

August 2011

Power metering – crucial for successful energy management

Intelligent metering is increasingly being accepted as a vital tool for successful energy management and therefore for the effective administration and control of tenant billing.

“Metering is invaluable in helping a property owner or landlord to achieve his goals for energy measurement, tracking and ultimately overall management,” says Bradley Hemphill, Managing Director of Electrical Engineering Solutions (EES). EES is a leader in designing and project managing Information Technology (IT) solutions for the built environment.

“You can’t control what you can’t measure,” explains Hemphill. “As soon as you are able to determine what is used, by whom and when (which intelligent metering enables you to do) then with the necessary data at your disposal, the rest of the management process becomes a viable option.”

“Metering enables the property owner to accurately bill tenants for what they use, and in so doing shifts the motivation to conserve energy back to the actual user. What is often ignored though, is metering with energy management as the objective. In designing the system correctly, stakeholders can monitor trends like maximum demand, load distribution and waste or inefficient use in specific services, like lighting or ventilation, throughout or in remote parts of a building or campus”

Similarly in an industrial or manufacturing environment, energy management metering provides the data required to quantify utility costs for various product lines.

“The integration of a metering service into the building network is fundamental to effective design, in achieving the goal of successful energy management,” states Hemphill.

The principal design requires:

- Operations
- Server and switches in technical room(s)
- IP network (fibre)
- Gateways (IP/ MODBUS) at each distribution board (DB)
- MODBUS network inside DBs

Operations

The electrical metering, monitoring and billing system is administered from the workstation via PC. Processing (analytics) are also available through cloud-based applications, receiving real-time updates. In this way billing forms are generated over a monthly period or ad hoc reporting cycle.

Server and switches in technical room

The network head-end equipment communicates via Local Area Network (LAN) and a fibre switch for connectivity to the gateway devices located at each electrical sub-distribution board (S-DB).

IP network (fibre)

Distributed fibre is routed via the network in a star formation to each of the gateways, terminating in a fibre outlet near each S-DB unit.

Gateways (IP/MODBUS) at each distribution board (DB)

Gateway devices are used to convert modbus to Internet protocol, allowing for transmission over ethernet. Gateway devices can double up as data-loggers, interrogating downstream meters, sometimes providing savings on installation costs.

MODBUS network inside DBs

This is where the meters do their work. Devices are series-connected in a MODBUS network within a DB. The gateways and meters are connected to emergency power from the DB.

The following metering and energy management reports can be generated on a real-time and scheduled basis:

- power consumption, maximum demand and KVA load (for KVA meters)
- power consumption only (KWH for KWH meters)

The application software is accessible either from the workstation in operations office or any other network location via an internet browser.

“In addition to the enhanced efficiency it offers, this type of metering technology can reduce the cost of industrial and business operations,” says Hemphill. “With greater awareness of Green Building practice becoming necessary, a well designed system will improve energy management efficiency, contributing to the environmental friendliness of a building.”

As electricity rates increase, the need for accurate metering and better energy management has never been more relevant. When last did you look at your building energy management policy?

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Electrical Engineering Solutions (EES) company profile:

Electrical Engineering Solutions (EES) is an ISO 9000, professional services company, offering engineering, project management and business management services in all sectors of industry throughout Africa and other emerging markets.

It is a leader in project managing the provision of Information Technology (IT) solutions to the built environment. Integral to its business is intelligent infrastructure, the implementation of which entails the convergence of IT and Building Automation Systems (BAS).

A benefit of intelligent infrastructure is that it facilitates energy management, thus contributing to the urgent global objective to establish a green environment. EES is a member company of the Green Building Council of South Africa.

The firm is proud to have played a significant role in the 2010 World Cup in the special systems design of five infrastructure projects: Cape Town Stadium, Nelson Mandela Bay Stadium in Port Elizabeth, Cape Town International Airport, King Shaka International Airport (KSIA) north of Durban and the Gautrain Sandton Station.

Based in Cape Town since 2001, the firm also has specialist experience in communication networks and related IT, security systems and 11kV and 400V electrical systems that support intelligent infrastructure.

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Issued on behalf of Electrical Engineering Solutions (EES)
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For further information please contact:

Annabel Eaton
Corporate Communication Services (CCS)
tel: +27 (0) 21 702 3550 (CT, South Africa)
cell: 082 8984878
e-mail: eatona@netactive.co.za