



Bundesministerium  
für Verkehr,  
Innovation und Technologie

# Strategies for Energy Efficient Technologies

4E Wokshop on Green ICT in Austria

Wien, 05. März 2010

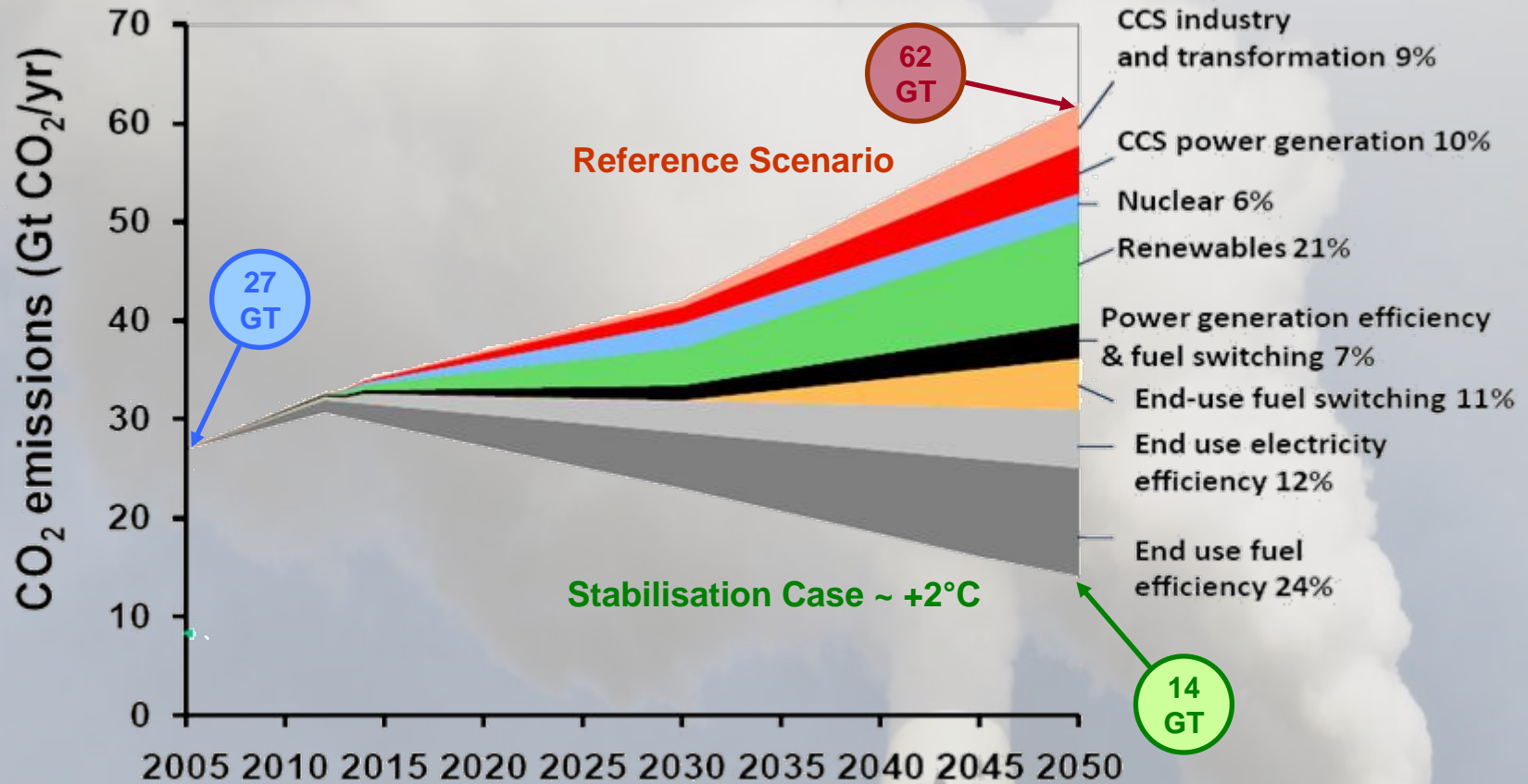
**Michael Hübner**

4E ExCo Representative for Austria

Energy and Environmental Technologies

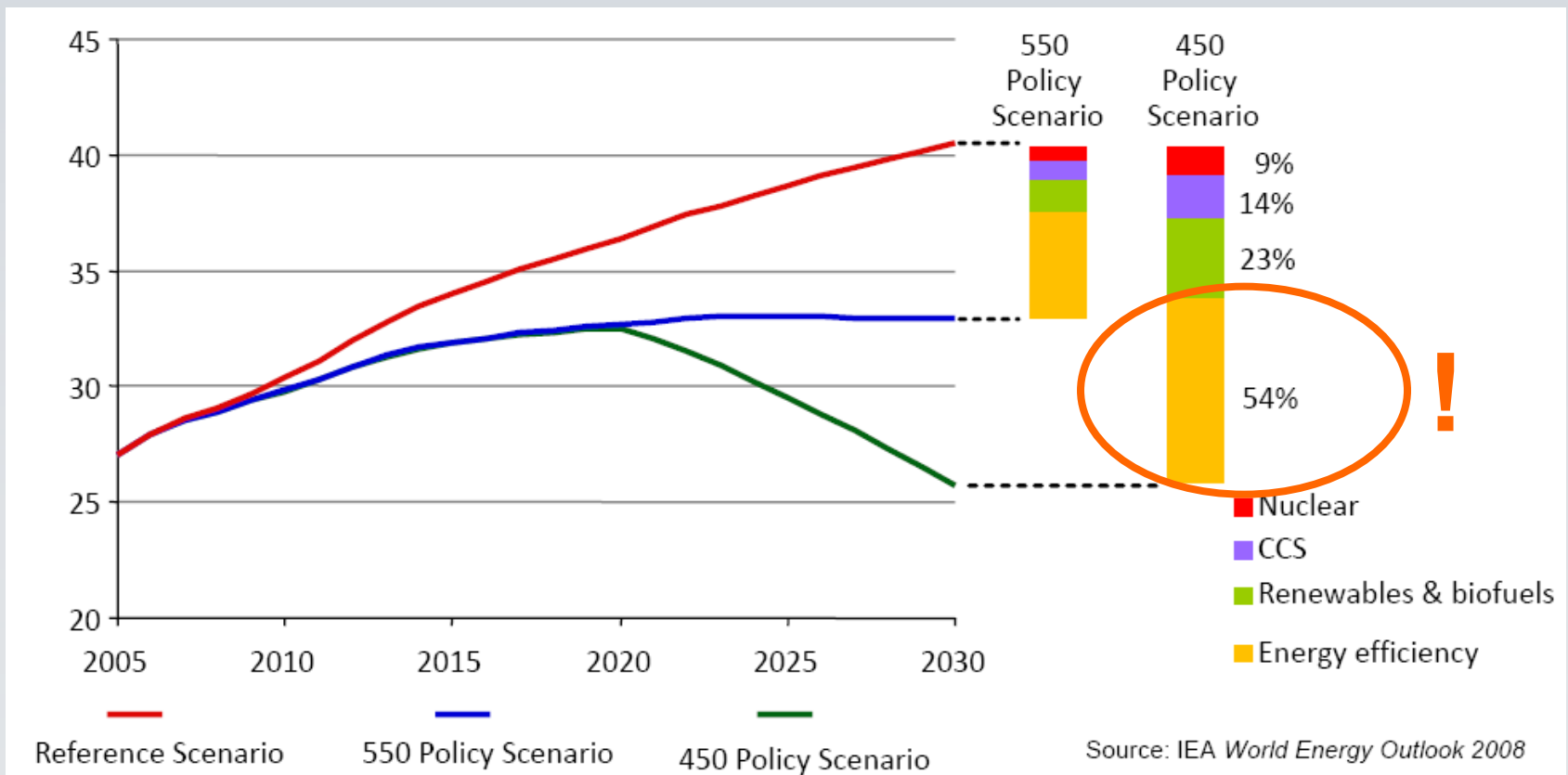
Federal Ministry for Transport, Innovation and Technology, Austria

