Bundesministerium
für Verkehr,
Innovation und Technologie

Strategies for Energy Efficient Technologies

4E Wokshop on Green ICT in Austria

Wien, 05. März 2010

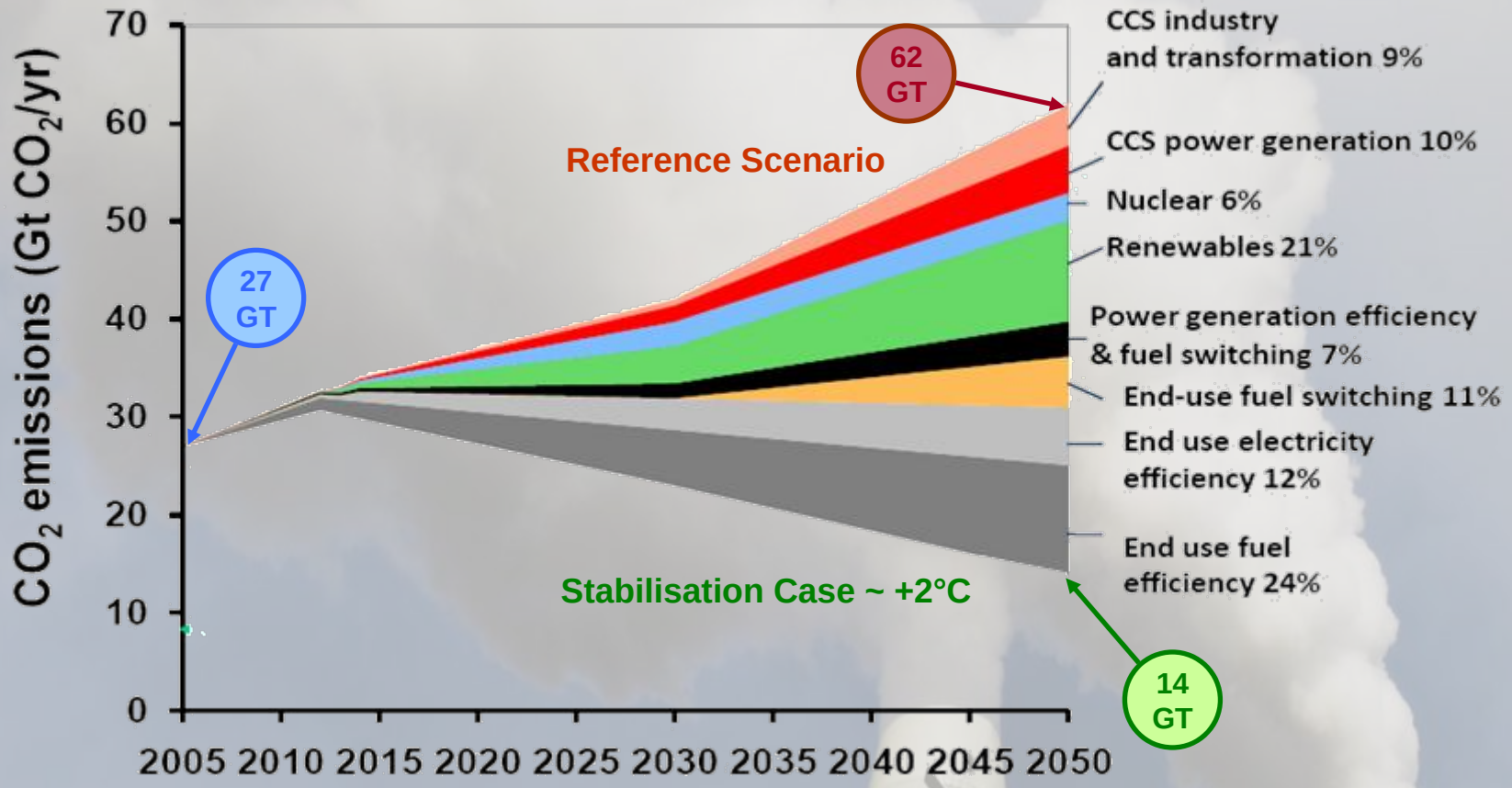
Michael Hübner

4E ExCo Representative for Austria

Energy and Environmental Technologies

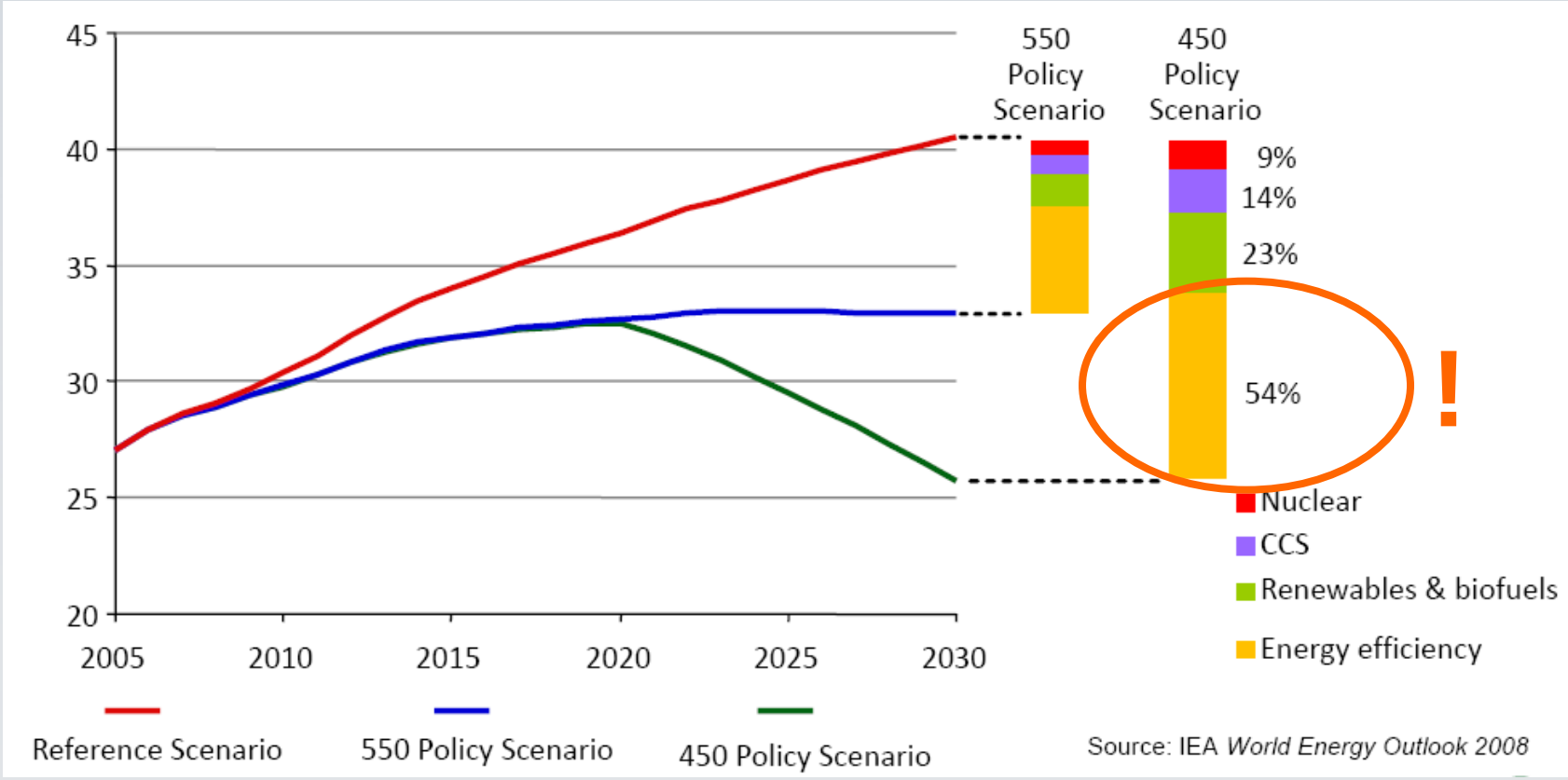
Federal Ministry for Transport, Inno vation and Technology, Austria

