EVERYTHING STORE—EXECUTIVE SUMMARY
TEAM EFFICIENT SEA FEBRUARY 24, 2013

The Everything Store has committed to an ambitious target to reduce its energy consumption by 2020 as part of the Department of Energy's Better Building's Challenge. To address this goal, we have completed a comprehensive analysis to categorize and prioritize the replacement and retrofitting of rooftop units (RTUs) in a pilot group of 100 buildings from our nationwide portfolio.

The RTUs were evaluated individually based on size, age, climate zone, and IEER rating and then categorized as being candidates for replacement, retrofit, or maintenance as usual. We have determined that our recommended strategy would be to consider 62% of our RTUs for replacement over the next one to three years. Forming a strategic partnership with one to two RTU suppliers and passing on the savings to incentivize consumer involvement in energy efficiency will also reduce RTU cost and further increase social benefits and sustainability branding. Below is a summary of the expected results of the pilot program:

Financial Summary	
Total Electricity Cost Saved[1]	US$ 2.83 Million / Year
Net NPV (Compared BAU)[2]	US$ 19.56 Million
Initial Investment Requirement	US$ 12.91 - $13.04 Million
Overall Payback Period[3]	4.6 Years
Sustainability Impact Summary	
Electricity Saved	27,079 MWh /Year, enough to power 2300 homes
Pilot Portfolio RTU Energy Use Reduction[4]	18%
GHG averted (Ton CO2	14,623 metric tons CO2 / Year
Key Implementation Consideration	
Supplier Selection	• 1029 to 1042 RTUs from one primary supplier with a residential business segment (Aaon, Lennox, Carrier) • 300-313 RTUs from a secondary supplier with a residential business segment (Aaon, Lennox, Carrier)
Time Frame of Pilot	1 year capital budget approval & supplier engagement process, 1-3 years implementation, 3 year measurement and verification

[1] First five year annual average, assuming flat electricity price in real dollar terms to be conservative
[2] NPV over the 35 years analysis period. Excluding the bulk equipment savings, to be conservative
[3] Calculated based on the equipment cost after bulk discounting of 40% and 20% (see supplier selection), installation cost, and electricity cost savings. Additional O&M savings from replacement not included in calculation, since they occur whenever an old unit is replaced by a new one
[4] Energy savings from the proposed pilot divided by total energy use of the RTUs, including units not upgraded

I. Energy Efficiency: The Need and the Opportunity

The cost of doing business today is escalating; energy and labor costs are rising while consumer demand and revenue remain flat. Already slim operating margins are being stressed further by the increased pressures of public policy and the economic recession. Efforts to keep operating costs down have become more important as we aim to maintain profitable margins.

Many large retailers have already begun to successfully create sustainability campaigns that not only reduce costs and energy consumption but also build corporate reputation and increase market share and consumers are beginning to take notice. Companies that are successful at "greening" focus on more than the costs and savings of particular energy efficiency projects; they focus on the increase in market share, boost energy efficiency and build competitive advantage. They also drive sustainability though skillful organizational change.[5]

In a recent study the Pacific Northwest National Laboratory (PNNL) estimated that on average, standalone retail stores could save 43% of their energy consumption by retrofitting or replacing their packaged HVAC units and often achieve payback in less than five years.

Since HVAC systems make up such a large portion of all energy costs of operating a building, identifying and prioritizing candidates for energy efficient retrofit or replacement is a critical component of this larger strategy. Thus, as part of a recent push to achieve 20% energy reduction by 2020, RTUs have been targeted and evaluated as a potential option for meeting these goals.

Recently, maintaining these RTU's has become more and more expensive due to the high cost of maintaining outdated equipment. At the same time, the cost of energy has been escalating as the sources and risks of a secure energy source face an uncertain future. On the other hand, grants, rebates and other policy incentives make economics of installing more efficient equipment even more favorable. However, these advantages won't last forever; the time is ripe for a comprehensive strategy to take advantage of favorable policies and market conditions to make a durable impact on the operations of the Everything Store, Inc.

II. Pilot Recommendations

RTU Recommendations

The goal of the project is to create a RTU upgrade strategy that maximizes economic and operational benefits and achieves sustainability targets. We created a dynamic Excel-based model that evaluated different technology options for individual stores and RTU units.

