

Smart Information for Smart Energy Management

Tuan Anh Trinh

Network Economics Group

Budapest University of Technology and Economics



Future Internet Assembly, Valencia, April 25-16, 2010



Economics of information

The **right** information
at the right **time**

Two white dice with black pips are shown on a background of a newspaper page. The dice are slightly out of focus, suggesting a sense of chance or uncertainty. The newspaper text is visible but blurred, providing a textured, real-world context for the concepts of information and risk.

Uncertainty and
associated **risk**



Partial information

Psychological effect

Economics of Information

Aspects of Information

- › Uncertainty and trust
- › Partial information vs. complete information
- › Asymmetry of information flows and structure
- › Timing

The background is a dark blue gradient with several overlapping, semi-transparent, light blue shapes that resemble stylized leaves or petals. These shapes are positioned in the upper left and lower right corners, creating a sense of depth and movement.

Economics of information for energy efficiency

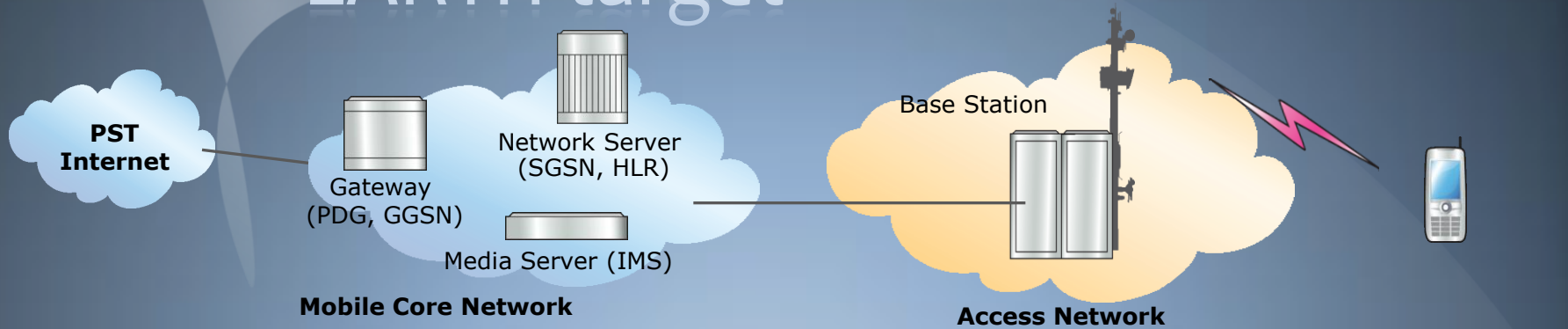
Energy efficiency means business efficiency

- › It is *not only* about our care for the environment, *but also* about our wallet
- › Electricity bill is ~ 20% of OPEX of mobile operators
- › Electricity bill of data centers is getting higher and higher

The background is a dark blue gradient with several large, overlapping, organic shapes in a lighter shade of blue, resembling stylized leaves or petals. The text is centered in the upper half of the image.

Energy-efficient ICT
The **EARTH** project

EARTH target



Energy Consumption
(CO₂-contribution)