The Global Challange: Low Carbon Economy



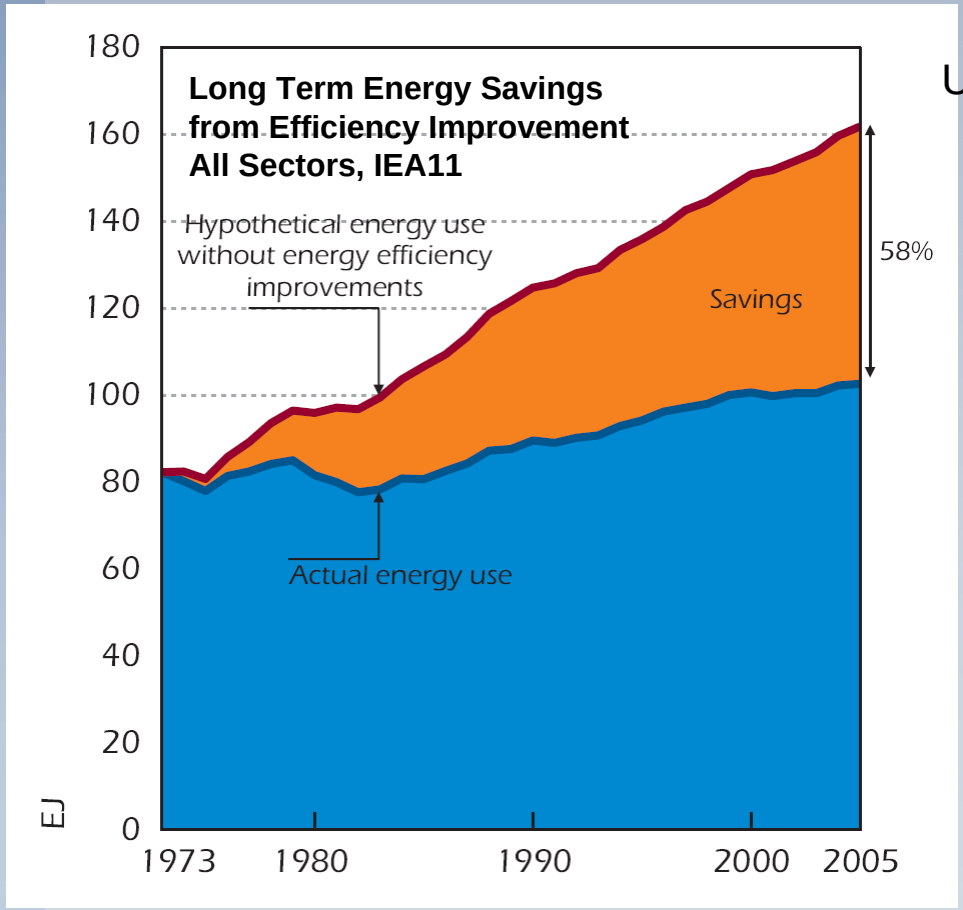
Source: Energy Technology Perspectives 2008, OECD IEA

Efficiency is Key



Source: „Ensuring Green Growth in a Time of Economic Crisis: The role of Energy Technology, G8 Environment Ministers Meeting 22 April 2009, Siracusa, Mr. Nobuo Tanaka*Executive Director*, *International Energy Agency*

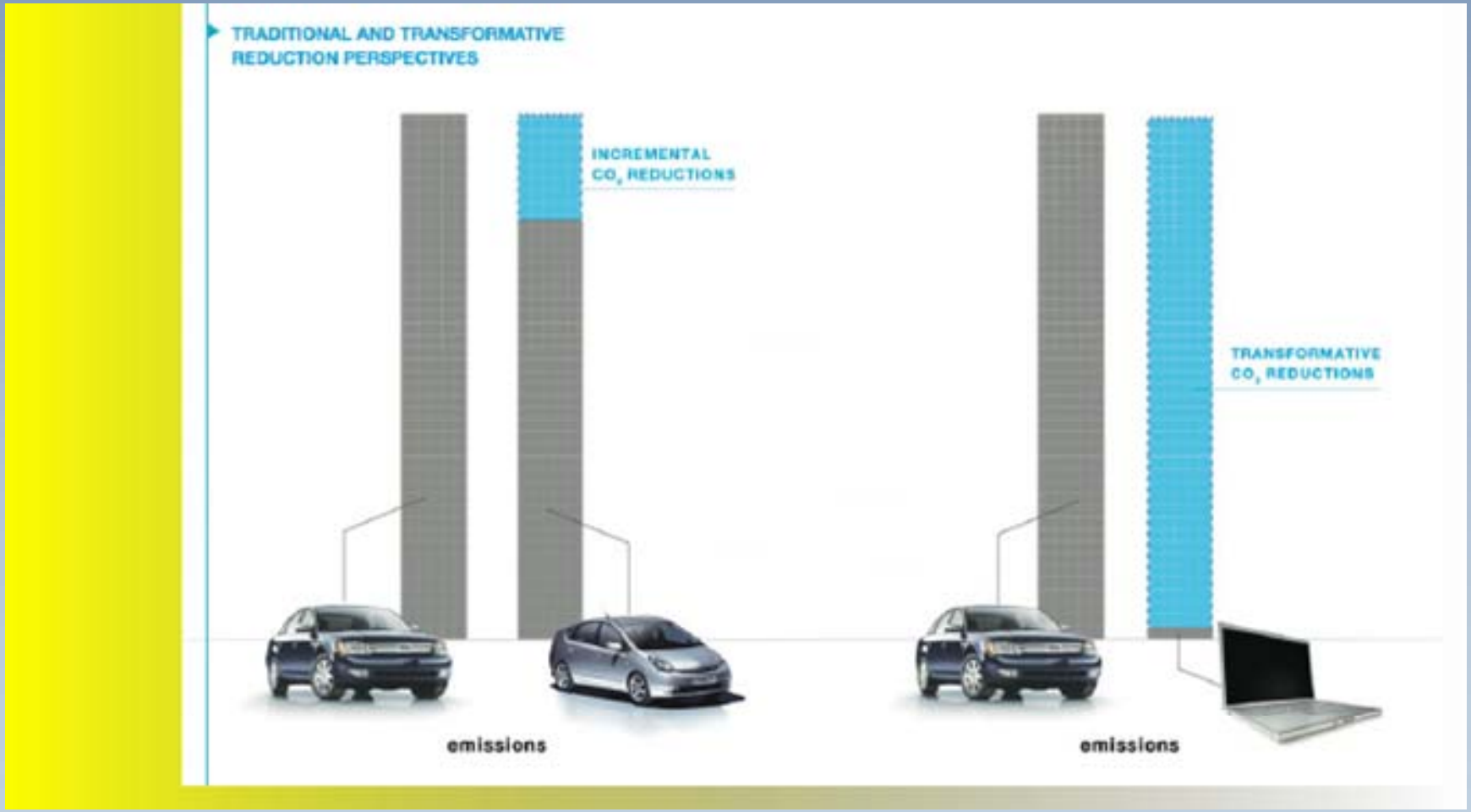
Efficiency- What do we mean? (Rebound)



Source: IEA indecators database, Worldwide Trends in Energy Use and Efficiency, IEA 2008

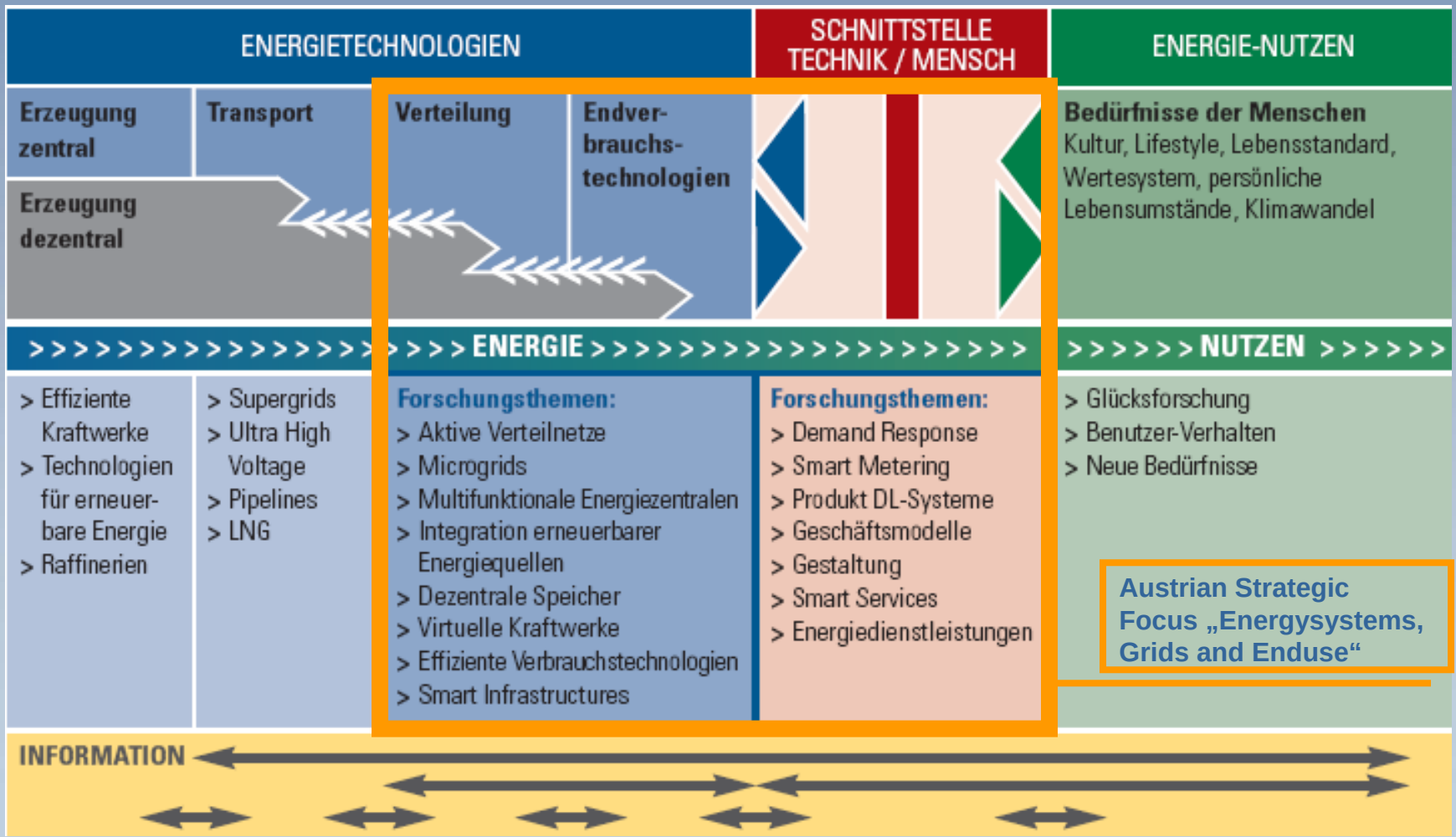
Unsere Visionen:

