JANUARY 26, 2017

Industrial IoT Encourages Growth in Building Management Systems

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Keywords

Building Management System (BMS), Internet of Things (IoT), Building Information Management (BIM), Building Automation Systems (BAS)

Summary

New, IoT-related technologies such as advanced analytics, machine learning, and cloud platforms – in parallel with increasing social and political demand for enhanced safety, security, and environmental compliance – have led to a resurgence in demand for building management systems (BMS). However, shortcomings in many legacy BMS solutions make them incapable of efficiently fulfilling the demand for integrated building management. These shortcomings include lack of basic analytic tools, proprietary programming languages, cumbersome user interfaces, and an inability to process live data.

In recent briefings with L&T Technology Services, ARC Advisory Group learned about that company's proprietary smart building framework, i-BEMS (Intelligent Building Energy Management Systems), and its "system-of-systems" approach to enabling smart buildings. L&T Technology Services, a subsidiary of Larsen and Toubro Limited, India's largest engineering and construction company, operates in the global engineering, research, and development space. Its typical business model is to offer innovative design and development services across a broad range of industries such as transportation, aerospace, telecom, and medical and industrial products.

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The Era of Integrated Buildings Management Solutions

Building management systems (also referred to as building automation systems) control and monitor various subsystems such as HVAC, lighting,

elevators, captive and utility power systems, fire systems, security systems, and so on. As these subsystems contribute to the majority of the energy consumption in a building, the benefits of having an effective BMS include:

- Energy Efficiency – Real-time data paired with historical trend analysis can be used to reduce use of energy for lighting and HVAC, while optimizing power system efficiency. This data and analysis can provide insights into energy usage trends, enabling implementation of efficient business logic and quicker, more informed decisions.

- Operational Performance – By continuously monitoring and controlling air quality, the BMS can improve indoor air quality to help increase employee productivity and health. Also, maintenance and downtime scheduling can be optimized by monitoring various machine health parameters.

- Safety and Security – Remote monitoring and alarms coupled to HVAC, fire, security systems, and access control allow for rapid and appropriate responses to emergency situations.

Traditionally, most of the various subsystems in a building operated as standalone entities with their own IT solutions. As long as the number of disparate subsystems remained small, this worked fine for the facility managers. However, the introduction of newer subsystems such as rainwater harvesting, water reclamation, and renewable energy increased the complexity of buildings significantly; increasing the overhead cost of managing these subsystems. We're also seeing a significant increase in the number of parties within the organization that require access to the energy data. This results in the need for increased visibility into energy consumption patterns.

Technological, Political, and Social Drivers for BMS

The tools and infrastructure developed for Industrial IoT (IIoT) have dramatically altered the landscape for data collection and associated business processes. Consequently, the trends promoting growth in the BMS market are firmly linked to the IoT movement. Examples of this include lowered cost of products with embedded intelligence, advances in predictive analytics, and cloud services.

Support from BIM

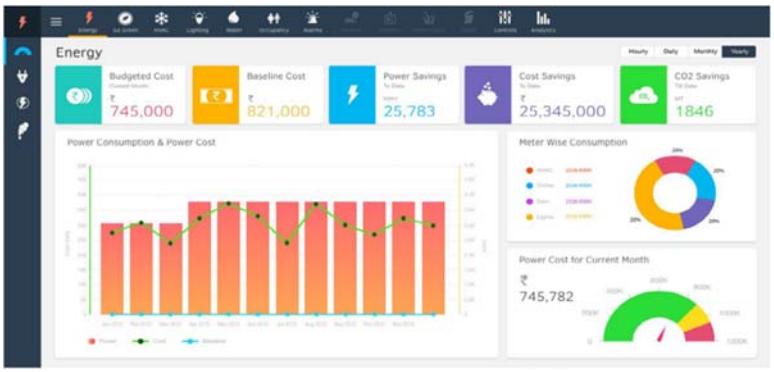
Recently, ARC has observed increased competition in the building information management (BIM) market. We attribute this trend, in part, to the adoption of a product lifecycle management (PLM)-style approach to projects in the construction industry. BIM tools ease the integration of complex building systems into architecture, engineering, and construction workflows. This helps reduce project costs, increase speed of delivery, and enable a smooth information and asset management handover from EPC to owner-operator. Thus, incorporating a BMS solution at the design phases of a project becomes easier to cost justify.

