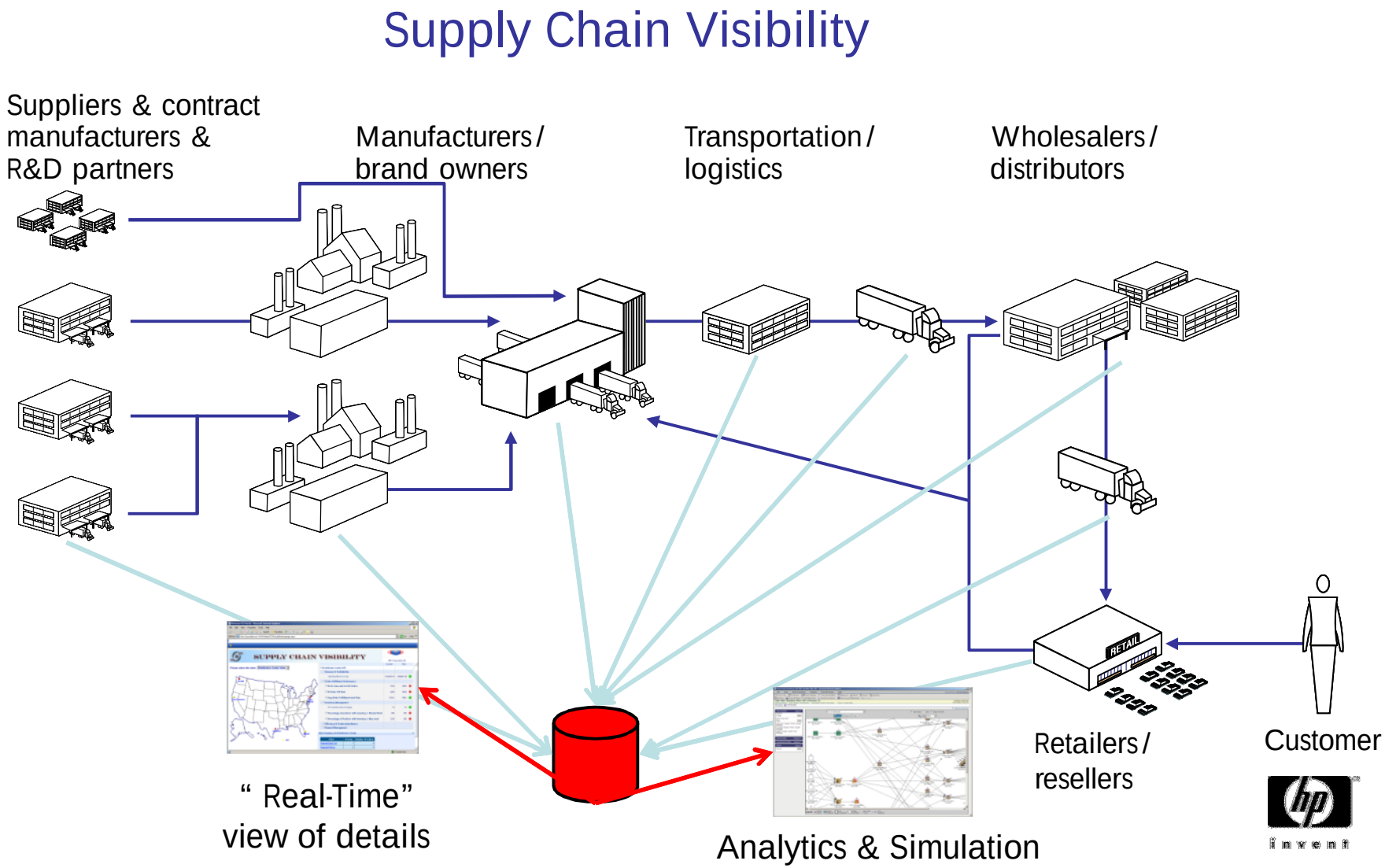
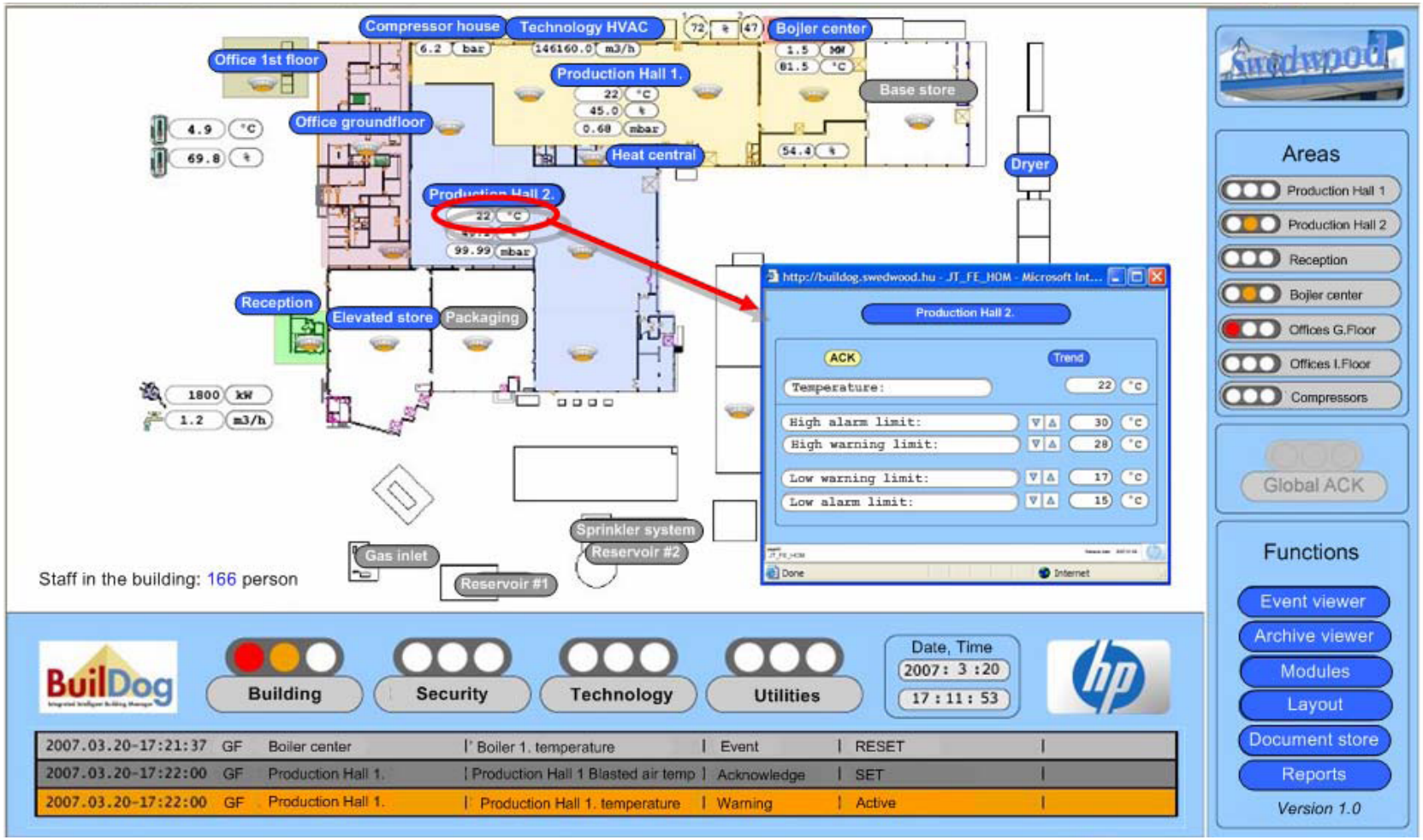
Using IT to reduce the CO2 footprint of supply-chains



