

A photograph taken from an airplane window, showing the wing of the aircraft in the upper right corner. Below the wing, a large, billowing plume of white smoke or steam rises from a volcano, contrasting sharply with the clear blue sky above and the darker clouds below. The perspective is from a high altitude, looking down at the volcanic activity.

Energy impact of running hardware



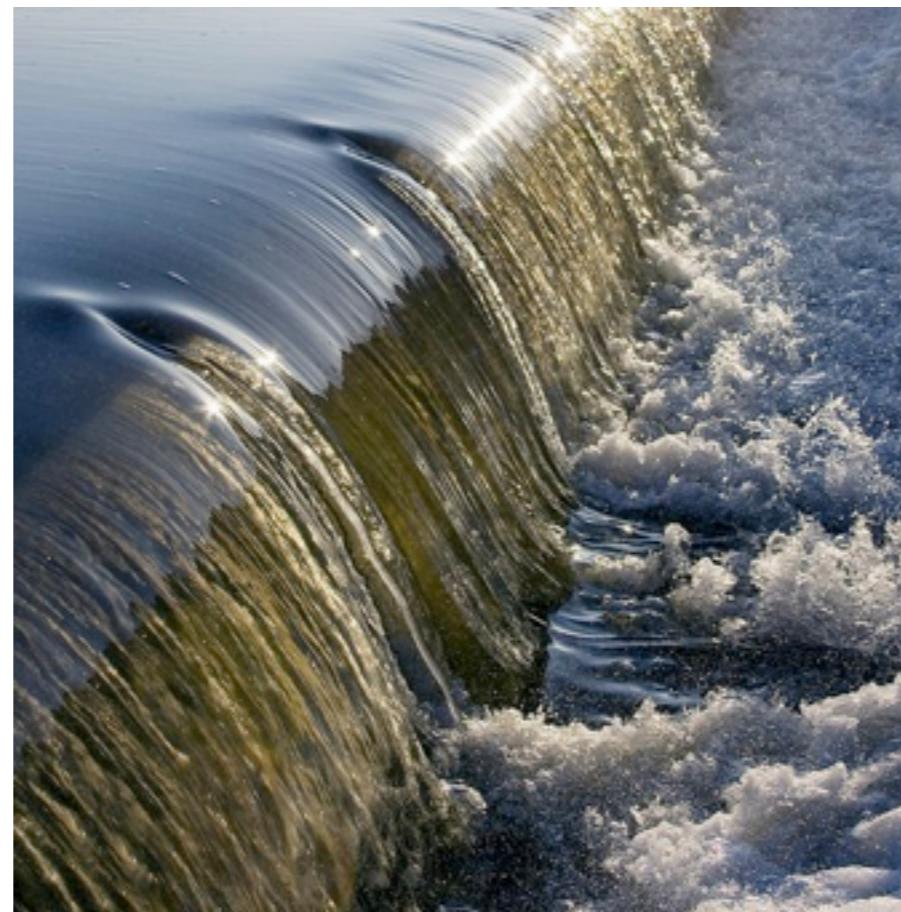
Kimmo Gläborg

IT-entrepreneur
Founder, Streamfile.com
Sysadmin background

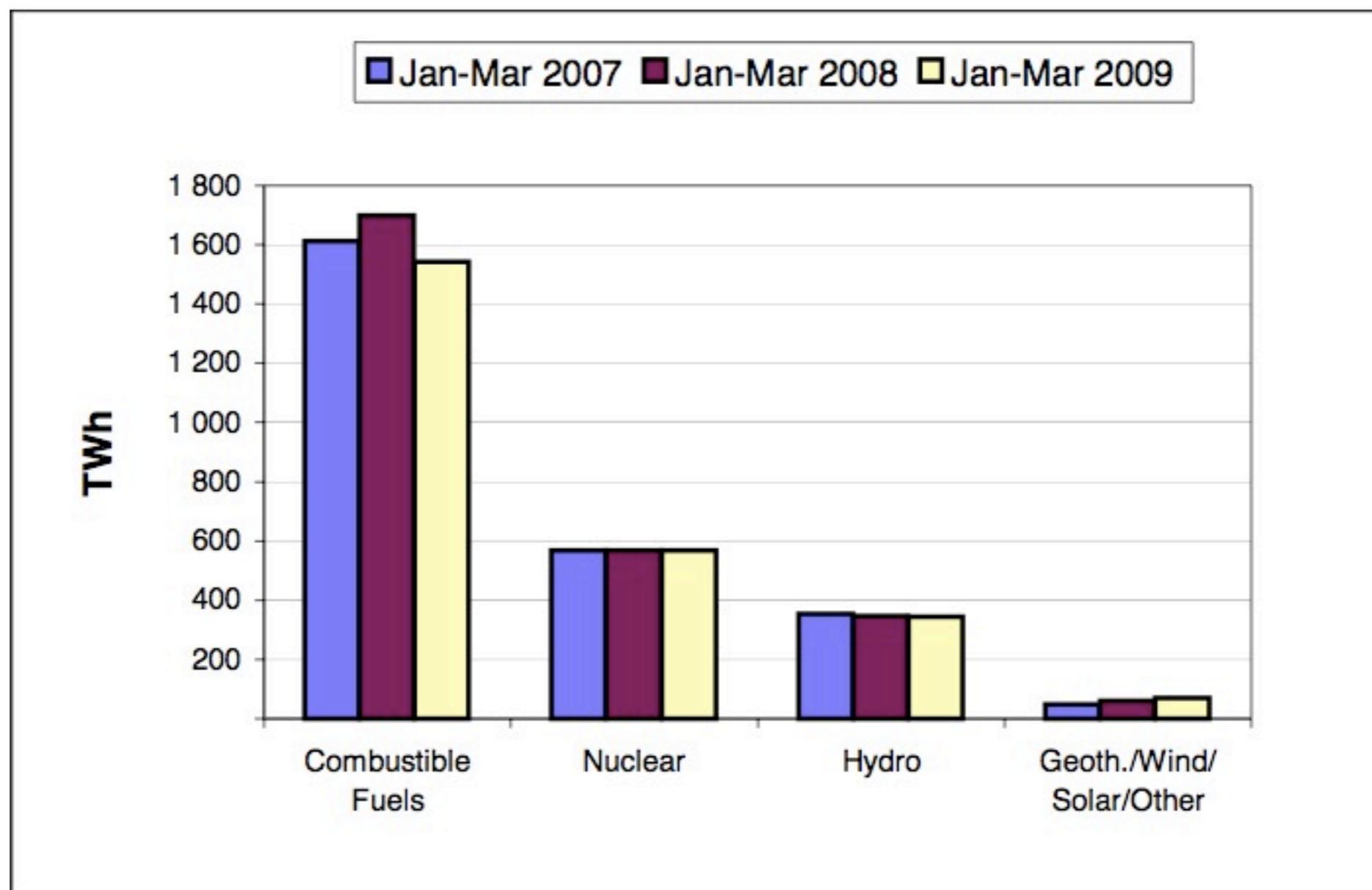
Telefortress facility



Where does the energy come from?

