

Eco-Technology: Delivering Efficiency & Innovation

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Eco-Technology: Two Sides of the Coin

Drive Computing
to Be More
Energy Efficient

~2%*

Opportunity



Use Computing to Improve
Energy Savings Outside
Information and
Communications Technology

98%

The Big Opportunity

Today's Discussion

How do we facilitate growth while reducing our environmental footprint?

- Innovation
- Harmonization
- Collaboration



Innovation



Innovation



Harmonization



Collaboration

Intel - A Snapshot

Year founded: 1968

Number of employees: > 80,000

2008 Revenues: \$37.6 Billion

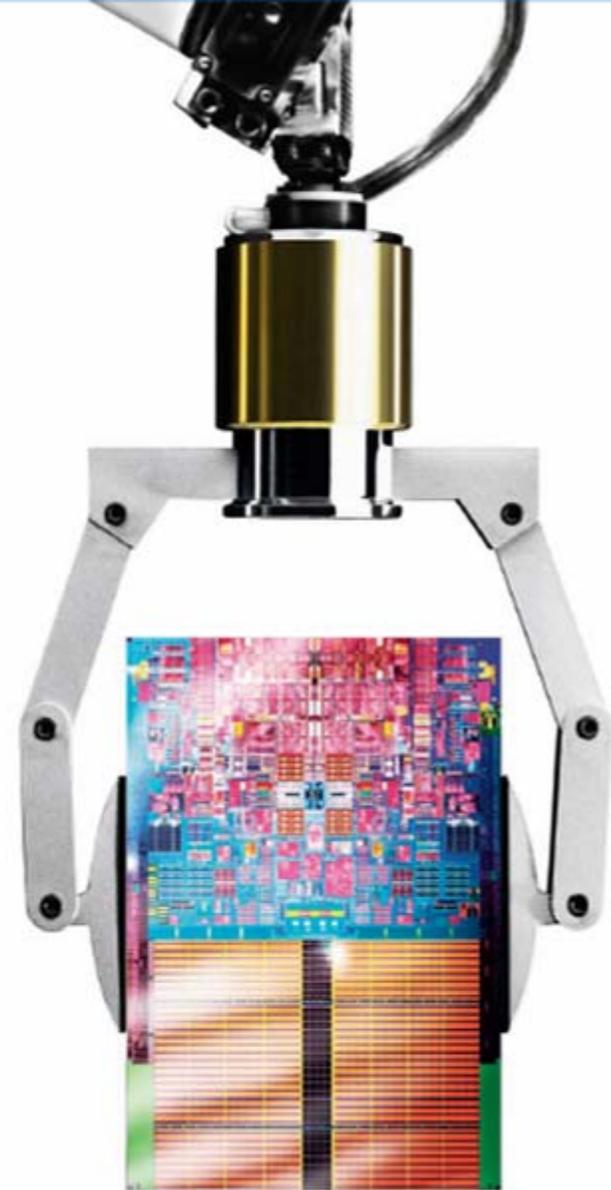
Capital 2001-08: \$41.5 Billion

2008 Net: \$5.3 Billion?

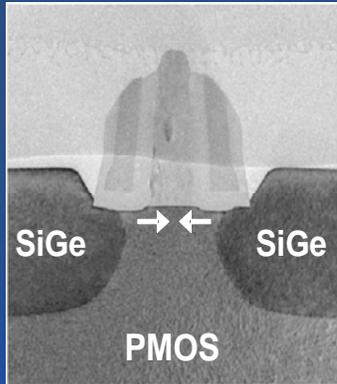
300 offices/facilities in 50 countries

40 years of leadership in computing and communications.

