



AMD Technology Contributing To An Energy-Efficient World: High Performance Computing

By powering high performance supercomputers, Advanced Micro Devices (AMD) technologies are helping to find solutions to the world's energy and environmental challenges.

ENVIRONMENTAL

Climate change, energy shortages, pollution...our planet faces a myriad of complex energy and environmental challenges. The solutions to complex challenges such as these require the focus of our best scientists.

With AMD technologies powering five of the top 10 most powerful supercomputers in the world, scientists are able to perform crucial research that can help us fulfill our society's energy and environmental needs.

AMD technology enables high performance computers to perform up to a quadrillion calculations per second. That's one thousand trillion operations each second. This extreme speed enables the creation of models that can help simulate complex natural systems such as global climate patterns and help us understand how to generate alternative energy more efficiently.

And with AMD's efficient processors, these supercomputers are becoming more energy efficient themselves. It's good to know that even the supercomputers that are working to solve the world's energy and environmental challenges are "walking the talk."

AMD Opteron™ processors – High Performance, Low Power *The Green500*

For decades, computing performance and speed has been synonymous with power-hungry computers. Supercomputers often consume large amounts of electrical power and produce significant heat that must be addressed by cooling facilities – which consume even more power and add to the cost of operation.

Supercomputers can not only help solve our energy and environmental challenges, but through cutting-edge AMD technology, they can also be more energy efficient themselves. More than 30 of the most energy-efficient supercomputers in the world are powered by AMD Opteron processors and are featured on the Green500 list — a ranking of the world's most energy-efficient supercomputers.





The latest 6-, 8- and 12-core AMD Opteron™ processors deliver a significant performance increase over previous generation AMD Opteron processors while operating within the same general power and thermal envelopes. This offers IT organizations outstanding performance-per-watt while minimizing data center energy consumption and the associated power and cooling costs. The improvement is enabled by the AMD-P suite of power management technologies, which are described below.

FEATURES	BENEFITS
AMD PowerNow!™ Technology with Independent Dynamic Core Technology	Allows processors and cores to dynamically operate at lower power and frequencies, depending on usage and workload, to help reduce TCO and lower power consumption in the datacenter
AMD CoolCore™ Technology	Can reduce processor power consumption by dynamically turning off sections of the processor when inactive.
AMD PowerCap Manager	Allows IT datacenter managers to set a fixed limit on a server's processor power consumption
AMD Smart Fetch Technology	Can reduce power consumption by allowing idle cores to enter a "halt" state
AMD CoolSpeed Technology	Highly accurate thermal information and thermal protection.
Advanced Processor Management Link (APML)	In APML enabled systems, this allows advanced power control and thermal policies
Low power U/RDDR3 memory	Supports DDR3 1.5v and low power DDR3L 1.35v memory technologies
Dual Dynamic Power Management	Enables more granular power management capabilities to reduce processor energy consumption. Separate power planes for cores and memory controller
CIE	Reduces memory controller and HyperTransport™ technology links' powers

Some of the world's top scientists are using AMD technologies to tackle major energy and environmental problems to help improve our lives and our planet.

SOLUTIONS

Oak Ridge National Laboratory
The Kraken Computer at Oak Ridge National Laboratory uses the latest six-core AMD Opteron™ processors featuring a huge memory and file system. Kraken was the first academic supercomputer to enter the "petascale," meaning this system can perform more than 1 thousand trillion operations per second. Kraken allows scientists to create and run models that simulate complex energy and environmental phenomena.



For example, the scientists at the University of Tennessee are using Kraken to enhance the efficiency of biofuels in both production and use. The research simulates the chemical reactions that turn cellulose (plant material) into fuel in extremely fine detail. Using the power of the Kraken, the researchers are gaining knowledge that can help turn plants (biomass) into biofuels.

Learn More!

To learn more about AMD, go to: www.amd.com/corporate

Kraken is also being used to develop weather simulation models to predict and understand the effects of climate change on our environment. Researchers can forecast climate-related changes in coastal flooding, food-crop production, biodiversity, and many other impacts. With this information, they can work towards identifying the most efficient and effective ways to both combat and adapt to climate change.

For more information, visit: <http://blogs.amd.com/stories/2009/11/16/oak-ridge-national-labs-kraken/>

Nor-Tech Wind Technology

In a 100-megawatt wind farm, a drop in output of even a few percentage points can result in the loss of hundreds of thousands of dollars. By improving the understanding of wake turbulence on the efficiency of wind farms, the Nor-Tech supercomputer is promoting the use of clean, renewable wind power.

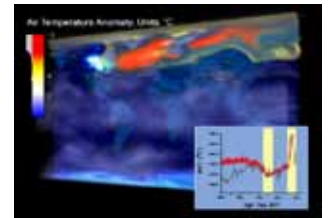
The AMD Opteron processor-powered Nor-Tech supercomputer cluster is specifically tailored to compute fluid dynamics for wind turbines. This application helps wind farms measure and optimize turbine placement and positioning to optimize the power output for wind turbines and to minimize the inefficiencies associated with wake turbulence.

The complicated fluid dynamics computer programs run exceptionally well on AMD Opteron processors, making the Nor-Tech cluster a ideal tool for optimizing wind turbine performance. Building on success, there are plans to use this supercomputer for similar renewable energy projects, including a Department of Energy-funded project to generate wind power for New York City.

For more information, visit: <http://blogs.amd.com/stories/2010/05/26/nor-tech-wind-farm-cluster/>

The City of Austin, Texas, Water Utility

AMD Opteron processor-powered Dell servers are helping the City of Austin Water Utility establish a more energy-efficient server and storage infrastructure as well as a disaster recovery plan. The Austin Water Utility serves approximately 1.5 million residents and provides 50 billion gallons of water yearly to its customers. To keep water flowing to the city's two treatment plants and into the homes and businesses takes a tremendous amount of energy, maintenance, planning and communication.



Using AMD technology, the city is able to increase its compute capacity without increasing its carbon footprint and the associated environmental, societal, and economic costs. By using the AMD-powered Dell servers, Austin was able to consolidate its 40 existing servers onto only four updated Dell servers, which allowed the utility to expand compute capacity, control server sprawl, and save on power and cooling.

The results of the migration to new servers included a 99 percent reduction in disaster recovery time (hours vs. weeks), a 75 percent reduction in monthly planned downtime (30 minutes vs. 2 hours), zero unplanned downtime thus far, a 90 percent reduction in server power consumption, and a projected five-year savings of \$350,000.

For more information, visit: <http://blogs.amd.com/stories/2010/02/23/city-of-austin/>