The RTU financial model output was driven by RTU age, IEER, climate zone, electricity pricing, and O&M. A database of all 2120 RTUs was compiled and each RTU has been categorized as a candidate for replacement or for business as usual (BAU) based on a 5-year payback criteria and NPV maximization.

[5] BCG and MIT Management Review, 2013

RTU Replacement Option	Number of RTU Units	Percent of Total RTU Units	Stores Affected
Continue Current Standard Practice	778	36.7%	7 stores with no RTU upgrades
Tier I Efficiency RTU	1,288	60.8%	93 stores with at least some RTU upgrades
Tier II Efficiency RTU	25	1.2%	
RTU Challenge Efficiency RTU	29	1.4%	

Replacement with Tier I Efficiency RTU was the most economical option for 61% of the RTU units. Tier II efficiency RTU was not as economical in terms of NPV (though often still within the 5 year payback timeframe) because for a 1-point increase in IEER rating, Tier II price is almost double that of Tier I.

RTU Challenge Efficiency RTUs are substantially more efficient than Tier II options, but are heavier than existing unit and need expensive structural modification. This makes them uneconomical except for the largest capacity units where the electricity saving outweighs the initial investment.

The candidates that were selected for retrofit or replacement were prioritized based on a Net Present Value (NPV) analysis that incorporated tax-incentives and favorable policy conditions of each of the stores.

To compare RTU replacement across input criteria, histograms based on unit size, electricity cost, age, and IEER value were compiled (See Appendix I – RTU Histogram). By the data across multiple criteria it is evident that Tier I replacement was the most prevalent with total pilot replacement percentage of 61%. Furthermore this data verifies expectations that older and larger unit replacement offer better chance for positive NPV. In addition lower IEER and higher electricity cost also drive positive NPV opportunities.

After careful study of the pilot stores in our portfolio, a comprehensive model been created that can be used to assess the optimal strategy for any given RTU and rank it against the other units. Once the units have been prioritized, determining which projects to pursue will rely on overall corporate and sustainability strategy, complementary energy projects, and capital budgeting requirements.

Strategic Partnering to Maximize Benefits

As part of our analysis, we have determined that through strategic partnering with RTU manufacturers, we can develop symbiotic relationships that would add social value as well as contribute to the financial success of our business. Selecting one manufacturer to supply around ¾ of the replaced units can offer substantial cost savings, especially when carried out across the portfolio. For the remaining ¼ of replaced units, the original manufacturer would be used to reduce the cost of switching brands and to maintain competition among suppliers.

Since we estimate that our stores generate approximately $1.4B in revenues for residential HVAC equipment[6], in return for a lower negotiated price, we may offer this manufacturer opportunity to increase their market share in the residential equipment sales. We could agree to conduct specialized employee trainings on the manufacturer's equipment to increase the likelihood that customers will select their units.

Figure 1 - Schematic diagram illustrating strategic partnership

Greater Consumer Visibility and Involvement: RTU replacement and retrofit has definite cost and energy impact, but since much of this is not visible to the customer, more must be done to capitalize on the opportunity for social impact. In order to create a competitive advantage and drive revenue from sustainability efforts, we feel that if we offer a well-crafted incentive program, we may leverage this opportunity to maximize positive social impact while driving business results.

We could offer the customer points as part of a storewide incentive program. Customers could earn more points by purchasing our partner's energy efficient products and use them toward future purchases. If we offer customers to earn sustainable products such as compact fluorescent lights or weather-stripping at a discounted price, we can increase awareness, generate revenue from sustainability programs, and add value to the customer experience. We can pass on the benefits of selecting energy efficient RTUs throughout the community. Since this program would provide more visibility to the customer, programs that offer greater visibility to the customer could have lasting improvements on our corporate reputation.

