

The GBMC Energy Management Journey

Michael A. Forthman

Vice President, Facilities/Support Services GBMC

Oct. 10, 2013

GBMC History



- Founded in 1965
- Constructed on 72 Acres in Towson, MD
- 1.2 Million Square Feet of Buildings on Campus
- In Addition to Hospital, Main Campus also includes PPW, PPE, PPN, Gilchrist, Parking Garages and Support Buildings

GBMC Background



- 270 Beds
- 17,000 Admissions
- 4,000 OB Deliveries
- 28,000 Surgeries
- 57,000 ED Visits
- 37,000 Outpatient Clinic Visits
- Parking for 3,500 Vehicles

Why Embark on This Journey?

- Advice from Property Manager
- Capital Planning Improvement
- Formation of GBMC Green Team and Related Strategic Plan
- Economic and Marketplace Conditions
- Healthcare Reform, Reduced Reimbursements, Reduced Patient Volumes, and Future Healthcare Model (MD Waiver and ACO's)
- Quality Based Reimbursement
- Increases in Most Supply and Equipment Costs
- Need to Lower Costs of Daily Operations to Achieve Razor Thin Margins

Mileposts in Journey

- Procurement
- Master Infrastructure Plan
- PJM Demand Load Response
- Lighting Projects
- Retro-Commissioning
- Energy Audit
- Future Plans

Procurement



Energy Procurement with SRC/Enernoc

- Entered into a Consulting Agreement in February 2006
 - First Entered into a Consulting Relationship with SouthRiver Consulting
 - (SouthRiver was Acquired by EnerNOC in June of 2008)
 - First 3rd Party Supply Contract was for 9.6 cents per kWh
 - BGE was charging 16 cents for On Peak Electricity
- 2006 Strategy: Solicit a 3rd Party Supply Contract for Main Campus Accounts
- Strategy has been Adjusted Over Time

GBMC Energy Procurement Strategy

Effective with 2008 Fiscal Year

Executive Summary

ELECTRICITY

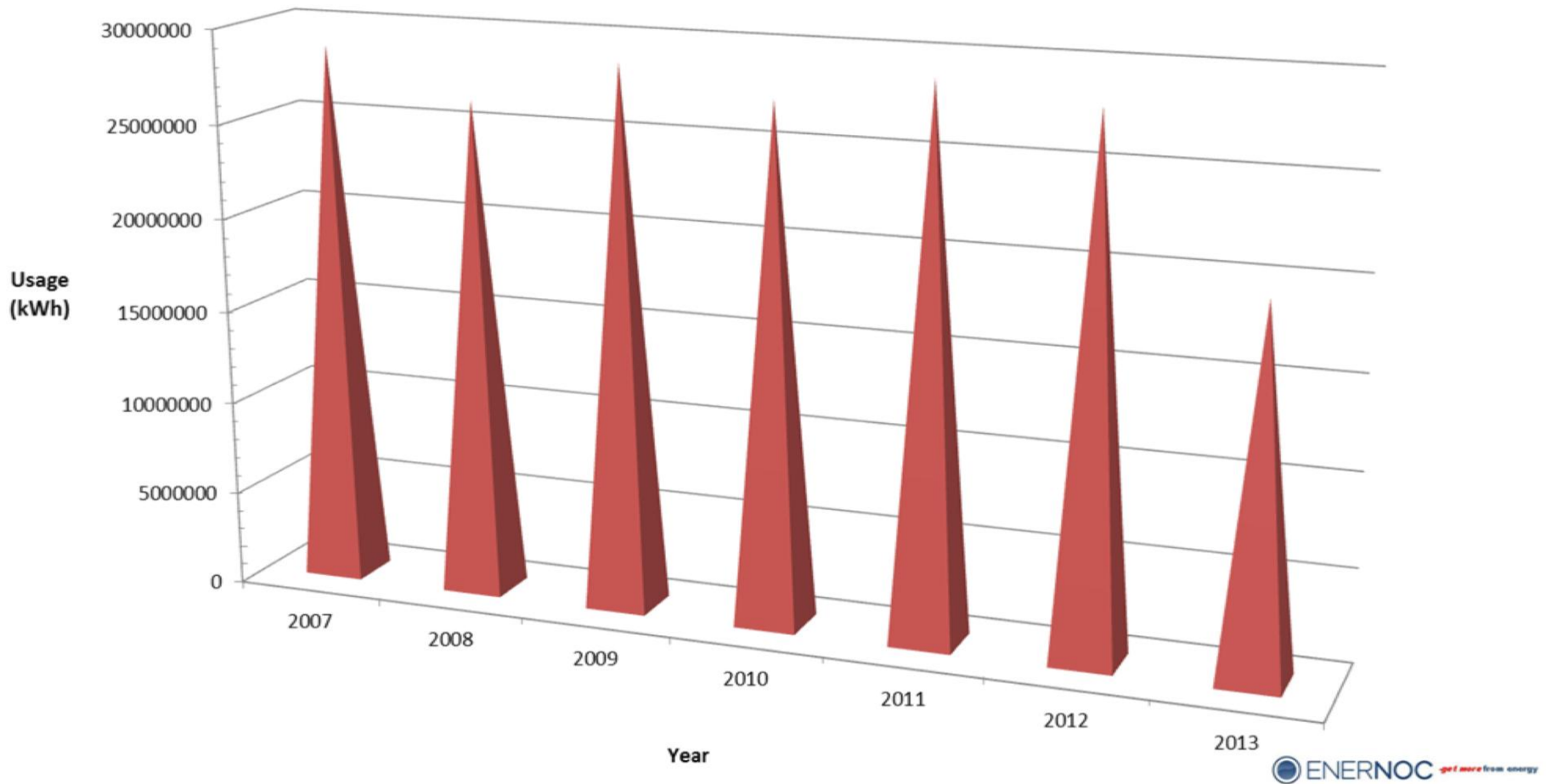
- Utilize LMP (real time market) approach for GBMC primary account
- LMP contracts historically result in annual weighted average pricing which is lower than fixed price contracts
- LMP pricing provides the opportunity to purchase fixed price blocks of energy at advantageous times of the year
- LMP block purchases are based on GBMC's energy strategy and tolerance for risk (70%)
- Remaining hours (30%) are purchased during lower priced off-peak and non-summer periods
- LMP provides the choice of switching to a fixed rate if market conditions warrant and GBMC's budget would benefit
- Utilize standard fixed price approach for smaller accounts because consumption is too small for LMP approach

