SMART METERING AND POLICY ISSUES

SMART METERING TODAY

SMART METERING TOMORROW: the ECUBE Project

SMART METERING TODAY

Agenda

- SMART METERING TODAY
- SMART METERING TOMORROW: the ECUBE Project

SMART METERING & SMART GRID

The Electric Elements

SMART METERING & SMART GRID

BENEFITS FROM SMART METERING

- Increasing Consumer awareness
  - There is broad evidence in the literature that consumers save energy when aware of their consumption patterns. Darby (2006): saving from direct feedback ranging from 5-15%. OECD (2009): Research findings suggest that better information about the use and price of electricity can help reduce energy consumption up to 20%. Consumer 2020 (2010): consumer meter reading using mobile phone: 12% efficiency gain

- Fostering Retail competition:
  - It is easier to switch supplier + more efficient market

- Offering real-time pricing: variable pricing and demand side management...but still at the trial stage!!!

- Integrating renewable energy
  - UPSTREAM: The delivery of data for distribution operators to optimize grid management
  - DOWNSTREAM: Smart Meters may interact with intelligent appliances to allow for network driven load shifting activities

OBSTACLES TO LARGE SCALE IMPLEMENTATION OF SMART METERS

- Lack of standardization (need for interoperability)
- Personal data protection
- Uncertainty in the development of the supporting data infrastructure
- Regulated or liberalized Meter Market
- Operators incentives for Demand side management (reduced demand cuts into utility profits)
- Meter are expensive to replace
- Low tolerance for errors: disincentive to be a “first mover”
- Lack of energy management skills, reduces the preparedness to use Green ICT
- Lack of awareness on the economic and energy related savings
- Meter ownership (to reduce switching costs)

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Options for the Allocations of Roles across the SMI Supply Chain

- Option 1: Exclusive provision of smart metering infrastructure, with settlement data management competition (All Europe, but UK, Netherlands, Germany)
- Option 2: Competition in the provision of meters and meter data management services

Deployment of smart meters in Italy: a managerial decision by ENEL Distribuzione (1/2)

- In 2001, Enel, the major distributor through Enel Distribuzione, launched the “Progetto Telegestore”, which aimed at replacing electromechanical meters with new smart meters
- **Strong Commitment from Top Management**
- **Total Investment (R&D Costs, Production and installation of meters, Production and installation of concentrators, IT system development): 2,100 Million Euro**
- From 2001 (0.2 M) to 2006 were installed 30 M smart meters
- **Benefits for Enel:**
  - Improved operational efficiency: No need to access customer premises (Opex reduction) ($500 M euro in 2007)
  - Remote bad payers management (Power limitations to 10% of contract value)
  - Improved customer service (tailored tariffs, billing on real consumption)
- **Decision Made**, to be ready for the deployment of Broadband through Power line communications

Deployment of smart meters in Italy: regulation made easier the process (2/2)

- As the regulator imposed in 2006 an obligation to substitute electromechanical meters, it allowed inclusion of costs of smart meters into the distribution and metering tariff:
  - Investments in smart meters and smart grid are included in tariffs and earn the remuneration of capital (7.2% WACC real pre-tax for the regulatory period 2008-2011) and depreciation;
  - Depreciation of old electromechanical meters which were not completely depreciated at the time they were replaced is remunerated by the metering tariff
- Furthermore, the regulated meter market left the ownership of the meter to the distributors creating a stronger incentive to invest

TELEGESTORE Energy Services – 2008 market test

- **Test objective**: qualitative evaluation related to energy services of:
  - customer acceptance;
  - potential impacts on customer energy consumption behaviors.
- **Test equipment**: on the shelf display with a sw application to collect and show energy data;
- **Target**: 1000 residential customers in 50 municipalities;
- **Test management**: performed by a third party (The Nielsen Company) to guarantee objective results;
- **Data collection**: 3 face2face interviews to collect feedbacks.

**TELEGESTORE 2008 market test – main results**

- 65% of involved customers looked at the display weekly;
- Customers expect to have economical data (related to the energy bill) and real time data;
- Customers changed their energy consumption behaviors:
  - 29.3% delayed the whitegoods use to the evening;
  - 11.9% avoided the simultaneous use of different appliances;
  - 7.5% switched off appliances instead to leave them in stand-by;
  - 6.6% used less the whitegoods.

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Dynamic management of energy consumption, both for residential and commercial-industrial, including components and scalable infrastructures, that enable the control, optimization and economic development, creates synergies among companies to create and develop an ecosystem.

The E-Cube project, partially funded by the "Industry 2015 Program" promoted by the Italian Ministry of Economic Development, creates synergies among companies to create and develop an ecosystem, including components and scalable infrastructures, that enable the control, optimization and dynamic management of energy consumption, both for residential and commercial-industrial facilities.

E-Cube aims to adopt the Privacy by Design (PbD) approach developed by the Ontario Privacy Commissioner Ann Cavoukian. According to this approach, utilities and providers and users, thus playing a vital role in making energy and environmental issues visible to the household consumer, thereby informing and empowering consumers and enabling behavioral changes.

Moreover, to create awareness on the social impact of energy consumption behavioral changes, the E-cube system will feature on the display the "Cubesh Meters", to limit the changes in energy consumption to the customer’s footprint. Thanks to this tool, it is possible to calculate CO2 emissions coming from daily life activities (home, work, purchases and administration paperwork).

### Policy issues

- ICT applications can make environmental impacts positive or negative and the balance of these outcomes can be strongly determined by incentive structures and policies that shape behaviors;
- Furthermore, while smart metering can produce positive impacts, such as reduced energy use and better environmental management in primary production and household activities, it raises also new consumer protection concerns and may produce negative impacts on privacy from potentially exploitative applications. Therefore, in order to guarantee a successful smart meters deployment it is necessary to address all these issues;
- E-Cube aims to adopt the Privacy by Design (PbD) approach developed by the Ontario Privacy Commissioner Ann Cavoukian. According to this approach: utilities and manufacturers should integrate the principles of PbD into the construction of their data infrastructures; privacy concerns should be taken into account before the deployment of smart grid technologies.

### Framework for government intervention

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<tr>
<th>Obstacles viewed by market players</th>
<th>Cost-benefit analysis</th>
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<tr>
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<td>Large</td>
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<td>Positive result</td>
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<td>5. Steps by government</td>
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<td>2. Steps by the market</td>
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<td>Negative result</td>
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<td>3. No steps</td>
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Source: Miller, C (2006)
BE AWARE OF NON-SMART OBSTACLES!