Consumer Engagement through Green Messaging: To engage customers, the Everything Store can put up educational posters in stores, create on-site recycling programs, and take part in social media and surveys to engage the customer in an effective green messaging to drive business results. Consumer education should aim to educate consumers without overwhelming

[6] In 2003 the Construction and Labor Research Council stated that the HVAC residential sales market for home improvement to be $7bn. Based on conservative estimates based percentage of HVAC sales in big box retailers and number of store in the U.S. it was determined that the theoretical "Everything Store" HVAC residential equipment sales would be $1.4bn.

them which enhance rather than distract from customer's shopping experience.[7] This type of alignment between consumer and corporation will begin to address some of the larger challenges of creating a more sustainable economy

III. Complementary Programs, Recommendations, and Impact

Energy Efficiency Strategy Coordination: In addition to prioritizing the RTU's that are most ready for replacement or retrofit, it is important to consider the overall energy strategy of the company and account for the potential synergies among several components in the strategy. The HVAC system has complex interdependencies with other building systems such as lighting, building envelope and building management system. As such, the ideal strategy would account for synergies among the systems and quantify the benefit of a comprehensive strategy.

Bundling complementary solutions: We may reduce the capital expenditure cost of replacing RTUs by bundling our measures with solutions that reduce the heating and cooling load on the building such as natural day lighting, or an upgraded building management system. Often, these measures are overlooked because they have less tangible measures of profitability. By bundling these solutions, we can justify the deployment of these strategies as they pertain to cost-savings from downsizing HVAC equipment.

Smarter Infrastructure Using existing information to predict & program HVAC system: Given the strong emergence of big data and automated building controls, identifying opportunities for cost savings could become easier as new technologies or innovative business solutions develop. In conversations with industry experts from Retroficiency[8], aims to utilize existing data collection methods to predict occupancy and demand of the building. Anticipating the demand can be used to pre-condition the space and reduce fluctuations that lead to energy loss.

Addressing current issues: RTU efficiency loss goes beyond the age and efficiency of the unit. Associated HVAC infrastructure and BMS control systems can have as much as a 5% impact on HVAC energy use. Miss managed ductwork, registers, and outdoor air ventilation are easily managed infrastructure that often go unchecked. A well maintained BMS system will prevent unnecessary unit runtime. Automatic fault detection and diagnostics is a low cost way of integrating with existing building management system and reducing cost and emissions.[9] [TIAX LLC – Energy Impact of Building Faults]

Investing in simple technologies: Installing simple technologies in stores can have a large impact on thermal load. One option for our superstores would be to thermally insulate cooled perishable grocery items from energy loss with transparent covers or doors. This will reduce the air volume needed for cooling and let consumers spend more time in the grocery area without

[7] RILA Sustainability Report
[8] Retroficiency – a new and innovative company focused on energy efficiency http://www.retroficiency.com
[9] TIAX LLC – Energy Impact of Building Faults

freezing.[10] Thermal insulation improvements: inner and outer wall insulation coatings for 5% reduction in RTU energy consumption.

CO2 sensors to control HVAC: CO_2 sensor modules such as Telaire 6613 CO2 modules by General Electric Sensing and Inspection Technologies ($120/unit) can help monitor HVAC system. Installing these systems with feedback control systems can help track the store demand more efficiently. These sensors can be placed inside the return ducts, and 4 feet above the standard and superstore floor for approximately 110 sensors per standard store and 750 sensors per superstore. The total installation and equipment cost of these sensors would be about $15,000 per standard and $95,000 per superstore. This would translate to roughly $45,000 and $240,000 and pay back in less than 3 years (assuming 20% savings).

Right-sizing: Right sizing is a critical component to improving the energy efficiency of the HVAC system. Rule of thumb sizing and not accounting for building infrastructure can result in the selection of oversized replacement or retrofit equipment. Often HVAC units today are oversized by approximately 20%[11] in order to meet unexpected fluctuations in demand at peak hours. Further, smaller units can achieve greater energy efficiency than is possible for larger units[12]. Because the size of the unit is so dependent on the demands of the building, right-sizing of units should be assessed and implemented after other components of the strategy are implemented.

IV. Pilot Evaluation

Design: To evaluate the effectiveness of the pilot program, not only should data be collected as to the adherence of operating metrics to predictions, but also to other operating buildings. The 100 pilot stores should each be paired or with a similar store that falls outside of the pilot group to compare the pilot stores to existing operations.

