Smart meters help to save money

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Smart meters store digital electricity consumption data that is transmitted at almost any predefined interval to the meter-reading company. (© Andreas Ingerl)

How can domestic electricity customers be motivated to use energy more efficiently, let alone make more efficient use of renewable sources? One possibility is to install electronic meters to measure the electricity consumed. In the RESIDENS project, scientists are examining how to get the best out of smart meters by simplifying their use.

Who wouldn't like to know how much electricity they consumed yesterday or whether it is cheaper to turn the washing machine on in the afternoon or to wait until after ten o' clock at night? But the problem is that you only find out how much electricity you have used once a year

with the annual statement. In most cases, it is impossible to determine whether the extra amount owed is due to higher electricity prices or higher consumption caused by the huge new flatscreen TV, the set-top box and daily surfing on the Internet. And many electricity customers have no idea at all how they can help to make more efficient use of energy from renewable sources by adapting their behavior.

In the project "RESIDENS: research project for more efficient energy usage by system orientated integration of end consumers" researchers are examining how electricity customers can be motivated to use energy from renewable sources more efficiently. The work is being conducted as a collaborative effort by researchers at Ilmenau University of Technology, the Fraunhofer Application Center for System Technology AST and the Fraunhofer Institute for Digital Media Technology IDMT in Ilmenau. But electricity customers can only use energy more efficiently if they know exactly how much power they are consuming at any time, and under what conditions they can save money by using green electricity. This is why the researchers are using electronic power meters, which measure how much electricity is consumed and transmit the recorded data at almost any predefined interval to the meter-reading company. "Smart meters make it possible to analyze the data in numerous different ways", explains AST engineer Dr. Peter Bretschneider. For instance, you can display a reading of the instantaneous power consumption or the cost of a kilowatt-hour of electricity. And you can trace how much energy you have used over a certain period. The smart meter enables actual consumption to be determined on a monthly basis. The meter also displays the currently applicable tariff, enabling customers to select the appropriate time to do their laundry, by waiting until off-peak rates apply before starting the washing machine.

To simplify the use of the new digital meters for electricity customers, the researchers are also working on applications for a Web portal, where

consumers will be able to see at a glance how much they paid for electricity last year, how much energy they have consumed today, and how the cost compares with the previous day's electricity consumption. An annual overview highlights the months in which the most electricity was consumed, and a daily overview pinpoints the hours of peak consumption. The portal will also inform consumers of the most cost-effective times to use green electricity and calculate their carbon footprint on the basis of their present pattern of consumption. This might prompt electricity customers to switch more often to energy from renewable sources. "Smart metering is about more than just producing an intelligent readout of meter data. It encompasses the entire spectrum from tariffs, metering and communication technology to data administration and processing", emphasizes Bretschneider.

The research project is divided into three parts. In the first phase, the objective is to assess the degree to which energy policy measures are accepted by consumers and evaluate the related behavior patterns. In the second phase, the experts will evaluate the acceptance of the electronic power meters. "This will include a detailed analysis of the strong and weak points identified in connection with the systematic integration of the smart meter, and of possible improvements from the end-user perspective", reports Bretschneider. On the basis of the results from the first two studies, the researchers aim to develop a strategy to educate electricity customers in the use of smart meters and improve the implementation of energy-saving measures in general.

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