RETAIL INDUSTRY LEADERS ASSOCIATION

BEST BUY - EXPLORATORY ANALYSIS UNCOVERS ENERGY SAVINGS OPPORTUNITIES

RILA Retail Energy Management Program:
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Implementation Model:
Thorough Analysis Identifies Potential Energy Cost Savings from Plug Loads

BARRIER
Limited data on a large energy load made potential energy savings unknown.

SOLUTION
Conduct a thorough analysis across stores to understand the load's current energy use, operational context, and opportunities for energy savings.

OUTCOME
The analysis allowed Best Buy to identify process changes and new technology that, with capital investment, could save Best Buy up to $3 million per year in energy expense if all recommendations were implemented.

OVERVIEW

Best Buy is a leading provider of technology products, services and solutions headquartered in Richfield, Minnesota. The company has operations in the U.S., Canada and Mexico.

In 2015, Best Buy set an aggressive goal to reduce carbon emissions by 45 percent by 2020. In order to reach that goal, the company needs to significantly reduce energy usage in its retail stores. Best Buy's sustainability team identified plug loads (the energy used by products that are powered by means of an ordinary AC plug) as a significant source of energyconsumption for the company. Best Buy's large format store base plug load demand had increased an average of 2.3 percent on a year-by-year basis since 2010, due in part to the use of interactive product displays. As a result, reducing plug load energy consumption became a priority for the team.

To help Best Buy analyze and ultimately reduce plug load energy consumption, the company participated in the Environmental Defense Fund (EDF) Climate Corps program in the summer of 2016. EDF Climate Corps is a summer fellowship program that embeds trained, custom-matched graduate students inside leading organizations to accelerate clean energy projects and strategy. Best Buy enlisted its EDF Fellow Nitin Raviprasad to measure and analyze plug loads and to propose both process improvements and new technologies to better manage plug load.

Nitin Raviprasad, 2016 Best Buy EDF Climate Corps Fellow

Better Buildings
U.S. DEPARTMENT OF ENERGY

This Implementation Model was completed with support from the Department of Energy's Office of Energy Efficiency and Renewable Energy and the Better Buildings Initiative to highlight innovative proven energy solutions from market leaders in the Retail sector. Find more ideas at the Better Buildings Solution Center at betterbuildingssolutioncenter.energy.gov

> At Best Buy, we are committed to reducing our energy usage and carbon emissions. This project exemplifies how all aspects of our operations are thoroughly examined for potential opportunities."
>
> Hugh Cherne
> Senior Manager, Environmental Sustainability
> Best Buy

PROCESS

Best Buy intended to use Raviprasad's analysis to identify the root causes of their increased load, conduct research on connected solution opportunities, and identify ways to reduce energy demand through process and equipment changes, all specifically for plug loads. Best Buy's process for designing its analysis is transferable to retailers who need to research a variety of energy loads before piloting a solution:

Analyzing Energy Load Leading Practice	Best Buy Application of Leading Practices
1. Establish an energy baseline through analysis of existing energy consumption data.	Best Buy and Raviprasad analyzed energy management system (EMS) data to understand current consumption. Stores employ sub-meters that dissect the load and split into three categories: HVAC, lighting and plug load.
2. Select pilot locations that are representative of the overall portfolio, easy to access, and exhibit other key characteristics.	Selected five Minnesota stores to undergo energy audits, chosen primarily for their proximity to corporate headquarters.
3. Perform an in-store energy audit that includes: measuring the load; reviewing related systems, processes, and settings; observing employee behavior; and conducting interviews to add context.	Each audit included examination of five subcategories of plug load settings and operational practices to observe: (1) vendor displays, (2) TV controls, (3) computer shut down, (4) appliance "demo-mode," and (5) base plug load (which was already isolated from other loads through sub-metering). These energy audits uncovered three main problems: First, store displays were running around the clock. Second, some stores were not following store operating procedures for energy usage. Third, display appliances were often not put in energy-saving "demo-mode." In addition to conducting in-depth store audits, the plug load analysis gained key contextual operational information from interviews with Best Buy store managers about behaviors around energy usage.
4. Determine how much of the energy load could be addressed via employee training or new tools and processes.	From the store manager interviews, Best Buy and Raviprasad obtained context about how employees interact with displays and appliances. These interactions revealed potential for improving store employee onboarding and providing continuous access to information to overcome key gaps, such as employees being unaware of how to place appliances in "demo-mode."

5. Identify innovative solutions by contacting external technical experts, and research approaches other companies have taken.	The plug load analysis next required exploratory research into technologies that could be used to control displays. This included a review of several solutions to reduce plug load to determine a cost-effective system. Best Buy and Raviprasad reached out to solution providers as well as the Plug & Process Load Technology Solution Team at the U.S. Department of Energy's Better Buildings Alliance to learn more about the options. Best Buy received a demo plug load management system from a solution provider, which would give the company real-time data and control over its electrical equipment.
6. Perform financial analyses and construct a menu of next steps.	Raviprasad created an energy use road map, which was essentially a reference manual that included an analysis of plug load metrics, interviews with store personal, operational and reporting observations, research on connected solutions, and proposed solutions to identified issues. These findings were shared with facilities, store planning, and vendor display teams, leading to discussions on possible short, mid and long-term strategies.

