LESSONS LEARNED FROM EMS PILOT & DEPLOYMENT

SOLUTION OVERVIEW
Prior to deploying EMS, HVAC controls at Starbucks locations were operated manually by store partners or set by HVAC service suppliers. This led to inconsistencies and higher utility and R&M costs – due to excessive heating and cooling, equipment malfunctioning, hot or cold spots within the store, and avoidable service provider dispatch.

In order to address these concerns, an energy management system was tested and piloted to enable remote control and monitoring of installed equipment. Based on the success of the pilot, Starbucks rolled out EMS systems, leading to optimized space-conditioning in over 5,600 company-operated stores. The selected EMS solution not only allows remote monitoring, control and troubleshooting of HVAC settings, but also enables remote control of signage and interior/exterior lighting. Centralized control of outside lighting and signs led not only to optimal energy savings, but also enhanced the Starbucks brand by providing a welcoming store environment and ensuring the store signage is lit.

ORGANIZATION
Starbucks Coffee Company

ORGANIZATION TYPE
Quick Service Retail

BARRIER
Ability to scale impactful solution that consistently improves energy performance. Burden on staff to control HVAC and lighting settings, affecting store comfort and increasing energy costs

SOLUTION
A customized EMS package based on store typology with the ability to provide real-time visibility to store conditions, and centrally set and adjust schedules and set points

OUTCOME

https://betterbuildingssolutioncenter.energy.gov/implementation-models/lessons-learned-ems-pilot-deployment
For more information, visit https://betterbuildingssolutioncenter.energy.gov
The ability to automatically set in-store temperature and lighting to match local weather conditions, saving six-percent of the utility cost on average, and the ability to measure equipment performance and monitor store comfort for customers.

POLICIES
Global Responsibility 2020 Goals

The EMS supports achievement of Starbucks’ energy conservation goal (measured in kWh/sf), reducing the energy footprint of each location by an average of 6 percent.

http://www.starbucks.com/responsibility/environment/water-and-energy

http://globalassets.starbucks.com/assets/ee8121c1a6554399b554d126228d52ed.pdf (pg. 9)

Capital Funding IRR Requirements

Starbucks selected locations for capital funding based on the Internal Rate of Return (IRR) on the capital investment associated with installing the EMS. Based on the energy cost savings alone, the average simple payback is under 3 years; however the business model is more sophisticated and factors in capital cost, energy savings, utility rate escalation, depreciation schedule, and is consistent with the application process for all Starbucks capital projects. Over time the business model has adapted to include additional information, such as install attrition rate. Installation was not possible in approximately 10% of stores where it had been scheduled. This was due to site conditions, or timing concerns, such as the end of a lease, or an imminent HVAC unit replacement.

PROCESS
Pilot

2008 – 2009: 8-store test of Energy Management System (EMS) and LED lighting technology demonstrated attractive energy cost savings.

2009 – 2012: Starbucks contracted with a vendor to pilot an EMS across 700 stores, primarily in high-cost energy markets like New York and California, which validated both savings opportunities and vendor requirements. The stores were split into two cohorts of 100 and 600 stores. Measurement and verification was completed after the pilot EMS system was deployed to each cohort.

Roll-Out

2012: One of the key lessons from the test and pilot stores was that utilizing a turn-key vendor (hardware, software, installation, service, and support) would allow Starbucks to scale the EMS very rapidly to capture utility savings, while not having to add significant staff to manage the effort. To
date the program has been implemented with less than one dedicated full-time employee. Key management tasks include leading the capital project, monitoring vendor performance, and acting as an EMS SME to assist facilities partners to troubleshoot issues.

Starbucks initiated an RFP process to select the vendor and technology to scale EMS to the whole portfolio of applicable locations. The vendor was selected based on the following key criteria through an RFP:

- Proven track record & number of deployments
- Capacity for deployments
- Solution Offerings
- Cost
- Availability of a 24/7 Monitoring & Control Center
- UL & CE Listing
- Global Footprint
- Proven Project Management Skills
- Local HVAC Tech Support at deployment locations
- Vendor was a Private Company and a Corporation
- Full Service Vendor
- Self-hosting
- Credit Check

The successful vendor spent several months working with Starbucks to customize their application and meet a series of approvals, including performing test installations and demonstrating that they could meet IT security protocols. Once these approval steps were met, Starbucks conducted a broader roll-out of the EMS to 5,500 locations (approximately 1,000 per year), leading to optimized space conditioning and lighting.

Starting FY2015, all new locations will be designed with the EMS as standard. For existing stores, Starbucks provided capital funding based on exclusion policies that reflect the business model for EMS installation. Key criteria include confirming Starbucks pays the utility bill for the location, controls the HVAC equipment, and has at least two years of remaining lease life.

TOOLS AND RESOURCES
Starbucks provided a number of tools and resources to its stores, to ensure smooth commissioning and efficient use of the EMS system. Some key support mechanisms include:

1. Graphical operating instructions for store partners, describing how to use the EMS and how to request assistance if they are having issues.
2. Daily Reports showing EMS equipment status and key performance alerts.

3. Quick-start Guide for facilities service managers, showing the major EMS component and a troubleshooting guide to confirm the vendors meeting installation standards.

4. Troubleshooting service managed by the EMS vendor to diagnose simple HVAC issues (such as set point change requests and non-communicating equipment) prior to dispatching Starbucks HVAC service suppliers.

OUTREACH
Starbucks conducted more than 50 trainings with their EMS vendor for HVAC service providers and facilities service managers across North America during the rollout. Education was key to addressing concerns about the ability to service equipment in the field that was being controlled remotely. Outreach and training continues to be an ongoing opportunity given the number of
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installed locations and varying degrees of understanding about what the system does and does not do.

MEASURING SUCCESS
Starbucks measured success based on effective use of capital (Were the number of installations per year achieved within the capital budget?) and energy savings from system installation (measured annually with successive capital projects).

OUTCOMES
The implementation of the EMS led to decreased utility consumption and concordant cost savings and reductions in greenhouse gas emissions. Using a turnkey vendor and justifying the capital investment, as is typical of capital projects, allowed Starbucks to scale the solution quickly to the majority of their North America portfolio.

Starbucks’ detailed measurement & verification (M&V) process documented 5.8-percent average electricity savings, and two-percent average natural gas savings across more than 2,700 locations. In addition, remote monitoring and control of the HVAC system allowed Starbucks to respond better to extreme weather events. The EMS ensured a better consumer experience for Starbucks’ customers, by controlling space-conditioning, lighting, and signage.

The next phase of the program is focused on using the data generated by the EMS to facilitate troubleshooting and inform capital and maintenance budgeting for equipment repair and replacement. Specific costs were not identified thus far for the program, but the overall trend indicated that repair and maintenance costs were initially higher in EMS-enabled stores, most likely due to issues associated with adoption and installation. Towards the end of the first year after installation, this trend appeared to begin reversing. R&M cost reductions were observed where the facilities team was proficient in EMS operation and used the system proactively to inform maintenance activities. Further analysis to establish statistical trends will be a focus of M&V in 2016.

Finally, the EMS selected provides a platform for future development from the base system. In 2015 and 16 additional hardware was added to approximately 15 EMS locations to monitor circuit level energy data, and water flow by end use. These stores serve as a test bed for new equipment and allow Starbucks to directly measure the impact on comfort, capacity and utilities.