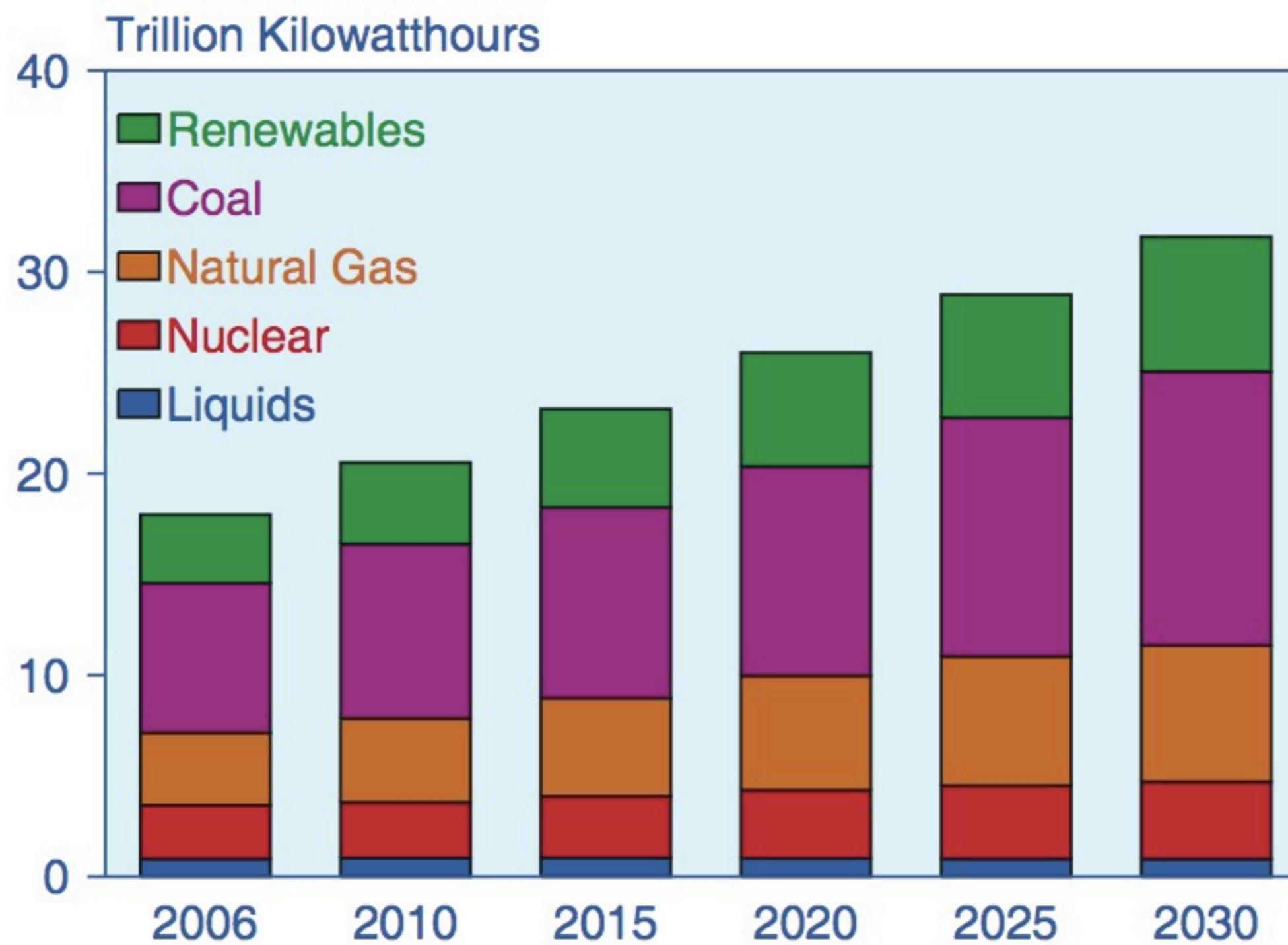


'Year to Date' Comparison of Production by Fuel Type



[Source: IEA International Energy Agency]

World Electricity Generation Forecast 2006-2030



[Source: IEA International Energy Agency]

China

- By the year 2030 China's CO2 emissions will be comparable to those of the U.S and EU, combined.
- Mostly by burning Coal
- With one exception....



[Source: IEA International Energy Agency,
Exxon Mobile]



Three Gorges Dam

- largest hydroelectric power station in the world.