From Incremental to Transformative

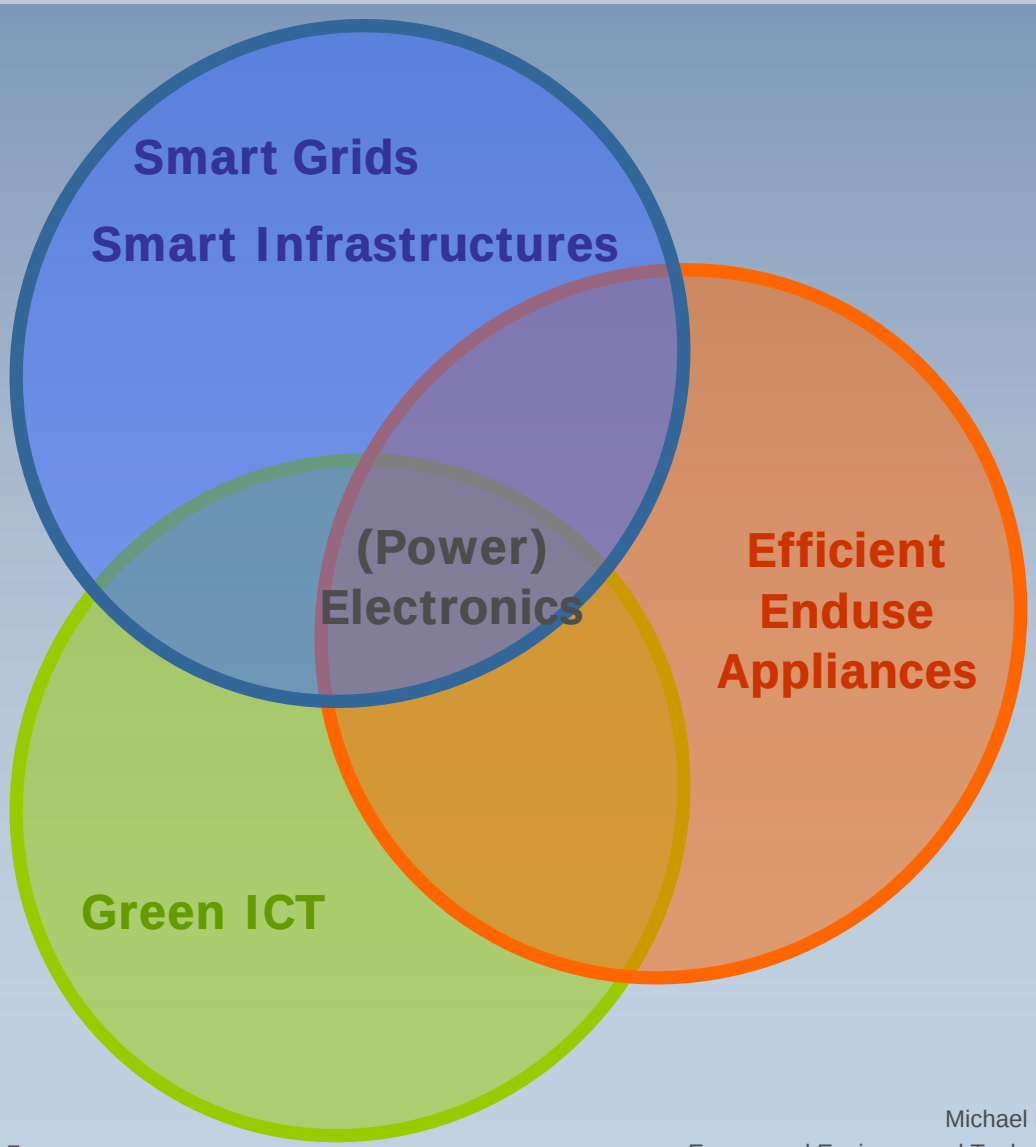


Source: Dennis Pamlin, Senior Associate, Chinese Academy of Social Sciences, Global Advisor

