Chapter 8

Conclusions and Directions for the Future: The BRIDGE project

Akkermans, H. - Ottosson, H. - Sweet, P.- Ygge, F.

8.1 Executive Summary

The KEES project has delivered results that, we believe, are important to understand how to approach innovative IT applications and services in a deregulated energy market environment. The project has outlined approaches for market segmentation understanding, IT requirements and field experiments, and e-business service models, that help establish the business case for IT in energy applications.

In brief:

- *Deregulation initially leads to a fierce price competition, and, in the short run, this reduces economic incentives for energy savings and efficiency.*
- *Still, a significant energy savings potential through efficiency improving measures exists in the order of 10-20%, but to achieve this, investment costs for new technology must be lowered, by about 50% compared to the current level.*
- *An alternative to the cost reduction would be to find cost sharing applications that uses a part or the whole of the energy saving IT infrastructure for other purposes.*
- *Smart information technology for new applications and services in homes, offices and plants is getting mature, but how customers want to interact with this technology is an issue that must be better understood: technology is ahead of the market.*
- *The use of the powerlines for electronic communication is a promising technology, but in considering its business case, a clear distinction must be drawn between broadband access technology (where strong competitors such as xDSL and others are present) and the in-home, narrowband home networking applications (where "no new wires" is an important requirement).*
- *For the household market, price is the most important consideration, however, a broad customer interest in and support of energy saving activities and services is evident from market surveys.*

The KEES project points to several practical implications deriving from the above research results:

- *When introducing new energy saving activities and services to the market, carefully frame such services in an attractive way, in order to appeal to the wide variety of customer considerations that come into play.*

- *There is an un-exploited potential for customer relationship building in several market segments. In the household market an interest has been expressed in being contacted by the supplier e.g. concerning energy saving advice, and in the industrial market a need is felt, apparently due to limited IT capabilities, for co-development of IT-based energy efficiency activities by the supplier with key industrial customers.*
- *Technology is ahead of the market, and therefore there is a clear need for real-life application trials that focus on how customers interact with new forms of information and communication technology.*
- *Further knowledge dissemination and promotion activities are called for, to enable enterprises and their customers to form a sharper vision on how the future may look like. These activities can benefit from the fact that the IT in energy field is widely seen as attractive, witness the high visibility and free publicity concerning the "smart home" (for example, see the cover article in Newsweek of 31 May 1999).*

8.2 Directions for the Future – The BRIDGE project

In "Directions for the Future", the KEES project proposes two fundamental R&D sectors where further investigations have to be carried out in order to fully understand the impact IT will have on energy distribution and the potential for energy savings.

- New Energy Business Logics: Karlshamn Municipality as test area
- Electronic Energy Markets: Oskarshamns Municipality as test area

Both those R&D sectors are described below forming the base for next step to better understand future possibilities integrating IT in energy distribution. The knowledge transfer between the academic researchers and the industrial partners is mainly done through deliverance of prototypes and demonstrators as well as through seminars, workshops etc.

8.2.1 New Energy Business Logics: The Karlshamn municipality test area

The *business logic* or *business model* of the traditional electrical industry is fundamentally changing. The value chain (producer-distributor-retailer-customer) is emerging as a value constellation where services are bundled in sometimes completely unrelated and spontaneous ways. Where money is made and service delivered (customer service, electrical power, etc.) is shifting underneath us. Understanding the logic of service development in a shifting, 'infodigital' economy is a tough challenge, but one that will be faced by energy suppliers that survive the coming decade.

To understand what role energy suppliers can play in the coming decades, we must investigate the following questions. What are the value creation models underlying 'existing access services' in play already? How will these influence the service portfolios of Energy companies hoping to develop the local grid into an alternative local access service? What are the key elements of value in access networks other than technology? How can existing companies leverage their nearly 100% penetration rates, for the benefit (commercial and social) of households that do not have, but seek, low cost and equal access to the global information highway?

What are the critical factors influencing energy information use by individuals and households, and how do they influence service choice? How are the next generation customer loyalty and customer care programs to be outlined? How will mobility and free-choice influence 'switching' behaviors and opportunities for building customer relationships over time?

Answers to these questions will take concrete form in terms of specific service offers, service bundles, and service models. The convergence of telecommunications and electrical energy industries, coupled with increasing and intense International (re-regulated) competition in the energy business demands innovative service ideas. We are seeing this emerge already today in the form of: 1) New intermediaries selling electricity contracts to households and business, 2) Strange but promising strategic alliances between banks, insurance companies, etc. and electricity suppliers, 3) Cross-

selling between energy and telephony services, and 4) investing in new ways of using the power grid to control and optimize both energy consumption and energy markets for example. Each of these efforts is eroding existing 'energy business models' and are based on new business logics.

The New Energy Business Logics program is investigating how the business logics of energy services are changing. In co-operation with Lund university, The Stockholm School of Economics, the University of Southern California, and others we are examining (and seek support to investigate further) how these changes are occurring, in what ways, and the impact they have on customer relations and service business models.

The investigations already made through the KEES project in the Karlshamn Municipality builds the base for the proposed program on New Energy Business Logics.

8.2.2 Electronic Energy Markets: The Oskarshamn Municipality test area

The growth of the Internet has drastically increased the interest in and relevance of electronic commerce. There are already a number of electronic auction servers running on the Internet (such as the AuctionBot and eBay). Of particular interest is to allow real world parties to be represented by trading software, software agents. The introduction of software agents enables new market mechanisms. For example, when negotiating over a number of commodities, far more possibilities can be evaluated by software agents than by their human counterparts. Power markets are examples of such complex markets; there are dependencies between the production at different time periods and the corresponding holds for distribution and consumption. Furthermore, there are complex dependencies between the different actors. Electronic power markets can hence potentially increase the efficiency for all actors. They also allow for smaller consumers and producers to directly participate on the market, rather than buying through a reseller.

As prices of power vary significantly over time and as many loads are not time critical, there is an incentive to control loads at the consumer side. How to control the loads locally is tightly connected to how to act on an electronic power market. As computational power is being integrated in more and more devices and since local and global communication capabilities continuously increase, even the extreme example of a software agent representing an "intelligent house" planning its power usage and buying the needed power directly from an electronic power market does not seem too far fetched. In a shorter time frame, larger users (such as industries) are in focus. This reasoning also applies directly to smaller and larger producers.

The use of this type of load control is already in use to create "virtual gas turbines" and the like. The main improvement enabled by new technology is that these measures can be taken at a more fine grained level and be more automated, yielding higher efficiency.

Specifically, fieldtests are in preparation in the Oskarshamn area. The application in focus in this work is to investigate and test how a number of industries and the local energy utility can co-ordinate their energy

management in new and more efficient maners by use of information technology.

The Electronic Energy Markets program is investigating how advanced computer technology can improve the co-ordination between production and use of energy. The work is done in co-operation with Uppsala university, the Free University of Amsterdam and academic expertise on energy systems (mainly professor Björn Karlsson and his group at Linköping University). Much of the work is done in co-operation with industrial partners (such as ABB (S), ECN (NL), Iberdrola (ES), IBM (US,S), PreussenElektra (D), and Sydkraft (S)).