



→ Implementation experiences – prepare for you smart home deployment

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Vienna / September 22nd, 2010




Agenda





- Opening Remarks
- Presentation Session 1
 - Pecan Street Project - Brewster, McCracken
 - Future energy infrastructure – Hellmuth Frey
 - Creating user awareness - Pierre Yves Plaza Tron
- Break
- Presentation Session 2
 - Control and adaptability are key – Ferry Cserep
 - Dong Energy's smart home strategy – Morten Sejr Olsen
- Panel Discussion
- Closing remarks

→ Introduction of the Bits to Energy Lab



- **Joint project at ETH Zurich and the University of St. Gallen**
 - Information Management
ETH Zürich (E. Fleisch)
 - Distributed Systems Group
ETH Zurich (F. Mattern)
 - Operations Management
University of St. Gallen (E. Fleisch)
- **Multi-disciplinary team :**
 - Electrical engineering, computer science, marketing, and psychology
- **Mission:**
“We combine Ubiquitous Computing, mathematical modeling, behavioral science to foster energy efficiency.”

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→ Research partners of the Bits to Energy Lab



- **Industry partners**
 - Illwerke VKW, ewz, L+G, Philips, Electrolux, SAP, Nokia Siemens Networks, Swisscom and others
- **Research cooperations**
 - Massachusetts Institute of Technology (ESD, Energy Box)
 - University of Cambridge (StopCarb)
 - Energy Science Center (Joint projects)

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→ Global development goes hand in hand with increased energy consumption and GHG emissions

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- No country will abandon its growth strategy
- But GHG emissions must be reduced

Source: IPCC (2007), Climate Change 2007: Mitigation of Climate Change

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→ Steady development in terms of power, size, cost, ...

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Wireless communication

New materials

Embedded computing

Digital sensors

RFID

Remote localization

POSITION
N 047°
23'17"
E 008°
34'26"

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→ Paradigm shifts in the energy sector



- **From centralized to decentralized**
 - renewable energy
 - distributed generation with fluctuations
 - local vs. global storage
- **From regulation to deregulation**
 - new players (resellers, energy services,...)
 - complex and timely interactions
- **From control to co-operation**
 - co-operation between generation and consumption
- **From generation fol. load to load fol. generation**
 - virtual power plants, demand side management
- **From energy consumption to smart energy usage**
- **From unlimited supply to a precious resource**

Strongly supported through ICT






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Source: Mattern, Staake, Weiss. ICT for Green – How computers can help us to save energy, 2010.

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→ Green ICT vs ICT for Green




Green ICT

ICT for Green

Increase automation & process efficiency



Enable new processes to conserve energy




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→ **What is the future road for Smart Homes in this environment?**




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- **How to create ...**
 - ... consumer confidence?
 - ... consumer involvement?
 - ... consumer engagement?
- **How much are IT are we able to handle?**
- **How do we deal with privacy issues?**

CONSUMER

- **Greent ICT vs. ICT for Green**
- **How „smart“ should a smart meter be?**
- **Is the smart meter the gateway to home? What else if not?**
- **How can we achieve future proofness (Building life cycles vs. Update frequency)?**
- **How to create the required interconnectivity?**
- **Is IPv6 the standard of the future?**


TECHNOLOGY




AES
2010
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→ **Thank you!**



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