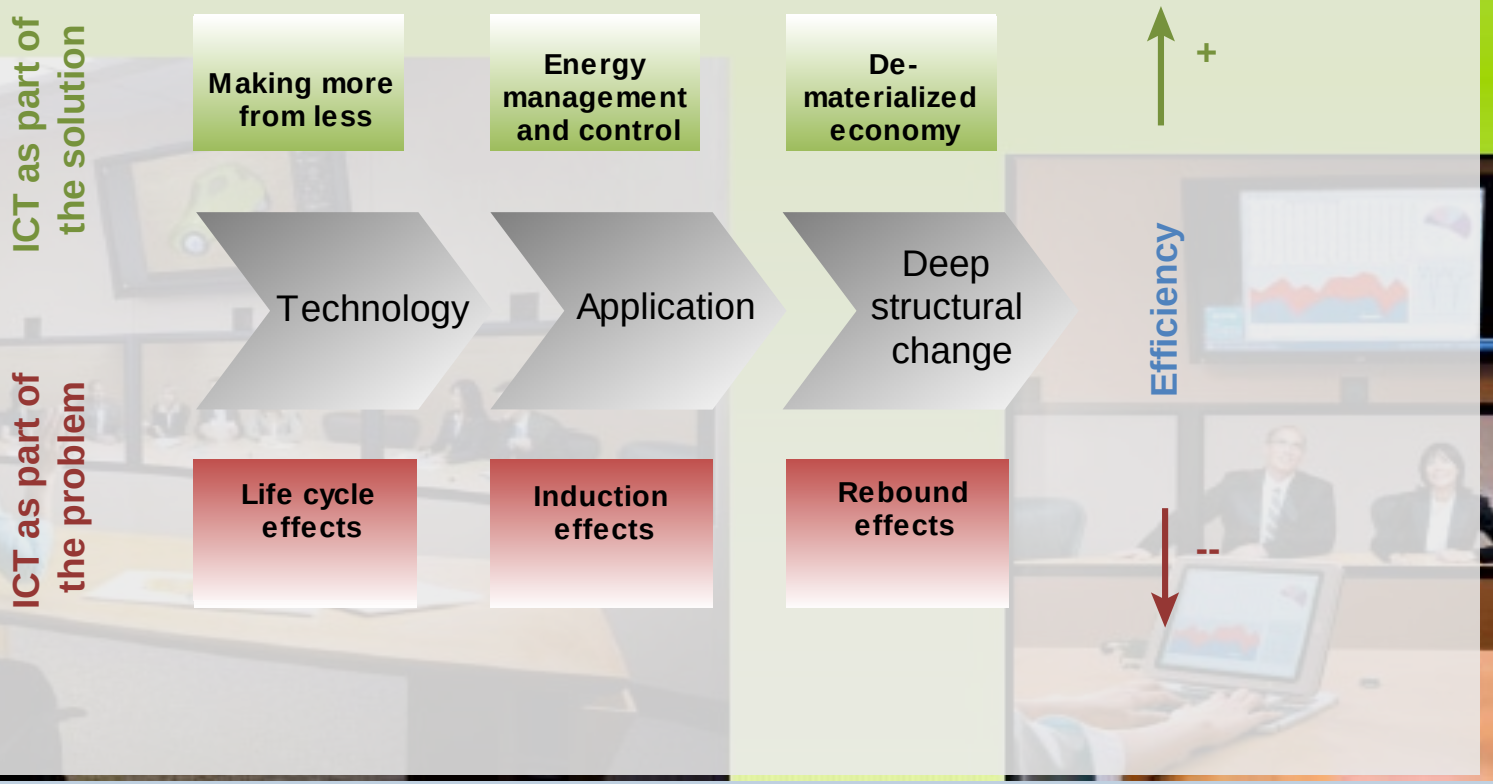
Systemic Approach



Key Topics

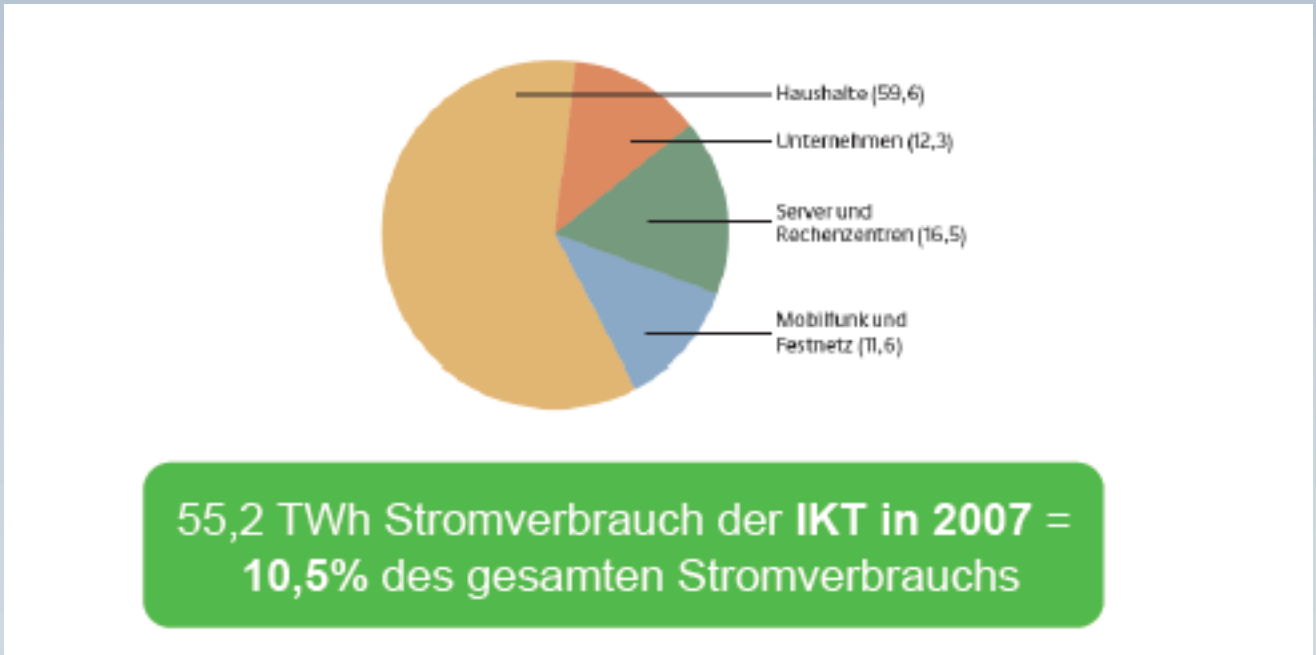

Smart Grids
Smart Infrastructures
(Power) Electronics
Efficient Enduse Appliances
Green ICT

“Green ICT” – what are we talking about?



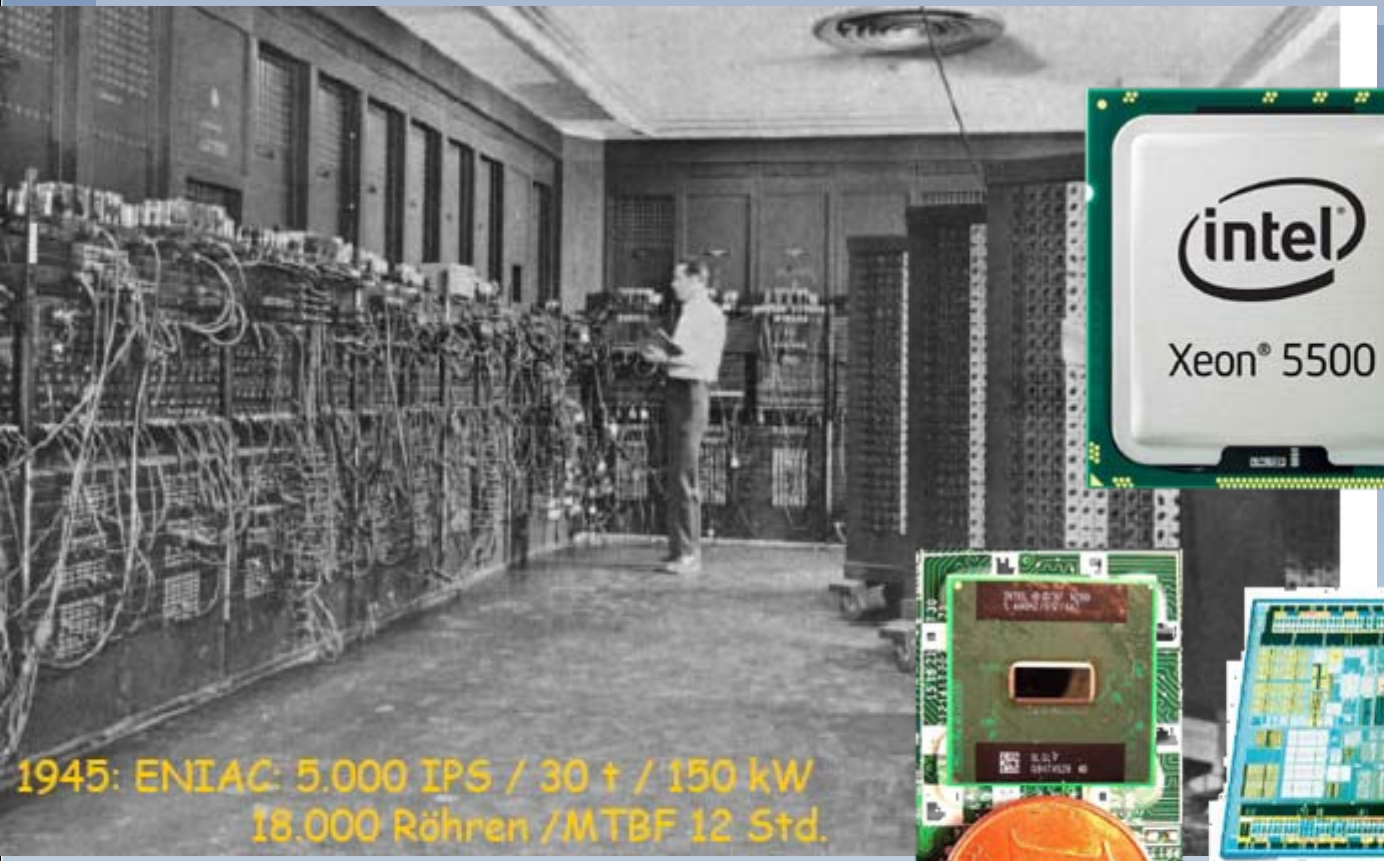
ICT needs Energy

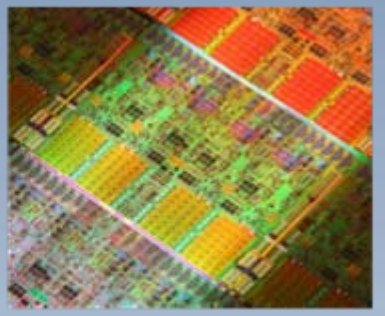
Bsp. Deutschland:



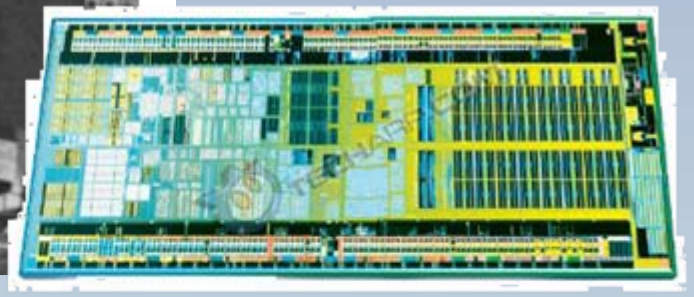
Quelle: www.bmwi.de und Fraunhofer (2009) / Mallek, TU Graz

Making More From Less





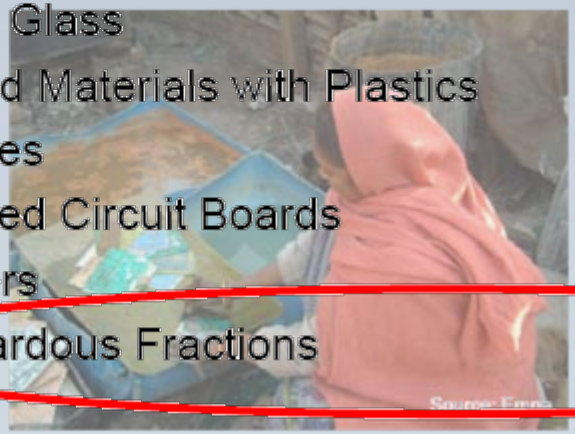
45 nm 214 mm²
3,2 GHz 130 W (0,8-1,35 V)
820 mio Transistoren



45 nm 26 mm²
1,7 GHz 2,5 W (0,9-1,15 V)
47 mio Transistoren

Source: Dr. Wolfgang Pribyl, TU Graz, Institut für Elektronik

But: Lifecycle, Materials



Composition of E-Waste (WEEE)

