

Now is the time to deploy smart building technologies

By  Neil Cameron

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The grid - the infrastructure that delivers electricity from our local utility and municipalities to buildings - is over-taxed.



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Because of increasing demand during peak time periods and the imminent output of renewable energy sources such as solar and wind when South Africa's independent power producers (IPP's) start contributing with supply, the grid is less able to provide a stable energy supply.

However, by linking all supply and demand elements through intelligent two-way communication, the grid could constantly monitor demand and adjust delivery accordingly. That's the idea behind the 'smart grid'.

For example, by interfacing with home appliances or building controls, the smart grid could allow those energy-consuming devices to operate in off-peak periods and disable them during peak periods to save energy, reduce strain on the grid and enable users to consume electricity when it is least expensive.

Natural progression

In South Africa, we do not have a 'smart grid' per se but the natural progression to our energy crisis is to implement the technology in order to connect demand to supply capabilities and deliver bi-directional information between the utility and the consumer. It will drive consumer usage and behaviour through 'time of use' billing and enable facilities (and consumers) to reduce their consumption during peak periods.

Facilities will be able to control their energy loads by having them connected to a smart grid and enable companies to manage their own load shedding. This will deliver significant financial benefits to organisations and assist the utility to manage demand better. To deliver all the benefits the smart grid has to offer, smart buildings need to be connected to it.

A smart building provides some or all of the following advanced capabilities:

- Optimised coordination of energy loads, on-site energy generation and energy storage.
- Fully integrated control of lighting, heating, cooling, ventilation, IT, and other energy consuming systems, using weather data and information from security, scheduling and other business systems to optimise performance.
- Advanced diagnostics and automated measurement, verification and reporting of energy and greenhouse gas emissions savings.
- Continuous two-way communication between the building and the grid.
- Automatic demand response to dynamic pricing signals from the grid. By utilising smart building technologies, owners and tenants can vary electricity usage in response to signals from the grid when prices change to consume electricity when it's cheaper, and they can reduce demand when the grid is reaching capacity.

This is known as 'demand response'. Smart building management systems can automate a short-term reduction in energy demand through load shedding or load shifting. For example, if the owner sets an electricity price threshold for the building and the grid signals that the price will exceed that threshold at a particular time of the day, the system would automatically reduce energy demand in the building at that time. The system could turn off non-critical loads, reduce lighting levels and let building temperatures float within limits or start the use of stored or on-site energy generation.

Reliability and security

Combining smart grid and smart building technologies improves reliability and security, while reducing energy costs and greenhouse gas emissions. Johnson Controls has been providing smart building technologies to customers for years and those customers are reaping the benefits. Commercial buildings in the US now consume 18% of the country's energy and 36% of the electricity.

In a recent energy efficiency indicator study, 44% of facility executives in the US selected smart building technology as one of the top three technologies expected to have the greatest price-performance improvement over the next ten years. The time to deploy smart building technologies is now. Doing so could avoid \$33bn in energy costs and eliminate 160 million tons of carbon emissions annually by the year 2030.

ABOUT NEIL CAMERON

Neil Cameron is Johnson Controls area general manager, building efficiency - Africa

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