Can Wireless Technologies Revolutionise Energy Metering?

At first glance, the obvious answer to this question seems apparent; however, clients and system contractors of energy monitoring systems must delve deeper to ensure the suitability, resilience, and long-term viability of wireless technology in any metering solution.

Wireless technology in commercial and industrial settings differs significantly from that in residential properties. Therefore, wireless technologies must exhibit robustness, scalability, security, and reliability, with a focus on commercial and industrial applications rather than adopting smart home technology.

Wireless Technology

For the context of this discussion, we focus on wireless connections for commercial and industrial applications. Elcomponent holds its own perspective on the wireless technology it predominantly supports, though it is crucial to note that the availability of hardware specifically for energy metering can be constrained depending on the chosen technology.

Various wireless technologies present distinct merits and pitfalls. The most common ones include:

- LoRa (LoraWan): Designed for long-range communication with low power consumption, suitable for remote metering.
- Bluetooth: A widely used technology for short-range wireless communication, with Bluetooth Low Energy (BLE) being energy-efficient, ideal for battery-powered devices.
- Zigbee: A low-power, low-data-rate wireless communication standard suitable for metering applications, known for its low power consumption and compatibility with home automation.
- NB-IoT (Narrowband Internet of Things): A cellular technology designed specifically for the Internet of Things (IoT), providing long-range communication with low power consumption, suitable for metering applications.
- Wireless MBUS: Specifically designed for MBUS-compatible meters and data loggers.
- Proprietary Solutions: Generally advisable to be avoided for general metering applications.

It is important to clarify that this editorial does not aim to endorse a specific technology or discuss the merits of particular wireless solutions. Instead, it aims to provide insights into the considerations necessary to ensure a robust, reliable system that can operate effectively for many years, delivering accurate information to relevant stakeholders.

Challenges of Wireless Solutions

Regardless of the technology chosen, fundamental questions must be addressed.

Understanding the client's needs, the type of sites and locations requiring metering, and the desired data and its presentation are paramount. While wireless solutions can simplify physical installations, they may introduce complexities in system commissioning, configuration, and documentation, impacting the overall quality of the commissioned system.

The other emerging trend with wireless technologies is proprietary solutions and closed eco systems. On the surface are very slick and simple to use. However, these are often accompanied by recurring fees and in the case of a site issue or failure to receive data, there are no self-help tools to analyse faults or site issues. This is not a sustainable approach and we have seen many of these solutions become unserviceable after only a few years.

A modern metering system with a selection of technologies can be complex. FIG1

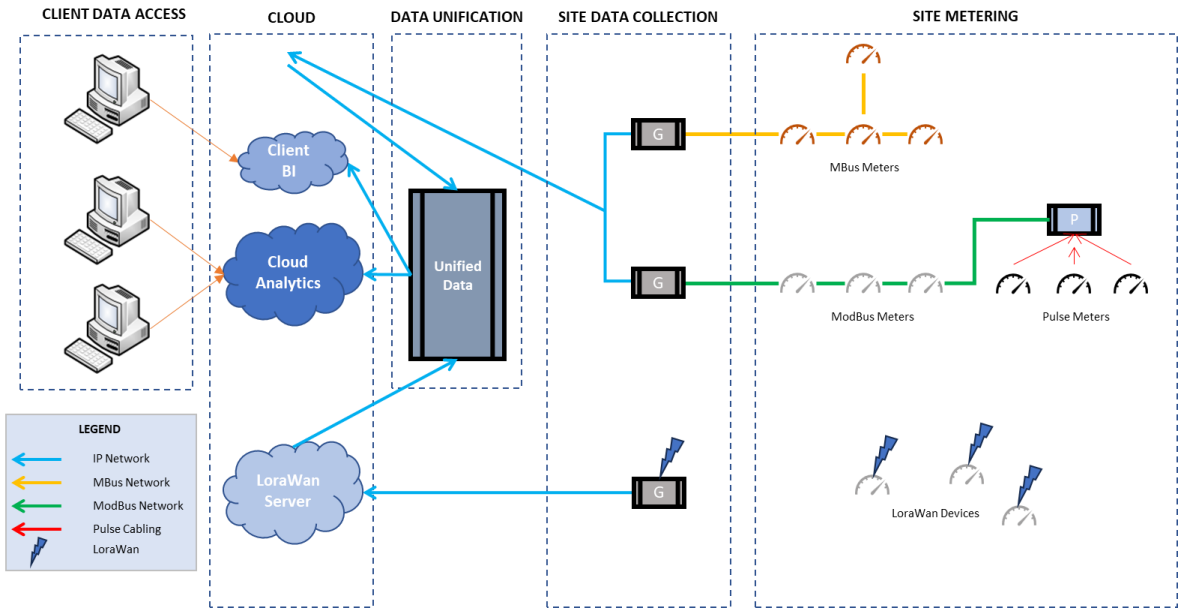


FIG.1

Client-Centric Approach

Clients often initiate the decision-making process by evaluating software solutions and then working backward to select data collection systems and metering hardware. However, it is advisable for clients to consider their metering solution from a basic perspective before delving into software demonstrations. Questions such as the future scalability of the system, potential changes in data usage, and the time required for system management should guide the decision-making process.

The ideal solution, both in terms of hardware and software, is one that provides a robust system capable of easy adaptation, working seamlessly with any metering device, and facilitating data transmission to various systems or recipients. The selected software should accept data from different sources without being inherently tied to a specific hardware solution.