- total capacity of 22,500 MW (2011)



Key issues with Renewable Energy

- scalability
- price per watt

[Source: Exxon Mobile]

Negawatt

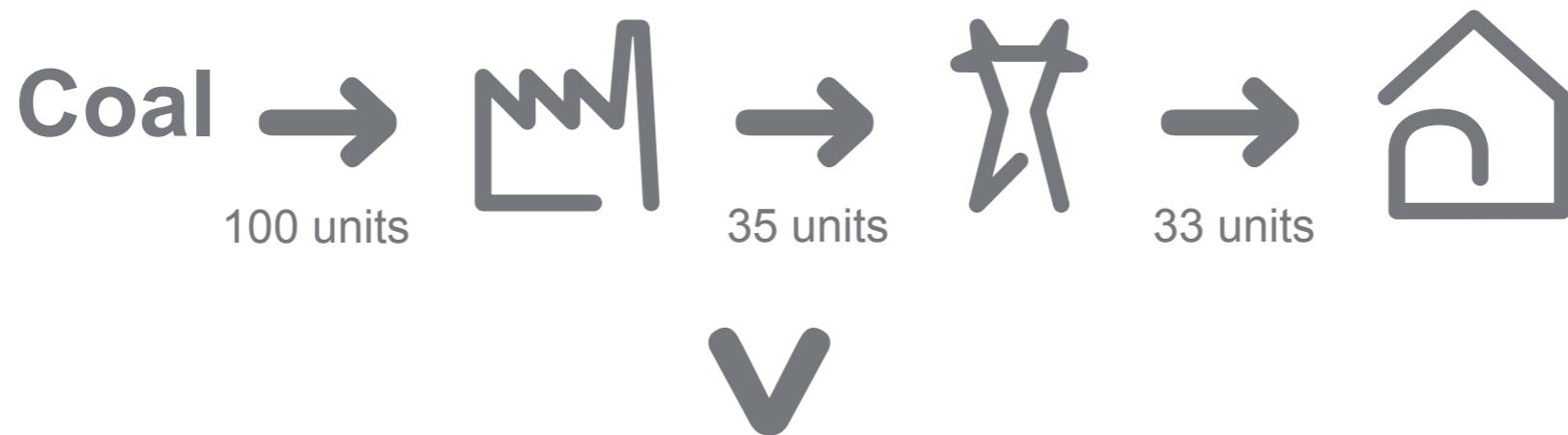
-is a watt of electricity that does not have to be generated



Amory Lovins

Negawatt

Replace a 75-watt incandescent light bulb with a
15-watt compact fluorescent bulb and you
produce 60 negawatts.



1 unit saved at
at point of use
“Plug”



3 units saved at
the power
Plant

Solutions out there

- Carbon tax
- Price energy at real cost
- Use fossil fuels in an environmental friendly way, CSS carbon capture & storage
- If you cant measure it, you cant fix it. Smarter grids are needed for wind and sun