Since there are many stores that have comparable design and operating features, stores can be grouped according to size, type (superstore vs. regular), climate zone, and age. Setting up the pilot program in this way will create a business case specific to the Everything Store and will provide even more useful than any benchmark set by industry speculation or prediction. In this way we will be able to very accurately quantify and predict the potential impact of rolling out the program across the portfolio of 3000 stores and fine-tune the strategy according to data collected. This benchmark and performance verification serves as a validation for the RTU supplier and installation and as a protection step for Everything Store before scale-up.

Measurement and Verification: Measuring the performance of these stores will require a diligent and strategic collection and comparison of metrics in both the control and pilot group

[10] Walmart Global Sustainability Report 2012
[11] 2007 ASHRAE 90.1 Appendix G
[12] Rocky Mountain Institute

that provide key insights to the effectiveness of the program. Below are a list of these metrics and the expected method of collection for each of the stores under consideration:

1. Interval-specific electricity consumption which can be obtained from the provider or from existing sensors. If available, segmentation of power consumption by building system (i.e. HVAC, lighting, etc.)
2. Hourly seasonal customer occupancy and purchase information is likely already available. This data will be used to compare operations both to previous conditions of the same store and comparable stores.
3. Customer surveys should be deployed at the end of the program used to assess customer comfort and its correlation with revenue generation. Employee surveys should also be conducted to quantify the impact of this energy efficiency initiative on productivity metrics and employee satisfaction
4. Tracking of O&M costs and other RTU operational metrics (breakdown, etc)

V. Implementation Plan and Scaling Up Considerations

Evaluating Financing Options

Identifying the optimal financing strategy is reliant on the overall corporate strategy and capital budgeting considerations. While conventional methods of financing such as bank loans, equity issuance, or internal funding are always present and Energy Performance Contracts have become more prevalent, there are several sources of funding that are available and specific specifically tailored to energy efficiency projects.

The table below summarizes some of the less traditional opportunities to consider as the optimal financing strategy is evaluated.

		Financing Source	Project Size	Upgrade Scope	Source of Repayment	Recipient of Energy Savings	Collateral / Security	Incremental Cost to Borrower	Sale Restrictions
Emerging Models	**Energy Service Agreements (ESA)**	Private	$250,000 to $10 million	Extensive retrofit	Energy savings	Investor	Equipment; UCC1 Financing Statement	None	None. Can be transferred or terminated.
	Property Assessed Clean Energy (PACE)	Public and/or Private	$2,000 to $2.5 million	Extensive retrofit	Property tax pass-through of energy savings or tenant recovery	Owner/Tenant	Tax lien	Higher tax assessment less energy savings and any recoveries	None. Obligations remain with property.
	On-Bill EE Tariff	Public	$5,000 to $350,000 (depending on size of bill, nature of customer, etc.)	Selective interventions	Energy savings	Owner/Tenant	Equipment; UCC1 Financing Statement	Financing costs (P&I) funded through utility bill less energy savings	Tariff stays with the property
	On-Bill EE Loan	Public	$5,000 to $350,000 (depending on size of bill, nature of customer, etc.)	Selective interventions	Energy savings	Owner/Tenant	Equipment; UCC1 Financing Statement	Financing costs (P&I) funded through utility bill less energy savings	Tariff stays with the property

Source: World Economic Forum, 2011; DBCCA, 2012.

Our analysis demonstrates that it is feasible to reach our payback goal through a self-sufficient model. Thus, tax breaks and rebates provide a secondary incentive for large retail stores. Given

that the decision criteria for selecting RTUs was not dependent on tax or policy incentives the Everything Store is prepared to maintain a similar strategy in the event that the DOE revises or eliminates their energy efficiency tax incentive policies.

The optimal strategy for the pilot program is going to be different than that of the larger portfolio of stores. Considering that the pilot program should be easily scalable, focusing on financing options that on a national or state level will take precedence over options that may be more attractive for particular stores but infeasible on a larger level. Since ESCO's tend to extract much of the potential energy cost savings and upfront funding tends to be more desirable than savings realized over longer periods, large loans and grants take priority over state and utility rebates and tax incentives. This is especially true in the case when the store property is leased not owned.

Timeline

The capital budget process for the pilot requires one year. During this time, negotiations can also be held with the three potential suppliers (Lennox, Carrier and Aaon) on the bulk order of RTUs and the residential energy efficiency partnership.

