Wipro EcoEnergy

A BIG DATA APPROACH TO ENERGY MANAGEMENT IN RETAIL

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Abstract

In this era of rapid transformations, Energy Management is more of a necessity than a choice. Retail businesses spend billions of dollars each year on energy. The industry faces the dual challenge of not only reducing carbon footprint, but also imbibing sustainable strategies that balance business objectives with environmental responsibilities.

Popular energy-saving initiatives entail retrofitting lighting, and heating, ventilation, and air conditioning (HVAC) assets. Though these measures ensure savings, they bear the burden of being capital intensive projects. Savings through operations in large multi-site scenarios lead to results, though limited by the extent of visibility.

This paper discusses how the effective usage of Big Data Analytics can revolutionize energy sustainability initiatives for retailers, driving consumption pattern analysis, establishing efficiency blueprints and supporting maintenance efforts. Indeed, Big Data is the harbinger of an efficient tomorrow, bolstering the retailer's fiscal as well as competitive repute in the market, combined with the augmentation of savings potential.

Architecting Success with 'Better Buildings Challenge'

As part of President Obama's Climate Action Plan, the US Department of Energy (DOE) is promoting 'Better Buildings Challenge', wherein partners target to reduce their energy consumption by about a fifth by year 2020. This includes retailers in many segments such as home improvement, apparel stores, the electronics, pharmacy and grocery segments who have been leveraging on Big Data to analyze energy usage.

Recently, a US-based leading consumer electronics enterprise achieved greenhouse gas reductions of 8% per square foot, with a cumulative progress rating of 24% towards realizing its energy efficiency goals. Two other large scale retail outlets with a nation-wide presence also demonstrated significant energy savings across their portfolios.

These achievements were the result of a strong synergy between energy management endeavors and leveraging Big Data.

Going the Big Data Way

The concept here is to collect large volume of data (terabytes of information) pertaining to energy consumption, costs, asset operations and business policies, and sift through that to determine operational savings. Some of the examples include standardizing the temperature policies across the portfolio, ensuring that unnecessary lights and air conditioning do not operate when not required and the efficient working of assets. This data when analyzed over a long term, allowed retailers to figure out not-so-obvious energy leakages like chronic equipment efficiency issues, insulation problems with the building envelope and heat gain through the skylights.

The savings are largely achieved by correcting the operational deviations and fine-tuning the asset operations through controls in this kind of program. There are hundreds of ways in which performance can deviate or can be improved across lighting, electrical, cooking, air conditioning and refrigeration systems. Hence, one needs access to data across all sites.

For retailers, making Big Data work for energy efficiency programs entails the following:

Establish Savings Potential

Carry out pilot study and determine saving strategies that can be actioned with data. Savings can range from 4% to over 20% across sites and could be feasible to implement based on size of spend.

Set-up Data Collection Mechanism

Volume and method depends on the present state of technology deployed, and how granular you would like the data to be, to determine deviations. For example, one can determine the store energy performance through historic monthly invoice data, which means one sample per month. Better visibility into energy deviations in near real -time is obtained from half-hourly interval data, that is, 48 samples a day. One gets best actionable insights when asset data is collected. Let's say 15 parameters for 10 roof-top units every 30 minutes. That will be 15 x 10 x 48 = 7200 records just for a single store in a day.

Such data is typically collected via Building Automation Systems, directly through controllers or through their management application. Many legacy and proprietary systems do not allow any access to data, in which case metering and sub-metering analysis have to be used.

Analysis Capabilities

Just collecting data or having software to analyze does not mean that one would be able to figure out the savings. Analytics capability requires collaboration between data analysts and domain experts. Also, given that data is voluminous, structured methods and toolset is a must for complete analysis across all sites.

