Digital meters: The power grid becomes intelligent

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The power grid shall become „intelligent“

Sometimes technical progress just needs to be stipulated. An EU regulation and the German Government plan to ban the old black electricity meters with rotating disk from German houses. Their measuring technique, which goes back to the 19th century, still works, but the modern digital electricity meters provide many more features. They show accurate power consumption per household, allow for flexible tariffs - which fluctuate tremendously throughout the day because production costs are always changing, and can be read automatically from the energy suppliers' data processing centers.

„With the aid of digital meters, consumers are able to identify power guzzlers and replace them with more economic devices. Or they operate devices only at times when power is particularly cheap, for instance during the night. In test environments, the power consumption decreased by at least 5 percent - in some cases even by 50 percent," said Martin Jetter of the IT inter-trade organization Bitkom.

In 2010 intelligent meters mandatory for new buildings

Starting in 2010, intelligent meters will be mandatory for new construction and completely renovated buildings. However, those interested can get a new meter installed after December 4, 2008. The ENBW subsidiary, Yello, is the first to enter this new market. "Everyone can get this new meter, even if they don't get electricity from Yello," said CEO Martin Vesper. This is because of liberalized metering and metrology regulations. Customers will receive a detailed monthly invoice. "Customers can see on their computer, when and how much energy was consumed," states Vesper. "Instead of monthly down-payments, the precise consumption will be invoiced. This transparency will pressure manufacturers of electrical devices," predicts Vesper. "Then it becomes obvious if low-priced transformers use a lot of energy and suddenly are no longer inexpensive."

Broadband internet access is necessary for using the Yello system. The data is transmitted from the home's meter via the in-house power lines to a so-called router that transfers the data to a processing center through the internet.

Customers can easily view their electricity consumption in a diagram on their PC.

400 million meters to be replaced

Ingo Schönberg, CEO of Power Plus Communications AG follows a different path. The company, which used to be part of Mannheim MVV Energy Group, transmits digital metering data directly, via the power grid to the data processing center and back to the consumer. For many years, the company's Powerline technology unsuccessfully attempted to compete with DSL suppliers like Deutsche Telekom. When MVV no longer believed in this technology, the managers continued on their own expenses. "Now we are the only European provider who offers broadband internet connections through the power grid," says Schönberg. In the next few years, when 400 million electricity meters are replaced, Power Plus will be a primary provider in communication services. For this purpose, the company recently received 10 million Euros from the British Investment Funds Climate Change Capital Private Equity.

ENBW's CEO presents their "intelligent meter"

Investors also hope that large energy suppliers will use the technical assistance of Power Plus to benefit from efficient advantages by using an intelligent power grid. All large power supply companies test digital metering systems in pilot projects, like RWE in Mülheim an der Ruhr, Eon in Bavaria or Rheinenergie in Cologne. ENBW already offers digital meters, because intelligent power grids offer tremendous advantages to power supply companies as well.

Peak load energy consumption shall be flattened and power plants shall be used more efficiently

„With the aid of information technology, peak load and energy consumption can be effectively flattened – so power plants are used more efficiently," states Jetter. Power suppliers need to have in store considerably expensive peak load power plants which only need to be switched on in case of increasing energy demand, like in the early evening hours. If the energy consumption is shifted away from these periods, energy production costs will decrease. As a consequence, the power supplier can then define the best priced consumption times. "Our technology is ready for that. The customer activates the dishwasher and defines that it should be ready by 6:00 in the morning. We determine the most appropriate time for the washing cycle – i.e. when electricity is cheapest.

Soon outdated: The black electricity meter

In the future, the same scheduling will apply to heat pumps and electric vehicles that store energy, as well as for owners of solar energy collectors who want to know if it is more economical to feed the energy collected into the power grid or to consume it themselves," says Vesper. In the future, an intelligent electricity management could arrange for freezers to cool down more during the night and temporarily shut off during peak load phases. This work could also be done by service companies who control the energy consumption in buildings via internet. Therefore IT service providers like IBM or network systems suppliers like Alcatel-Lucent see growth potential in the electricity sector and therefore are investing potential sums in technical development.

Close fight about the liberalization of the energy market

The growing decentralization of power plants increases the need for an intelligent electricity system. Instead of coming from few power plants, electricity will increasingly be provided from small, decentralized plants, which are often operated with renewable energies. Also wind energy, whose generation of electricity deviates considerably in the course of the day, makes new demands on the management of power grids. "In the past, these deviations needed to be balanced by the power supplier. An intelligent power grid will be able to assume a large number of tasks in the future," said Schönberg.

However, before the power grid can be used intelligently, there is much work to do, primarily through the Federal Network Agency. The new electricity providers still pay a standard fee for electricity transmission. A differentiation depending on the time of the day is not possible (yet). "For the currently valid transmission fees only the standard energy load profile is considered." The same applies to providing customers electricity. This needs to be changed so that flexible tariffs can be implemented," points out Vesper. Those who are aware of the close fight about the liberalization of the energy market know that this proceeding against the interests of the large energy providers might be long and exhausting. "We have been negotiating since October 2005 on framework agreements with the energy supply companies to be able to operate the measuring facilities. This was very troublesome. But now we finally did it," said Vesper.

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