phaseservices
solutions for power quality

Evaluation of the effects of a filter/ protection system on the Facility Maintenance Budget

Evaluation Conducted for:

WAL-MART Stores, Inc.
Facilities Management & Environmental
1300 SE 8th Street Bentonville, AR
72716-0175

Evaluation of the effects of a filter/ protection system on the Facility Maintenance Budget

phaseservices

solutions for power quality

Data Analysis Performed By:
Phase Services, Inc.
222 N. Center Street
Bonham, TX 75439
Tel. 903.436.4669 Fax: 877.295.6511

Data Analysis Performed For:
Adrian Willson, Senior Electrical Service Manager
WAL-MART Facilities Management & Environmental Services

Table of Contents

SECTION 1

Report Overview

Executive Summary

Wal-Mart started operations in Rogers, Arkansas in 1962, based on a core value to save people money so they can live better. This corporate culture is carried through every aspect of the Wal-Mart business model, including facility maintenance. With over 7,800 Wal-Mart stores and Sam's Club locations in sixteen markets worldwide and employing more than two million associates that serve more than 100 million customers per year, maintaining clean welcoming facilities is very important to Wal-Mart.

In this evaluation, Wal-Mart will investigate the potential to improve facility electrical performance and reduce its facility electrical maintenance budget by deploying power quality filters and surge protection throughout selected facilities and parking lots.

To accomplish this facility wide goal, Wal-Mart identified selected facilities that had two years worth of facility electrical budget data. Then they procured a number of surge protectors from multiple companies, and eventually selected Environmental Potentials and ACT Communications products because of demonstrated performance, type of protection required at a given location, and price. Based on data gathered by each store since 2003, a facility wide protection / filter strategy clearly showed lighting maintenance expenditure reductions between 70% to 93% over total facility lighting maintenance budget. Expected Return on Investments for Florida is less than six months, the Southeast showed a full six months, the Midwest showed six to nine months, and the Northeast comes in at twelve months.

Based on performance data reviewed in the commercial sector and information provided by each protection company evaluated, it is believed that Wal-Mart now has enough data over the last five years to develop a strategic facility protection plan that can be deployed worldwide, could provide a very quick return on investment goal of twelve months or less, and benefit overall operations with many years of continual savings in their facility electrical budget.

This system, once deployed inside their facility, will not only protect and extend the life of their existing electrical equipment, but also their sensitive energy savings and "Green" initiative products like electronic ballast, Variable Frequency Drives (VFD's), and all of the switch-mode power supplies that are pervasive within a typical facility.

This investigation will continue with an annual review of facility maintenance information to ensure initial savings continue year-over-year.

Scope of Evaluation

The scope of this evaluation was to discover the viability of a technology implementation to reduce the facility electrical lighting budget. This system would also be expanded to protect facility Green initiatives including wind and solar power sources, as well as insure the anticipated energy savings ROI from the deployment of electronic ballast and LED lighting to be specified in the future. This effort was expanded in 2007 to leverage the positive effects of filtered/protected power on extending the life of HVAC and refrigeration units at each facility.

This evaluation will be presented in two parts: historical data before a protection strategy was deployed, and after a protection strategy was installed.

Store Selection

Fifteen Selected Test Site Locations with data gathered since 2003. This list is not all inclusive of all Wal-Mart stores currently deploying protection systems. Only stores listed that specifically had historical data to compare to.

- **Siloam Springs, AR – Super Store #4**
- **Pompano Beach, Fl – Super Store #1387**
- **Gunterville, AL – Standard Store # 681**
- **Mobile, AL – Super Store # 991**
- **Pensacola, FL - Super Store #1224**
- **Lake Charles, LA – SAM'S Club Store #8265**
- **Blackstone, VA - Super Store #2645**
- **Georgetown, TX – Super Store#1303**
- **West Palm Beach, FL – SAM's Club Store #8157**
- **Hialeah, FL- Super Store #1590**
- **Mt. Dora, FL – Super Store # 705**
- **Okeechobee, FL – Super Store #814**
- **Hot Springs, AR – Super store #216**
- **Richardson, TX – Garden Store #261**
- **Houston, TX – Super Store #2257**

Wal-Mart Facility Management and Environmental Services selected specific locations throughout the country that had historical facility maintenance records available to review. With this historical data, a monthly expenditure buy rate was calculated for each store. Expenditures in the budget that did not reflect lighting maintenance were removed from the expenditures considered. For example, expenditures to repair a light pole hit by a semi-truck was removed from the analysis, because filtering and protecting the power would have made no difference on this expenditure, it would have still happened with or without power protection.