NATURAL GAS

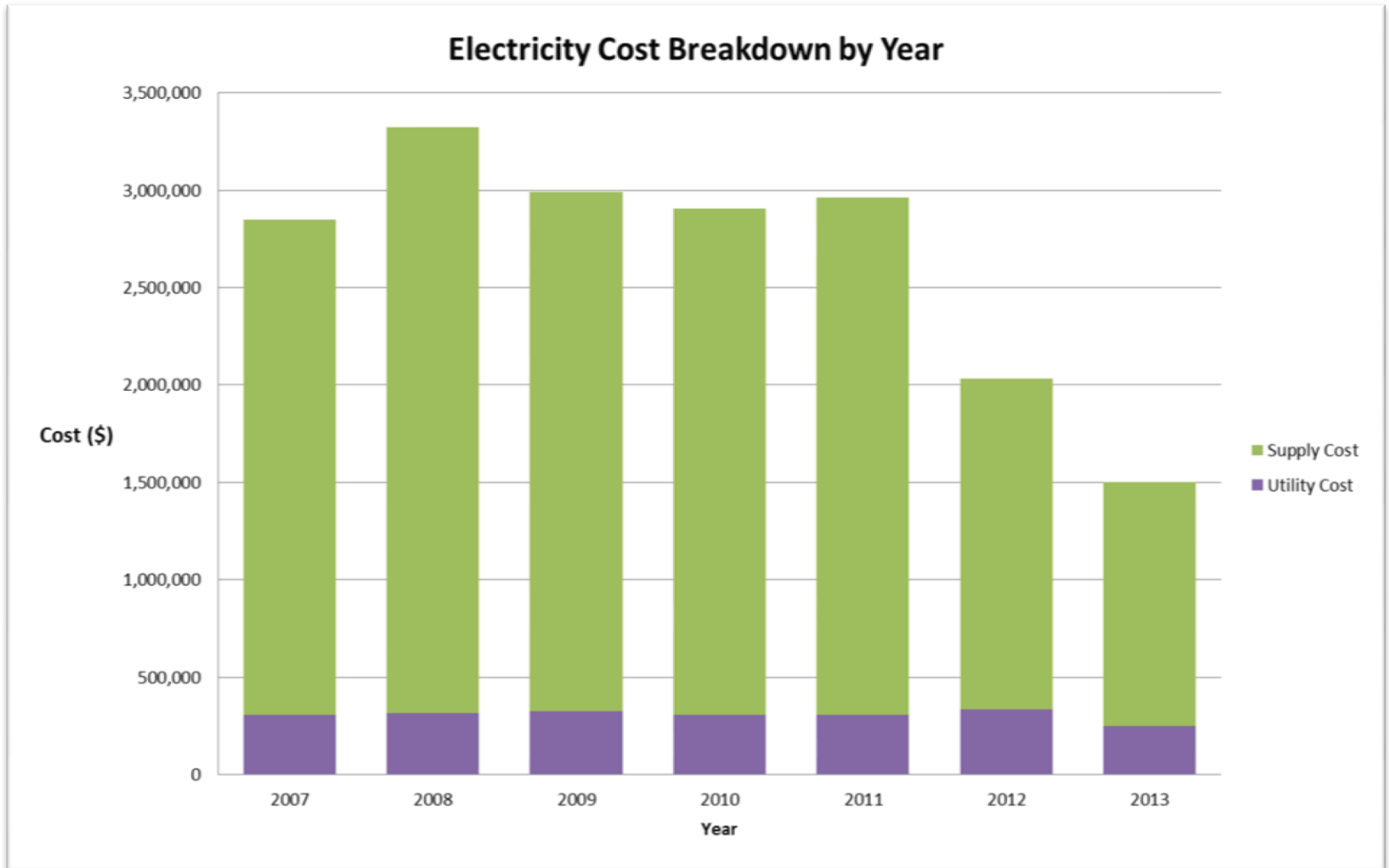
- Purchase basis (primarily interstate pipeline transportation and supplier margin) contract to hedge basis volatility and enroll in the Hess "Prime" Program
- "Prime" methodology helps to navigate through market volatility by establishing "Value Buys," when the market trades at historically advantageous levels or "Time Buys," when "Value Buy" targets are not reached
- "Prime" is a dollar cost averaging approach that allows GBMC to purchase natural gas in layers over a period of time based on a moderate risk profile, but still allows the flexibility to trigger at any time if GBMC's budget would benefit
- "Prime" eliminates the need to outguess the market
- The strategy offers a structured and disciplined approach to natural gas price risk management