Safety, Security, and the Environment

In addition to financial motivation, building owners in developed countries are experiencing increased social and political pressure to meet security, safety, and environmental benchmarks. This pressure can come in many forms including green building certifications such as LEED, local building safety codes, or regulations that stipulate access control and security systems for government buildings. Although these types of pressures aren't as prevalent in developing countries, the increased volume of new construction projects is likely to make up for this.

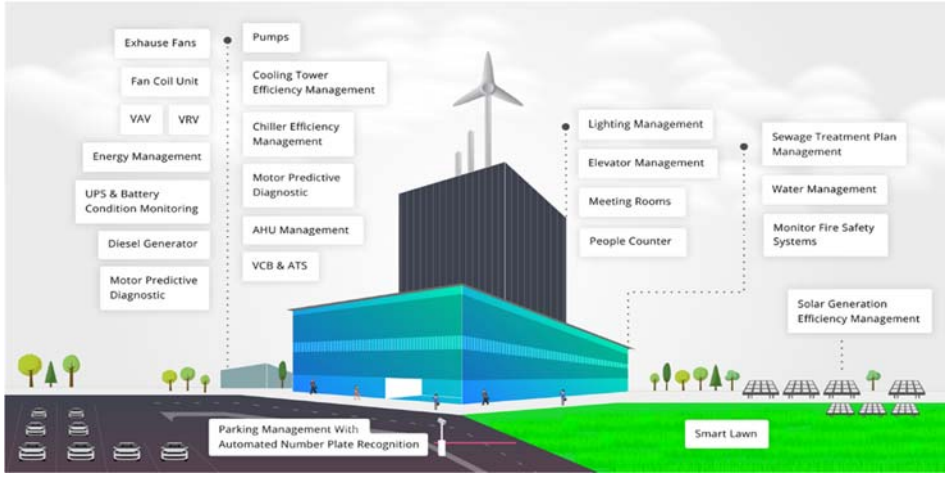
i-BEMS: A New Solution for Building Management Systems

i-BEMS, a cloud-based, device-agnostic platform, provides a modular approach for adding subsystems as needed. i-BEMS aims to provide an end-to-end view of building operations and intelligent tools to control and optimize these operations. i-BEMS' integrated platform approach can provide end-customers with a holistic view of the complete assets, building space, and various operational costs involved. Its multiple built-in frameworks/solutions (video analytics, remote monitoring algorithms, energy optimization algorithms, and so on), aim to make the various subsystems more intelligent. This helps reduce the need for human intervention, improve operational efficiency, and optimize energy consumption.



i-BEMS Sample Dashboard

In reviewing the i-BEMS offering, it appears that L&T Technology Services and ARC are "on the same page" relative to the future of building management systems. L&T Technology Services has partnered with Microsoft to provide the i-BEMS solution as a Microsoft Azure service, and with GE Predix for elevator analytics and performance management. This enables i-BEMS to deliver customizable mobile applications, highly configurable interfaces, and advanced analytics tools. While this approach allows customers to co-develop their own solutions, i-BEMS also comes with a comprehensive set of tools, features, and novel applications such as a patented video algorithm for monitoring the occupancy count and computation of air quality.



i-BEMS – Features at a Glance

Conclusion

The advances in BMS provide an example of the profound effect the growing IIoT has across industries. However, many facility managers still operate using disparate systems provided by competing building automation suppliers.

With i-BEMS, L&T Technology Services enables facility managers to utilize data from all systems within a single platform to generate intelligent insights; helping optimize operational performance while providing sustainability and security. The integrated approach also enables a holistic focus on all stakeholders (facility managers, tenants, occupants, guests, owners, etc.). This increases the number of potential use cases and improves the user experience. For example, with its video analytics, i-BEMS can track the building

occupants, enabling quicker and more effective responses in emergency situations.

L&T Technology Services believes that its integrated and smart approach to building management solutions could save up to 40 percent of a facility's energy costs.

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