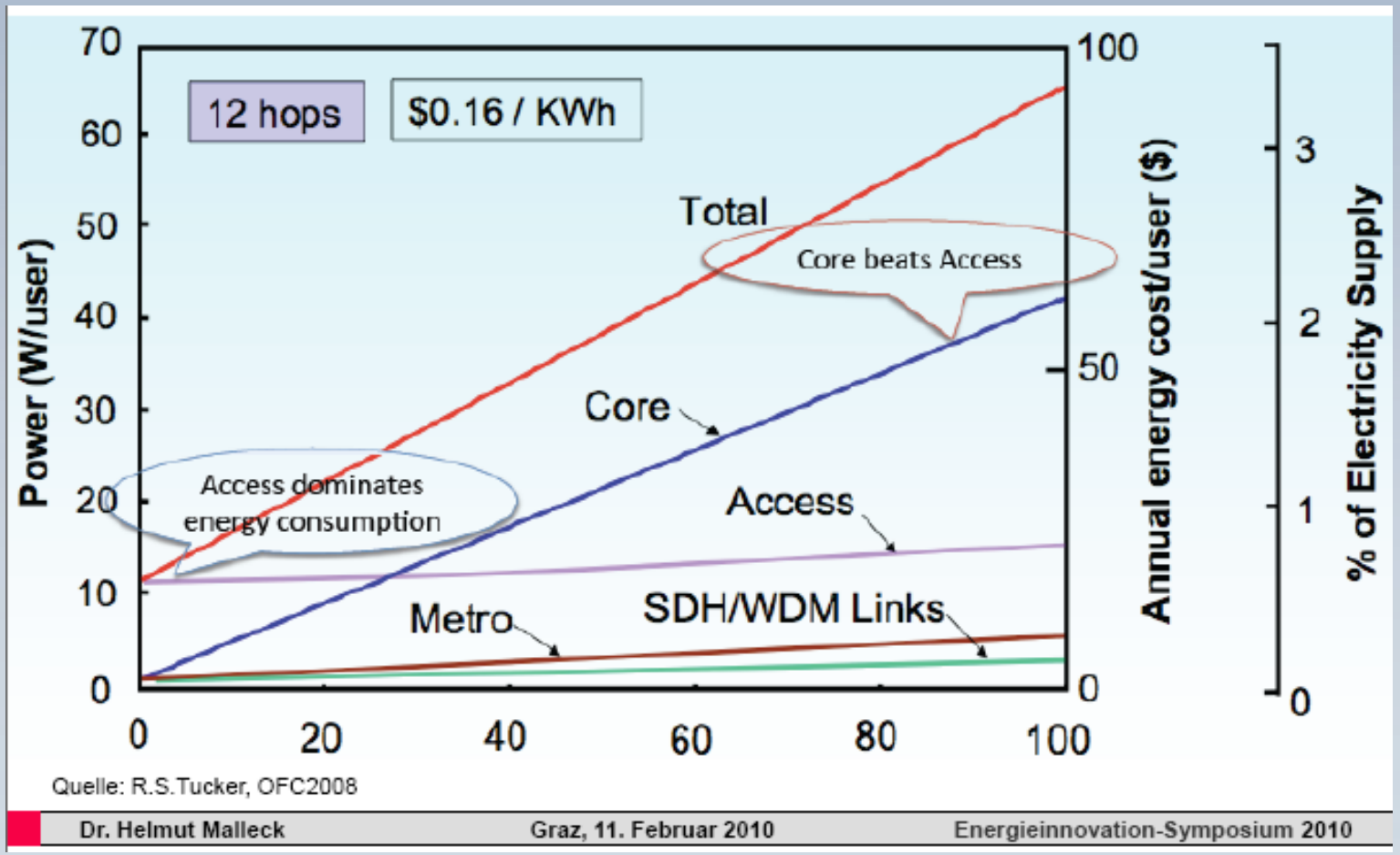
Ferrous Metals	39.1 %
Non-Fe Metals (Aluminium, Copper, Silver, Gold…)	21.0 %
Plastics	14.2 %
CRT Glass	13.4 %
Mixed Materials with Plastics	5.8 %
Cables	2.2 %
Printed Circuit Boards	1.9 %
Others	1.6 %
Hazardous Fractions	0.8 %

Source: Empa

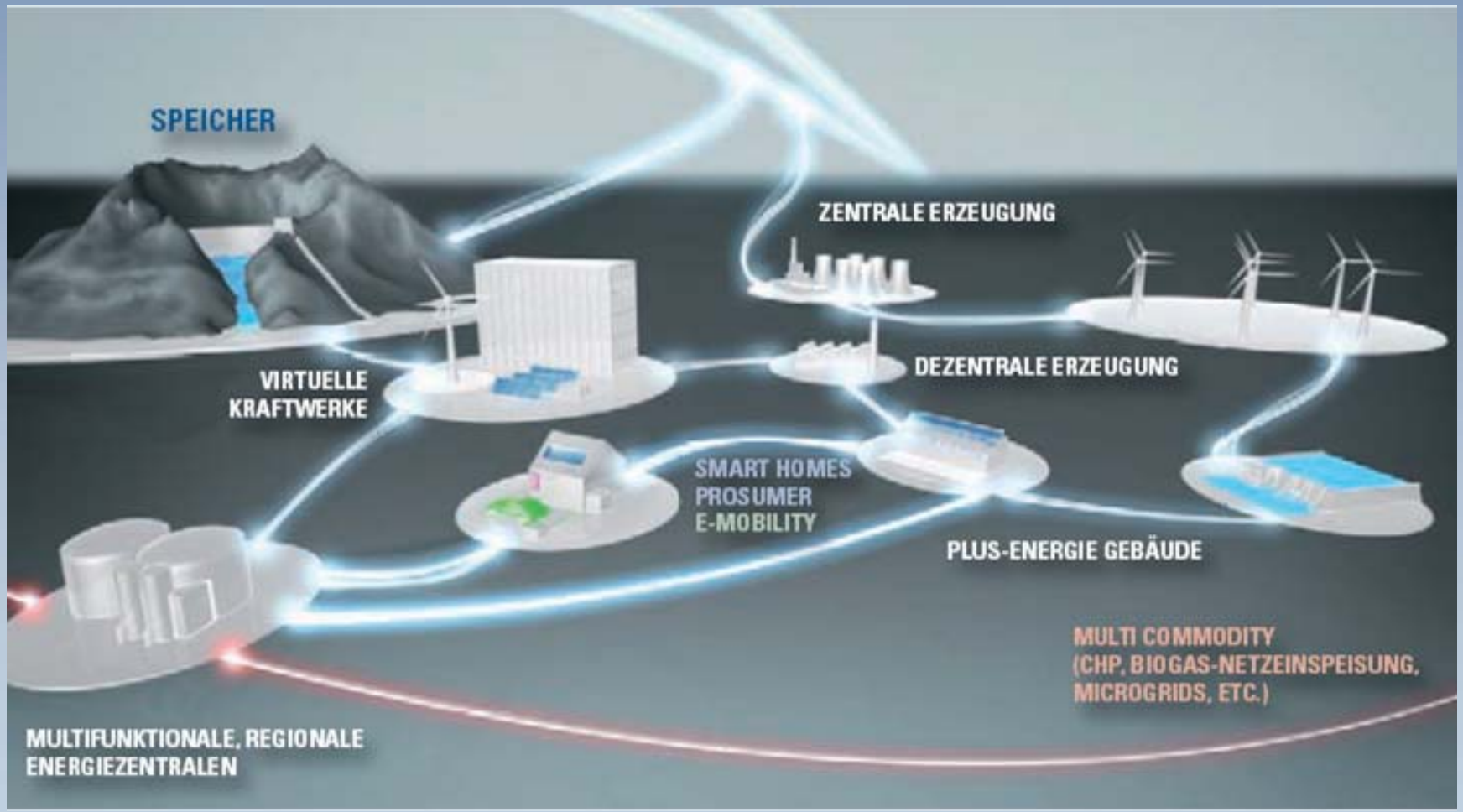
Source: Lorenz Hilty, Empa, Switzerland, OECD Workshop, Copenhagen, 23.05.08

Dematerialization

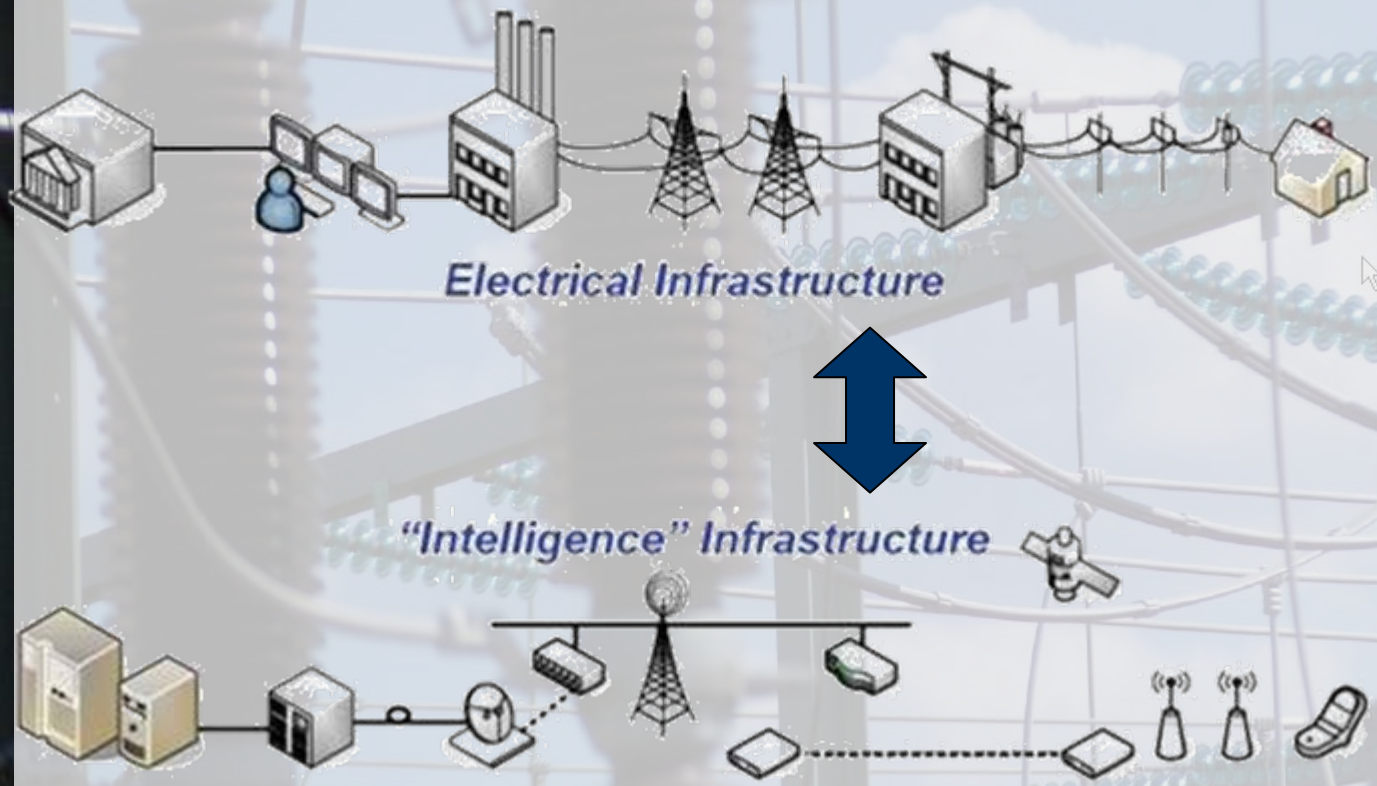
But: Bandwith means Energy



Smart Grids


SPEICHER
ZENTRALE ERZEUGUNG
VIRTUELLE KRAFTWERKE
DEZENTRALE ERZEUGUNG
SMART HOMES
PROSUMER
E-MOBILITY
PLUS-ENERGIE GEBÄUDE
MULTI COMMODITY
(CHP, BIOGAS-NETZEINSPEISUNG, MICROGRIDS, ETC.)
MULTIFUNKTIONALE, REGIONALE ENERGIEZENTRALEN

