



## The Next Round of IT Innovation – Resource and Energy Efficient Microprocessing

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Why Energy Efficiency?

IT and Energy Consumption – Scoping the Challenge

European and Global IT Initiatives

Enabling a Greener IT  
Energy Efficient Microprocessors – Design, Manufacture, Usage

# Energy Efficiency

## A Look from the Lifecycle Perspective

- Energy efficiency is an important aspect of resource efficiency within a product lifecycle assessment (LCA).
- Energy usage and material usage both contribute to LCA environmental impact categories, as analyzed in an internal AMD pilot LCA for some selected microprocessors (2005 and 2007).
- When only looking at the manufacturing phase of a microprocessor's lifecycle, total manufacturing energy together with and the supply chain of copper dominate the considered relevant environmental impact categories.
- However, the energy need of a microprocessor during its lifetime active use phase dominates all of the relevant LCA-considered environmental impact categories.
- Therefore, the LCA-derived impacts associated with combined energy use in a microprocessor's manufacturing and active use phases significantly exceeds the contribution of materials use in manufacturing alone.

## “Leading the world to Energy-Efficient Processing”

AMD  
PowerNow!  
TECHNOLOGY



- **Products** based on technologies that address the need to optimize energy use



- **Initiatives** that address improved energy-efficient solutions and influence public policies

Sustainable Manufacturing and Design



- **Operational Behaviors** that address responsibility related to energy and the environment

## Partnerships Addressing IT and Energy Efficiency

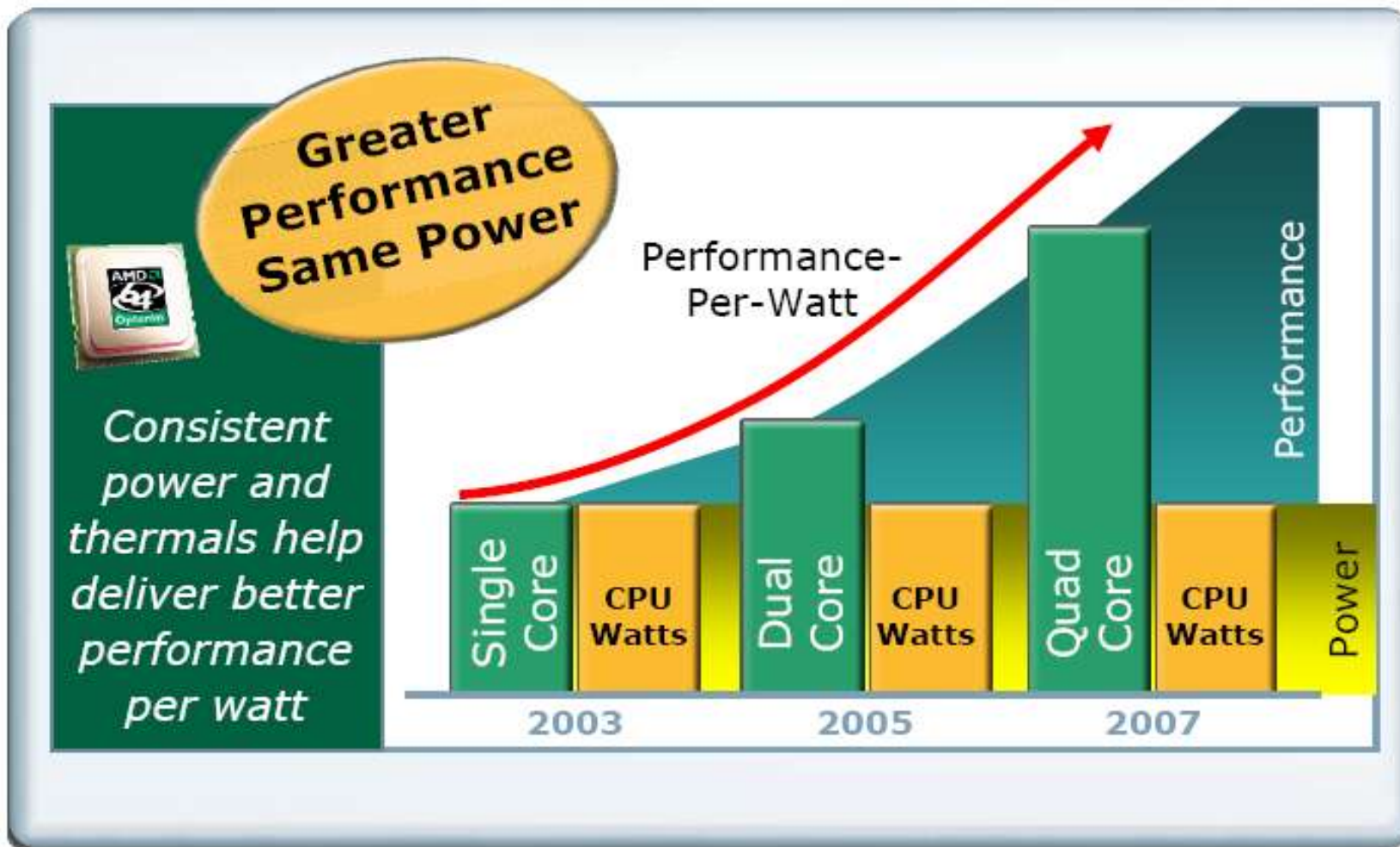
### Scoping the Challenge:

- AMD-sponsored Alliance To Save Energy study, "*Energy Efficiency in Datacenters: A New Policy Frontier*"
- AMD commissioned two studies by Dr. Jonathan Koomey (2007): worldwide datacenter energy use *doubled* between 2000 and 2005
- EPA Server and Datacenter Energy Efficiency report - August 2007
- WEF: The Contribution of ICT to Climate Change Mitigation; January 2008: statements on the potential contribution of ICT to climate change mitigation

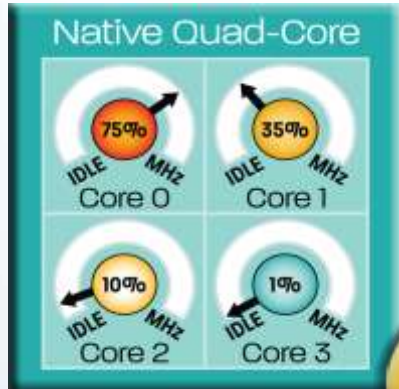
### Collaboration with Government, Industry, and Customers:

- AMD is a charter member of the ENERGY STAR Low Carbon IT Campaign that was launched on April 3, 2008
- AMD is a founding member of The Green Grid™
- AMD is also a founding sponsor of the Climate Savers Computing Initiative™

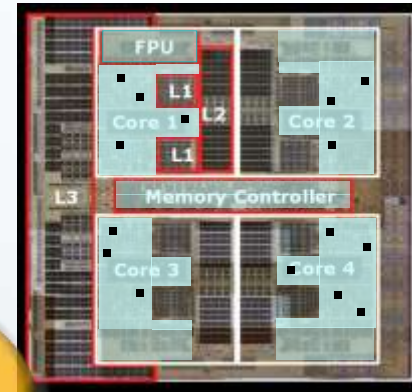
# Performance per Watt Scalability



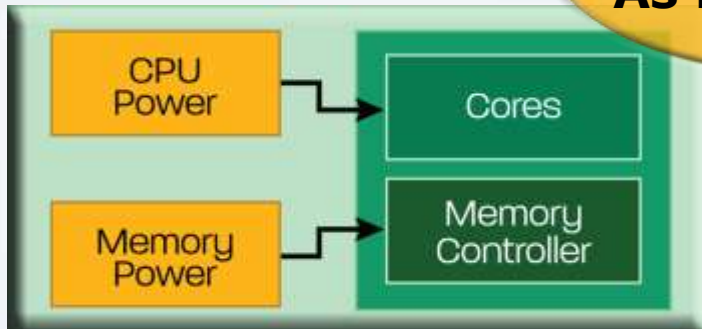
## Independent Dynamic Core Technology



## AMD CoolCore™ Technology



**Same Power/Thermals As Dual-Core!**



## Dual Dynamic Power Management™



## Enhanced AMD PowerNow!™ Technology

# AMD Green: Global Climate Protection Plan 2007



First published in 2001, GCPP integrates **products, operations,** and **people**

Presents AMD strategy, actions, and emissions reporting

AMD exceeded its Climate Leaders goal to reduce normalized greenhouse gas emissions 40% by 2007 – actual reduction ***greater than 50%***

AMD set **new goals** to:

- Further reduce normalized greenhouse gas emissions by **33 percent by 2010** (against a baseline year of 2006)
- Further reduce normalized energy use by **40 percent by 2010** (against a baseline year of 2006)

**[www.amd.com/climate](http://www.amd.com/climate)**

# Low-Carbon Energy Sources

## Trigeneration for Manufacturing in Dresden, Germany

- Natural gas-fueled trigeneration for electricity, heating, cooling
- Avoided more than 800,000 t CO<sub>2</sub> emissions (1998 to 2007); in 2006 alone, almost 175,000 t CO<sub>2</sub> compared to a conventional energy supply
- 175,000 t CO<sub>2</sub>: More than 3.5% of annual GHG emissions of city of Dresden;
- EVC II elected "Cogeneration plant of the year 2007" in Germany

## U.S. Green Power Purchases

In 2001, AMD became one of the first companies to purchase renewable energy through Austin Energy's GreenChoice® Program

First member of the semiconductor industry to join the U.S. EPA's Green Power Partnership

AMD's new corporate campus has committed to using 100 percent GreenChoice energy from Austin Energy



# Conclusion

- Energy efficiency is an important aspect of resource efficiency
- Energy efficiency has become an innovation driver and a differentiating competitive feature in the IT industry
- Partnership and initiatives within industry and with governments are important to drive energy efficiency of IT products
- IT has the potential to also be the solution of some problems
- Resource and energy efficiency needs to be addressed along the whole life cycle



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