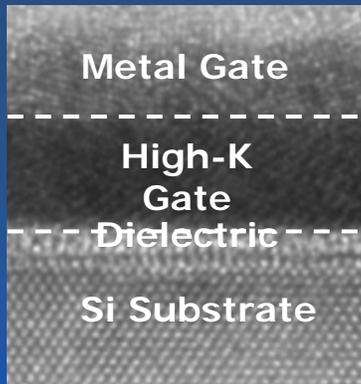
Innovation that moves the world forward



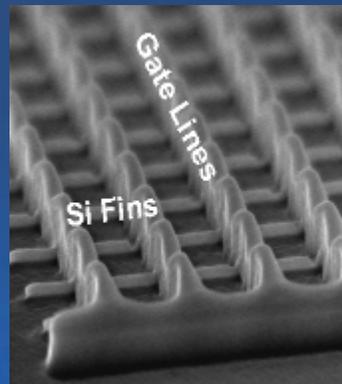
Innovation - It's in Our DNA



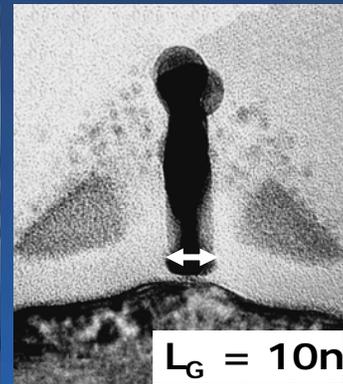
SiGe-S/D PMOS
(Strained-Si)
(In Production)



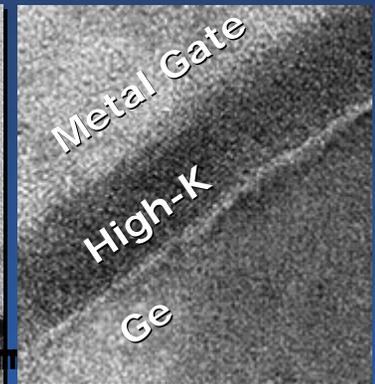
High-K/Metal Gate
(45nm node and beyond)



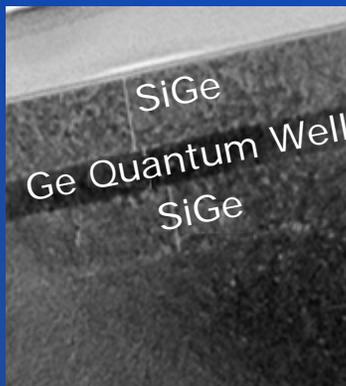
Non-Planar Tri-Gate Transistor
(Option for 32nm node and beyond)



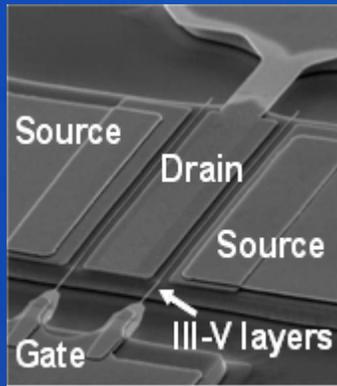
Planar Si Research
Transistor with $L_G = 10\text{nm}$



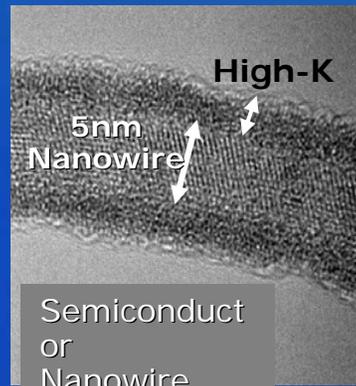
Ge MOSFET with High-K/Metal Gate



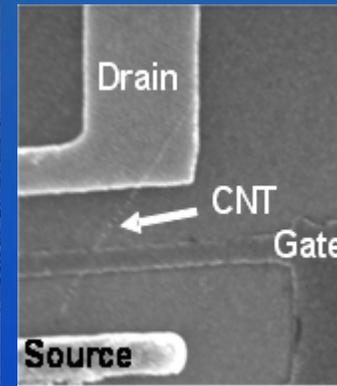
Strained Ge Quantum-Well Transistor



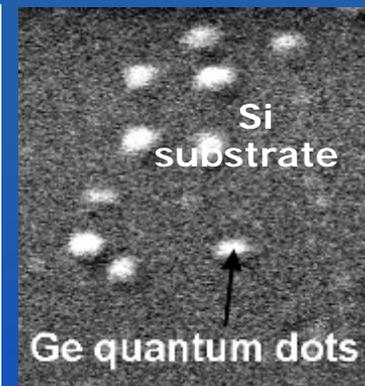
III-V Quantum-Well Transistor



Semiconductor-Nanowire Transistor



Carbon Nanotube Transistor



Ge Quantum Dots on Si

Innovation is the engine of the IT industry



Innovation in Environmental Performance



"It's no longer enough to just produce a profit. Instead, we need to continually improve our manufacturing process, thereby reducing our burden on the environment and becoming an asset to the communities in which we live and work".