Energy Monitoring System Definition

Elcomponent defines an energy monitoring system as a collection of energy measuring devices automatically read by a system. The data collected is stored and provided to one or multiple systems, enabling informed energy and sustainability management decisions.

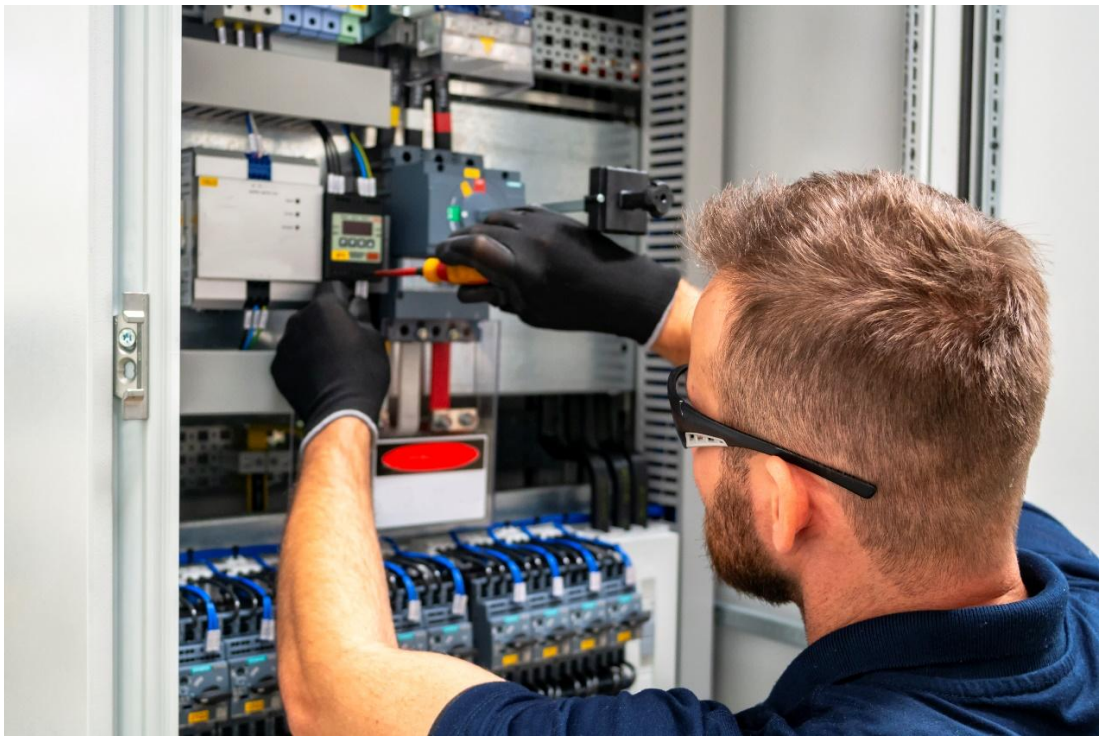
Significance of Site Topology

The diversity of site topologies necessitates a tailored approach to energy monitoring technology selection. Factors such as the size and complexity of the site, whether a single retail unit or a multi-site campus, significantly influence the choice between radio, cabling, GSM (global system for mobile), and LAN (local area network) communications. A comprehensive understanding of the site topology is crucial for determining the most suitable technology, which, in turn, impacts costs, complexity, and user adaptability for future system operation and management.

General Design Principles for Energy Monitoring Systems

Elcomponent adheres to certain design principles regardless of the chosen provider:

- Reuse existing equipment where possible: Rather than replacing serviceable metering, focus on standardising communications, ensuring flexibility in the face of meter availability changes.
- Avoid proprietary equipment: Steer clear of being locked into specific hardware or metering devices.
- Design for robustness and longevity: Ensure the system is designed to provide comprehensive data over many years.
- Enable flexible data transmission: Ensure the system can send data to one or multiple locations, with easy adaptability for future changes.



No Magic Solution

Despite the deployment of various technologies, there is no one-size-fits-all solution for all scenarios. In reality, a system may require a combination of different solutions based on specific needs. For instance, a switch panel with existing meters may only need a data logger connected to

meter communications for a robust solution. Conversely, a complex site, such as a quarry or a university campus, may necessitate a combination of wireless technology, site LAN, and GSM solutions, emphasising the importance of data consistency and management.

From the client's perspective, addressing these issues and complexities may seem mundane, making the role of a contractor with a proven track record critical. Metering across large estates, multiple sites, or complex buildings is inherently intricate, and anyone claiming otherwise likely lacks a comprehensive understanding of metering.

Conclusion

With meticulous planning and execution, it is possible to create a highly reliable and flexible energy monitoring solution. A well-designed system should facilitate easy addition or replacement of meters, offer effective operational management through data quality tools, and allow flexible data transmission to one or multiple sources. While wireless technologies can simplify many metering scenarios, they do not replace conventional wired solutions; rather, they complement them. By considering the need for future changes and effective operational management, users can expect many years of service from the deployed technology. Some previously commercially unviable, use-cases will become possible with the implementation of wireless technologies. It is inevitable that more capability will be developed which will see expansion in this area, however, there is no substitute for a well-engineered, installed and commissioned system, regardless of the technology.

Elcomponent are available to discuss the practicalities of metering system deployment for wired and wireless solutions. Please feel free to contact.

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