



Bits to Energy Lab

Special Interest Group

Smart metering and energy-aware devices: The gateway to energy efficiency services



ETH

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Information technology allows to considerably reduce energy consumption

Demand for green products and services

Climate protection and the conservation of natural resources have become major goals of our society. Governments throughout Europe have set ambitious targets to cut greenhouse gas emissions, and to achieve this objective will require great efforts by all stakeholders. In fact, many drivers exist beyond compliance with regulations and social responsibility: Rising energy costs, shareholder interests, and especially the growing user demand for environmentally friendly goods are strong arguments to promote the development of energy efficient products and services.

Smart meters and energy-aware devices offer considerable business opportunities

Information technology will greatly contribute to a sustainable development as it allows for optimizing processes and – often overlooked – helps to change consumer behavior. Especially smart meters and energy-aware devices can positively influence energy consumption. Benefits include:

Increased energy awareness. Smart meters can provide users with direct feedback on costs and environmental effects of their consumption. Studies show that this leads to a reduction in electricity consumption of 5% to 15% and fosters the appreciation of electricity as a valuable good.

New products. With near real-time data on energy consumption, devices such as mobile phones or set-top boxes can serve as ambient interfaces. Moreover, white goods and consumer electronics can develop into energy-aware devices and as such become part of an energy management system.

Novel services. Smart meters can serve as a gateway for innovative green services. Examples range from remote energy management over the provision of automated energy audits to efficiency competitions of communities.

Process optimization. Faster meter reading and billing processes, easier fault clearance, and improved consumption forecasts allow utilities or third-party service providers to save costs and improve the customer relationship.

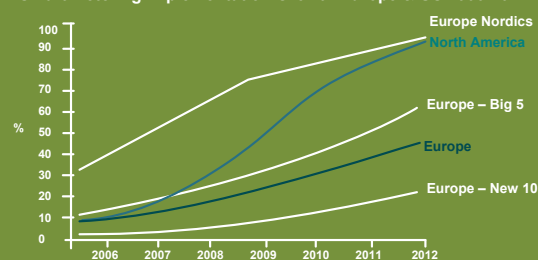
Enhanced incentive schemes. High resolution data on energy consumption enables novel energy pricing and bonus schemes. If designed properly, these incentive systems can unfold a positive effect on peak load and absolute consumption – and help to integrate the user in the overall strategy.

What are smart meters?

Smart meters continuously measure and record the electricity, water, or gas consumption of individual households and allow for remote access to the consumption data (e.g. using Power Line, GSM, or fixed data lines). Moreover, the devices offer telemetric connect-disconnect capabilities and, in the near future, will serve as a gateway for home energy management systems.

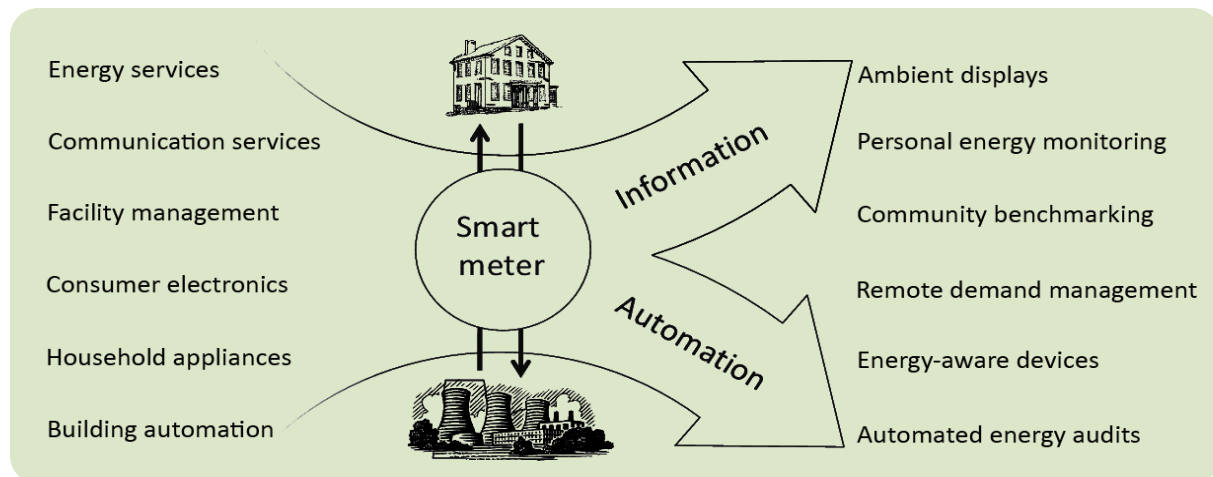
In Germany, the adoption of smart meters will be mandatory in new and renovated buildings by 2010.

