Advantages of Smart Grids

The definitive solution for managing the grids of the future

Introduction

With the recent requirement to install smart energy meters in Germany and other European Union Companies, Smart Grids are becoming the definitive solution for managing the grids of the future.

At this point the advantages they bring to both utilities and consumers are not in question. But of all their benefits, which are most important for European Union countries?

In this article we describe all the different benefits they provide, taking the "Benchmarking smart metering deployment in the EU-27 with a focus on electricity" as reference.

At CIRCUTOR we have a full range of smart energy meters with PLC PRIME technology as well as Data Concentrators (the Compact DC series), which read and programme the energy meters and send all the information about the units connected to the central management system.

The main advantages identified in this document are:

Energy savings through reducing consumption

One of the advantages of smart grids is that they can tell us the consumption at an energy meter at any time, so users are better informed of their real consumption. Moreover, with better consumption monitoring, contracted power can be adjusted to meet the real need of each consumer. These two factors result in users reducing their consumption and tailoring their contracted power to their real needs.
Better customer service and more accurate bills.

Another key advantage offered by telemanagement systems is that bills are more accurate. They always reflect the real consumption of each month instead of estimates, reducing the cost of the old system of manual energy meter readings. In addition to being able to access information about the installation remotely, problems become easier to diagnose and solutions can therefore be implemented faster, improving customer service.

Nowadays customers have to notify companies for them to take action. But with remote management the system itself automatically reports all incidents to the electric company so it can respond faster to users.

Fraud detection and technical losses

How does fraud being perpetuated by other customers affect me?

According to data from the Spanish National Commission for Markets and Competition, electricity fraud reached €150 million last year, equivalent to the consumption of Seville and Valencia combined. This does not negatively impact the utilities however, but rather translates into increased electricity bills for customers.

Telemanagement systems can detect fraud much more accurately, as the units do not contain any parts that are subject to mechanical wear. Moreover, the new energy meters with PLC PRIME communications have systems that detect the opening of the terminal strip cover and send an automatic alert to the managers of the grid warning of potential fraud.

Units with PLC technology can perform energy balances. The system adds together the energy of all the energy meters installed and compares it to the measurement taken by a totaliser at the head of the line to see if there are any losses (or theft) at any point that the company is not aware of.

Reduced balancing cost

Smart Grids can collect much more data than the manual energy meter reading system. This permits the use of data analysis techniques and the preparation of highly realistic consumption forecasts as many more variables are taken into account.

Utilities can then better tailor their pro-
duction to consumption (balances) and reduce energy surpluses.

**Increased competition**

Having real load curve data invites marketing companies to adjust their prices based on energy demand. When the marketing companies have more data they can make better offers that are more in line with their customers’ reality, increasing competitive options through a wider variety of offers (hourly tariffs, energy packages, etc.). This benefits consumers in that more competition leads to more competitive pricing.

**Levelling of the demand curve (Peak reduction)**

Through the use of different pricing profiles, utilities can level out the daily demand curve to shift consumption peaks to times with lower demand, optimising usage of the electrical network. So customers can intentionally connect loads at off-peak times when each kWh is less expensive. As an example: a customer may decide to change their consumption habits by using the washing machine during off-peak hours, at night, instead of when each kWh is more expensive, saving money and helping the utility balance consumption and avoid line saturation during peak hours.

Having consistent consumption means that power plants do not have to switch on and off as many times to generate energy, which lowers generation costs.

**Reduction of carbon emissions**

All the benefits above involve reducing consumption, which entails a reduction in CO₂ emissions. We can thus say that Smart Grids lead to a more sustainable future. All this will directly contribute to the future integration of electric vehicle charging systems on the mains. The deployment of renewable energy systems is also made easier as utilities gain greater control of their grids.

Smart Grids have two-way exchange of energy and information, facilitating the integration of renewable energies and electric vehicles.

This system can act remotely on network incidents, improving our supply and our relationship with the environment.

Through the use of different pricing profiles, utilities can flatten the daily demand curve to shift consumption peaks to times with lower demand, optimising usage of the electrical network.

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