HP Integrated Site Management Solution

Swedwood

IKEA



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Case study – Swedwood (the industrial group of IKEA)

Swedwood

IKEA

Functions

- Efficient air cooling by enabling optimal mixing of external and recycled production air flows
- Monitoring of separation objects (doors, windows) to prevent gas / air mixing and avoid contamination
- Appropriate cost distribution for resource consumption by e-metering
- Demand calculations to prevent unplanned surplus energy needs
- Consumption based energy demand forecasting

Benefits

- 11.3% power consumption reduction
- After 6 months 75% less contamination incidents
- 50% cost reduction for sewage handling
- Compensation claim for charged but unused energy

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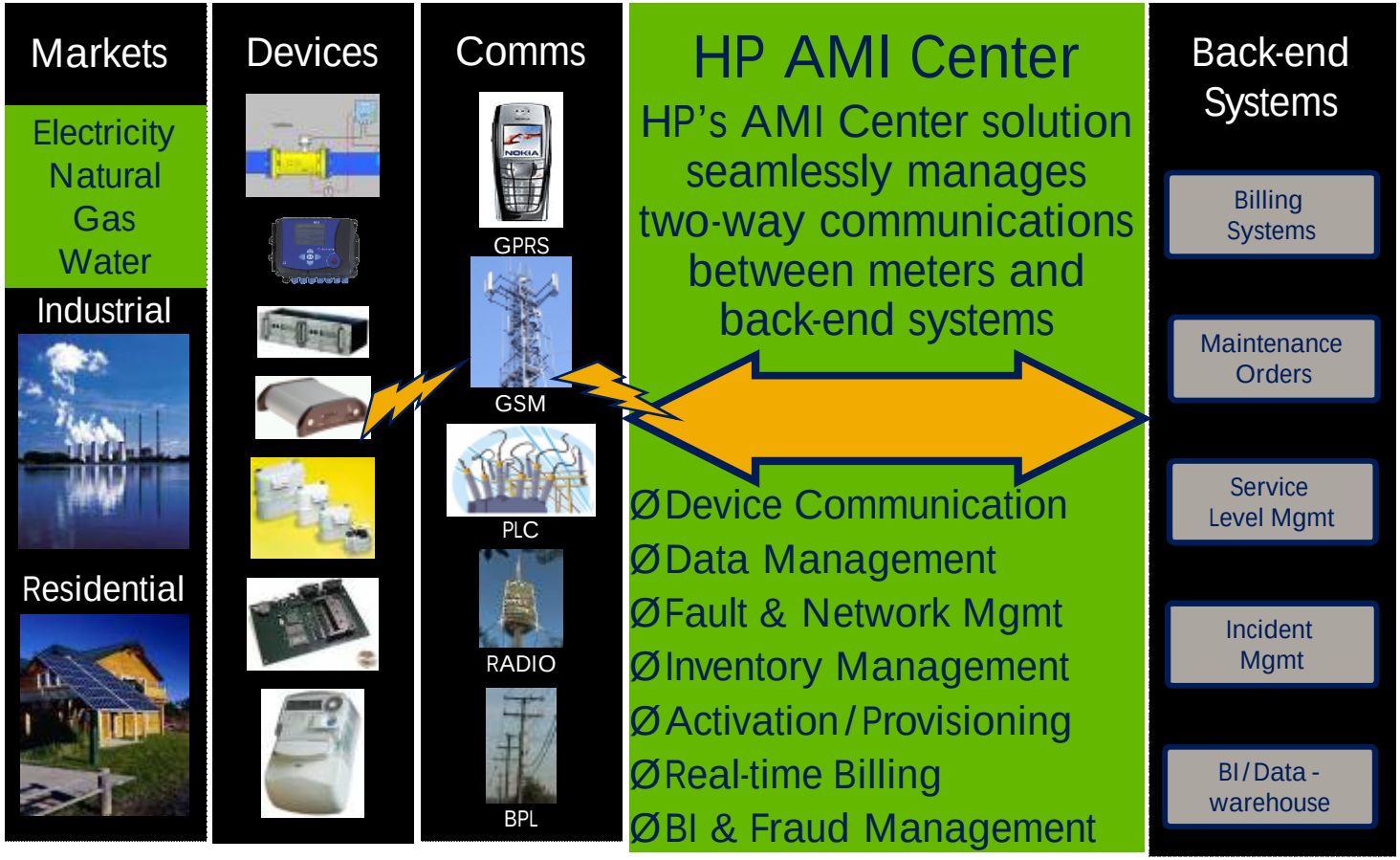
Using ICT to take entire power plants offline by optimizing grids

Advanced Metering Infrastructure

- AMI manages large networks of distributed devices
- Lower risk of device failure reduces losses and need for redundant base load generation

