Transforming Energy Efficiency through IoT – A Revolution in Energy Management

In the era of striving for net-zero carbon emissions and reducing carbon footprints, the concept of energy management through IoT is often underrated due to its simplicity. With an increasing number of climate change conferences and awareness campaigns in the past decade, governments have started enforcing laws to reduce energy consumption and incentivize reductions through rebates at both the state and national levels.

According to the 2023 Energy Statistics of India report, energy consumption significantly dropped during the pandemic (2020-21) due to lockdowns and enforced work-from-home, but increased by 10.39% post-pandemic (2021-22). In the same period, coal contributed to 47% of energy sources, increasing carbon footprint and emissions. As more companies revert to conventional work patterns, energy consumption is expected to rise, potentially offsetting the drop seen during the pandemic. To combat global warming and related disasters, the consumption of conventional energy sources must drastically decrease by 2030, as targeted by the Indian government in a statement released by the Ministry of Environment, Forest, and Climate Change.

A key strategy is to reduce energy wastage in the business sector. With the rise of local and foreign tech companies in India, the demand for corporate and co-working spaces has increased, leading to urbanization and infrastructure growth. Energy consumption, a significant portion of monthly bills for these businesses, becomes a prime target for optimization through technology.

Given the widespread availability of the internet through broadband, Wi-Fi, 4G, and 5G across India, IoT-powered products have found promising use cases in business spaces. IoT sensors can be installed on-site to monitor energy consumption from individual devices (HVAC systems, lighting systems, generators, UPS, etc.) and control device usage remotely. These sensors aggregate data across multiple locations and present it in a user-friendly format, helping business owners understand the contributions of individual devices to their energy consumption. Advanced algorithms in data analytics can identify and isolate patterns in energy consumption, optimizing energy efficiency.

Smart energy meters, replacing conventional ones, can relay consumption data per device and location, programmable to cut off energy after reaching a certain limit. Similar logic can be applied to HVAC systems, controlled by smart sensors based on occupancy levels, weather patterns, and peak/off-peak hours.

This concept can be expanded on a large scale to establish smart grids in tier 1 cities, eventually reaching tier 2 and tier 3 cities, creating a network of smart systems optimizing energy consumption and reducing carbon emissions. Furthermore, these smart sensors and devices pay for themselves within the short term through savings in energy bills, providing a meaningful and environmentally friendly approach that yields both short-term and long-term benefits for businesses and the planet.

- Bhargav S

Lead Solution Engineer