# The Global Challenge: Low Carbon Economy



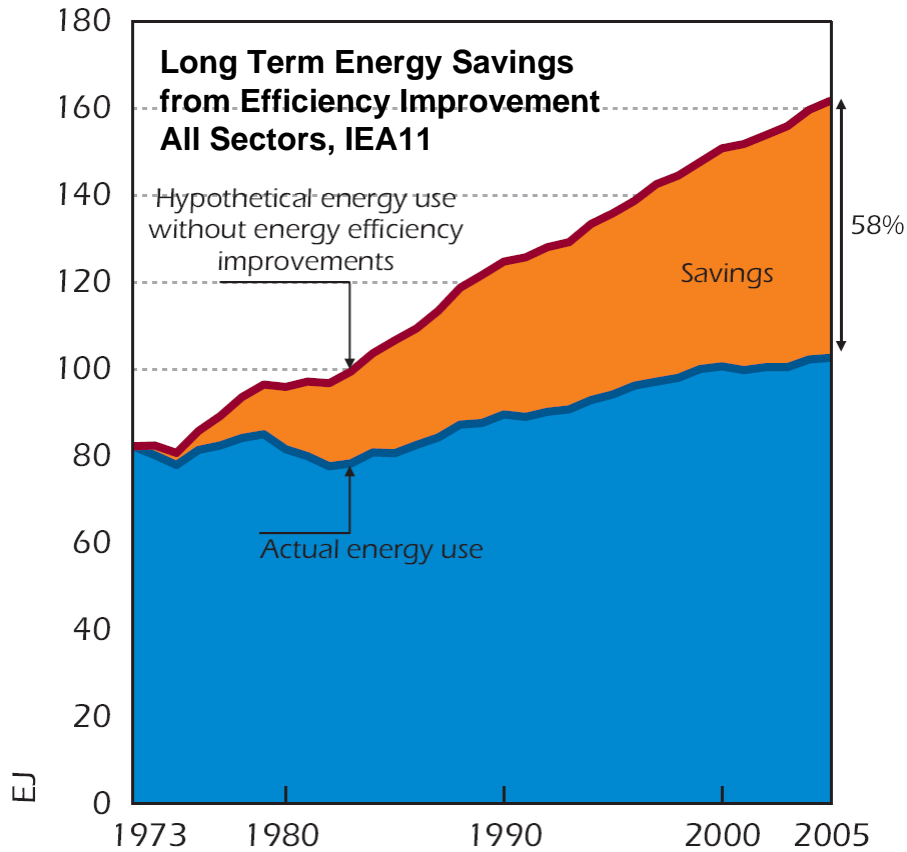
Source: Energy Technology Perspectives 2008, OECD IEA

# 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)



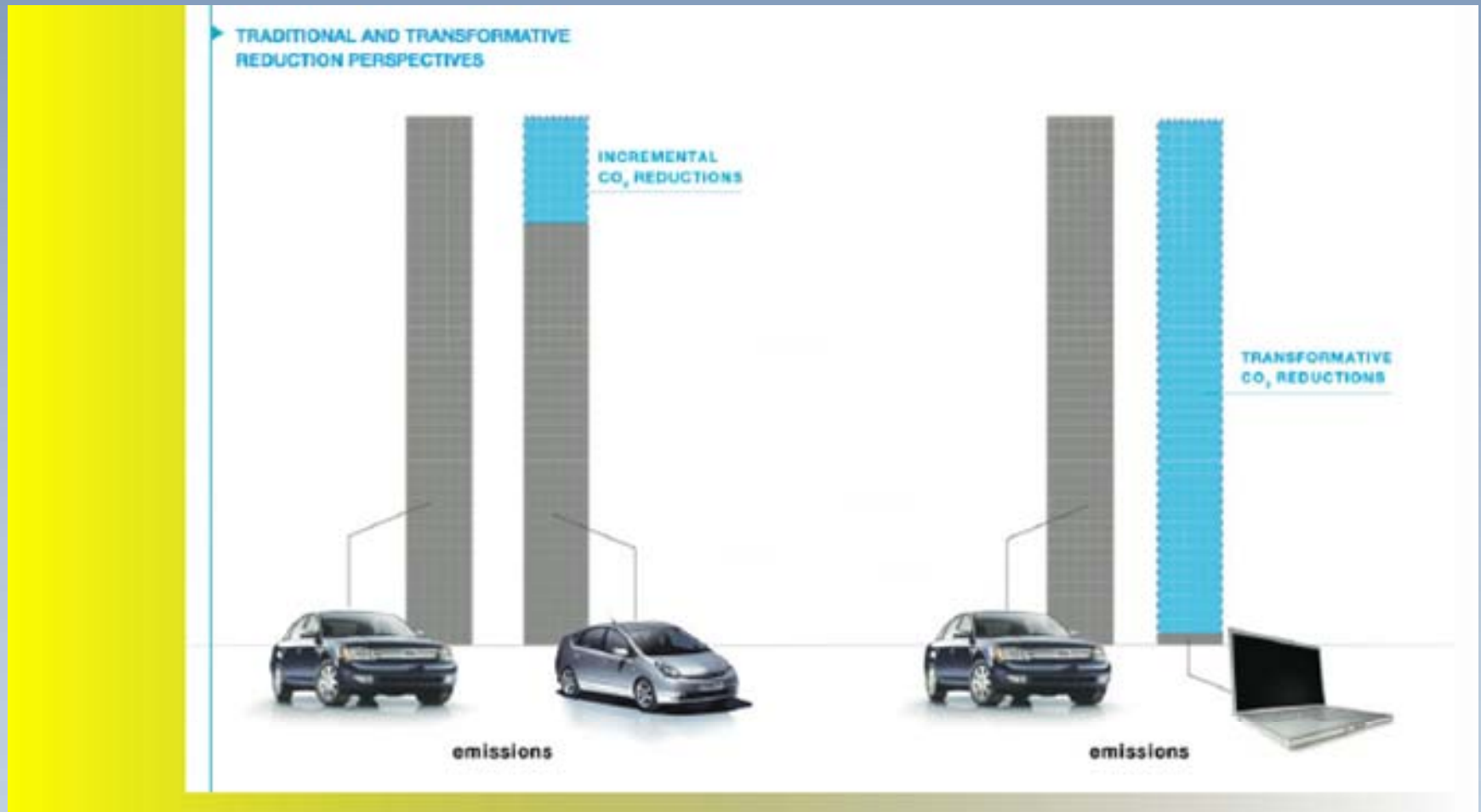
Source: IEA indicators database, Worldwide Trends in Energy Use and Efficiency, IEA 2008

Unsere Visionen:



BITKOM – German Association for Information Technology, Telecommunications and New Media