Electrical Usage

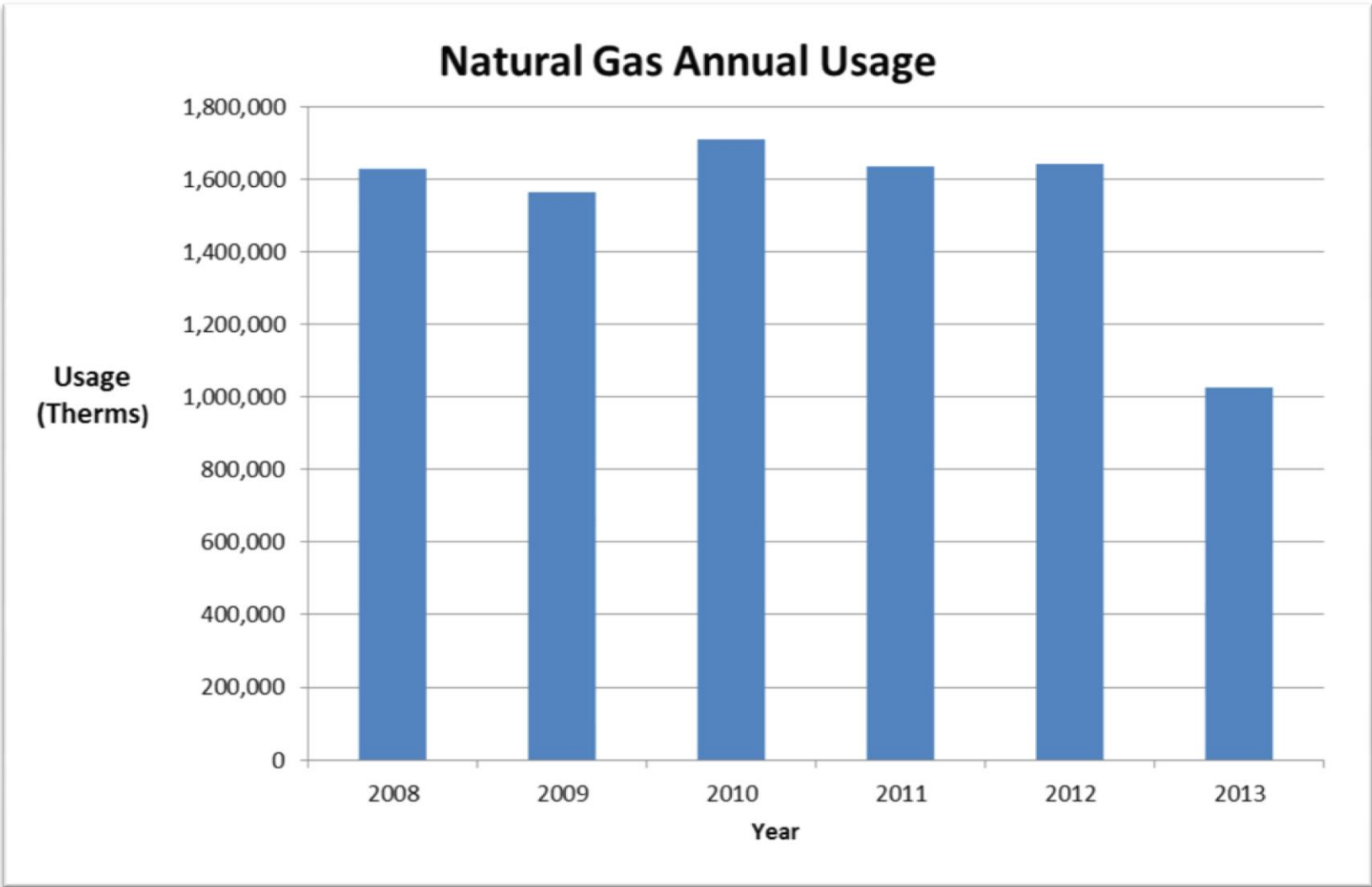
Annual Electricity Usage



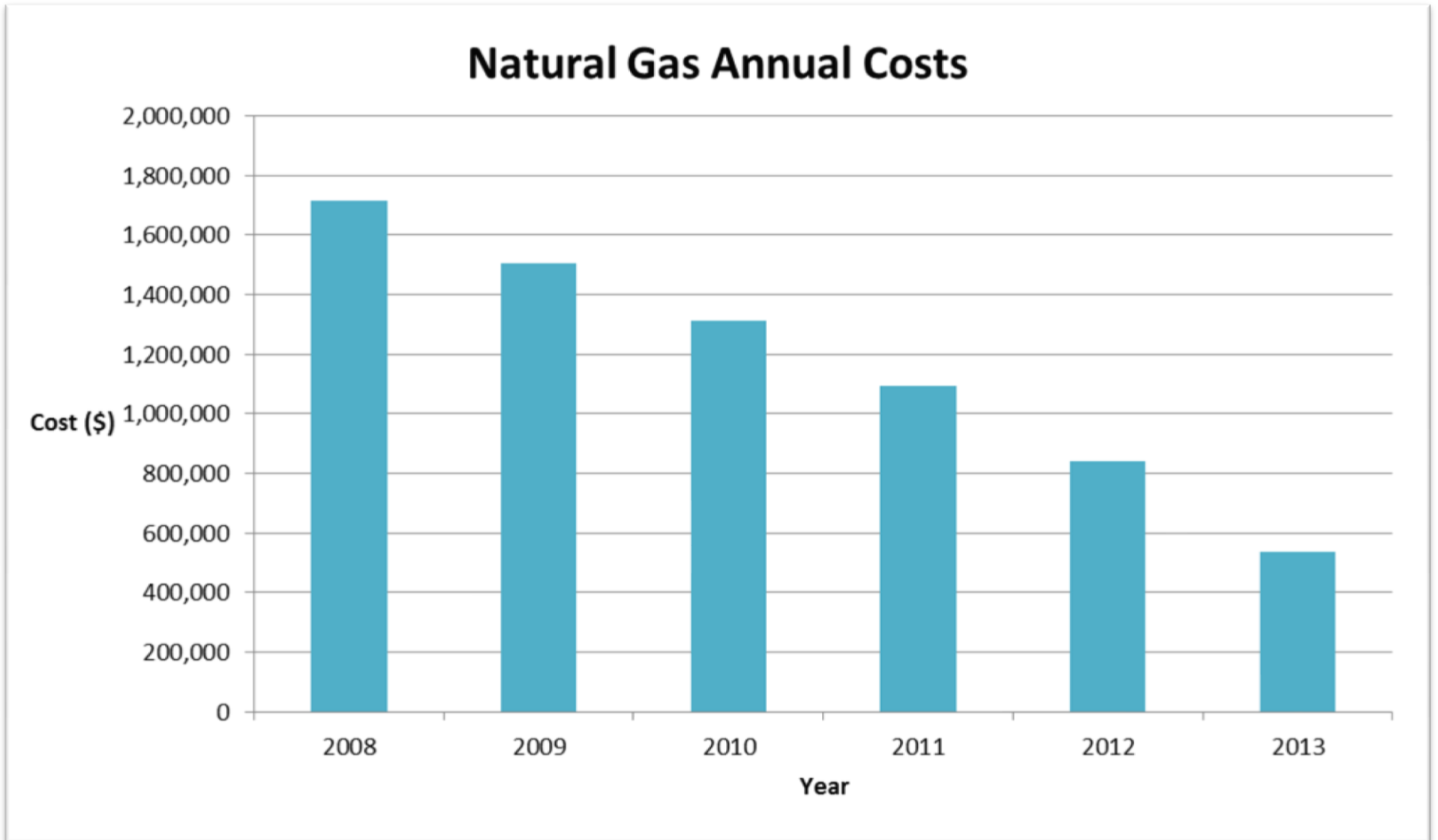
Electrical Costs



Natural Gas Usage



Natural Gas Costs



Master Infrastructure Planning



Master Infrastructure Plan

- Developed by Leach Wallace Associates, Inc. in 2007
- Analysis of Existing Mechanical Infrastructure and Recommend Upgrades & Replacements
- Recommendations Included: Boiler Replacements, Air Handler Replacements, Air Distribution Modifications, Emergency Power Upgrades, Chilled Water Equipment Replacements, etc.