HP AMI Center



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Make this vision a reality

- Current barriers
- A framework for action
- Policy requirements

Barriers

Insufficient return on investment

Poor awareness of business case

Lack of measurement methodologies

Skills shortage

Cultural shifts

Outdated infrastructure

Misaligned incentives

Broadband access

No coordinated national roadmap

Labor implications

Industry fragmentation

Vested interests

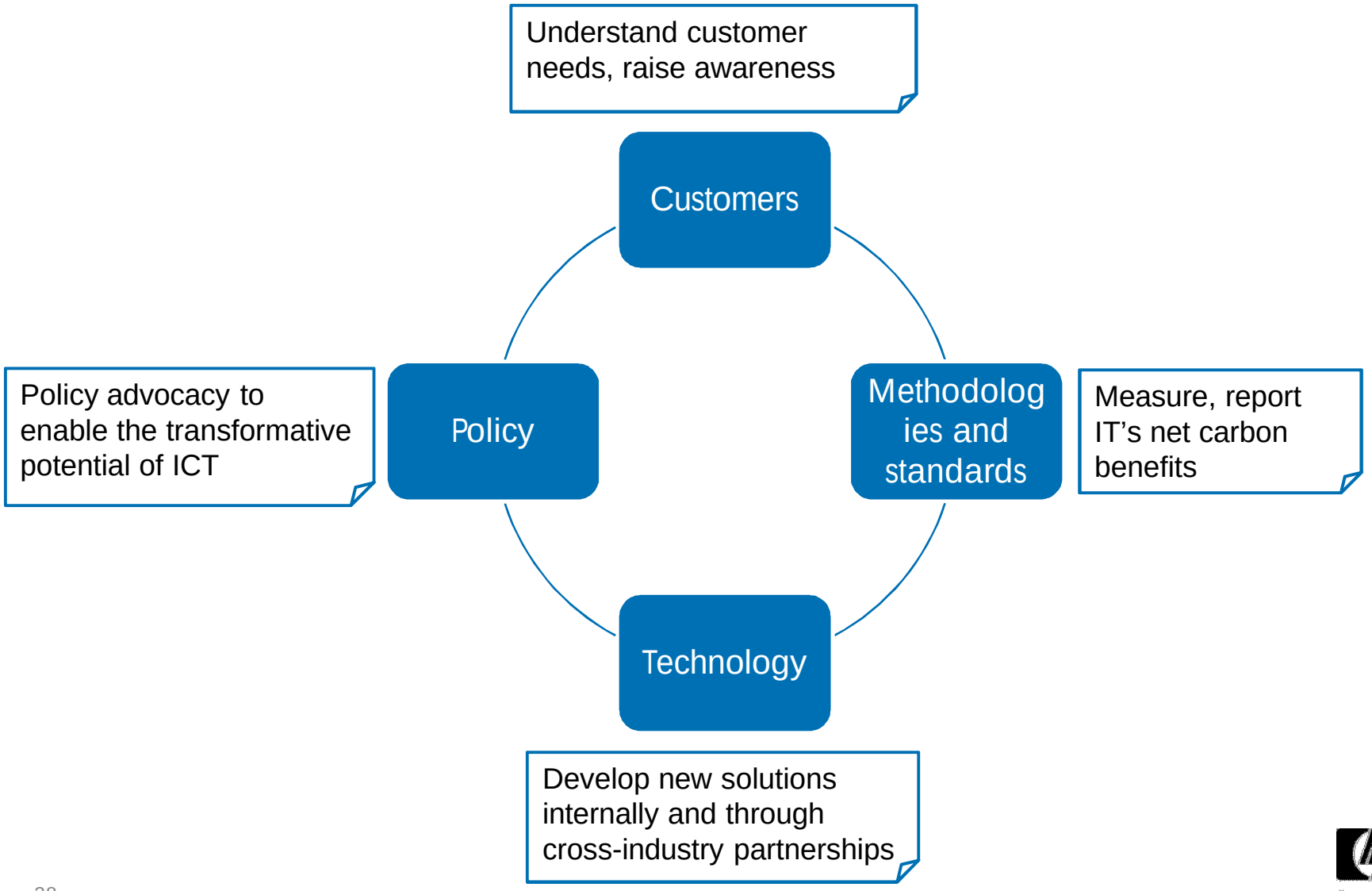
Lack of interoperability standards

Fear of production disruption

Lack of capital

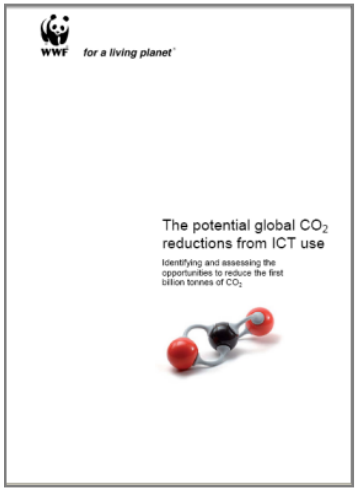
Technology immature

HP low-carbon ICT solutions market development framework



Understand customer needs and raising awareness

- HP-WWF partnership:
  - Ø First Billion Tons CO2 Reductions through ICT, June 2008
  - Ø Low Carbon ICT Services Market Survey, Spring 09
  - Ø Video Conferencing Report, Spring 09



- Climate Futures:
  - Ø 2030 scenarios