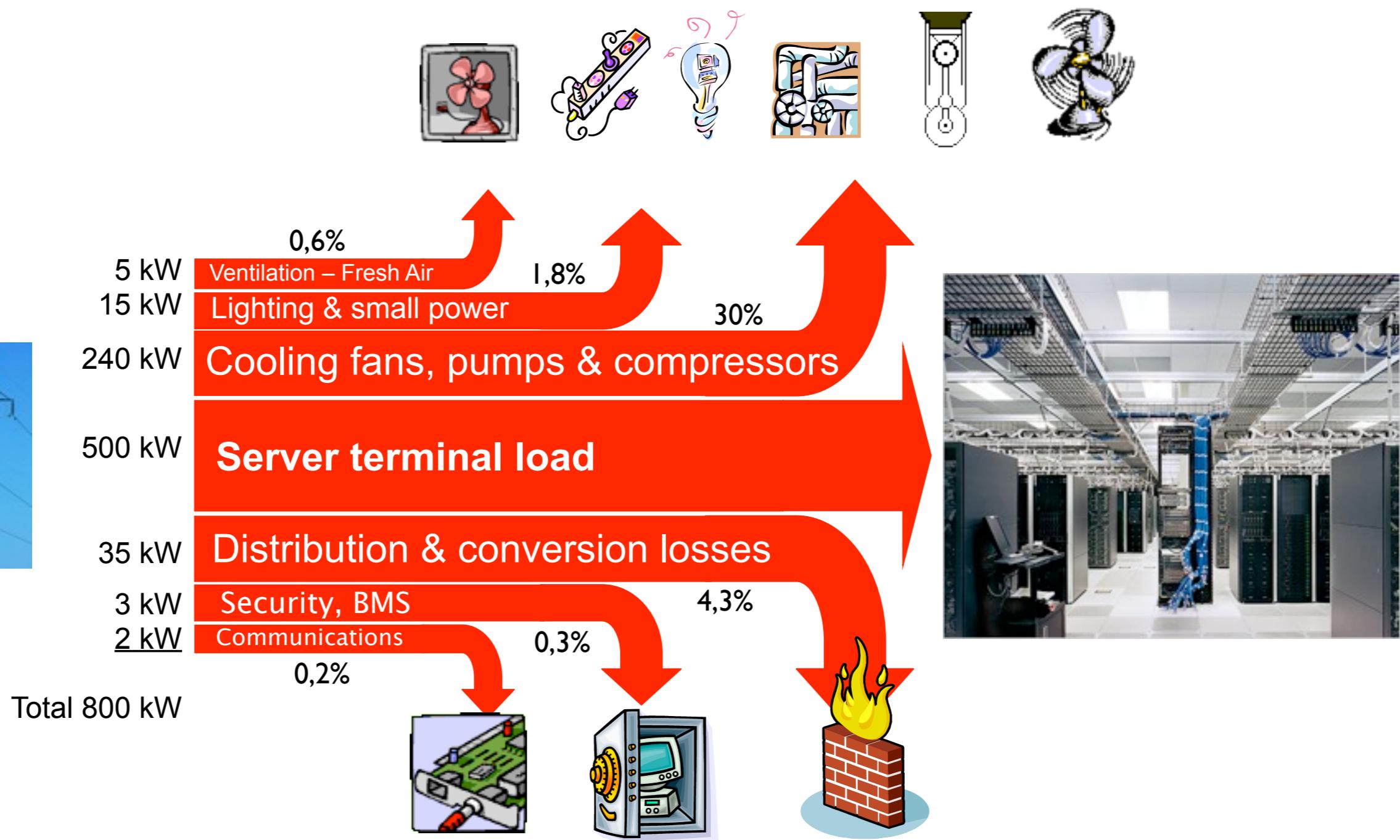


Datacenter efficiency

- Power Usage Effectiveness (PUE)
- A PUE of 2.0 indicates that for every watt of IT power, an additional watt is consumed to cool and distribute power to the IT equipment.
- PUE 1,6