10-20%

70-80%

2-10%

reduce by
50%

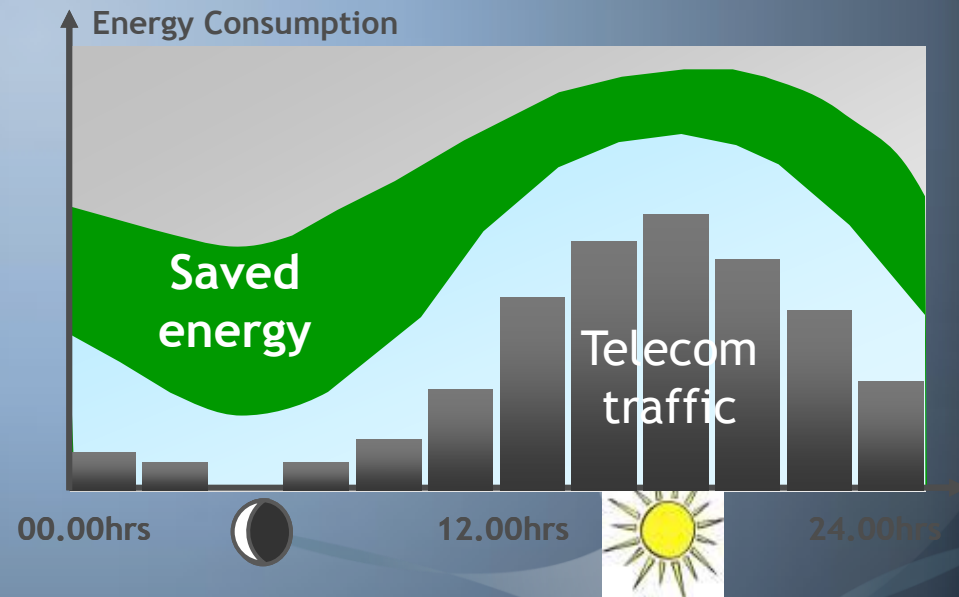
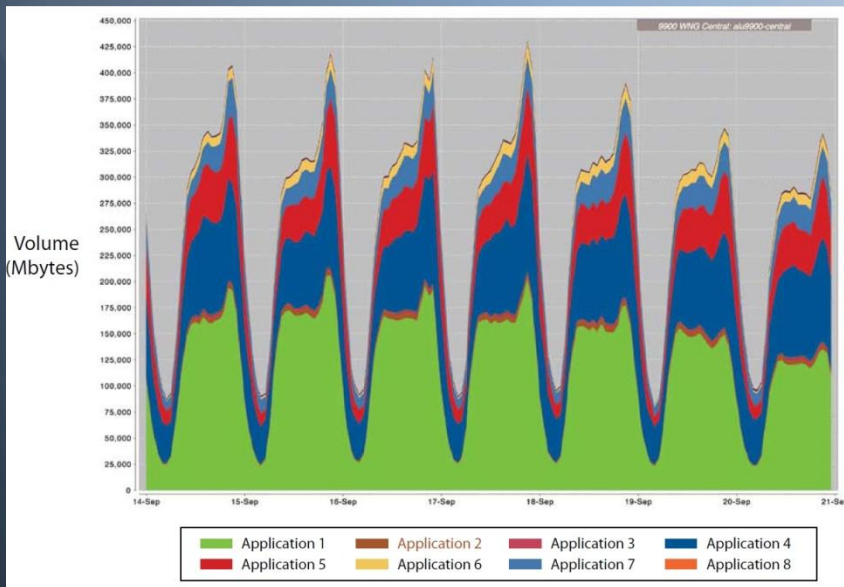


Green Networks

Green Radio

Focus on present and future mobile cellular networks (LTE-A,...)

Energy saving by sleep modes / power reduction



ICT for Energy Efficiency

What was the greatest engineering achievement of the 20th century?

- › The motor car?
- › The computer?

In 2000, America's National Academy of Engineering gave a different answer:

“The vast network of electrification”

An argument

- › The traditional grid made most of the innovations and technological advances of the 20th century possible
- › The smart grid will support the key green advances of the 21st century possible

Issues with the current grids

- › Lack of efficient energy storage techniques
- › Energy is transmitted through long distances
 - › Energy leakage ~ 2%
- › Utilities have to produce to peaks
- › Part of the produced energy in off-peak hours is wasted
 - › This is inefficient, expensive, and more pollutive

Lack of information!!!

Challenges with smart grids

- › The information issue
 - › Smart metering
 - › Sensors
- › Efficient communication of information
- › Efficient management of information
- › Incentive engineering
 - › Prosumers & change in business models
 - › Efficient pricing
 - › Dynamic pricing



Source: Interactive Institute, Sweden

It is possible to make profit by good
management of information, and
make it **energy efficiently!**
(win-win situation!)

Thank you for your attention!

A banner for the Network Economics Group featuring a collage of images including a person, a globe, and abstract patterns. The text "Network Economics Group" is written in a bold, yellow, sans-serif font across the center.

Network Economics Group

http://netecon_group.tmit.bme.hu

Recent Research Interests

- Energy-efficient networking and computing (wired-cum-wireless)
- Green data centers
- Incentive engineering



Action IC0804