  - Ø Raise awareness of low-carbon transformation required
  - Ø Help businesses with strategic planning

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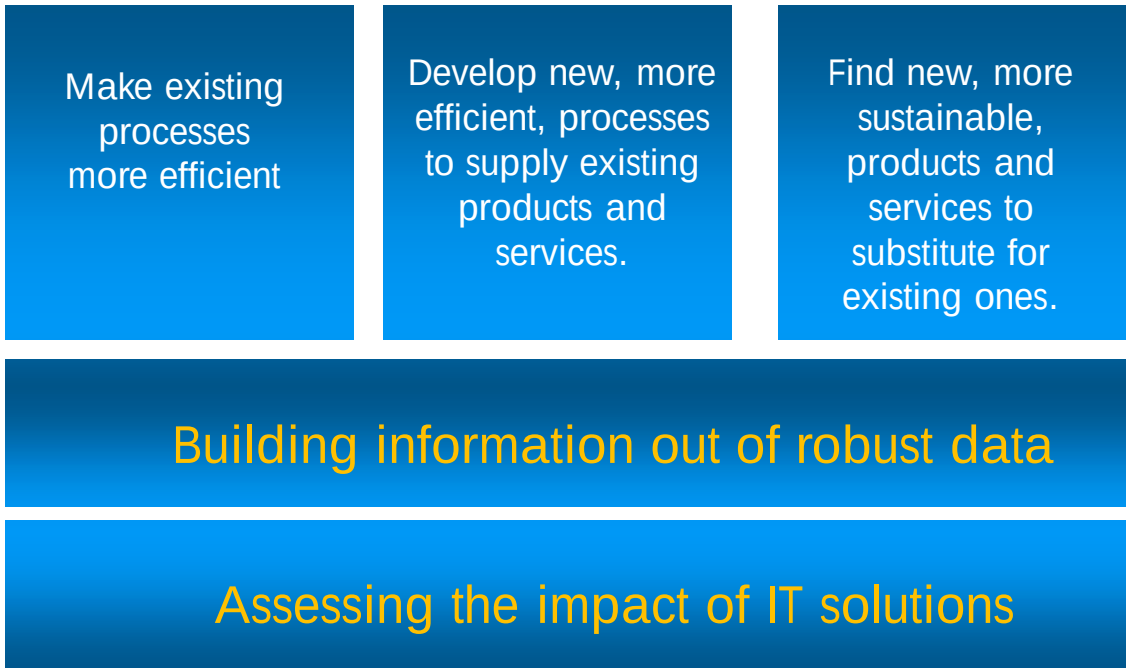
HP Labs – Sustainable IT Ecosystems Lab



Focused research on sustainability knowledge foundation

Policy requirements to enable the transformative potential of ICT

Enabling the transformative potential of ICT requires comprehensive and coordinated action from both industry and governments:

Industry:

- ØDevelop measurement methodologies
- ØDevelop interoperability standards
- ØLead by example: IT's own footprint

Governments:

- ØSet clear direction and targets for CO2 reductions
- ØImplement an effective market framework: carbon pricing, complementary incentives for ICT-enabled energy efficiency
- ØLeverage public spending: pilot projects, public procurement, R&D
- ØCoordinate: cross-industry and industry-governmental collaboration
- ØEducate and inform: best practices, benchmarking, training


Thank You!