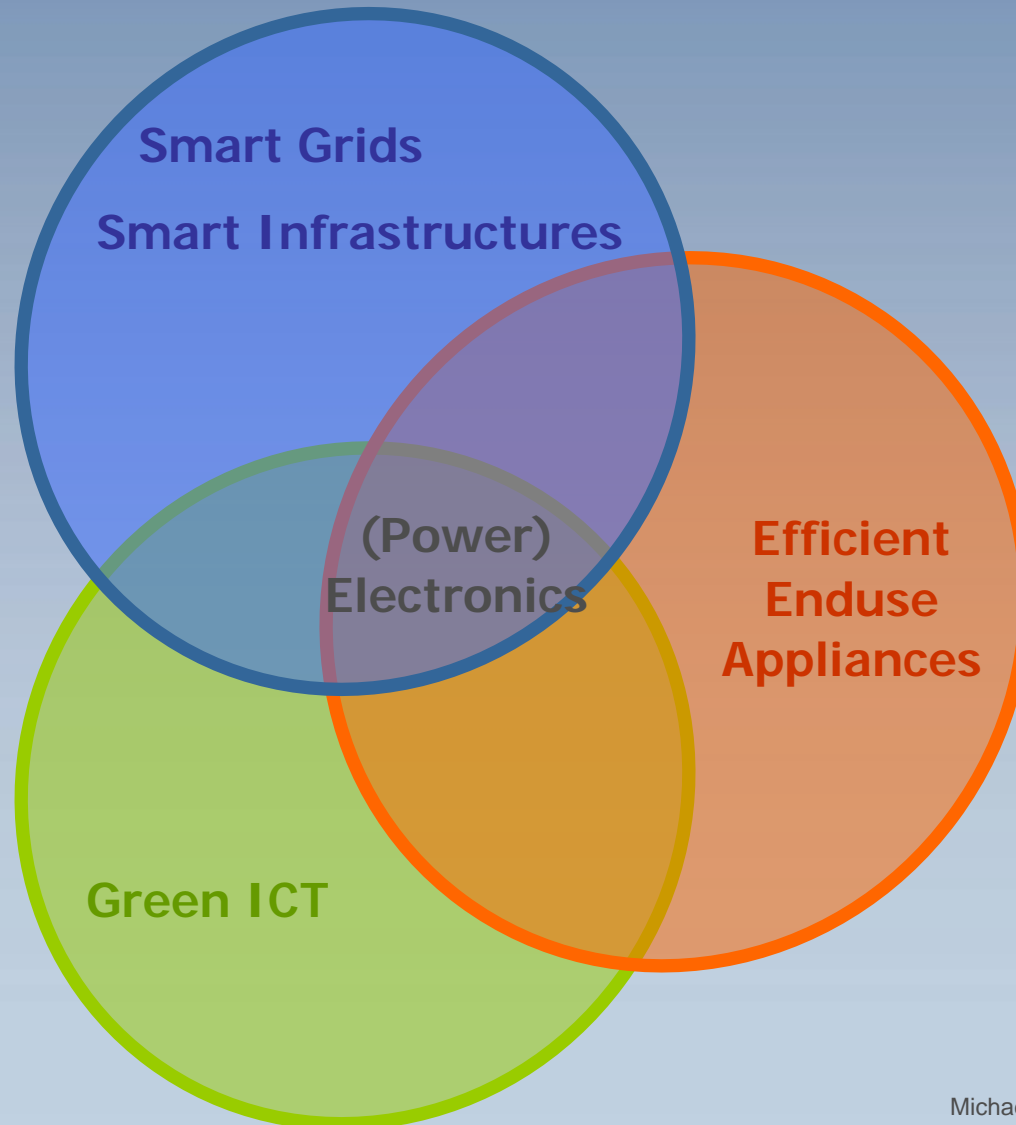
# From Incremental to Transformative



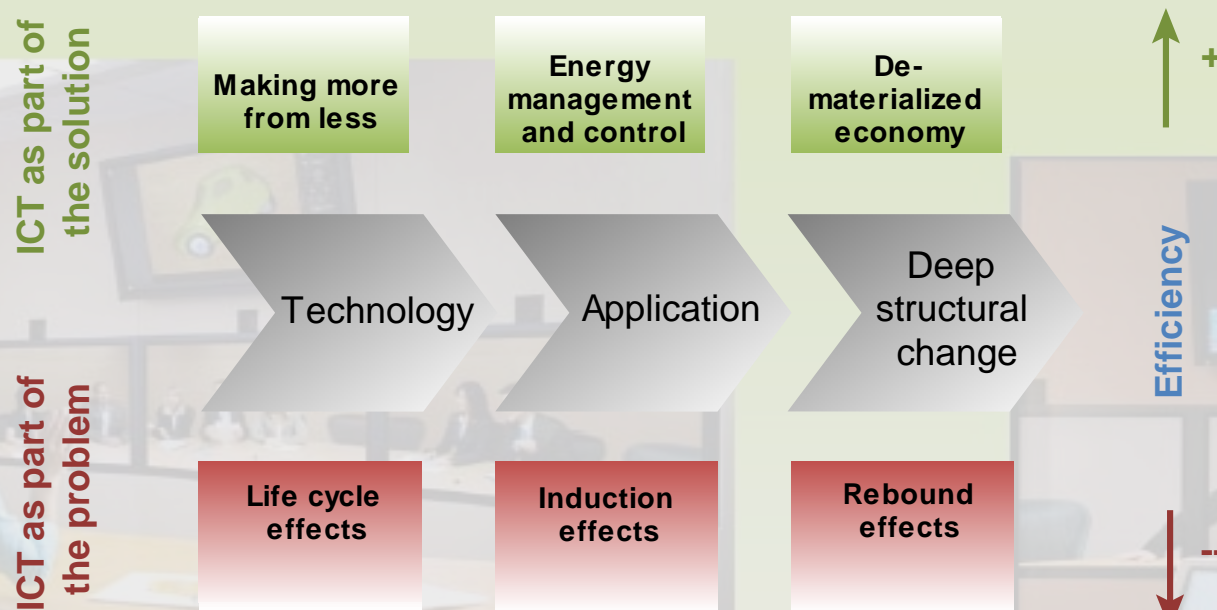
Source: Dennis Pamlin, Senior Associate, Chinese Academy of Social Sciences, Global Advisor



# Key Topics



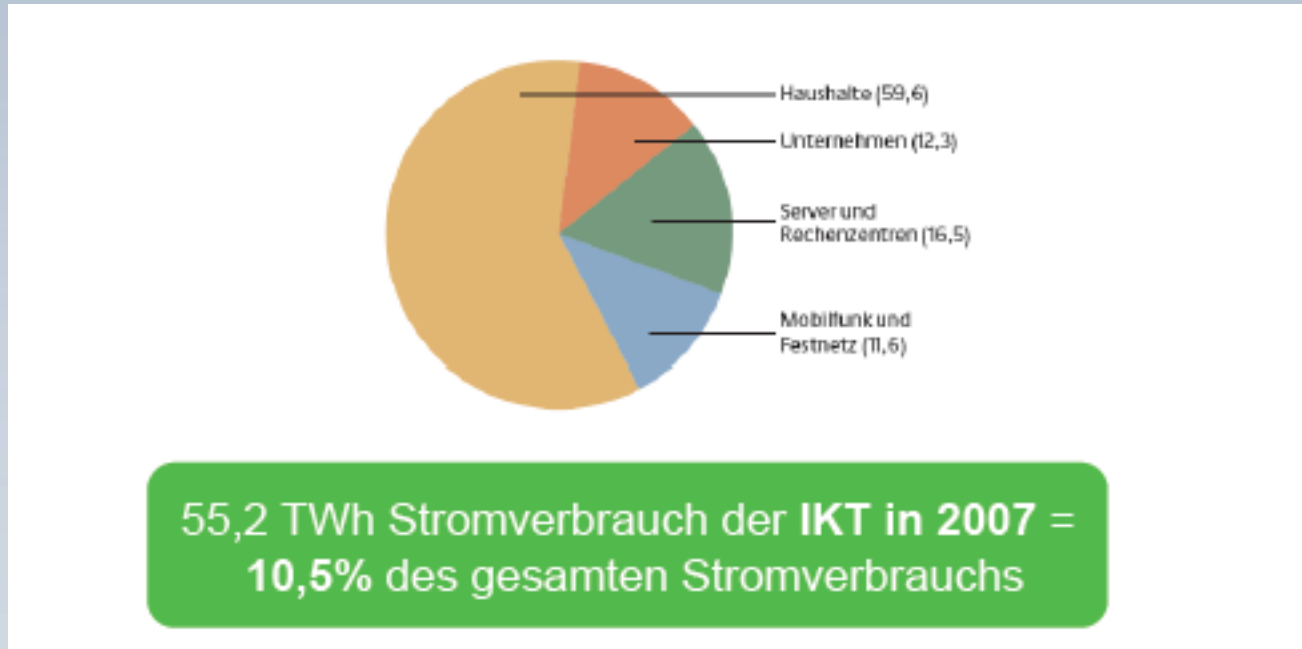
# “Green ICT” – what are we talking about?