Gordon Moore, Intel Chairman
Letter in EHS Report, January 1995

"Continuing our commitment to the highest performance in all we do—from product innovation to corporate responsibility—is good business.

Paul Otellini, President and CEO
CSR Report, May 07

Reducing Environmental Impact of Operations

Air Pollution



Global Warming Gases



Energy



Logistics & Transport



Water



Wastewater



Chemicals



Chemical Waste



Solid Waste



Reducing Environmental Impact of Operations

Intel wins the California Clean Air Award for outstanding leadership



Intel pledges to reduce global GHG emissions by 30% per production unit

Intel tops EPA's list of green power partners



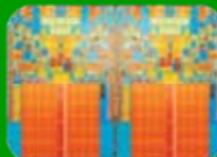
Intel pursues LEED certification for fabrication plants and buildings



Intel's Ocotillo Campus wins EPA Water Efficiency Leader Award



Intel's newest 45nm processors to go lead* and halogen free**



Packaging reductions of 16-40% decreased number of shipments and fuel consumed



Over 3 million gallons of water is reclaimed each year using special collection systems



Intel, regulators and neighbors join together to reduce waste and increase recycling >80%



Solid waste and consumer recycling initiatives reduce E-waste



Other names and brands may be claimed as the property of others.

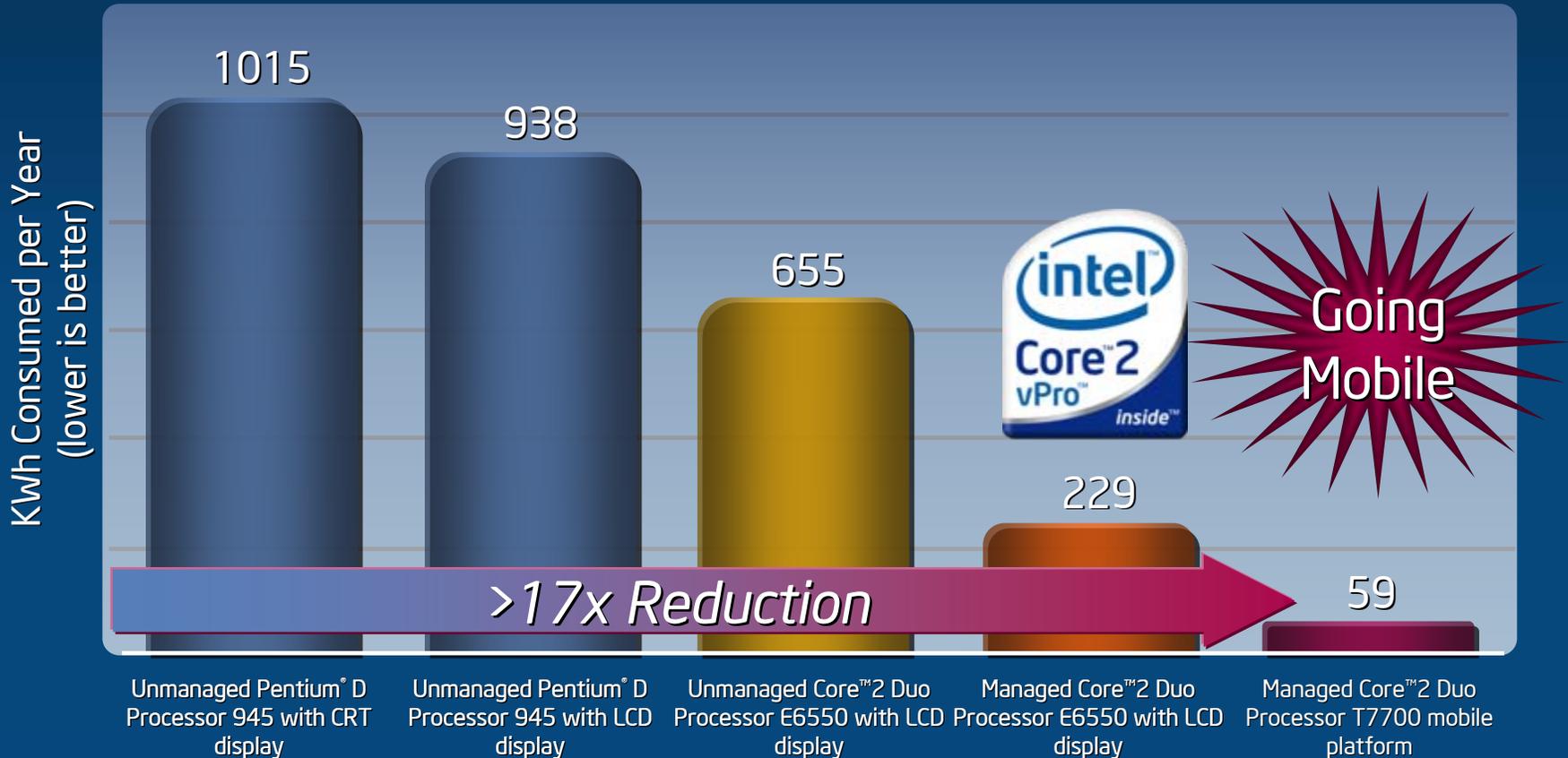
* 45nm product is manufactured on a lead-free process. Lead is below 1000 PPM per EU RoHS directive (2002/95/EC, Annex A). Some EU RoHS exemptions for lead may apply to other components used in the product package