Boiler Plant Expansion/Replacement



Emergency Generators



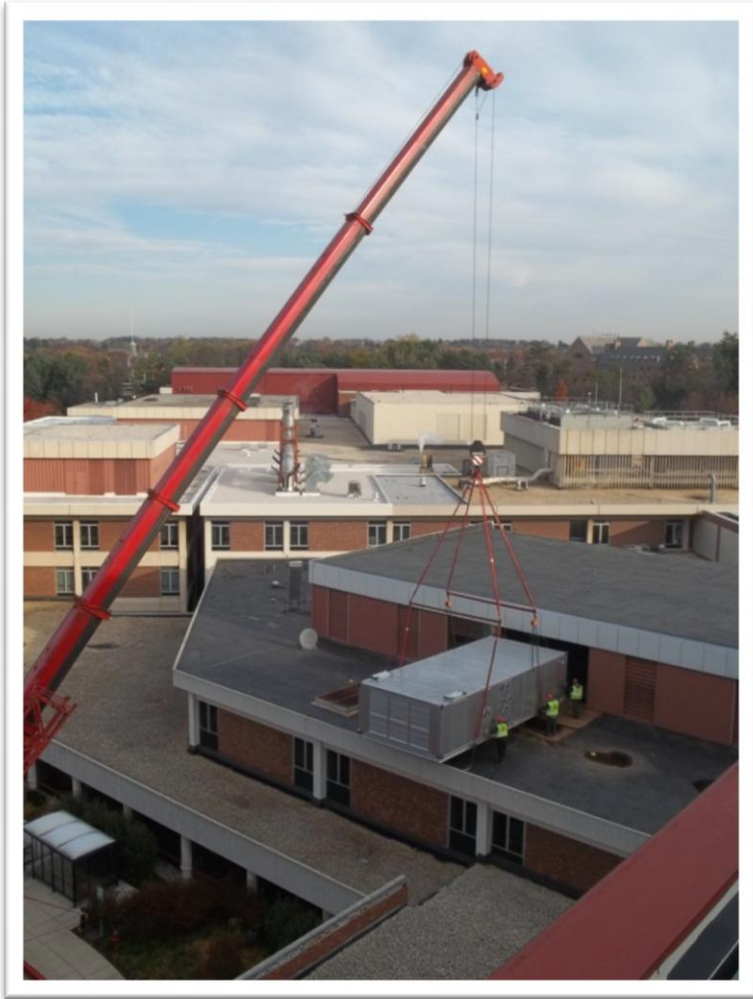
Cooling Towers



Roof Replacements



Air Handler Replacements



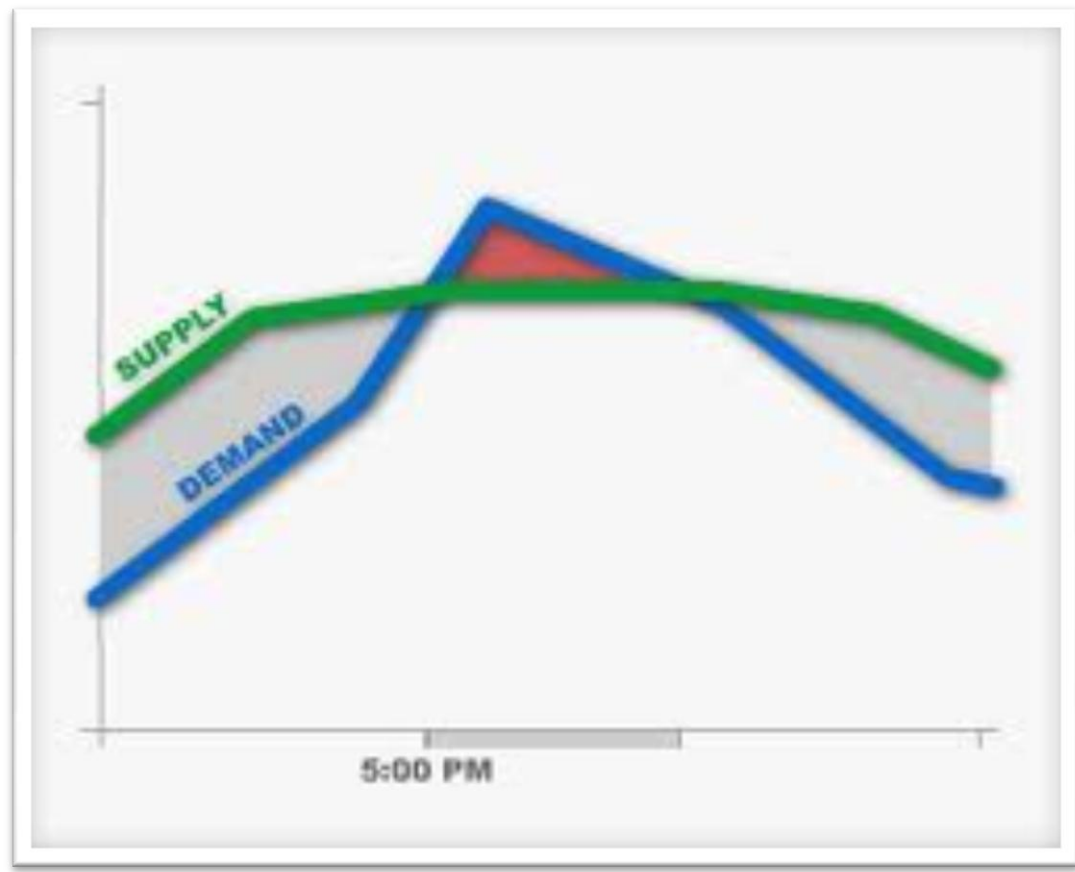
Domestic Cold Water Main Piping Replacement



Cooling Tower Filter Installation



PJM Demand Load Response



PJM Demand Load Response Overview

- Subscription Program June 1st through September 30th
- Provide Notification for Load Shedding on Peak Demand Days
- Codes Energy Use Demand Using **Green**, **Yellow**, or **Red** Days
- After Notification from PJM:
 - Load Shed Lighting, Air Handlers, etc.

Daily Notifications from Marketing to Staff

- How the Program Works, Time of Year (June – Sept)
 - Peak Load Contribution is Based on GBMC's Energy Load when the Power Grid Experiences its 5 Highest Usage Hours
 - PLC Tag is the Average of These 5 hours
 - We predict 9 to 11 hours to catch all 5 hours
 - 100% accuracy over the last 5 years
 - End user is Charged the Following Year for its Performance
 - Cost Avoidance Program
- Internal Marketing Communicates with Staff on what to do for GREEN, YELLOW and RED Days (Specific Steps They Should Take) and Signage

PLC Predictor Notice

GREEN Day Alert - No Action Necessary

To view this email as a web page, go [here](#).



Thursday, September 26, 2013
No Action Required Today

Today's PJM peak demand is within the normal range. No action is required.

For more information on the PLC Predictor program, please reference the [Program FAQ](#).

For questions, contact support@enemoc.com.

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					


Outlook based on current conditions and expectations. Daily status subject to change; see future alerts for updates.

This message is intended only for the designated recipient(s). It contains confidential or proprietary information, subject to the confidentiality protections contained in the DemandSMART PLC Predictor Services Agreement. If you are not a designated recipient, you may not review, copy or distribute this message. If you receive this in error, please notify the sender by reply e-mail and delete this message.

If you are not a designated recipient but would like to learn how your organization can reduce its peak demand charges with DemandSMART Predictor Services, please contact plp@enemoc.com.

PLC Predictor Notice

RED Day Alert - Implement Energy Reduction Plan

 Right-click here to download pictures. To help protect your privacy, Outlook prevented automatic download of this picture from the Internet.
DemandSMART Predictor

Wednesday, September 11, 2013
Action Period: 3:00 - 6:00 PM ET

Today's PJM peak demand is above the normal range.

To help lower your capacity charge for the coming year, we recommend reducing your energy consumption during the entire action period identified above.

