



An EMC Sustainability Profile

Global Data Center Massachusetts, United States

Sustainability

Sustainability is a broad concept that describes the integrated societal, environmental, and economic goals of maintaining earth's resources into the future.

On the environmental front, achieving sustainability calls for a range of activities around energy efficiency, renewable energy, resource and water consumption, waste handling, and biodiversity.

In its pursuit of environmental sustainability, EMC uses a systems approach to understand how sustainable practices touch or influence virtually every aspect of the business. The EMC approach to environmental sustainability includes:

- Lowering the energy consumed by our products, operations, and supply chain
- Applying best practices to the use and disposal of materials in our business and throughout the lifecycles of our products and packaging
- Contributing to a resource-efficient information economy

This document recounts how EMC's IT group applied systems thinking to create a more environmentally sustainable information and communications infrastructure.

Energy-efficient IT

Energy efficiency is the watchword at EMC's global data centers.

In its data center in Westborough, Massachusetts, for example, EMC virtualized servers, consolidated storage systems, and implemented environmental best practices. This saved approximately \$13 million in power, cooling, and floor-space costs over three years beginning in 2005, while lowering greenhouse gas emissions by at least 20,000 metric tons. It also postponed a data center upgrade due to continued growth until mid 2008.

In 2008, this EMC® data center redesign received several industry honors and recognitions, including InfoWorld's Green 15 Award.

A case study for environmental sustainability

Over the last few years, EMC IT has been revamping its operations for cost, resource, and energy efficiency. To make IT a case study for environmental sustainability, the organization set out the following goals:

- Operate more energy efficiently
- Reduce physical server growth through virtualization
- Apply EMC solutions to make more-efficient use of storage
- Employ energy best practices and innovative cost- and resource-saving processes throughout the corporation

The real challenge was to implement this strategy of lowering data center cost, power use, and environmental impact while continuing to support the company's business needs and growth.

Sustainability through technology

In the first six months of 2006, physical server growth in the six EMC data centers around the world grew at an astonishing rate of 31 percent. IT could not sustain that rate of growth going forward and data center expansion was not an option.

Instead, EMC IT applied information lifecycle management (ILM) principles to server virtualization. This significantly cut server growth that year from 31 percent to 2 percent and saved data center space, power, and cooling consumption by using infrastructure that was already in place.

EMC Director of Data Center Operations and Global Infrastructure Support, Dave Scheffler says, "We became more efficient, reduced the number of physical servers and storage devices, freed up floor space, and reduced the energy required to run them." Scheffler reports that SAN-based virtualized ILM helps lower power consumption by enabling consistent storage levels while also supporting growth at a predictable pace.

EMC and the Industry

EMC is actively engaged in industry groups working to promote energy-efficient IT, and the innovative use of IT to build an environmentally sustainable society. Some of the groups with which we work include:

- **The Green Grid**

The Green Grid is a global consortium dedicated to developing and promoting energy efficiency for data centers and information service delivery.

- **Information Technology Industry (ITI) Council**

ITI's Energy and Environment program is focused on reducing the environmental impact of IT products, and developing public policy for energy efficiency.

- **Storage Networking Industry Association (SNIA)**

SNIA develops standards, drives best practices, and educates on storage issues. Their Green Storage Initiative focuses on storage infrastructure energy use and energy-efficient design and operation.

- **Digital Energy Solutions Campaign**

The Digital Energy Solutions Campaign promotes the use of information and communications technology solutions to solve our energy challenges.

- **Climate Savers Computing Initiative**

Climate Savers Computing Initiative member companies commit to purchasing energy-efficient PCs and servers for new IT purchases, and to broadly deploy power management.

No more tape

In 2008, IT recorded another significant accomplishment by almost totally eliminating the use of tape storage media. To accomplish this, EMC implemented a first-write-to-virtual-tape policy over a DWDM network by means of EMC Disk Library (DL) systems at another offsite facility. Retention policies were then applied to purge obsolete files. Now, instead of going to tape within the originating data center, data is moved to the DL over the network for defined retention periods and then deleted. Higher-density disks enable increased storage capacity with lower power consumption. What's more, the era of continued media library growth—which requires periodic physical disposal of large amounts of tape media—has ended. This reduces EMC's waste stream over time.

IT and Building Services: partners in environmental best practices

EMC IT and EMC Building Services built a tight partnership, creating an innovative approach to data center redesign. This was key to the success of the project and is still critical to the day-to-day operations of EMC's data centers. In fact, EMC IT employs an IT resource on its staff whose job is to facilitate the relationship between EMC Building Services and IT. This ensures collaboration, change control management, and proper business notification.

The partnership enables each organization to understand the needs and operations of the other, resulting in high data center uptimes and new energy-efficient technologies.

This collaboration in environmental best practices in EMC data centers includes installing hot and cold aisles, plugging cable cutout holes, performing periodic Computational Fluid Dynamic studies, and ensuring all server/storage cabinet filler panels are in place.

Financial impact of sustainability

EMC saved or avoided more than \$14 million in energy-related expenditures over five years, beginning in 2005. The infrastructure improvement prevented EMC from having to expand or upgrade two enterprise data centers with power and cooling during the period of 2005 to 2008, an additional cost avoidance of \$26 million.

Virtualization

The financial impact of virtualization alone from 2006 to 2008 was significant. First, a data center expansion was curtailed, avoiding a huge cost by eliminating the need to buy more physical servers. But, just as important, the following savings will be achieved with virtualization over five years beginning in 2006:

- 60 percent reduction in physical space: \$80,000
- 70 percent reduction in power usage: \$2 million
- 70 percent reduction in cooling needs: \$1.2 million
- 70 percent reduction in infrastructure expenditures: \$1.4 million

In 2008, through the decommissioning of servers alone, EMC IT reduced the net total of physical servers in its six IT data centers globally by 271 yielding a cost savings of approximately \$250,000 per year.

At the same time, EMC IT virtualized an additional 335 servers, avoiding approximately \$320,000 in costs annually, further contributing to EMC's goal of becoming an environmentally sustainable enterprise.

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