**45nm Applies only to halogenated flame retardants & PVC in components. Halogens are below 900 PPM bromine & 900 PPM chlorine.



Potential System Level Energy Savings

Estimated Annual Energy Consumption



Performance tests/ratings are provided assuming specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. This data may vary from other material generated for specific marketing requests.



Moore's Law Delivers Data Center Optimization

2004

- 5.1M bops
- 6 racks
- 126 Servers
- 240 sq ft
- 48 kW



2007

- 5.1M bops
- 1 rack
- 17 Blades
- 40 sq ft
- 6 kW

Source: Comparison of SPECjbb2005 bops (business operations per second)

THE BOTTOM LINE

Floor Space
83%
REDUCTION

Annual
Energy Costs
87%
REDUCTION

Energy Savings
\$53K
SAVINGS

Source: Intel January 16, 2008. Performance comparison using SPECjbb2005 bops (business operations per second) between (2004) 2 socket single core Intel Xeon processor (3.6GHz) and (2008) 2 socket Quad-Core Intel Xeon processor E5450 (3.0GHz, 80W, 1333MHz) measured 8/22/07. ¹ Floor space based foot on sq ft reduction. ² Energy costs based on total solution rack power. ³ Energy Savings based on an electric rate of \$0.10/kWh assuming 33% average server load. ⁴ ROI is calculated based on cost of new servers (\$6,264 per server pricing based on HP DL 380G5 (32GB RAM) as of Nov 17, 2007, source www.hp.com) divided by energy savings per year. Actual performance results and savings may vary depending on configuration.

See slide 46 for details.



Where Are We Headed? 2012 Environmental Goals



Reduce absolute global-warming gas footprint by 20% by 2012 from 2007 levels.

Reduce energy consumption per chip 5% per year from 2007 through 2012.

Achieve engineering and design milestones to ensure that Intel products keep the energy-efficiency lead in the market for our next two product generations.

Reduce water use per chip¹ by 2012 from 2007 levels.

Reduce generation of chemical waste per chip by 10% by 2012 from 2007 levels.

Recycle 80% of chemical and solid waste generated per year.

¹ Assuming a typical chip size of approximately 1cm². (Chips vary in size depending on the specific product.)