SECTION 2

Historical Data

Store Selection and Historical Lighting Maintenance Data

Historical Electrical Facility Maintenance Data by Store BEFORE Protection Strategy Deployed

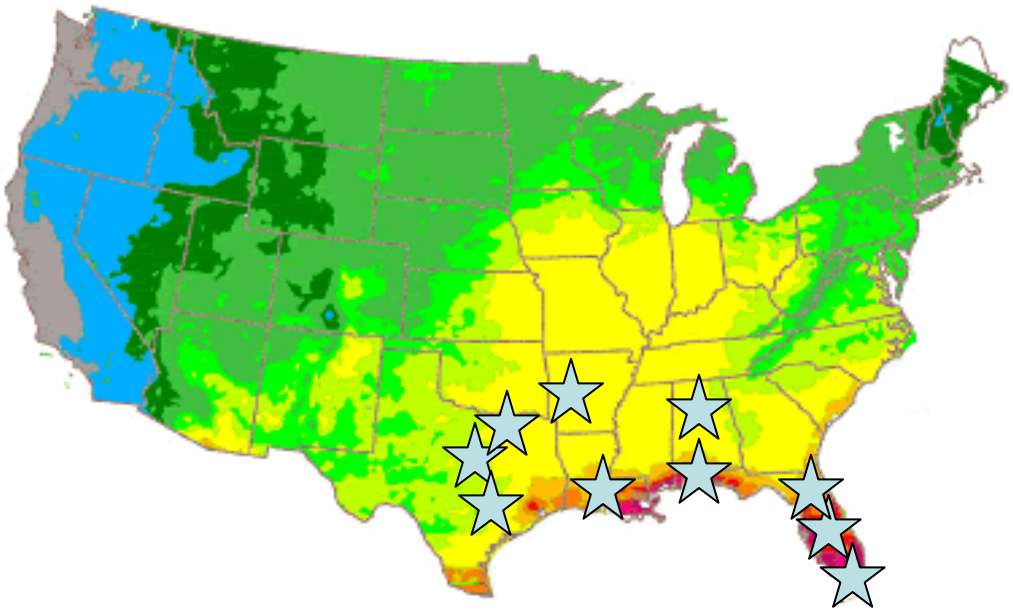
Store Selection and Lighting Maintenance Data

Store selection was based on a store with historical data on its monthly expenditures and store managers willing to participate in the Wal-Mart Corporate evaluation. Historical lighting maintenance data was compiled from all stores with at least two years history if possible. Any expenditure that a surge protection and filter system could not help (like a damaged parking light pole caused from a hurricane), was removed from the database calculations. If the data was in doubt the expenditure was left in the database and included as part of the monthly expenditures.

The remaining data for "qualified" lighting expenditures was totaled and then divided by months to get a monthly running average of expenditures. This running average was used as a guideline for ROI calculations. Store numbers 216, 261, and 2257 expanded their scope in 2008 to also monitor lowering the HVAC and Refrigeration maintenance budget. Wal-Mart believes based on data now seen from the other twelve stores that even faster ROI's will be achieved by calculating reduction in maintenance of their roof top HVAC units.

STORE LOCATION	STORE TYPE	LIGHTING MONTHLY EXPENDITURE (Parts & Labor) AVG
Siloam Springs, AR	Super Store #4	$1870
Pompano Beach, Fl	Super Store #1387	$2880
Gunterville, AL	Standard Store # 681	$1100
Mobile, AL	Super Store # 991	$2160
Pensacola, FL	Super Store #1224	$2410
Lake Charles, LA	SAM'S Club Store #8265	$2350
Blackstone, VA	Super Store #2645	$1440
Georgetown, TX	Super Store#1303	$1950
West Palm Beach, FL	SAM's Club Store #8157	$3210
Hialeah, FL	Super Store #1590	$3150
Mt. Dora, FL	Super Store # 705	$3820
Okeechobee, FL	Super Store #814	$3290
Hot Springs, AR	Super store #216	$2007
Richardson, TX	Garden Store #261	$1530
Houston, TX	Super Store #2257	$2490

STORE LOCATIONS USED DURING STUDY



SECTION 3

Monthly Expenditures After Protection System Installed

STORE LOCATION	STORE TYPE	LIGHTING EXPENDITURE (Parts & Labor) AVG	SAVINGS PER MONTH
Siloam Springs, AR	Super Store #4	<$100	$1870
Pompano Beach, Fl	Super Store #1387	<$200	$2680
Gunterville, AL	Standard Store # 681	<$100	$1000
Mobile, AL	Super Store # 991	<$200	$1960
Pensacola, FL	Super Store #1224	<$200	$2210
Lake Charles, LA	SAM'S Club Store #8265	<$200	$2150
Blackstone, VA	Super Store #2645	<$100	$1340
Georgetown, TX	Super Store#1303	<$150	$1800
West Palm Beach, FL	SAM's Club Store #8157	<$200	$3010
Hialeah, FL	Super Store #1590	<$200	$2950
Mt. Dora, FL	Super Store # 705	<$250	$3570
Okeechobee, FL	Super Store #814	<$250	$3040
Hot Springs, AR	Super store #216	<$100	$1907
Richardson, TX	Garden Store #261	<$100	$1430
Houston, TX	Super Store #2257	<$200	$2290

Avg Savings per Month for fifteen stores = $32,307 or $2,154 average/month.

Using an average of $12,000 as the parts and labor estimate per store to install the proposed filter/protection strategy, Wal-Mart is currently experiencing a Return on Investment of roughly 6 months after installation compared to currently protected stores.

