
A Survey and Thought-Provoking Impulses on Tackling Energy Efficiency in Households and Office Spaces

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Motivation

- Why foster EE in households and office spaces?
 - Building sector constitutes a significant portion of the overall consumed energy.
- What approach to study how to support EE in such spaces?
 - Take the end-user into account!
 - Although domestic and corporate environments differ, both also complement each other while involving humans strongly in actions taking place that demand energy.

Survey

■ Research:

- Recently many research projects: BeAware, beywatch, CITYNET etc.
- Similar approach to many user-centred projects:
 - Provide feedback → Raise awareness → Save energy

■ Industry:

- Hype on EE → Many start-ups and spin-offs emerged in the last years.
 - Feedback based end-user application (e.g. Google Power Meter, Microsoft Hohm)
 - Building Management Systems (BMS) mostly in large office buildings

Energy relevant parameters

- Productivity = Output/ Input
 - of people e.g. in office environments
 - of systems e.g. ee-system consumes more energy than it saves
- Wasted Energy
 - Hard to define → personal comfort, different conditions
- Varying energy prices
 - Smart Metering → What are the benefits for the end user compared to their preservations and fears?
- Standards
 - E.g. LEED (Leadership in Energy and Environmental Design)
 - A classification scheme for energy & eco-friendly planning of buildings

Discussion & Approaches 1/2

- Research vs. Industry
 - Bring better together endeavors and results from research & industry,
- Technical Standards
 - Customized or proprietary home automation systems could benefit from integration with energy efficiency systems
- Sustainable Energy Standards
 - To consider only energy- and eco-friendly planning of building might not be sufficient in the long run.
 - Certification for energy efficient building management

Discussion & Approaches 2/2

- Smart Grid / Smart Metering
 - Real-time pricing: Would need automation but to what extent?
 - Provider access to home: User acceptance?
- Context-Awareness
 - In order that users can focus on their actual task, we need to study and motivate their energy behavior by rather implicit interactions.
- Physical Computing (Sensor Platforms as Contiki, Arduino)
 - Context-Aware Sensing Modules to track users
 - Hardware, Ambient Feedback

Final Statements

- “...current approaches have put ICT for EE strongly ahead, in particular the user awareness has been increased by several applications providing to its users intuitive GUIs running on devices as mobiles that we do anyway use in our daily life, and thus already given evidence that ICT can be beneficial to save energy and not vice versa.
- “However, we need to think with a broader horizon in order to yield sustainably even better results. For this some thought-provoking impulses have been raised, before.”

Thanks for your attention!