For more information on the PLC Predictor program, please reference the [Program FAQ](#).

For questions, contact support@enemoc.com.

Dispatch History and PLC Outlook

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Outlook based on current conditions and expectations. Daily status subject to change; see future alerts for updates.

This message is intended only for the designated recipient(s). It contains confidential or proprietary information, subject to the confidentiality protections contained in the DemandSMART PLC Predictor Services Agreement. If you are not a designated recipient, you may not review, copy or distribute this message. If you receive this in error, please notify the sender by reply e-mail and delete this message.

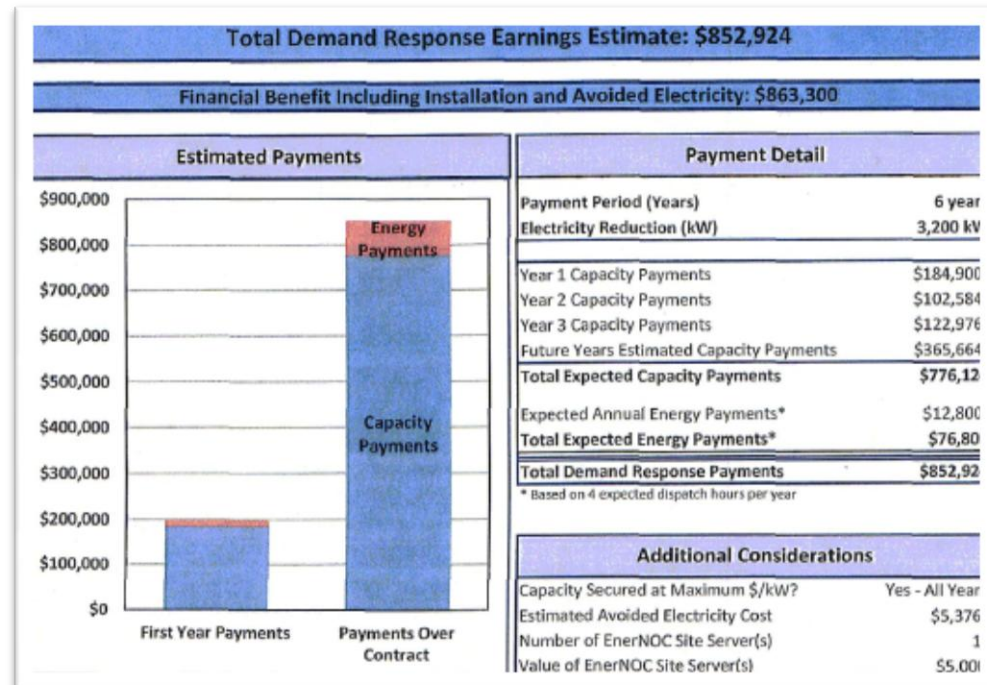
If you are not a designated recipient but would like to learn how your organization can reduce its peak demand charges with DemandSMART Predictor Services, please contact plp@enemoc.com.

What Should We Do?

- If a day is designated **Yellow**, please follow these steps:
 - Turn off lights in unused/vacant rooms
 - Turn off PC's at the end of the day
 - Don't obstruct air registers
 - Pull shades on windows to shield sunlight
 - Don't let hot water taps run
- If a day is designated as **Red**, please follow these steps:
 - Follow the same steps as Yellow Days
 - Turn off PCs not used in near term
 - Ask patients if the lights in their rooms can be turned off
 - Turn off TVs in unoccupied areas
 - Keep all blinds closed
 - Minimize opening of refrigerators and freezers
 - Turn off non-essential equipment that can be safely curtailed

Implementation of PJM Demand Response Program

- GBMC is paid \$184,900 (Capacity Payments) plus \$12,800 (Energy Payments) in FY14 to take 3,200 kW off of "The Grid" by running GBMC's generators (if called upon by PJM)
- Estimated Annual Energy Savings = \$5,376.00



