TechAndComputer (Nov. 12, 2012) — Information and Communication Technologies (ICTs) may allow a thirty percent reduction in electrical consumption in cities. This is what is demonstrated by a European research project that Universidad Carlos III of Madrid (UC3M) has participated in. The results were presented after analysis showed how to optimize the use of residential consumption and generation infrastructures.

The scientists and technologists who are participating in the ENERsip project have formed a consortium of ten partners from five European countries led by the Spanish company Tecnalia; they have designed, developed, and validated an ICT platform that allows residential electrical consumption to be reduced by 30 percent, while also integrating micro-generating installations using renewable energy, such as photovoltaic solar panels installed on the roofs of homes.

The key to obtaining these results lies in two strategies: reducing the consumption of electricity in homes (around 15 to 20 percent) and adjusting the consumption and generation of electricity in districts (approximately 15 to 20 percent). First, the system "gives the users information regarding their consumption, allowing them to identify the appliances that use the most energy; it then suggests possible solutions, attempting to modify certain behaviors and fomenting good practices that allow consumers to reduce their electricity bill," explains Professor José Ignacio Moreno, of the UC3M's Department of Telematic Engineering. In this way, the ENERsip platform allows appliances to be monitored by networks of sensors and actuators so that they can be controlled wirelessly by using web applications.

In addition, the system they have designed carries out automatic actions that allow the consumption in homes within a district to be adjusted as much as possible so that they use renewable energy generated by sources from within the same district, thus reducing energy flows and, consequently, energy losses and costs. "This type of action falls within what is know as electricity demand management," indicates another of the UC3M researchers, Gregorio López. For example, he comments, the temperature could be raised by a few degrees in the summer (or lowered in winter) in hundreds of thousands of homes during the periods of lowest production of renewable energy in a district, or the programmed running of certain appliances (dishwashers, washing machines) can be moved to a time period when renewable energy production its at its peak. "Of course," López points out, "those households would have agreed in advance to participate in this type of program in exchange for certain incentives, and pre-established levels of comfort would never be compromised."

Intelligent and efficient electrical grids

The conclusion of this project, which falls within what is known as Smart Grid framework, is that, thanks to the automatic actions that using ICTs permits, savings in electrical consumption of up to 30 percent can be achieved. To obtain these results, the researchers tested the system in various computer simulations; they validated the platform in a pilot project carried out in three buildings located in different geographic points of Israel. Moreover, these figures are in the same range of those which appear in reports on other projects, such as SMART 2020, for example, which estimates that the application of ICTs to improve energy efficiency could result in a savings of approximately 600 billion Euros globally in the year 2020.

A few basic ICT installations would be sufficient to make the ENERsip platform work. Specifically, the platform would require networks with sensors and actuators for the consumption and micro-generation infrastructures, an Internet connection and a web application that would allow access from any device connected to the Web (although the ENERsip project itself also uses a dedicated core communications infrastructure that offers certain advantages). "It could be implemented from any home equipped with the typical consumer infrastructure or consumer and micro-generation infrastructure," José Ignacio Moreno states. The team he heads at UC3M has been in charge of the formal design and modeling of the communications architecture of the ENERsip platform, as well as the software simulations to evaluate the performance of that architecture. In addition, he has participated in the design and definition of the platform's integration and validation phases and scenarios; he has reported on the progress of the research through technical articles presented at key communication conferences, such as INFOCOM 2011 and ICC 2012.

The ENERsip consortium, which is formed by ten partners from five European countries, is led by the Spanish company Tecnalia and includes the participation of various leading companies in the field, such as Amplia Soluciones (Spain), Honeywell (Czech Republic), IEC (Israel Electric Corporation, Israel), ISA (Intelligent Sensing Anywhere, Portugal), ISASTUR (Ingeniería y Suministros de Asturias S.A., Spain), MSIL (Motorola Solutions Israel Ltd, Israel), as well as research centers such the ISR-UC (Institute of Systems and Robotics-University of Coimbra, Portugal), UC3M (Universidad Carlos III of Madrid, Spain) and VITO (Vlaamse Instelling voor Technologisch Onderzoek, Belgium).

Project Web: www.enersip-project.eu

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