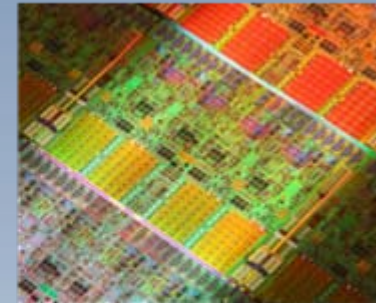
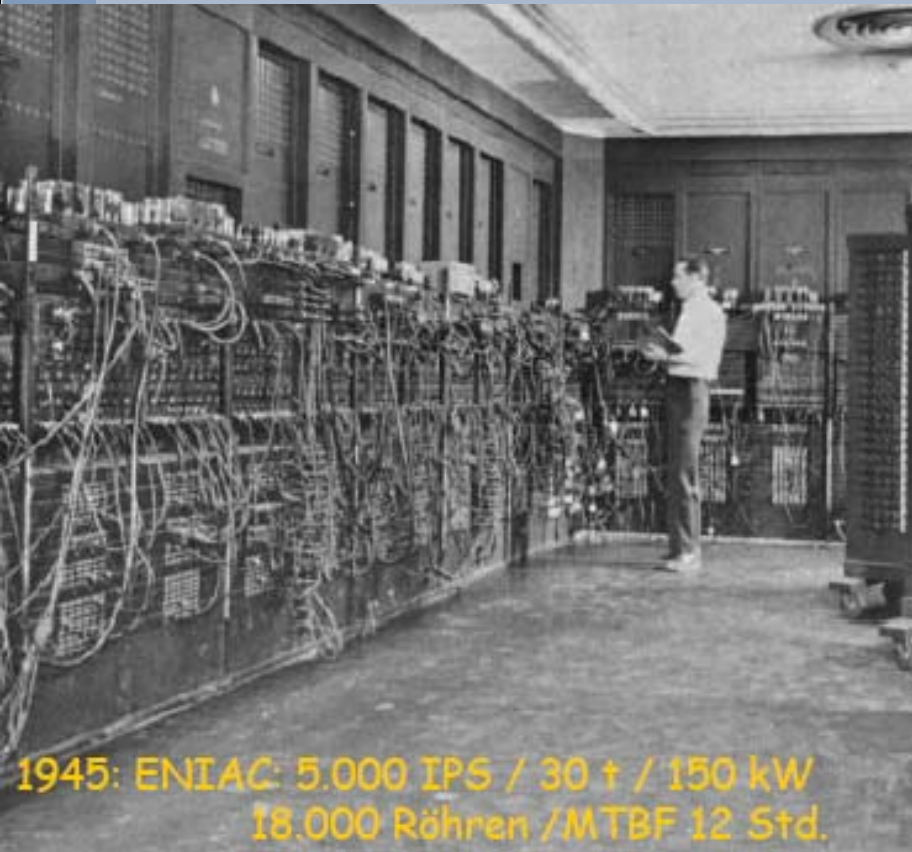
# ICT needs Energy

Bsp. Deutschland:



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

# Making More From Less



45 nm 214 mm<sup>2</sup>  
3,2 GHz 130 W (0,8-1,35 V)  
820 mio Transistoren



45 nm 26 mm<sup>2</sup>  
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 %