Action

Savings result from action and not just insights. In a 500 site portfolio, if one is able to cover just 20% stores every month, carry out detailed analysis of 20 and action upon 10 stores, obviously program will not produce meaningful savings. A retailer needs to touch almost all the sites for deviations and resolve the high-gain findings every week across relevant sites. Effort has to be factored in for the activity.

This also involves proactive measures like checking the set points to take advantage of favorable weather conditions when you are entering the shoulder months. A simple measure like correcting schedules for a one-day holiday helped us save $170,000 in just a day for a retailer.

Navigating the Terrain

A major challenge to Big Data adoption has been the lack of belief in such programs. The dearth of skilled users to work with data, IT support as well as security issues are other major concerns in embracing Big Data.

However, this is changing fast with more retailers increasingly adopting it. Many retailers who made progress under the 'Better Buildings Challenge' indicated that Big Data Analytics helped them reap rich gains.

The program has to be strategically positioned for multiple stakeholders:

Business Operations

Data analytics-based savings programs don't just save energy but also protect the customer experience. The rich data makes stores completely visible in near real-time. The saving strategies like correcting thermal profiles across the stores involve standardizing the temperature policies and schedules across the stores.

Utilities

Analytics and granular data allows one to enable multiple other levers for savings like strategic energy procurement, managing the demand charges and benefiting from demand response programs.

Maintenance

Performance data of assets coupled with maintenance history is essential for achieving energy efficiencies. The same data that is collected for energy efficiency is also used for improvement of maintenance activities.

Projects Organization

Data plays a very important role in planning and prioritizing the retrofits. One gets exact run-hours when calculating the lighting replacements. Also, when you deploy operational savings, many retrofits will have slower payback. As the program minimizes wastage by reducing unnecessary running of lights, LED replacement will have slightly longer payback. This brings in prudence in retrofit decisions. Retrofit savings can be tracked through the years by data. Similarly, when remodeling stores, retailers can determine which assets are inefficient and need replacements.

Reporting

Sustainability reporting requires accurate data pertaining to consumption. Any errors related to metering can be quickly identified through analysis and patched. Also, reporting available at strategic and tactical level helps one reduce the risk of exceeding energy budgets.