OUTCOMES

The Best Buy plug load analysis resulted in more than a dozen solutions, from simple process changes to complex, integrated, long-term solutions. These recommendations included:

- Address gaps in standard operating procedures for turning off display televisions;
- Put refrigerators in exhibition mode;
- Place desktop computers in standby mode;
- Install third-party occupancy controls on vending machines, which are only used by employees during store hours.

In addition, the plug load analysis included a feasibility study for installing Wi-Fi controlled devices to turn displays on and off in order to minimize electricity and labor. In the end, a diverse set of potential solutions – ranging from behavioral to procedural to technical – were all discovered through the Best Buy/EDF Climate Corps conducted analysis.

With an additional investment of $8-10 million and if all of Raviprasad's recommendations are implemented by Best Buy, the retailer could save up to $3.3 million in energy costs per year, or a 3- to 4-percent reduction in energy costs per store (approximately $3,000 per store).

INTERNAL PROCESS SPOTLIGHT: THOROUGH LOAD ANALYSIS

Building load analysis refers to how much energy a facility consumes and includes thermal loads and energy use (comprised of equipment loads, lighting loads, and plug and process loads). Commercial building loads can be complex due to a wide variety of uses and energy services.

As such, understanding what impacts building loads is the first step toward addressing a building's energy consumption. As one example, plug and process loads (PPLs) present significant opportunities for savings. PPLs are building loads that are not related to general lighting, heating, ventilation, cooling, and water heating.[1] Equipment such as cash registers, computers, copiers, and displays comprise about 20 percent of the electricity used in retail establishments.[2] Although plug loads will vary from retailer to retailer, the process for understanding plug loads can be extrapolated to a variety of building energy load types.

The National Renewable Energy Laboratory (NREL) recommends the following measures to address plug load energy usage, which can be used to address other building loads as well:[3]

- Institutionalize plug-load energy saving policies
- Promote employee awareness
- Benchmark current equipment and operations
- Perform regular building walkthroughs
- Institute a metering plan or similar monitoring measures
- Manage plug load turn-off times
- Address unique loads
- Develop procurement guidelines for device energy intensity

BENEFITS

- **Reduces Energy Costs:** Understanding what impacts the energy usage in a building helps retailers identify areas where potential energy savings can be gained through a variety of strategies, ultimately leading to lower utility bills.
- **Improves productivity and performance:** Understanding a building's energy loads helps retailers identify opportunities to integrate better fit technologies and processes, leading to improved productivity and performance in existing and future facilities.

1. *National Renewable Energy Laboratory, April 2013, "Assessing and Reducing Plug and Process Loads in Retail Buildings," http://www.nrel.gov/docs/fy13osti/54174.pdf.*
2. *ENERGY STAR, January 2008, "Building Manual, Chapter 23. Facility Type: Retail," https://www.energystar.gov/sites/default/files/buildings/tools/EPA_BUM_CH13_Retail.pdf.*
3. *Id.*

RILA ENERGY MANAGEMENT AT RILA

PROGRAM BACKGROUND

Retailers have a significant opportunity to reduce energy consumption and associated greenhouse gases across their portfolios, to the benefit of both companies and the environment. RILA is committed to helping its members overcome barriers to enhanced energy performance across their building portfolio. RILA has several resources available to help members optimize their energy programs.

ENERGY MANAGEMENT COMMITTEE:

The Energy Management Committee is a community composed of retail energy practitioners who work to improve energy efficiency and procurement at their companies – including the procurement of renewable and alternative energy. Energy practitioners address issues that affect the management of energy consumption as a retail operational expense and capital investment opportunity as well as performance related to efficiency, emissions, and/or renewable energy that may be framed by a sustainability goal. The Committee benchmarks regularly via calls, meetings and surveys.

RETAIL COMPLIANCE CENTER

Retail Compliance Center (RCC) Program Management Tools:

- RILA Retail Advisor for Energy: Free analytical platform that provides program evaluation, customized guidance, peer benchmarking and goal setting for retail energy management programs.
- Retail Energy Management Leadership Model: Roadmap to help retail energy managers optimize their energy programs.
- Energy Management Resource Library: Provides specific tools, case studies, and opportunities to help progress the maturity of energy programs.

For more information on RILA's Energy Management Committee, contact Erin Hiatt, Senior Director, Sustainability and Innovation at erin.hiatt@rila.org.

For more information on RCC resources and tools contact Kaela Martins, Manager, Environmental Programs & RCC at kaela.martins@rila.org.

Find more Better Buildings resources at betterbuildingssolutioncenter.energy.gov

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Finding the ways that work

About EDF Climate Corps: EDF Climate Corps embeds trained graduate students in organizations to help meet their energy goals by accelerating clean energy projects in their facilities. In just one summer, fellows get clean energy projects on the fast track to accomplishment – improving the organization's bottom line and environmental impact at the same time.