But: Interdependent Critical Infrastructures

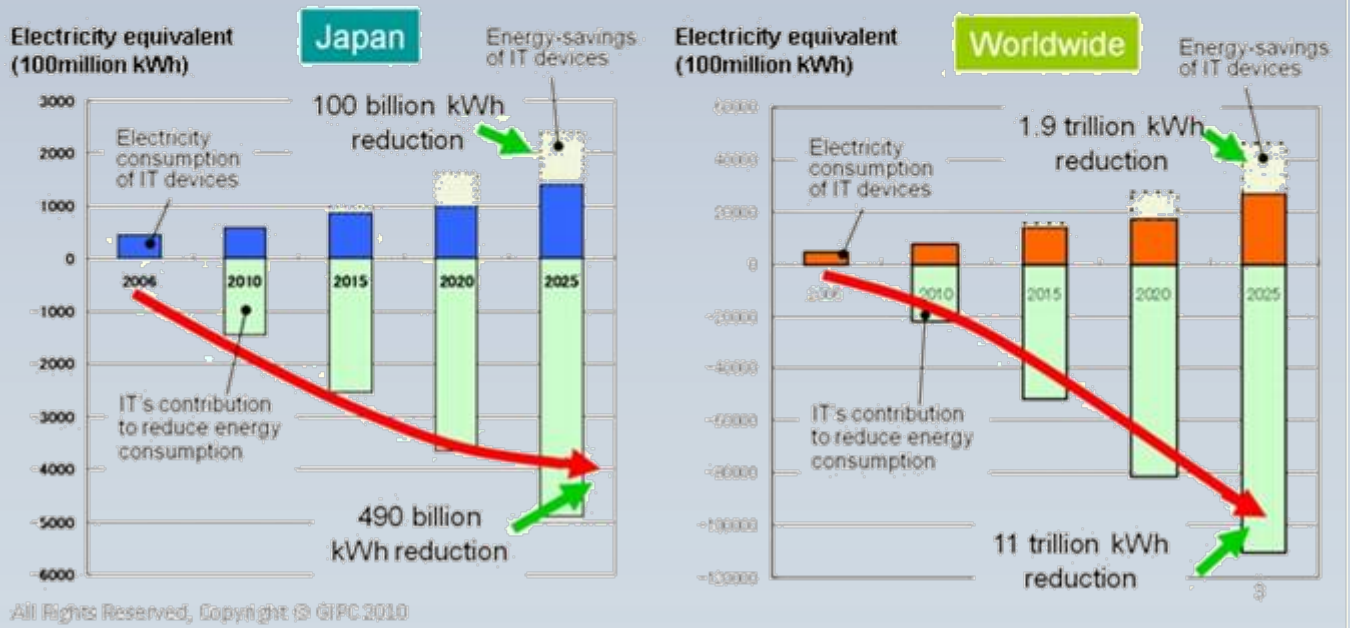


Source: EPRI – Electrical Power Research Instgitute, U.S.

Growing Expectations for Green ICT Worldwide – e.g. Japan

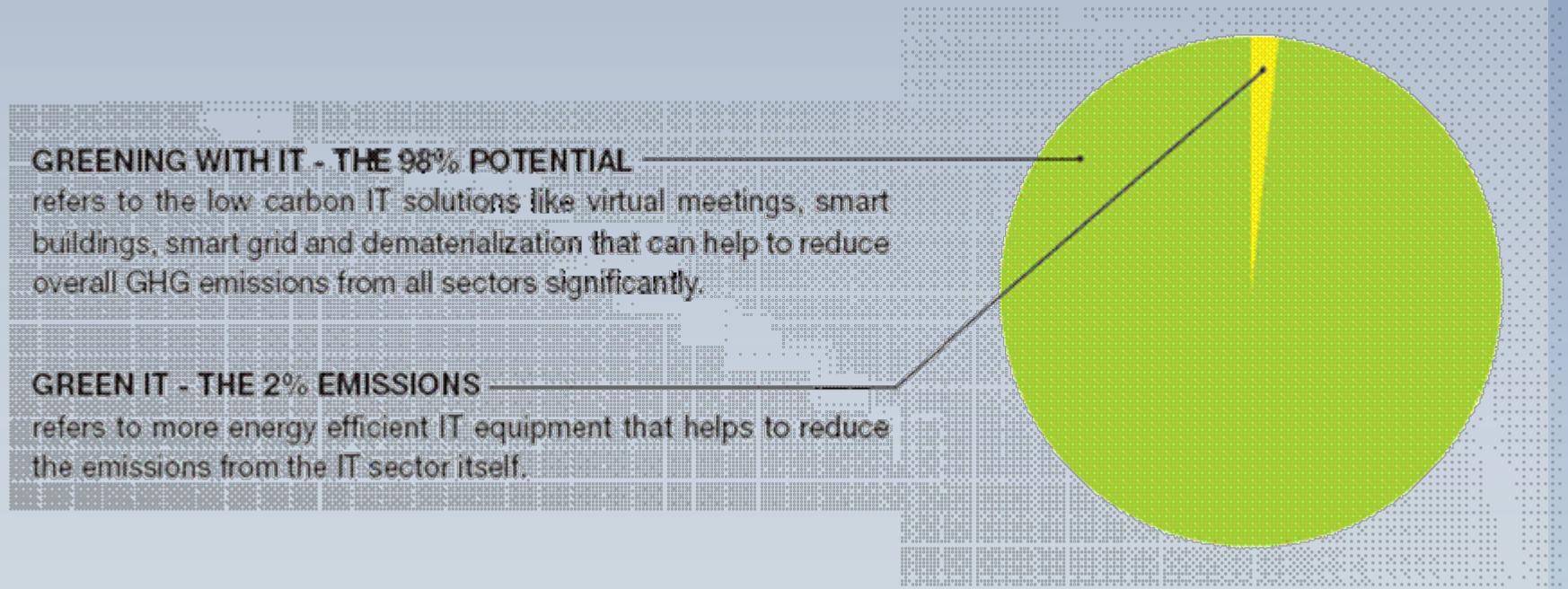
2. Growing expectations for green IT

The amount of "energy-savings by IT use" will exceed that of "energy consumption of IT devices" and IT can contribute the reduction of energy consumption of whole society if "Green IT" is actively promoted.



Source: Hidekazu Hasegawa, Executive Senior Vice President, JEITA (Green IT Promotion Council in Japan)

„Greening“ is the Goal



Source: From ”Green IT” to ”Greening with IT”, wwf 2009

What can we expect?