Beyond Energy

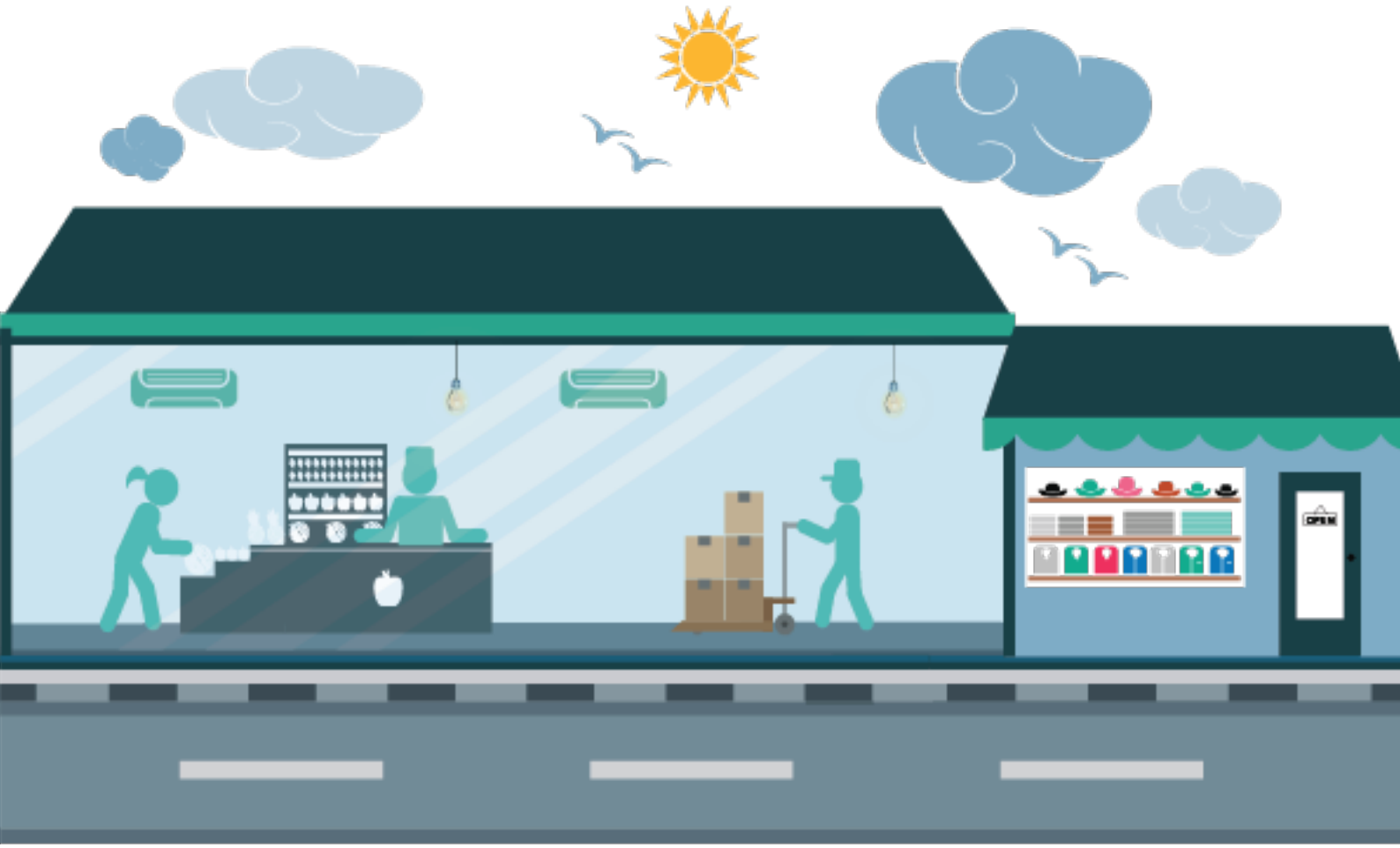
Big Data is also being used by retailers to collect and analyze humongous volumes of information to attract more footfalls. Data collected via web channels when coupled with device and sensor data at store level can potentially be used to ensure much better customer experience.

Analytics is already getting leveraged for improving asset maintenance that help bring down maintenance costs and improve asset life.

The data from in-store devices, video and wearable technology has the potential to improve sales effectiveness and improve workforce productivity. This will use same foundation as laid for Big Data Energy Management program.

About the Author

Ravi Meghani heads the Energy Management Solutions for retail clients at Wipro EcoEnergy. He has been leading propositions for Energy Efficiency and innovations in managing non-IT devices for Wipro for over 5 years. He has an extensive experience in M2M, Managed Services, IT Infrastructure and Voice and Data networks with skills in solution architecting, delivery and product development. With over 18 years of experience, Ravi's expertise is in areas of consulting, infrastructure, retail, financial institutions and telecom. He holds a bachelor's degree in Electronics Engineering.



About Wipro EcoEnergy

Wipro EcoEnergy is the energy services business division of Wipro Limited that provides intelligent, sustainable solutions for energy consumption and management. Utilizing leading edge analytical tools we deliver energy efficient solutions to our clients that reduce their carbon footprint, energy usage & recover avoidable energy losses.

Wipro EcoEnergy's Managed Energy Services offering, holistically addresses the entire spectrum of energy and sustainability services providing sustained energy savings. Wipro EcoEnergy has created a strong local ecosystem of partners in North America, Europe & APAC and has deployed its Energy Management Services solution for a number of clients around the world. These clients have seen substantial energy savings and cost reduction during the course of their engagement with Wipro EcoEnergy.

For more information please visit: www.wiproecoenergy.com or reach us at ecoenergy.info@wipro.com

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