A typical data center

IMW

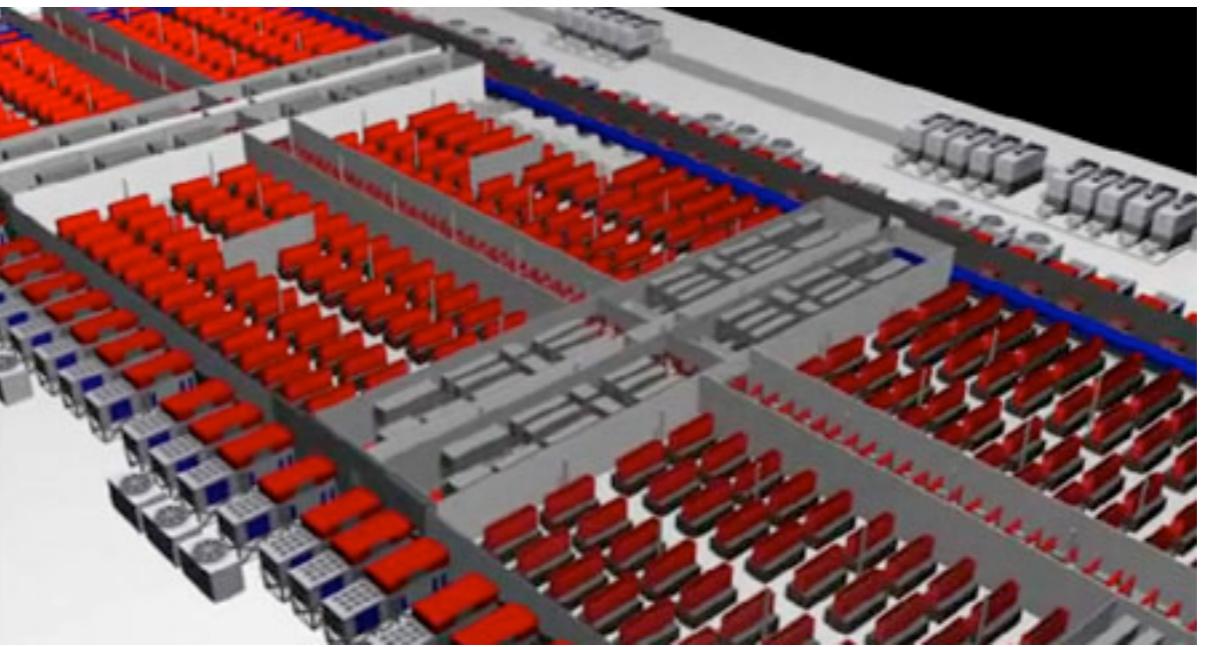


Where does the cloud live?





SuperNAP - Las Vegas





rackspace[®]
HOSTING

slicehost



San Antonio, Texas



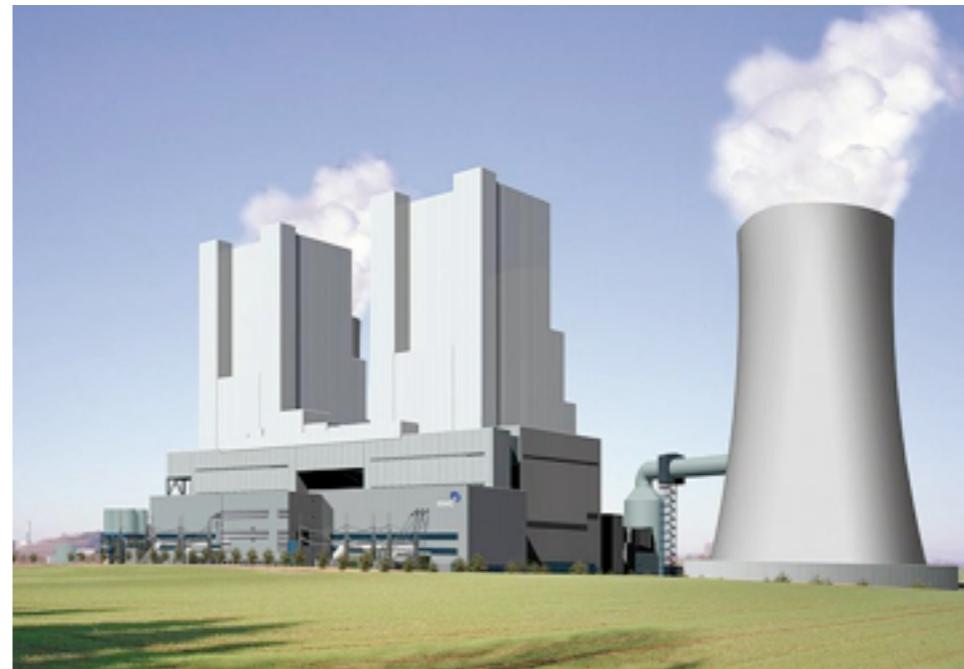
Frankfurt



Largest datacenter in EU - 120MW



Oskarshamn nuclear
reactor = 1,000MW



Neurath Coal plant, Germany
= 2,100MW



Hamina, Finland Summa Mill



**200 Million EUR
investment**

Activity	Google searches
CO2 emissions of an average daily newspaper (100% recycled paper)	850
A glass of orange juice	1,050
One load of dishes in an EnergyStar dishwasher	5,100
A five mile trip in the average U.S. automobile	10,000
A cheeseburger	15,000
Electricity consumed by the average US household in one month	3,100,000

What can the IT industry do?

- More, with less hardware. Efficient multi core support - Erlang
- Every server saved, saves CO₂ emissions in the end
- Virtualize, host on cloud services
- SSD disks

There are many power-management
improvements on client operating systems
-but are there any solutions to the
servers?

Thank You!

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