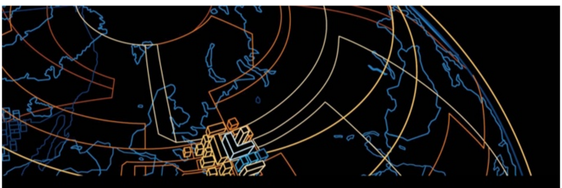


Powering the cloud

Every time you upload a video, share a photo, email a friend, tweet your location or check your bank balance your web device talks to a data center. Rows of servers storing trillions of megabytes of information live in vast, energy hungry computing complexes that power the Web.

Global data centers = 1.5 x NYC energy requirement

The energy impact of data centers

Data centers are responsible for about **2% of global carbon emissions** today and use 80 million megawatt-hours of energy annually, almost 1.5 times the amount of electricity used by the whole of New York City.

1 Data Center = 25,000 US houses

By 2020, at current growth rates and without improvements in energy efficiency data centers will produce

359 megatons of CO_2 = 48% US cars

Impacts of data centers

25%

A significant proportion of the average organization's IT budget is allocated solely to data center operations. (excluding software)

$ $ $ $

Servers

5.75 million new servers are installed every year to keep up with growth in online services, yet approximately 10% of installed servers are unused due to overly conservative capacity planning.

Energy used to power unused servers could offset the emissions of 6.5 million cars.

6.5 million

Servers are often oversized to cope with peak demand, meaning that on average they run at only 20% capacity.

Cooling

Computer equipment creates lots of heat

Cooling makes up around 30% of total energy usage in the average data center. This means around $281 million dollars goes out of the window.

$281 million

Infrastructure

Data centers are big

Each year new servers take extra space. Data centers are increasing in footprint by 10% year on year. The world's biggest data centers occupy over 1 million square feet, big enough to house 17 football fields.

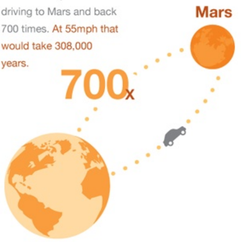
These buildings use more than 100 times the energy of a similarly sized building.

5x AC ↔ DC

Standby power batteries, microchips and many other components inside IT equipment run on DC power. Since today's data centers have AC power infrastructures (like your home or office) power has to be converted at 5 different stages within the data center.

This means that 20% of the energy is wasted within a data center's electricity infrastructure.

This produces carbon emissions equivalent to driving to Mars and back 700 times. At 55mph that would take 308,000 years.



Opportunities for efficiency

Servers

Significant amounts of energy can be saved through improvements in server design and management.

In a typical data center some of these improvements could individually reduce impact by:

27% Reducing power demand by 27% through virtualization, which reduces idle capacity.

= 6,500 Taking 6,500 cars off the road by using Energy Star compliant servers can reduce a data center's power consumption by 82,000 megawatt-hours.

Powering 2,500 US homes through better capacity planning.

2,500 US

Cooling

Improving airflow management, using variable speed drives for cooling fans and operating the data center within a slightly wider, yet safe temperature range can reduce energy needs by up to 25%. In some data centers that is enough energy to power 25,000 US homes.

The payback time when retro-fitting a data center with state of art energy efficient cooling can be as little as 2 years.

2 years for payback

Infrastructure

Using a DC power supply architecture within a data center can eliminate redundant equipment and reduce power losses in the conversion process by up to 20%.

In addition the average data center could save up to $47 million in real estate costs by eliminating the space required by redundant AC power equipment.

1x AC → DC

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

70 million years

DC power infrastructure also provides easier integration of photovoltaic solar panels, which generate DC power output.

Reliability and availability are also improved through a reduction in power supply components.

For more information talk to us on Twitter @DCdatacenters or visit www.ABB.com

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