Smart Metering Implementation Growth Europe & US 2006-2012



Source: "Smart Metering in the Energy and Utilities Sector". Daramonitor 2007; Factiva 2007. Accenture Research analysis

Novel business opportunities in the field of consumer energy efficiency



With the emerging smart metering infrastructure, valuable consumption data becomes available. However, it is yet unclear how to effectively use the data beyond billing and network management. Open issues relate to the choice of suitable interfaces and data representation approaches to induce sustainable behavioral change, the integration of novel energy-aware devices in the emerging infrastructure, and the development of privacy protection methods.

- Explore the energy-saving potential of smart metering infrastructures
- Outline the opportunities for novel services and products
- Address the challenges, especially with respect to data visualization, integration of energy-aware devices, and privacy concerns
- Analyze cost, benefits, and risks for the participating companies
- Formulate a strategy that helps to leverage the benefits
- Provide a platform for an exchange of ideas and know-how

Energy services | Communication services | Consumer electronics | Household appliances | Building automation | Public authorities | Facility management

The Special Interest Group (SIG) allows acting as an “Early Mover” by analyzing the potential of energy efficiency services. As a participant you will identify the aspects relevant for your own company, evaluate the business opportunities, and assess challenges and potential solutions. You benefit from the business administration competence of the University of St. Gallen and the technical know-how of ETH Zurich. Both institutions are well established in the international scientific community and have a strong focus on scientific rigor and practical relevance. A participation in this SIG also provides you with effective means to get in contact with peers from other companies.

Challenges

Goals of the Special Interest Group

Targeted business sectors

Benefits for your company

Joining the Special Interest Group

Organization

The SIG will be initiated with a kickoff-event in which the work packages are presented and adjusted to the needs of the participants. During the runtime, we will conduct interviews with industry experts, carry out surveys, and present demo applications. Three to four workshops will be held to present and refine the results. The deliverables – as defined in the kickoff-event – will be summarized in an internal report accessible to all participants.

Timeframe and expenses

Start: November 2008 | End: July/August 2009

The participation fee is 30.000 CHF (excluding VAT) and covers admission to the workshops and full access to internal results. As a non-profit research institution, all fees will be used to cover the expenses of the research initiative.

Contact

Please do not hesitate to contact us in case of any questions or comments.

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Phone: _____ Preferred date / time: _____

E-mail: _____

Comments: _____

The Bits to Energy Lab is a joint research initiative of ETH Zurich (Chair of Information Management & Distributed Systems Group) together with the University of St. Gallen (Institute of Technology Management). As an offspring of the M-Lab, we are well established in the international research community (e.g. Auto-ID Labs at MIT, University of Cambridge). The Lab is dedicated to investigate the potential benefits of Information technologies for a sustainable development. Our aim is to help achieve a more rational use of energy and to make resource consumption more transparent to companies and consumers. In this context, we investigate the applicability of sensor and actuator technologies for increasing energy and resource efficiency in production, logistics, and home environments and explore the changes in consumer behavior when the ecological footprint of processes, products, and services becomes evident.

Team

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