CIE COMPONENTS IN ELECTRONICS

N° and issue date : 100701 - 01/07/2010
Circulation : 14000
Frequency : Monthly
CIE_100701_30_303.pdf
Web Site: http://www.cieonline.co.uk

PRESS INDEX
Page : 29
Size : 90 %

Extracting intelligence from smart metering

Daryl Miller looks at the benefits of smart metering and the benefits that networking such technology could bring to residential, commercial and industrial properties

A smart meter looks similar to a traditional electricity meter, except for its ability to communicate how much electricity is used by the day, hour and minute. The information sourced is relayed automatically through a variety of technologies that optimise cost and ease connectivity. Depending on how it is equipped, the meter can also be the connection vehicle to control devices within a home or business; even switching on and off power to energy-consuming appliances. Water heaters, air conditioners and extractor fans are the typical large energy-consuming appliances that are targeted.

Having the ability to network smart meters brings out their true value. As the deployment of the 'smart grid' is rolled out to the UK, the remote access component of smart meters validates their importance.

In the last 40 years, measurement and billing requirements for the utilities sector have retained a relative stability. With suppliers billing their consumers every quarter and with meter readings fairly sporadic, utilities have maintained a one-way dialogue with customers. But the mandate for smart metering, with its environmental, cost and consumer-driven imperatives, is set to shatter this complacency.

Smart meters are being deployed worldwide; however, it is the network that brings out their true value. While plans to implement domestic smart metering – to cut energy use and carbon emissions – will vary from country to country, we can expect most developed regions to take steps towards this standard within the next 10 years. Already, the UK Government plans to fit every home with smart meters by the end of 2020. This project will see 26 million electric meters, and 22 million gas meters installed costing around £7 billion.

Utilities companies are now measuring real-time use of demand for electricity and gas, and this accurate data from the meters is used to measure the providers' capacity to deliver energy.

There are numerous benefits of this application. Equipped with control capabilities, utilities can offer cheaper prices to consumers who volunteer their energy-hungry appliances to be shut-off remotely during peak energy times of the day. The utility provider can more efficiently match demand with capacity using smart meters, and the network that interconnects them.

Government and energy suppliers can reap the benefits of measuring and monitoring peak demand in real-time. Further, they can use this information to plan upgrades to infrastructure. Decisions to either build a new power station or simply redistribute supply from one area to another, for example, can be more informed than ever before.

Infrastructure for utilities must be designed to deliver energy efficiency at

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the absolute peak of demand. Real-time monitoring of usage gives a quantifiable figure of this peak, instead of a vague and abstract concept, based on inaccurate and out-of-date monthly, or even quarterly, energy usage reviews.

Cost and energy savings

The 'green' credentials of smart metering need little publicity. Businesses and individuals alike are aware of the positive behavioural changes in energy consumption that can result from being able to monitor usage. However, when smart meters are networked, transparency is heightened and the benefits are further amplified.

Imagine being able to check your smartphone on the train to discover you left the television on, and remotely disconnect it from its power source. The benefits for businesses can also be impressive. For example, lights and computers can be automatically deactivated after a predetermined period of static energy usage, indicating that nobody is in the office.

With the EU setting ambitious targets to reduce CO2 emissions by 20 per cent by 2020, individual and business energy use has really come under the spotlight. Networking smart meters will help to drive the efficiencies and changes in behaviour that are necessary if these targets are to be reached.

Smarter customers

Networked smart meters offer more choice and greater flexibility to customers. Instead of quarterly usage estimates, customers will be able to take advantage of a whole host of payment options and plans that real-time monitoring will enable.

Similar pricing revolutions have taken place in other industries (telecommunications is a good example), where a movement from quarterly billing to real-time payment has shifted in power from provider to consumer.

The fundamental changes brought about by the advent of smart metering will seem daunting to organisations unwilling to change, but the benefits are for the taking. These changes could actually create important opportunities throughout the utilities sector and its customers. With unprecedented data comes unrivalled insight. For the first time ever, utilities will have huge amounts of demographic and consumption information. They will be able to use this to market to different customer groups and introduce bespoke tariffs – improving both attraction and retention, whilst boosting revenues in the process. Customers can expect better deals than ever at their fingertips, knowing that their provider is fighting for their custom.

Changes are coming to the utilities market, and smart meters have a large part to play in this. By connecting the devices, the benefits to consumers, utility providers and the environment are abundant.

Lantronix products can be used in just about every facet of power management, including utilities. For most power applications, the key to its technology is the ability to remotely control and manage devices in the field even when behind firewalls. These products can be embedded inside of the meters or attached externally to equipment. Efficient acquisition of data and control across the network are vital requirements for the power industry.

The utilities industry has long recognised the benefits of IP-based communication. At the substation level, however, there are often compatibility issues with communication hardware, which comes from a variety of vendors. With their versatility and protocol independence, the device servers developed by Lantronix can bring together a diverse array of serial devices on the network. Their remote management capability makes them dependable tools for monitoring power allocations during critical high-demand periods.

The future will be smarter, more efficient and easier, thanks to smart metering. Smarter planning will ensure that infrastructure is prepared for peak demand, and that investment is channelled to those places where it is most required. Consumers will be able to take advantage of smarter and cheaper, tariffs which regulate usage of energy at peak times. Businesses will have real-time monitoring of their consumption, coupled with remote links to unstaffed locations; allowing them to save further energy and costs.

Research conducted by ABI estimates that the total installed base of smart electricity meters that are capable of two-way communications will rise from roughly 76 million in 2009, to approximately 212 million smart meters by 2015. With numbers like this, the smart grid is hard to ignore as an industry- changing initiative. Companies that recognise the benefits of this technology will realise the potential for a smarter world.

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