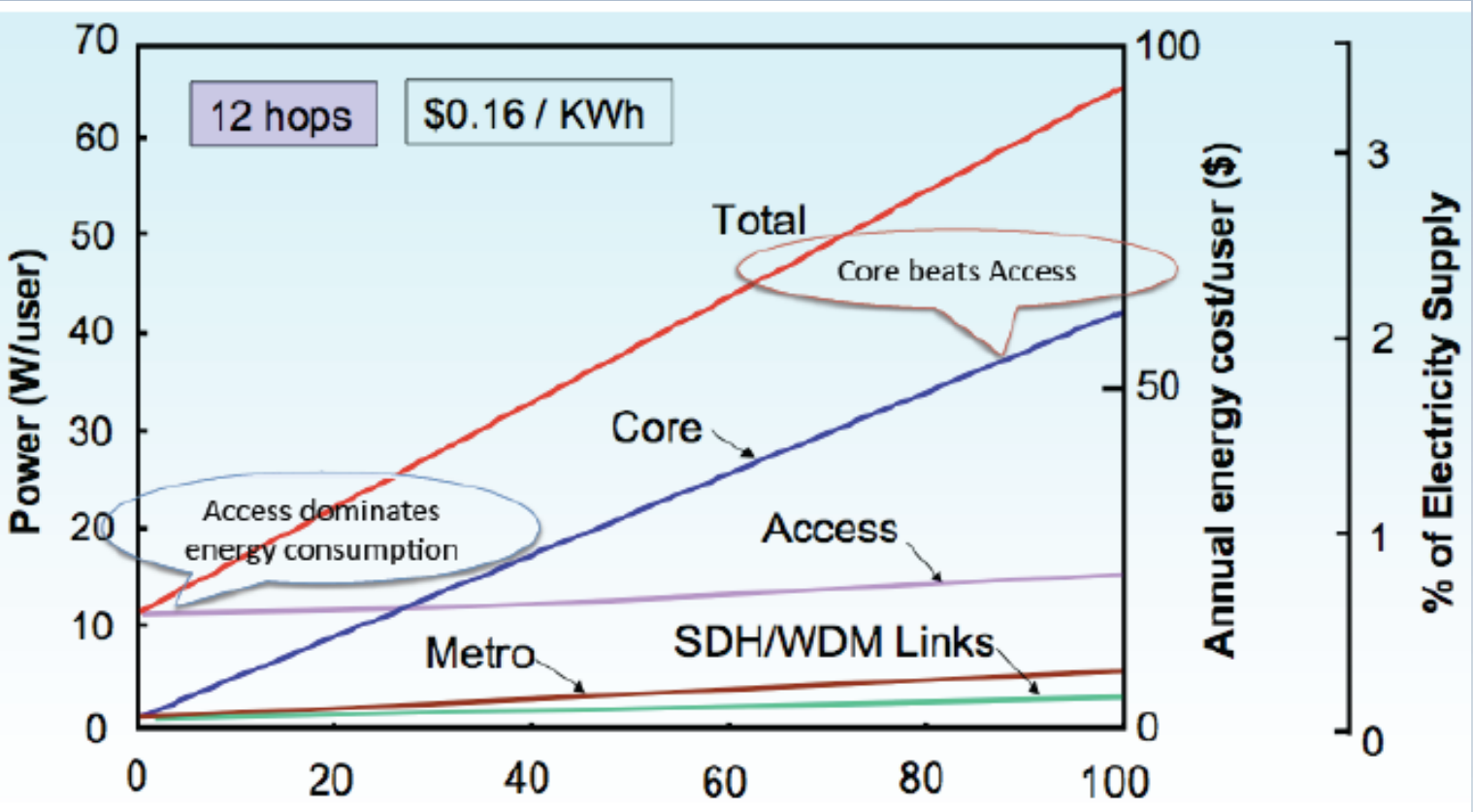


Source: Lorenz Hilty, Empa, Switzerland, OECD Workshop, Copenhagen, 23.05.08

# Dematerialization



# But: Bandwidth means Energy



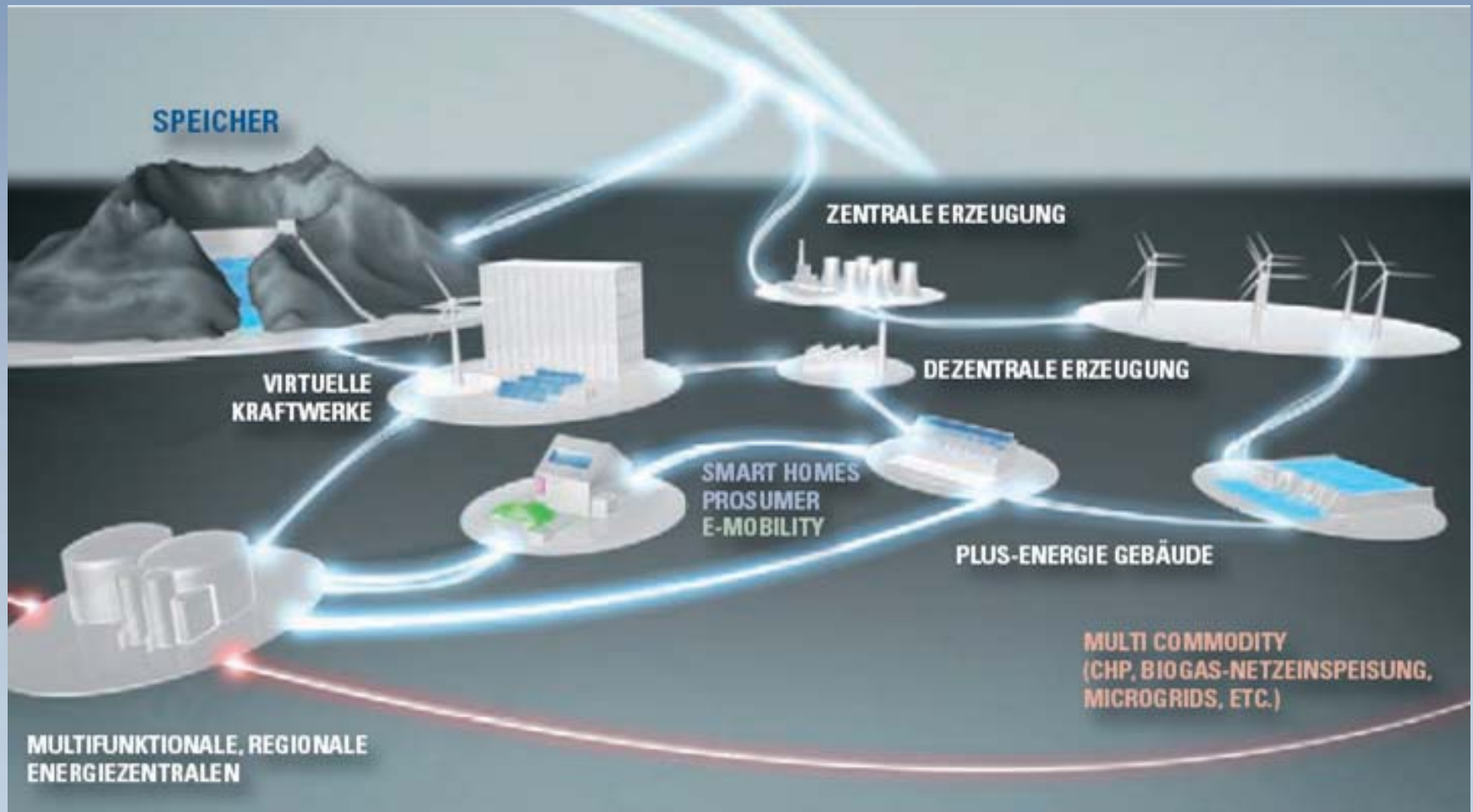
Quelle: R.S.Tucker, OFC2008

Dr. Helmut Malleck

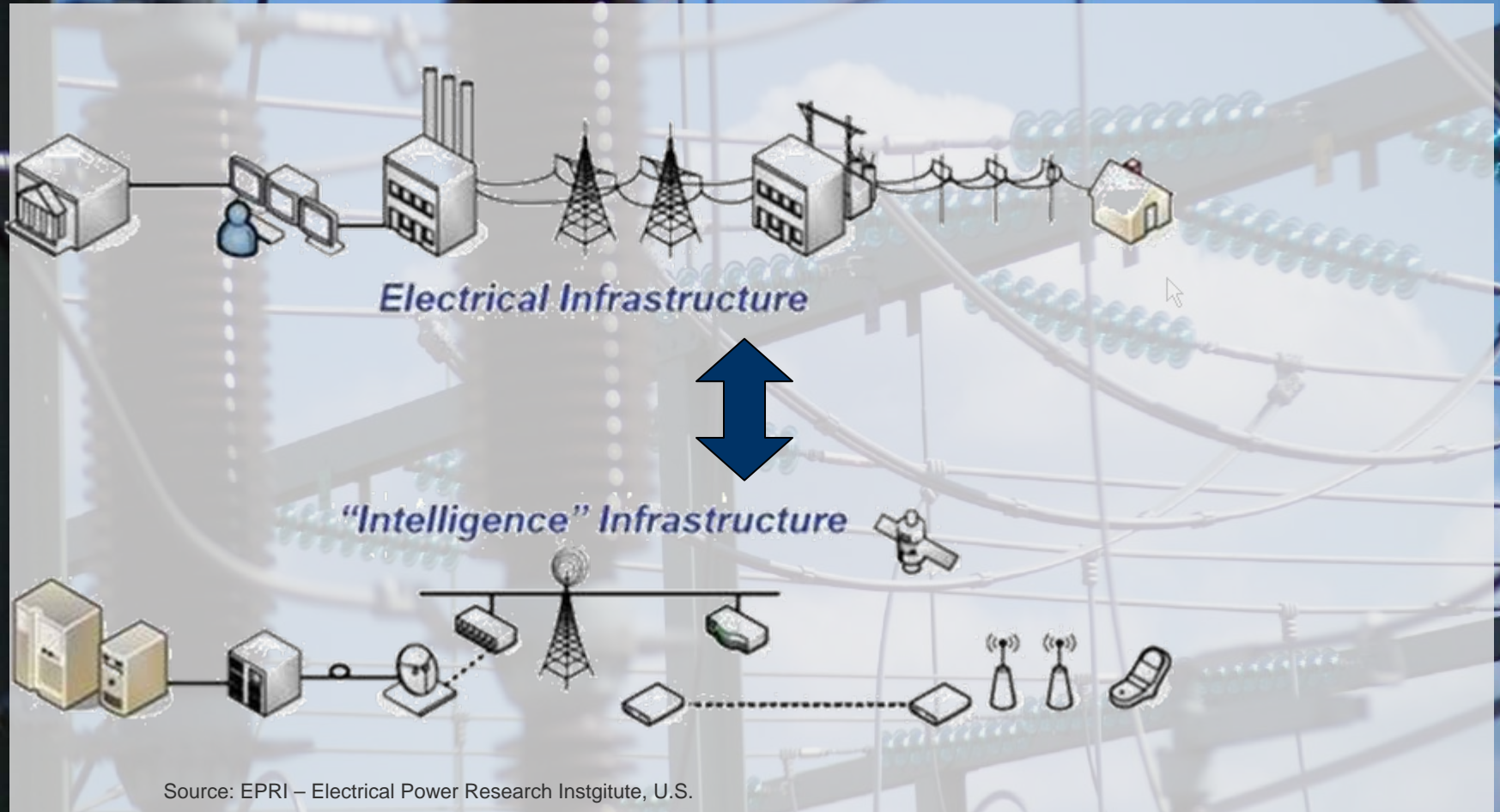
Graz, 11. Februar 2010

Energieinnovation-Symposium 2010

# Smart Grids



# But: Interdependent Critical Infrastructures



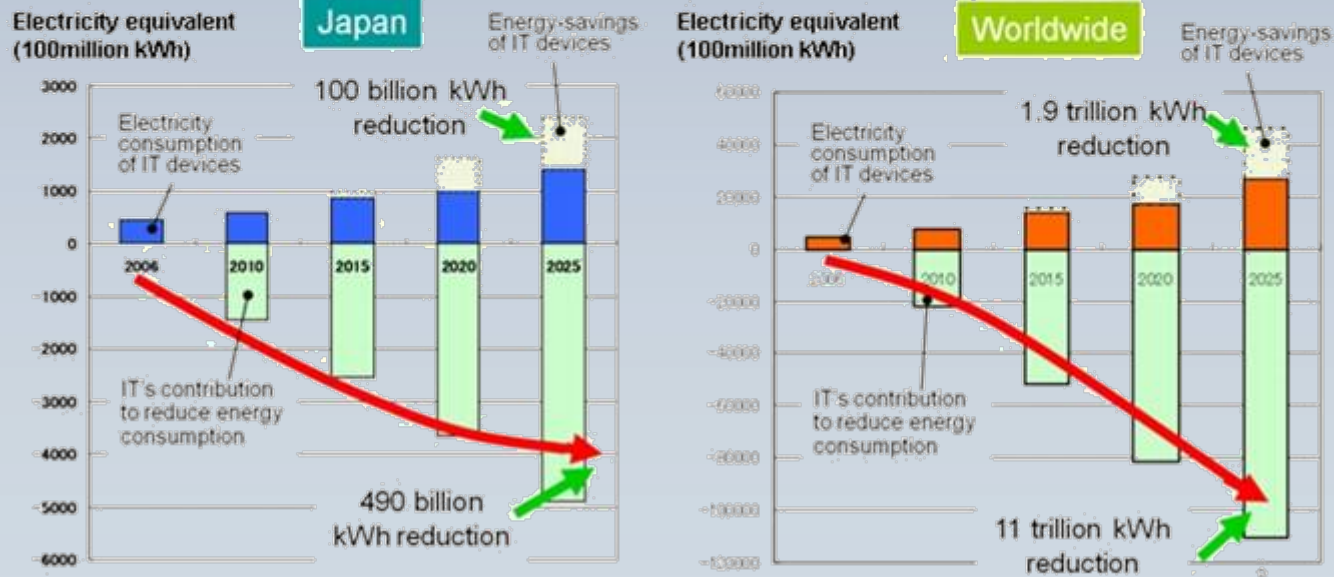
Source: EPRI – Electrical Power Research Institute, U.S.