The implementation of the project could be over 1-3 years, depending on the annual budget available for conducting such energy efficiency improvement project. If the budget is sufficient for the $13 million capital investment, it is better to conduct the pilot in one year to more quickly capture the energy savings and evaluate the outcome of the pilot.

In case the annual budget for such investment is insufficient, the pilot could be spread over 2-3 years. Energy savings from previous years can be used to fund subsequent years to reduce capital budget requirement. Prioritization of installation will be on a store-level and be based on NPV and ROI, and the existence of extremely favorable grants or tax credits for installation, which would reduce capital needs and result in even better NPV (see appendix for ranked list of states based on incentives available).

After the implementation phase, the measurement and evaluation phase will span 3 years for both the control and pilot groups of stores.

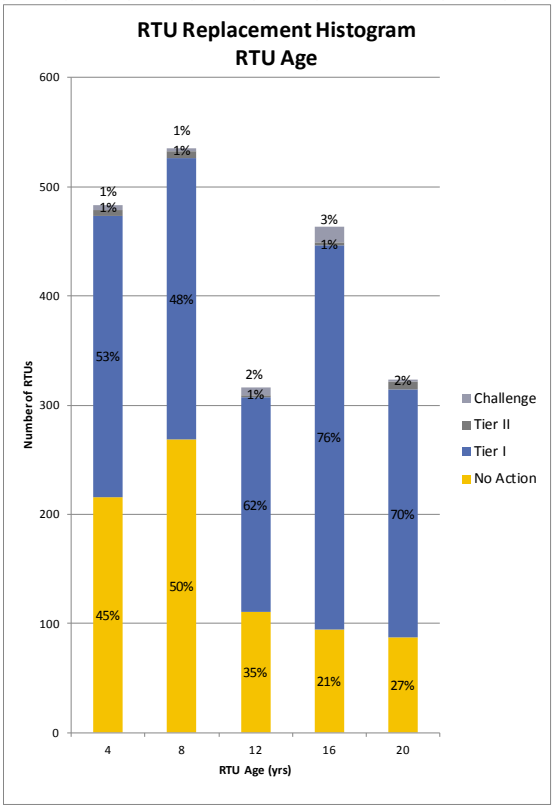
Budget

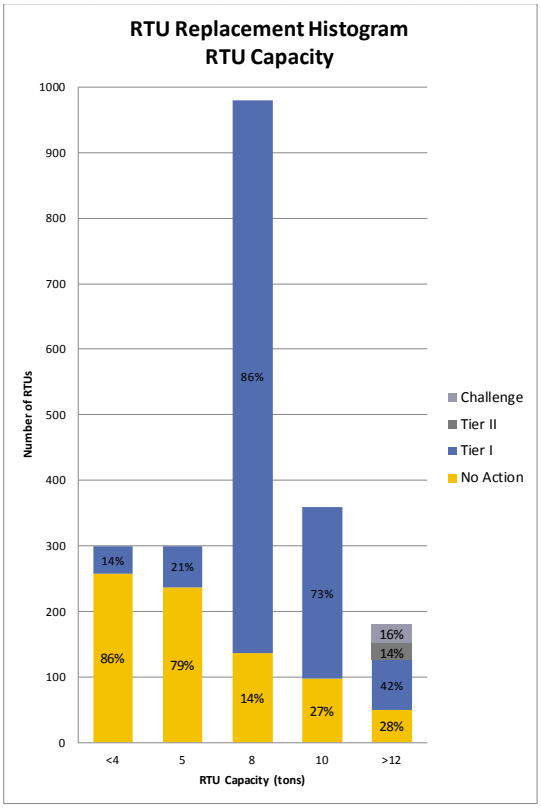
The expenditures for the pilot project include RTU purchase and installation, administrative costs such as employment of pilot program administrators, monitoring and maintenance personnel, and related logistic costs of pilot program administration. In addition, some pilot stores can also include CO_2 sensor and HVAC smart control systems.