With the addition of facility maintenance reduction being also experienced in HVAC and Refrigeration service calls, the ROI can be expected to reduce by another two months (ROI = four months) once validated in 2009.

Because of the less than one year ROI, self-funded retrofit models can be considered where documented budget savings in existing stores can be re-applied to other facilities to fund their installation of the protection strategy.

Because of performance seen in this report over the last five years, the following ROI expectations can be anticipated:

- Midwest - Data from stores in Dallas, Siloam Springs and Hot Springs should drive similar ROI models of six to nine months.
- Mid-Atlantic & Southeast – Data from stores on coastal regions (Atlantic and Gulf) can expect ROI models of less then six months.
- Northeast and Pacific regions – can expect ROI models of twelve to eighteen months.

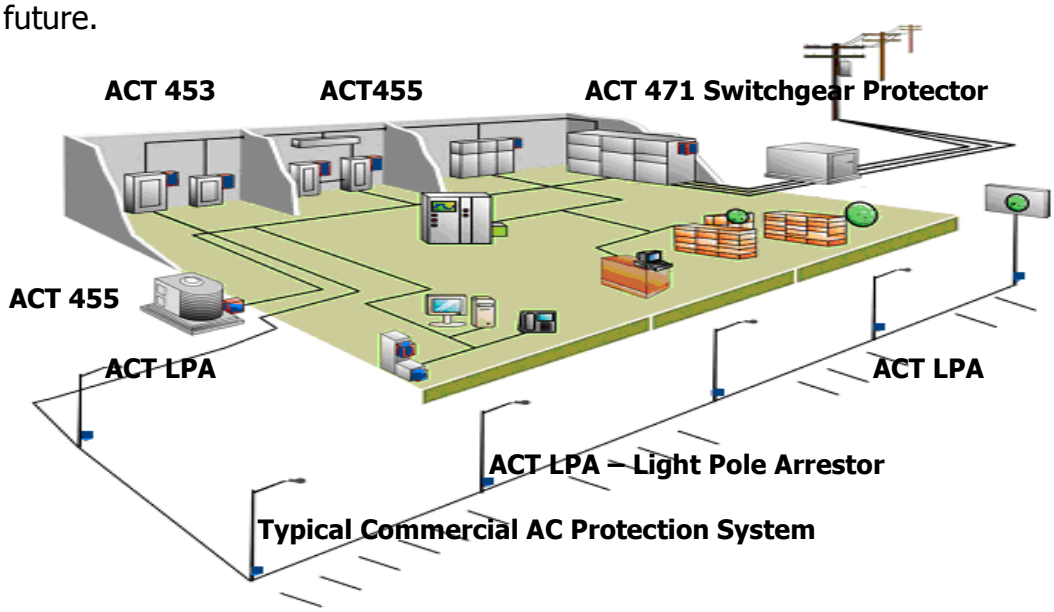
Filter / Protection System

A filter/protection system for each facility is designed to focus on removing common power quality events like transient surges. This field trial reflects similar results using two main surge protection companies (Joslyn & ACT Communications) with both MOV technology and high performance EMI filtering. While both companies' products performed similarly, the electricians indicated the ACT products had a much faster install time.

To get the performance seen over the last 5 years at Wal-Mart, we recommended that not only is surge protection be considered inside the facility at the lighting panels, but also at each light pole to prevent transient surges/noise from entering the back end of the power distribution system. By protecting both the inside and outside of the facility as a system, it appears they are forming a full facility protection shield to reduce medium frequency noise and transients generated inside and outside the facility created by utility service, VFD's, electronic ballast lighting, and other digital loads (computers, control cards).

Test conducted and reported to IEEE and in the field by commercial & industrial facilities have demonstrated over 5 years that reduction of both transient and noise frequencies by removal of the unwanted noise from the building, greatly improves the life of facility lighting.

As a documented side effect of fully protecting a facility with filtered surge protectors, it has been recorded that the life of the HVAC & Refrigeration units have been extended in the protected stores. Current field tests have been started in 2008 to document at what level savings could be attributed to improving the power quality delivered to HVAC and VFD's. Multiple stores have had filter protectors installed at the HVAC and maintenance costs are being monitored. This data will be reported in a separate report in the future.



Report of Findings

The findings in this report are compared to the guidelines suggested by the Standard Handbook For Engineers 13th Edition, IEEE STD. 519-1992 , Recommended Practices and Requirements For Harmonic Control In Electrical Power Systems, IEEE STD. C62 Guides and Standards for Surge Protection, ANSI (American National Standards Institute), and the NEC (National Electrical Code).

Field data results were within expectations based on laboratory testing results done on lighting ballast conducted by IEEE, GE Industrial Test Facility, and Danaher Test Facilities.

The actual facility expenditure data that this report draws on for its conclusions are the sole property of Wal-Mart, Inc. and are not available for public release. Questions on the report can be directed to Phase Services, Inc. (903) 436-4669.

USE
THIS
PAGE
TO
CUT OUT
SPINE
TITLE
ON RIGHT

Evaluation of Protection System To Reduce A Facility Electrical Budget