Lighting Projects



Employee Lighting Energy Reduction Education



Occupancy Sensor/Switch



Light Switch With Green Team Sticker

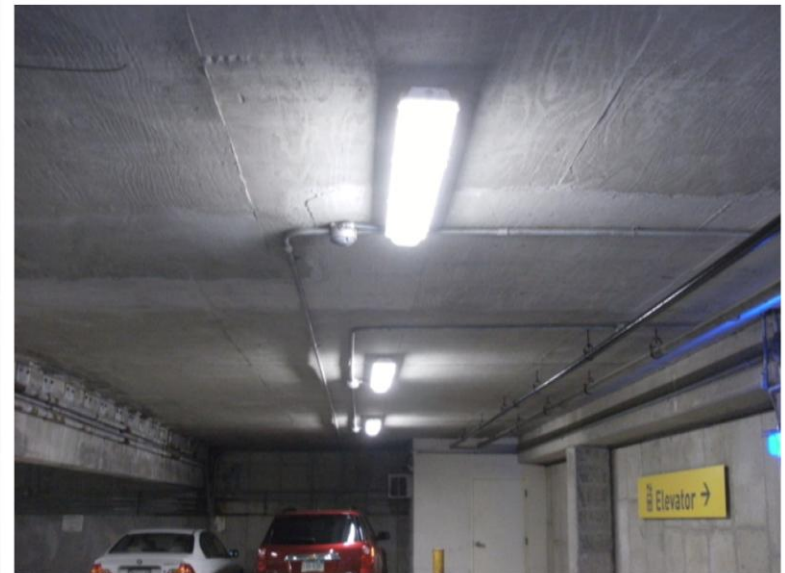
Exterior Signage

All Exterior Signs are LED's and Photo Controlled



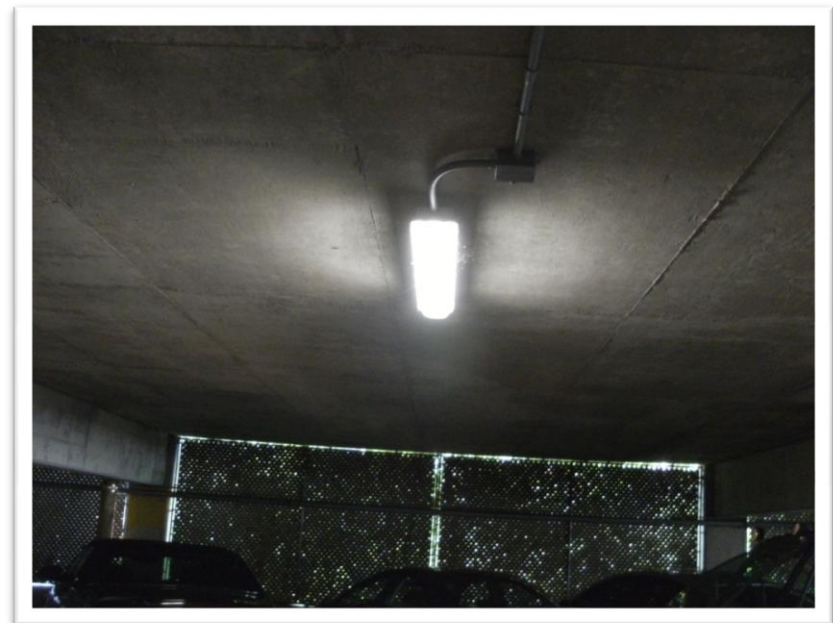
Lighting Upgrades – Daffodil Garage (September 2010)

- Replace 187 Metal Halide Fixtures with Linear Fluorescent Fixtures
- Facilities Service Group selected as installing contractor
- Installation Cost = \$35,635.00
- Estimated Annual Energy Savings = \$11,000.00
- BGE Rebate = \$8,985.00
- Return on Investment = 2.4 years



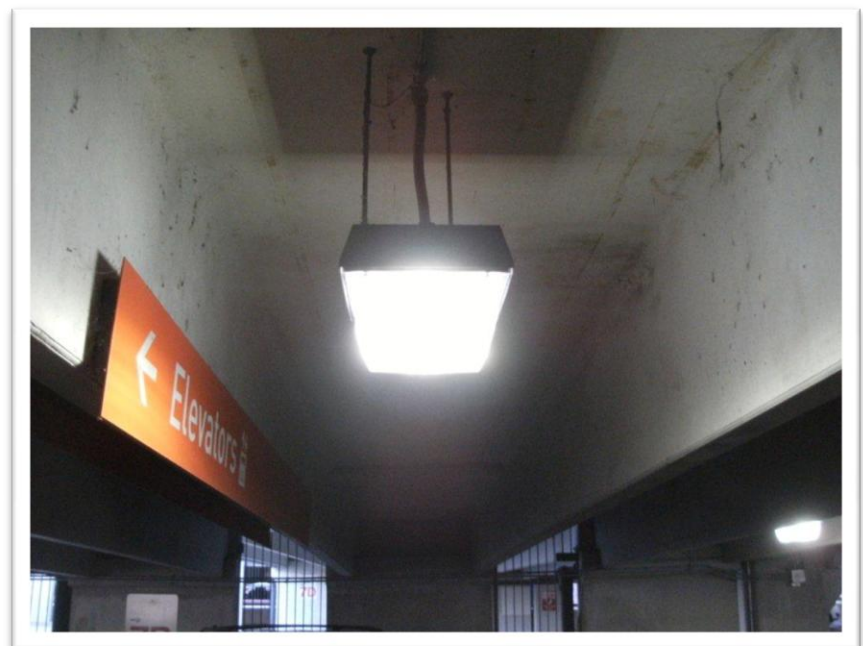
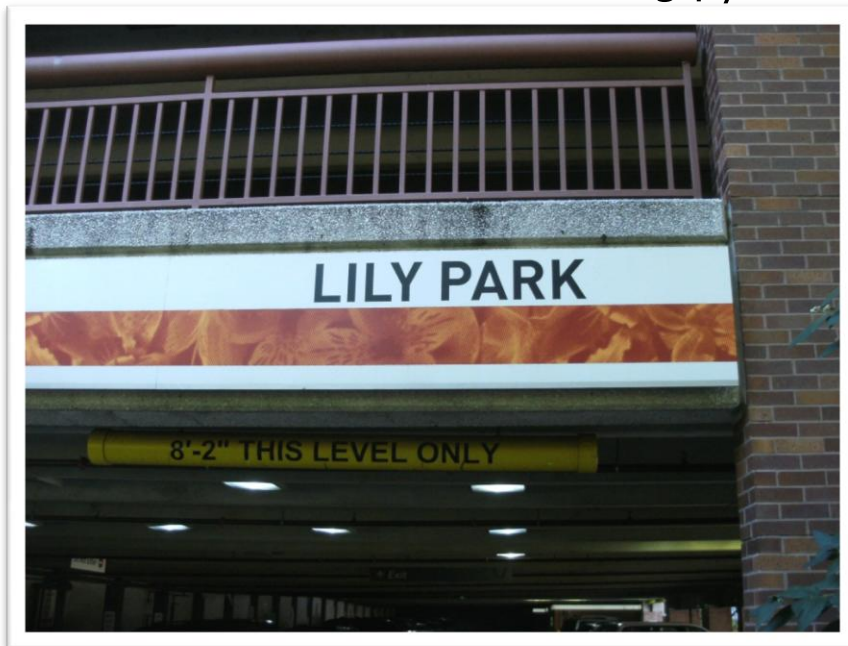
Lighting Upgrades – Iris Garage (January 2012)