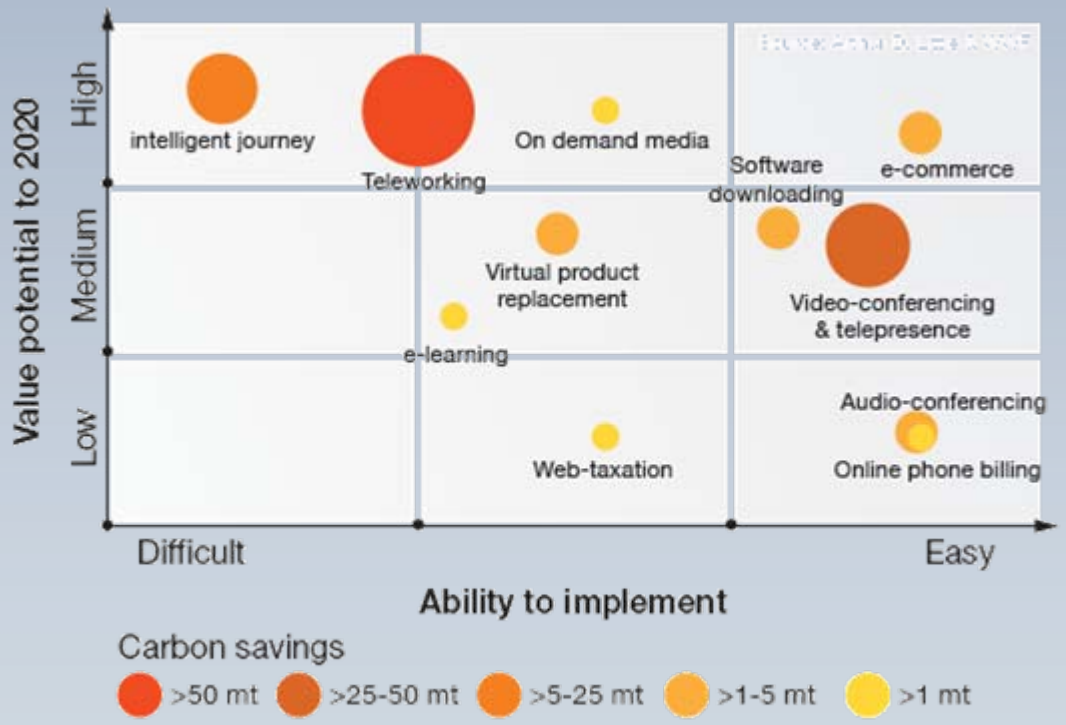
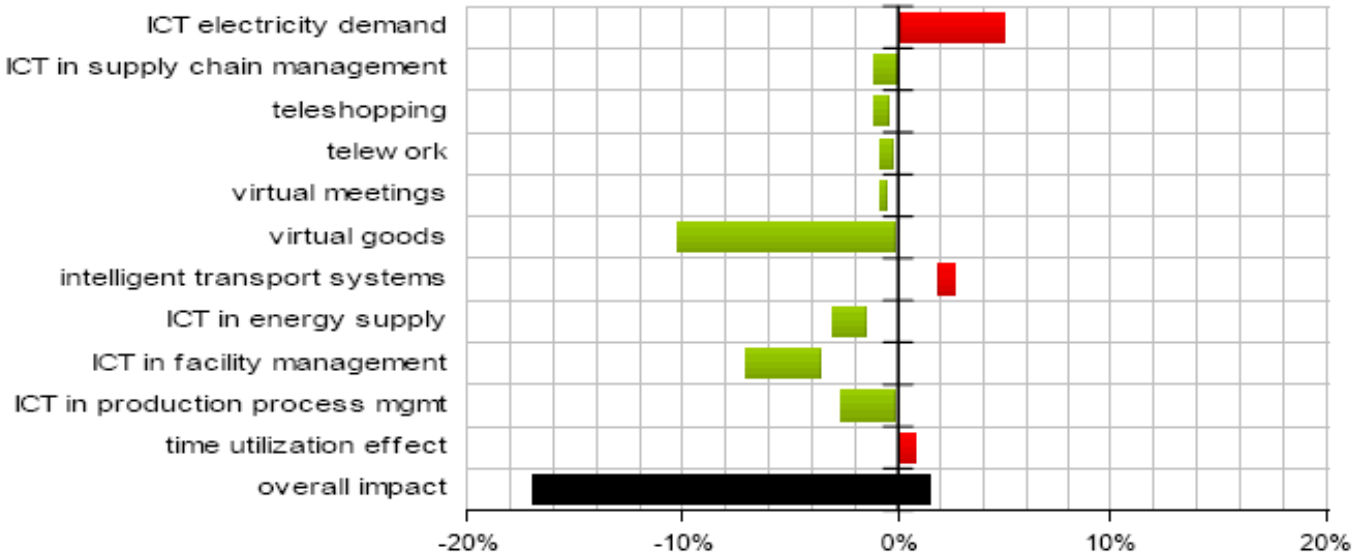


Figure 4
Carbon Management - A Business Opportunity

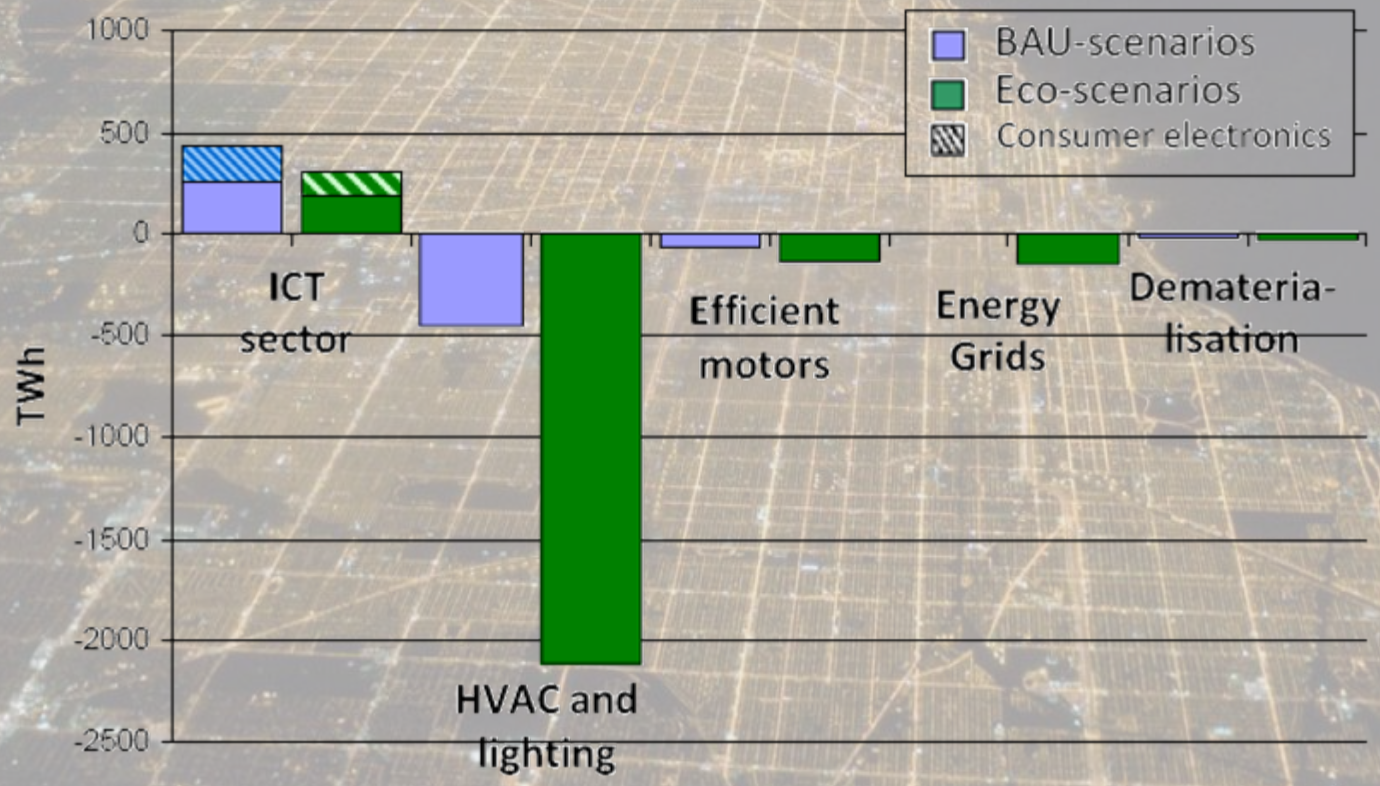
Source: From ”Green IT” to ”Greening with IT” , wwf 2009

Efficiency Potentials with ICT&Electronics



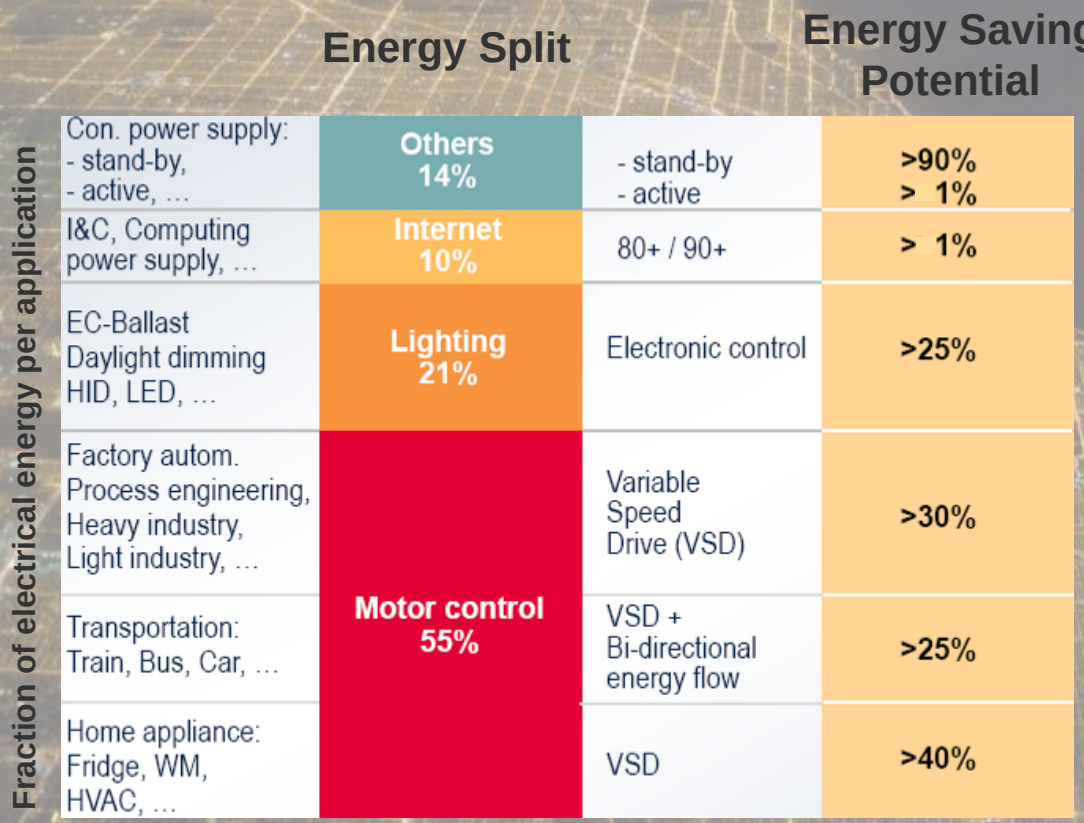
Quelle: Lorenz Erdmann, Institute for Future Studies and technology Assessment (IZT), OECD-Workshop on ICTs and Environmental Challenges“, Copenhagen, Mai 2008