# 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.



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



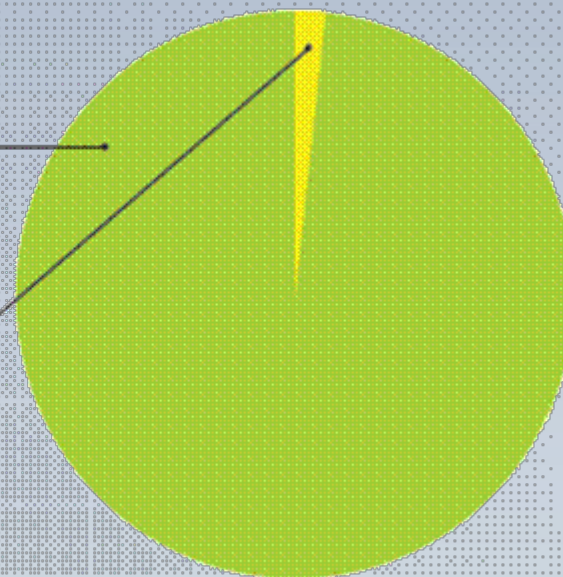
# „Greening“ is the Goal

## **GREENING WITH IT - THE 98% POTENTIAL**

refers to the low carbon IT solutions like virtual meetings, smart buildings, smart grid and dematerialization that can help to reduce overall GHG emissions from all sectors significantly.

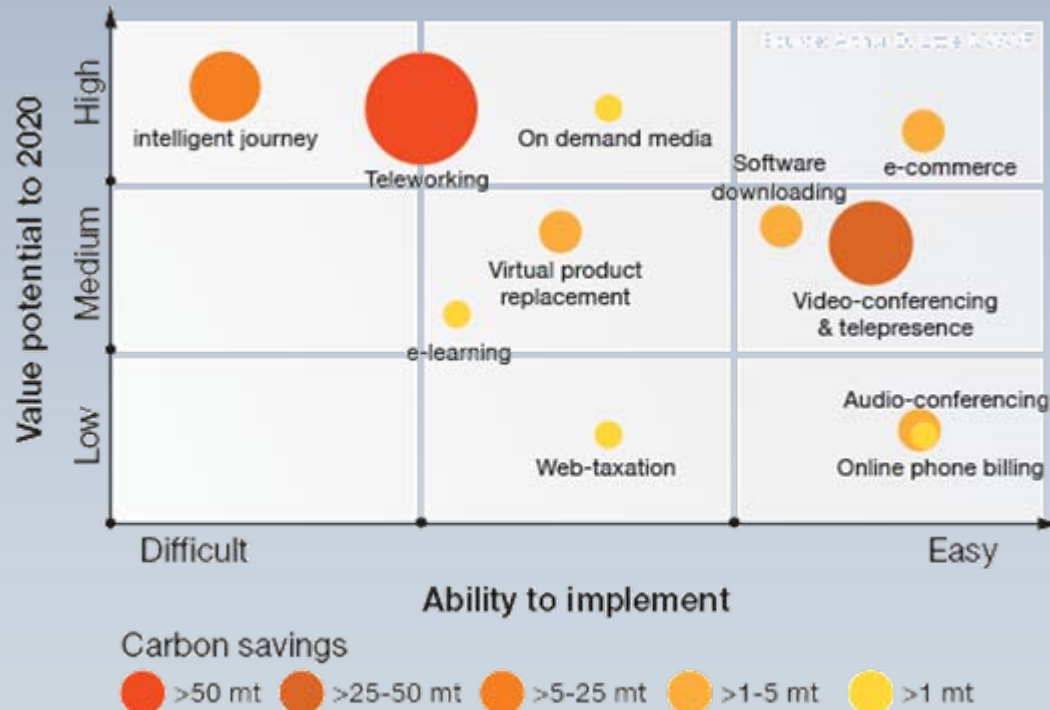
## **GREEN IT - THE 2% EMISSIONS**

refers to more energy efficient IT equipment that helps to reduce the emissions from the IT sector itself.



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

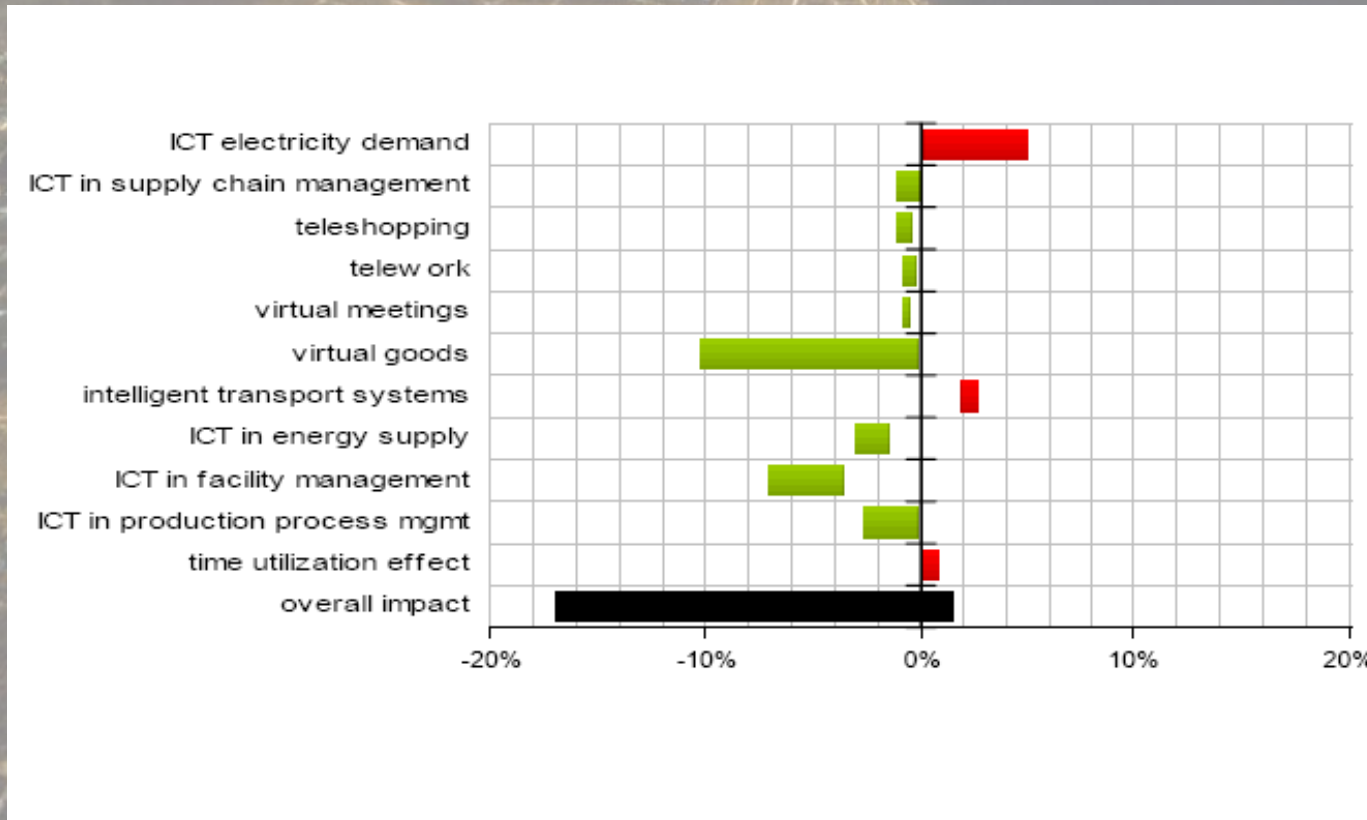
# What can we expect?