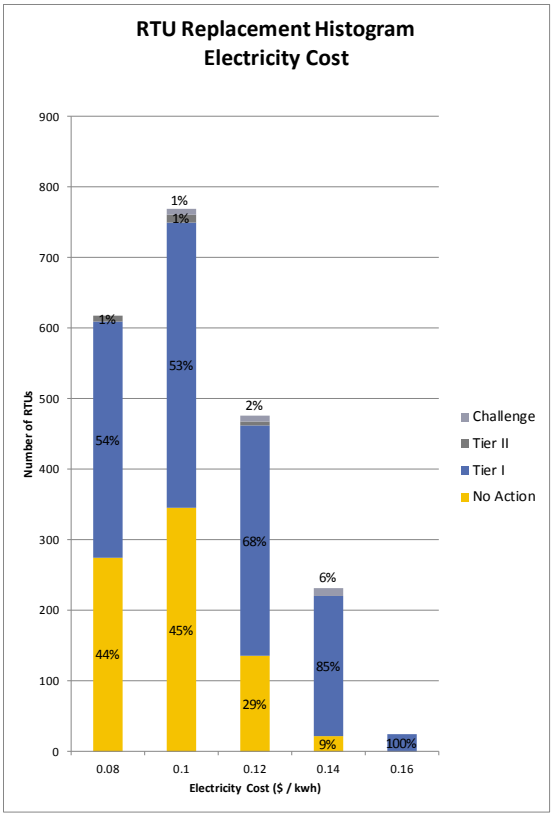
Pilot program budget (million $)	
Purchase and installation costs: (i) with switching to a new and single RTU brand (Carrier, Lennox or AAON): (ii) without switching to a new RTU brand	(i) 13.04 (ii) 15.76
Pilot program administration employees (5 people * 3 years)	1.5
Training fees for employees doing maintenance	0.12
Logistic costs of pilot program administration	0.2
CO_2 sensor and HVAC smart control systems (7 superstores and 7 standard stores, for each climate zone)	0.77
Total costs:	(i) 15.63
	(ii) 18.35

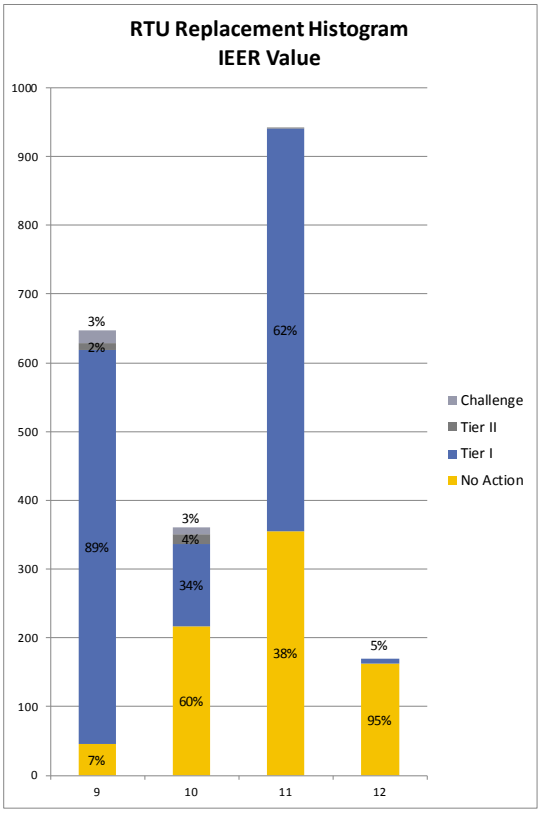
The pilot program is going to be administrated by 5 regional managers, and each regional manager is going to coordinate 60 employees who are going to be responsible for the technical success and maintenance of RTU's over the 3-year pilot program. Travel and possible replacement costs for the personnel's inspection visits are covered in logistic costs of pilot program administration. Complementary CO_2 sensor and HVAC smart control systems are included as well for a superstore and a standard store in each climate zone and their costs are accounted for in the last item. The total pilot program costs $15.63 million with a 62% RTU replacement rate are switched to a new and single brand, while the pilot program costs $18.35 million when we do not switch to a new RTU brand. All of these costs are covered in less than 5 years as indicated in the financial model.

APPENDIX I – RTU HISTOGRAM









APPENDIX 2 HEAT MAP SHOWING PRIORITIZATION OF UNITS