Efficiency Potentials with ICT&Electronics (EU27)



Source: Impacts of Information and Communication Technologies on Energy Efficiency- Final Report, EC DG-INFSO, 2008

Efficiency Potentials with ICT&Electronics

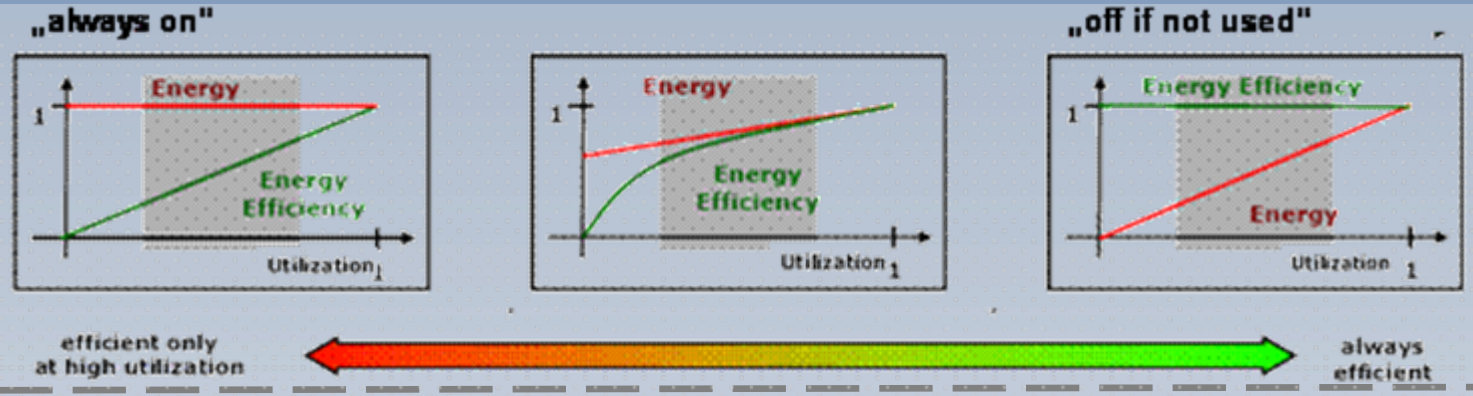


Source: Infineon, ZVEI, Siemens, CEMEP, CPES, EPA, NRDC

Example: Buildings

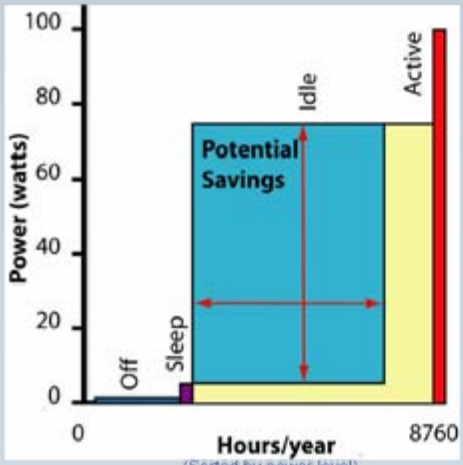
- **Building management („the energy passive house“)**
- **System integration of buildings heating and cooling loads**
- **Energy producing buildings („the energy active house“)**

Example: Standby and Beyond



Core Fact: Most PC energy use occurs when no one present

- **Not only computer systems but many enduse appliancess, electronic products, networking products**
- **e.g.: smart meters?**
- **→ protocols, system design, …**



Most of time when idle, could be asleep

But networking often prevents sleep mode

PC savings potential is **most** of current consumption

Similar patterns apply to set-top boxes, for TVs, printer, …

LAWRENCE BERKELEY NATIONAL LABORATORY

Example: Lighting

- **New technologies (solid state / LED, …)**
- **Smart lighting systems**
  (demand oriented, sensor controlled, system integration, …)
- **Energy autonomous lighting systems**

Picture Source: Autonomous PV-Street Lamps, HEI- Hornbachner Energie Innovation

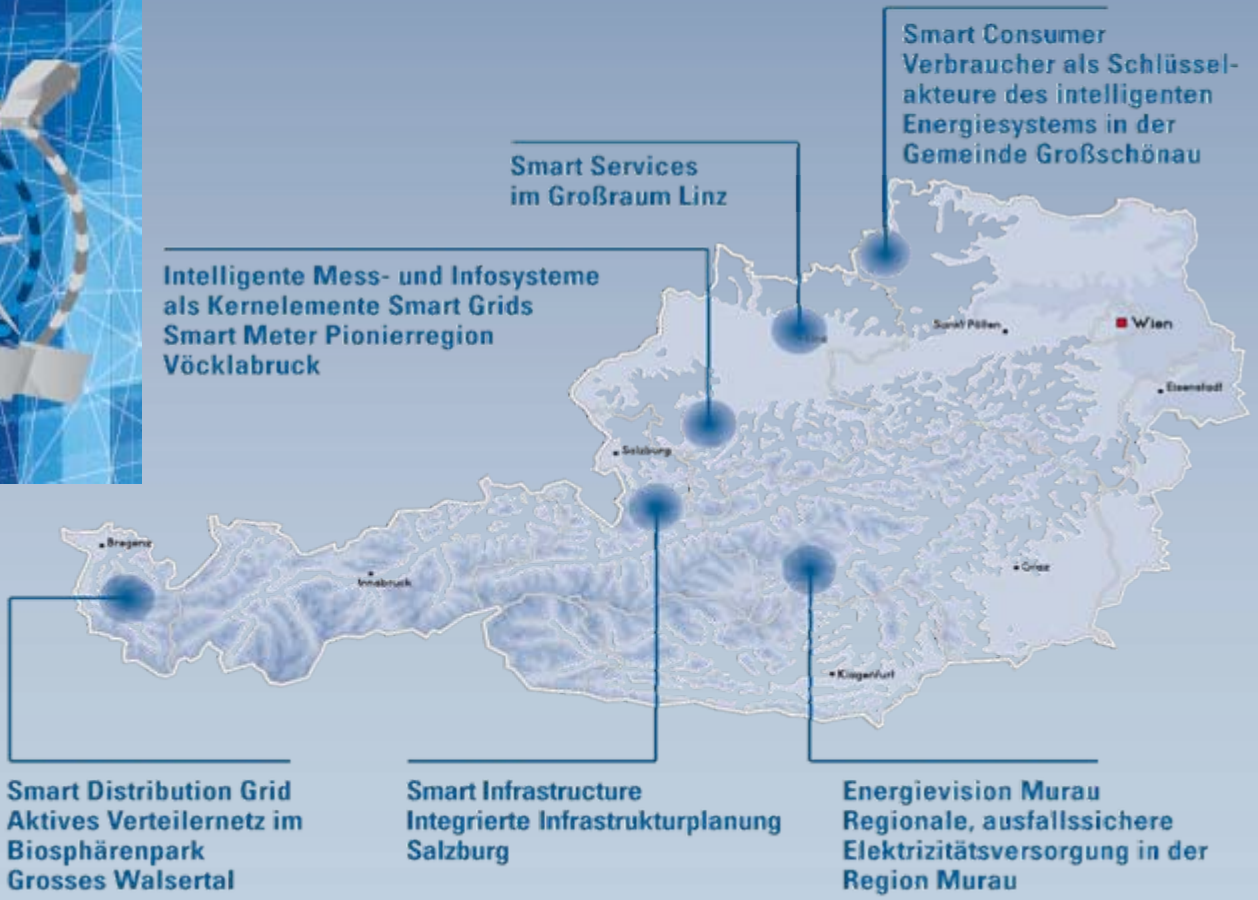
Example: Intelligent PV-Converters

- **Efficient power conversion**
- **Grid integration (power quality, ancilliary services)**
- **Building integration (shading, cascading)**

Abbildung 2: Überdachung mit PV-Modulen, Ludesch/Vlbg., C

Quelle: HEI Consulting 2009

Example: Smart Grids



SMART
ENERGY
SKULPTURE

New Services and Market Places

To be discussed at the workshop

- **Where are major potentials in the (Austrian) energy system?**
- **Where are chances for the (Austrian) Industry?**
- **What measures can be taken to overcome the „valley of death“?**
- **What is the role of R&D (especially in Austria)?**
- **What is the role of the different players in Austrian Industry (e.g. SMEs)?**

Microsoft Innovation Award: Sonderpreis „ICT for Green“ des BMVIT

Energieforschungsstrategie für Österreich - Reden sie mit!

- Online-Diskussion bis 10. März 2010
  www.energieforschungsstrategie.at

- Gemeinsam mit dem
  Rat für Forschung und Technologieentwicklung

- **→ Inputs für die Umsetzung der FTI-Strategie können somit die zukünftige Forschungslandschaft für Energie maßgeblich mitbestimmen.**

Danke für ihre Aufmerksamkeit.

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www.ENERGIESYSTEMEderZukunft.at