**Figure 4**  
Carbon Management - A Business Opportunity

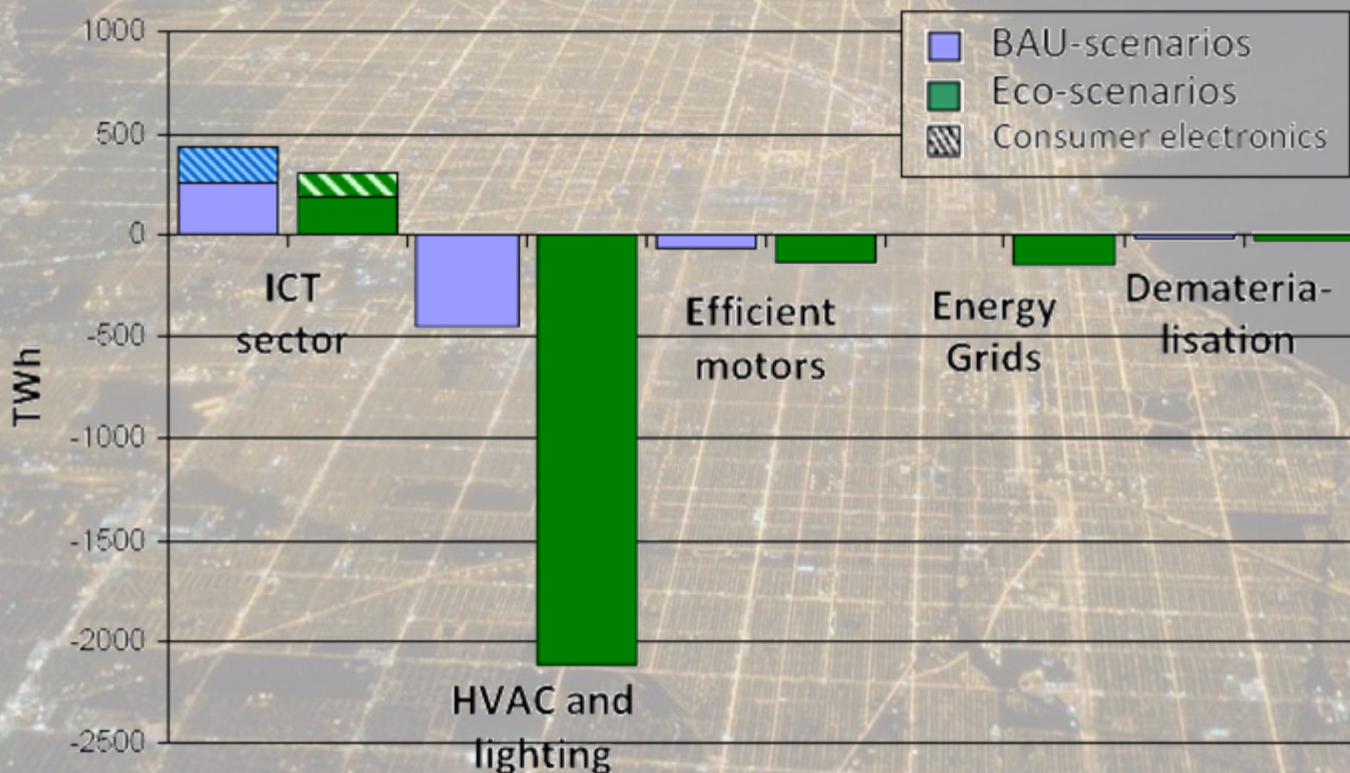
Source: From "Green IT" to "Greening with IT", wwf 2009

# 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

		Energy Split	Energy Saving Potential
Fraction of electrical energy per application	Con. power supply: - stand-by, - active, ...	<b>Others</b> 14%	- stand-by - active <b>&gt;90%</b> <b>&gt; 1%</b>
	I&C, Computing power supply, ...	<b>Internet</b> 10%	80+ / 90+ <b>&gt; 1%</b>
	EC-Ballast Daylight dimming HID, LED, ...	<b>Lighting</b> 21%	Electronic control <b>&gt;25%</b>
	Factory autom. Process engineering, Heavy industry, Light industry, ...	<b>Motor control</b> 55%	Variable Speed Drive (VSD) <b>&gt;30%</b>
	Transportation: Train, Bus, Car, ...		VSD + Bi-directional energy flow <b>&gt;25%</b>
	Home appliance: Fridge, WM, HVAC, ...		VSD <b>&gt;40%</b>

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“)**

**AKTIV HAUS**

Universität für  
angewandte Kunst  
Wien

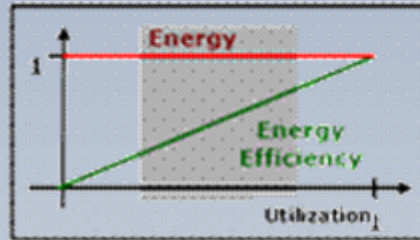
ID2 | Esslinger

BMVIT  
ENERGIEWORKSHOP  
Soziale Netzwerke  
und Energiemarketing & Hybride  
Energie

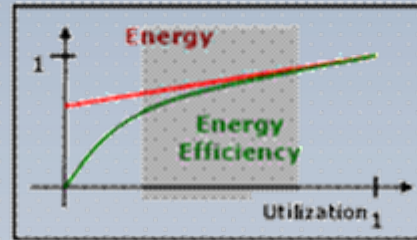
SHIRIN FANI  
GERDA HOPFGARTNER  
THERESA LOBKOWICZ  
ANNA WIESINGER

# Example: Standby and Beyond

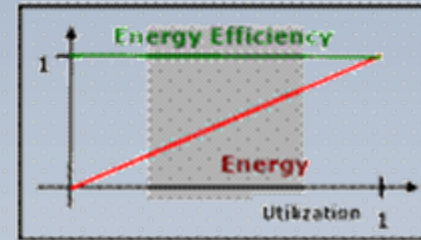
„always on“



efficient only  
at high utilization



„off if not used“

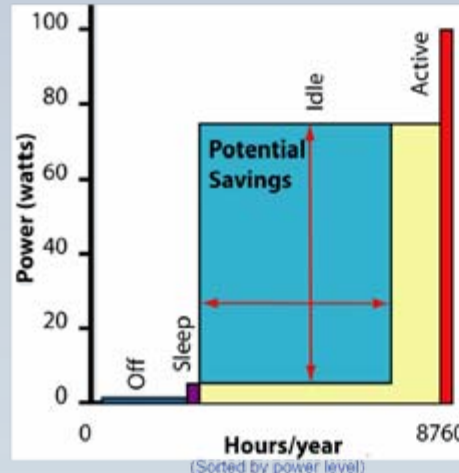


always  
efficient



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

- Not only computer systems but many enduse appliances, 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

