



## **ABB provides energy efficient solutions for the data avalanche**

Few who stand in the Uspenski Cathedral are aware of the banks of computer servers humming quietly in a cavern beneath their feet. The information technology service company Academica owns this unique underground data center, which it says is the most energy efficient in the world.

Baltic sea water and heat exchangers keep the servers cool, and help Academica's data center use 80 percent less energy for cooling than centers that rely on traditional cooling methods. Server heat is fed into the municipal heating network, providing enough warmth for 500 homes in a city where winter temperatures routinely dip to -20°C.

ABB power distribution units (PDUs) manage the server's energy consumption and improve the reliability of the data center's electrical distribution.

Energy efficiency is a huge issue for data centers, which are growing in number and size every year to keep up with growth in online services and manage the Internet's insatiable appetite for data.

Think of it: each and every day more than 200 billion emails are sent, three million images are uploaded to Flickr, and Facebook adds 70,000 new recruits to its 750 million active members, who log 45 million status updates. Every day five million tweets are sent, and bloggers post some 900,000 new articles.



Uspenski Cathedral, Helsinki, Finland. The ICT Company Academica's data center is located in the cave underneath.

To handle this data avalanche, data centers are increasing their footprint by 10 percent each year, and some now occupy more than 1 million square feet, big enough to enclose 17 football fields.

Not only are these buildings big, but they require a lot of power - more than 100 times as much as a similarly sized office building. Today data centers consume 80 million megawatt-hours of energy annually, almost 1.5 times the amount of electricity used by the whole of New York City, and are responsible for about 2 percent of global carbon emissions.

Heat thrown off by computer equipment is the enemy of stored data, so cooling the average center's systems accounts for about 30 percent of energy usage, which means about \$281 million is simply going out the window every year.

ABB's energy efficiency offering for data centers includes power management technology, motors and drives for ventilation and air conditioning systems, as well as an advanced data center infrastructure management (DCIM) solution. ABB recently acquired a stake in Power Assure, a developer of power management and software for data centers, whose technology can be integrated with ABB's DCIM to enable the data center operator to control, monitor, manage and optimize the whole ecosystem and energy efficiency of the data center.

ABB now also has a more efficient way of providing the power data centers need following the acquisition of US-based Validus DC Systems, a leading provider of direct current (DC) power



infrastructure equipment for data centers. DC power systems significantly reduce the amount of electricity a data center uses, as well as infrastructure costs.

The reason is standby power batteries, microchips and many other components inside IT equipment run on DC power, even though today's data centers have alternating current (AC) power infrastructures (like your home or office), which supplies only AC electricity.

AC electricity has to be converted into DC electricity at five different stages inside the data center to be usable by DC equipment. A DC power supply architecture can eliminate redundant equipment and reduce power losses in the electricity conversion process by up to 20 percent.

This means that 20 percent of the energy a data center wastes simply drawing power through its electricity infrastructure can be saved, just by using a different infrastructure - a DC power system.

A DC power system reduces power equipment, installation, real estate and maintenance costs, resulting in a saving on total facility costs of up to 30 percent. In fact, the average data center could save up to \$47 million in real estate costs alone by eliminating the space required by redundant AC power equipment.



Today data centers consume 80 million megawatt-hours of energy annually, almost 1.5 times the amount of electricity used by the whole of New York City. Picture of the green.ch data center, for which ABB will design and install an advanced, direct current (DC) power distribution system.

If the world's data centers switched to newly available DC power supply technology - which is up to 97 percent efficient - the annual energy savings would be enough to power your iPad for a very long time: 70 million years.