- Replace 120 Existing Light Fixtures with more Efficient LED Fixtures
- Brown & Heim Selected as Installing Contractor
- Installation Cost= \$19,850.00
- Estimated Annual Energy Savings = \$8,600.00
- BGE Rebate= \$8,985.00
- Return on Investment= 1.25 YEARS



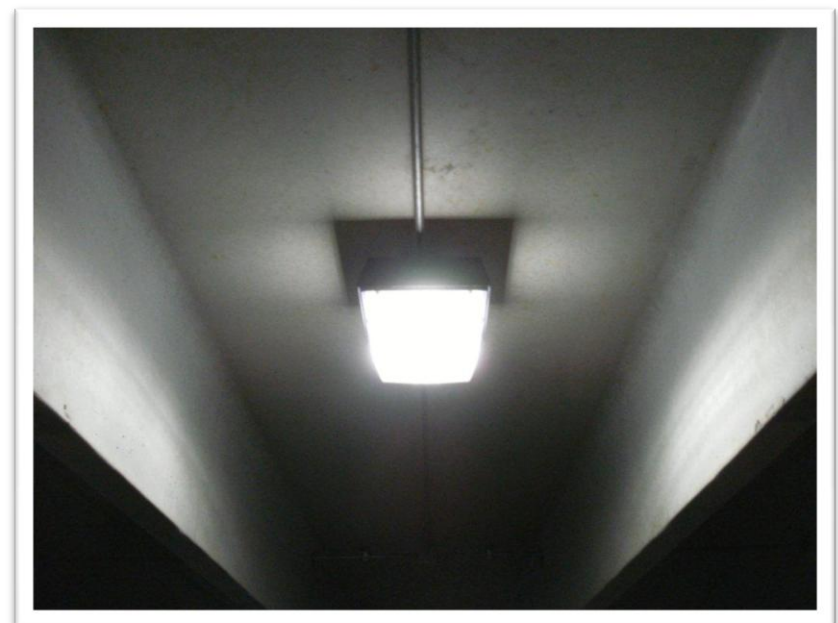
Lighting Upgrades – Lily Garage (October 2013)

- Replace 306 Existing Light Fixtures with more Efficient LED Fixtures
- Shrader Electric selected as installing contractor
- Installation Cost = \$98,122.00
- Estimated Annual Energy Savings = \$52,000.00
- BGE Rebate = \$70,000.00
- Return on Investment = 0.54 years



Lighting Upgrades – Tulip Garage (October 2013)

- Replace 230 Existing Light Fixtures with more Efficient LED Fixtures
- Shrader Electric selected as installing contractor
- Installation Cost = \$84,348.00
- Estimated Annual Energy Savings = \$32,000.00
- BGE Rebate = \$60,150.00
- Return on Investment = 0.75 years



Retro-Commissioning



Chilled Water System Retro-Commissioning (August 2013 through November 2013)

- Perform Investigations and Analysis on Existing Equipment, Control Sequences, and Sensor Accuracy to Identify Potential System Improvements to Increase Efficiency
- Leach Wallace Consulting Engineers (Approved BGE Energy Consultant) Performed Lead Commissioning Engineering
- Initial Cost = \$206,840.00
- Estimated Annual Energy Savings = \$120,000.00
- BGE Rebate = \$90,000.00
- Return on Investment = 0.97 years
- “An Aging Plant is like an Aging Automobile - Needs Periodic Fine Tuning”

Energy Audit



Energy Audit – Scope of Work

1. AtSite® Conducts Energy Audit to Determine How Energy is Currently Being Used
2. Identify Energy Conservation Measures (ECMs)
3. Create a Smart-Building Technology Plan that Identifies Areas Where GMBC Should Invest in Smart Metering Equipment
4. Review Existing Master Utility Plan, Facility Condition Assessment, and Other Planning Documents to Provide Insight into How AtSite® Recommendations Complement These Plans

Energy Audit - Goals

1. Identify Area Where GBMC is Using More Energy than Necessary, and Outline Strategies for Reducing that Energy Use
2. Break out Recommendations into No/Low Cost and Medium/High Cost ECM's, as well as Operational versus Capital
3. Create Framework for Gaining Greater Visibility into Resource Consumption through Smart-Building Technology so that GBMC can Make Informed Decisions About its Resource Use
4. Determine how Capital Project Priorities Match Up with AtSite's® Recommendations to Identify Synergies

Energy Audit - Deliverables

1. Energy Audit Report
2. List of Recommended ECM's
3. Smart-Building Technology Plan
4. Summary of Previous Facility-Level Reports
5. Final Presentation to Summarize Findings

Future Plans



Future Plans

- Review Energy Audit
- Development of FY15 and beyond action plans and capital plans (Smart Building Technology, Lighting Upgrades, Utility Replacements, etc.)
- Possible Future Master Facilities Plan
- Evaluate Future PJM Demand Load Response
- Continue to Monitor Energy Procurement Strategies

Questions?