Harmonization



Innovation



Harmonization



Collaboration

Wafer Fab and Assembly/Test Sites

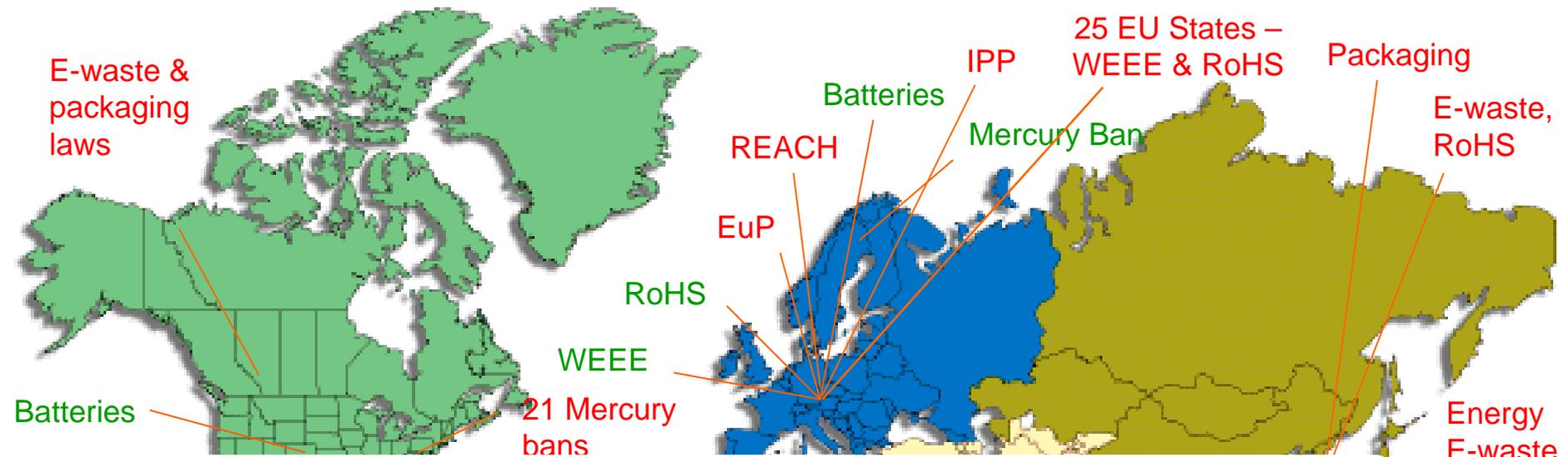


*Projected

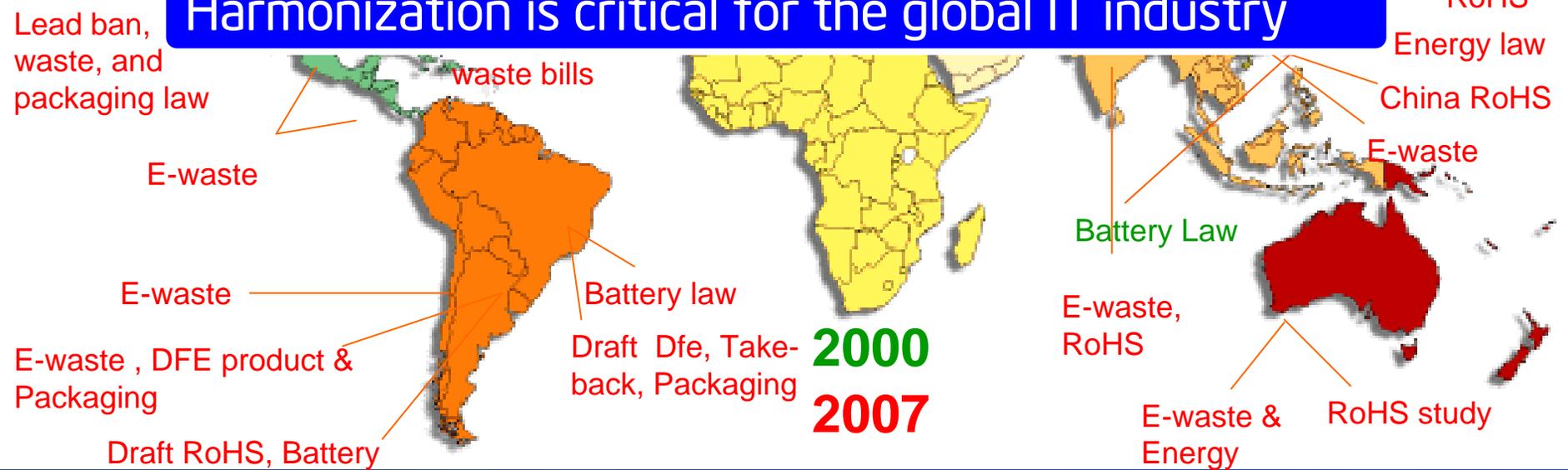
- Wafer Fab
- Assembly/Test



Global Regulatory Environment



Harmonization is critical for the global IT industry



Collaboration



Innovation



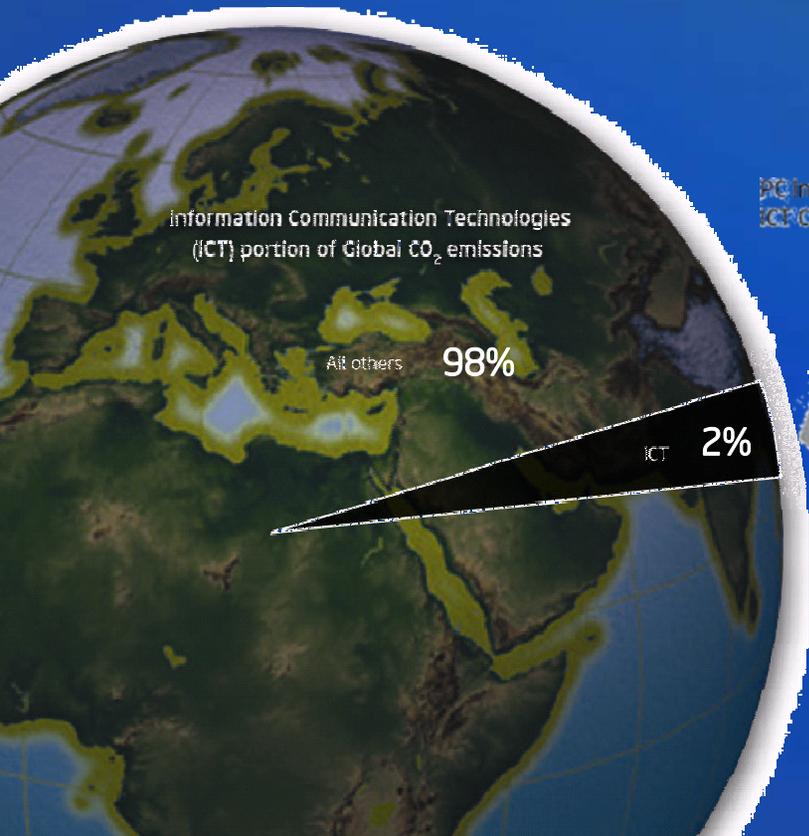
Harmonization



Collaboration

Why Collaborate?

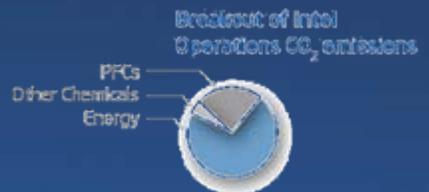
Carbon footprint of PC industry



PC Industry portion of ICT CO₂ emissions:



Intel's portion of PC Industry CO₂ emissions:



Today's Reality



The average desktop PC wastes up to half the power delivered



Servers lose approximately one-third of their power



90% of desktops do not utilize power management settings



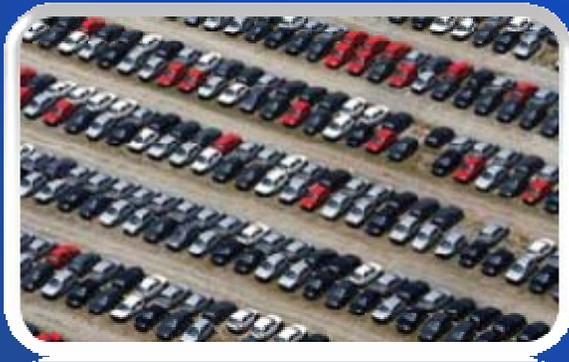
- Increase computing energy efficiency
- Increase use of power management
- Reduce computer power consumption 50% by 2010*

*Based on IDC projections of desktop and server units shipped, a baseline of typical desktop and server power consumption in the first half of 2007, and an average cost of \$0.0885/KW.



Collective Impact by 2010

- Goal is to improve computing energy efficiency by 50%.
 - Collectively save an estimated \$5.5 billion in energy costs
- Reduce global CO2 emissions from computing platforms by 54 million tons per year.
 - Equivalent to removal of 11 million autos
 - Eliminating 20 coal plants from the planet
 - Planting 25,000 sq. miles (~65,000 km²) of trees



Summary

Together we can reduce our environmental footprint and grow the IT industry.

Continue to improve the 2% while using our technology to address the 98%.

To accomplish this we need:

Innovation

Harmonization

Collaboration



Questions