Abbildung 2: Überdachung mit PV-Modulen, Ludeschwilbg. CH

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



Quelle: HEI Consulting 2009

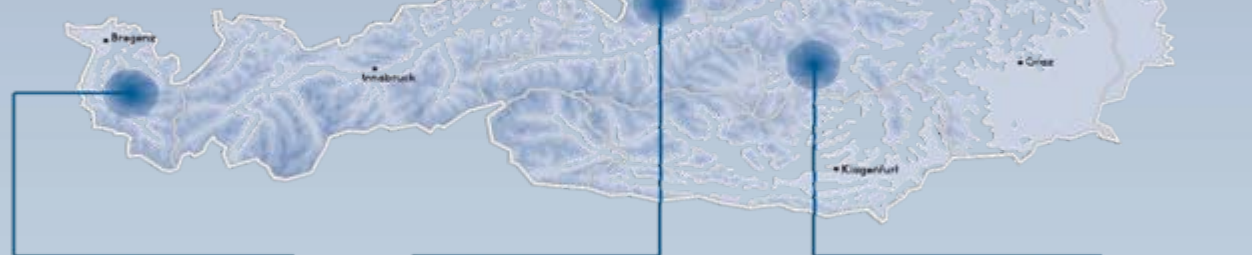
# Example: Smart Grids



Intelligente Mess- und Infosysteme  
als Kernelemente Smart Grids  
Smart Meter Pionierregion  
Vöcklabruck

Smart Services  
im Großraum Linz

Smart Consumer  
Verbraucher als Schlüssel-  
akteure des intelligenten  
Energiesystems in der  
Gemeinde Großschönau

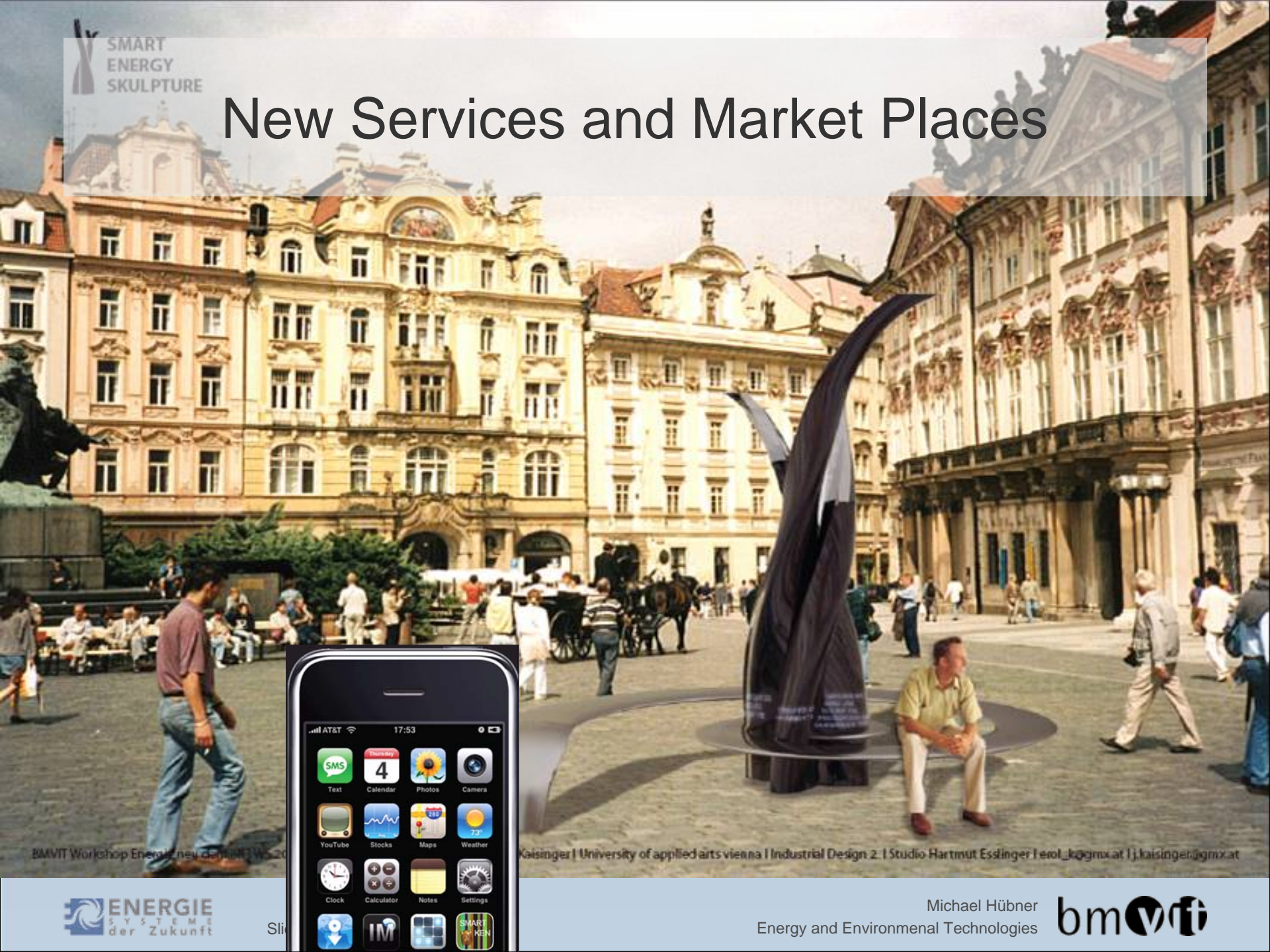


Smart Distribution Grid  
Aktives Verteilernetz im  
Biosphärenpark  
Grosses Walsertal

Smart Infrastructure  
Integrierte Infrastrukturplanung  
Salzburg

Energievision Murau  
Regionale, ausfallssichere  
Elektrizitätsversorgung in der  
Region Murau

# New Services and Market Places



BMVIT Workshop Energy and Environment

Kaisinger | University of applied arts vienna | Industrial Design 2 | Studio-Hartmut Esslinger | erol\_k@gmx.at | kaisinger@gmx.at

# 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

## Innovation Award 2010

Das BMVIT vergibt erstmals den Sonderpreis „ICT for Green“ für Projekte, die den ökologischen Fußabdruck anderer Wirtschaftsbereiche nachhaltig verbessern. Die Verleihung findet im Rahmen des Microsoft Innovation Day durch Infrastrukturministerin Doris Bures statt.

<http://www.microsoft.com/austria/innovation/award/news.aspx>

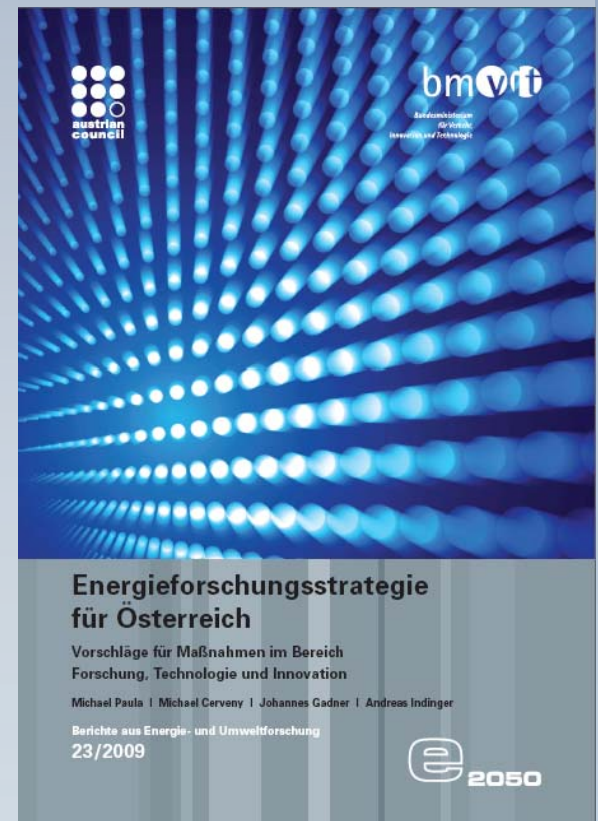


# PUSH YOUR IDEAS.

Auch in 2010 → Wir bringen die Hidden Champions ans Tageslicht:  
Reichen Sie Ihre innovative, auf Microsoft Technologie basierende Lösung ein  
und gewinnen Sie **10.000 Euro Preisgeld!**

# Energieforschungsstrategie für Österreich - Reden sie mit!

- Online-Diskussion bis 10. März 2010  
[www.energieforschungsstrategie.at](http://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.





**bmvit**

*Bundesministerium  
für Verkehr,  
Innovation und Technologie*

**Danke für ihre Aufmerksamkeit.**

[michael.huebner@bmvit.gv.at](mailto:michael.huebner@bmvit.gv.at)

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