



Borton
Lawson

ENGINEERING
ARCHITECTURE

Warwick Administrative Offices
Lititz, PA



Submitted to:



June 18, 2009



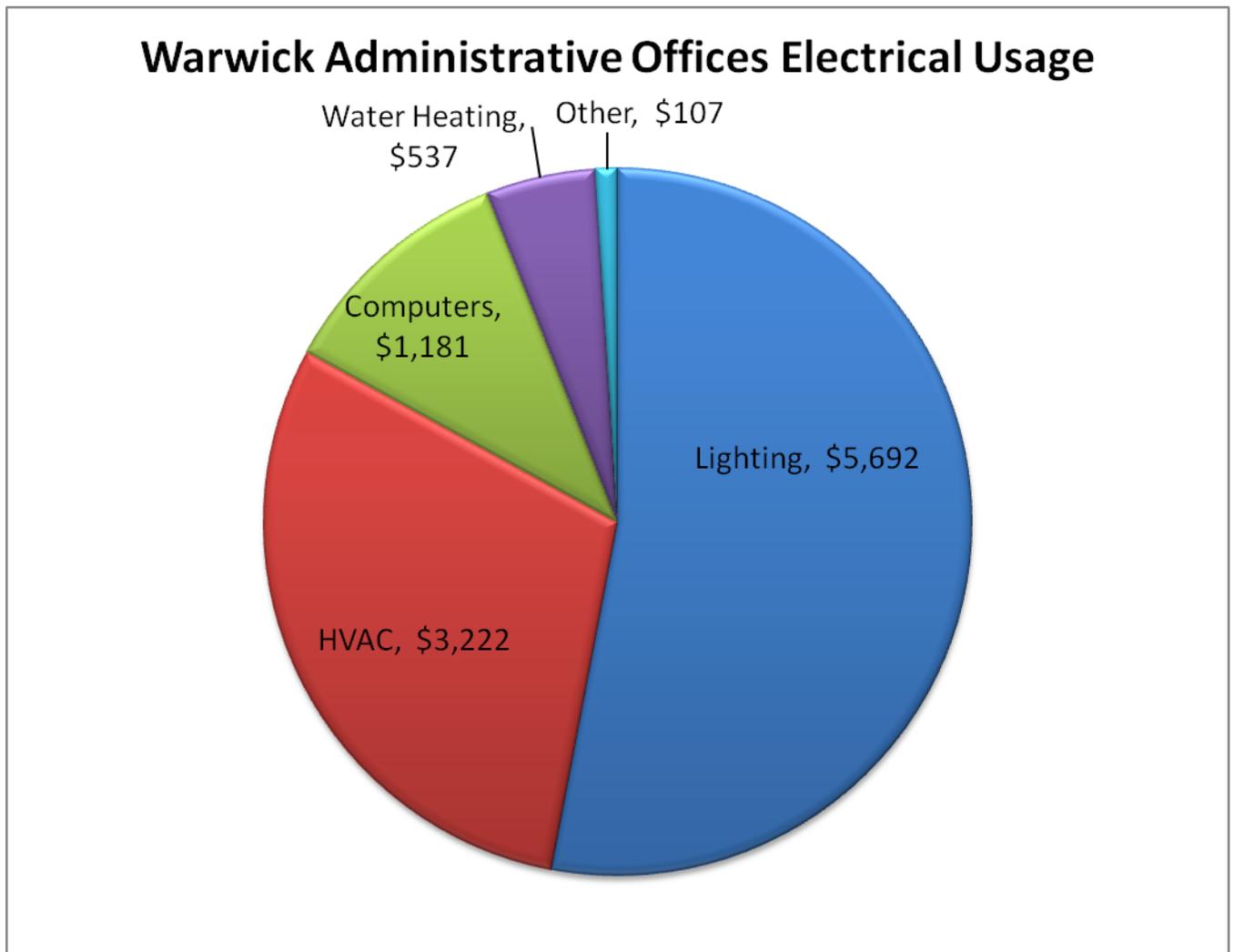
I. Executive Summary

Attached is a summary of Borton-Lawson's findings from a Tier 1 Energy Audit performed on June 2, 2009. The audit team consisted of Bill McFarland P.E. who performed the site visit and Pat Walko, P.E. who assisted in evaluating the mechanical systems.

Overall, the Warwick Administrative Offices are in excellent condition and care has been taken with the maintenance of equipment.

Upon reviewing the utility billing, the site currently pays \$0.09 per kWhr. Expect an increase of up to approximately 55% when PPL eliminates their rate cap structure at the end of 2009.

Below is a breakdown of the current electrical usage at the site.



The items discussed below focus on reducing overall energy costs as well as maintenance and design enhancements. The items are not in any particular order but are designed to follow the Detailed Review.

Items are broken down into three categories 1) 'immediate' - for action as soon as economically possible 2) 'current' - for action to be taken within the current or next two budget years and 3) 'long term' - for action to be taken three years and beyond.

Items marked with an '**' may require engineering assistance typical of the type performed by Borton-Lawson. Please let us know if you would like to see a proposal for any of these services. Please be aware that grant and loans are available for most if not all of these items. Borton-Lawson will assist with any applications required for these funding sources.

The following items should be considered for immediate action:

- Replace T12 fixtures with energy efficient T8 fixtures, saving approximately \$300 annually.
- Install occupancy sensors in any areas intermittently occupied.
- Replace hot water heater with energy efficient unit savings approximately \$80 annually.
- Install a timer on the hot water heater and the water cooler.
- Verify each element in the boiler is operating properly as a 5% variation in output will not meet the buildings needs. A boiler upgrade to an Energy Star unit would save approximately \$195 annually is not economically justified due to an approximate installation cost of \$5,000 (payback of over 25 years).

Consider the following for current action:

- "Smart Strip" makes a power strip that can sense when a computer shuts down and in turn shuts down other peripheral devices such as monitors, printers and scanners.
- Consider changing the fixtures to low flow motion detection in order to best conserve water.
- Review location of the server room.

Consider the following for your long-term strategic plan:

- Evaluate windows and consider moving to double paned units.
- Verify that the site meets current OSHA, NFPA 70E or NEC code for arc flash protection. *
- The site appears to be conducive to having photovoltaic system installed on the roof. This could be augmented with a solar hot water heating application.*

The most cost effective and significant savings can be obtained with lighting upgrades, occupancy sensors, and hot water upgrades.

If you have any questions or comments on the study or would like clarification of these issues please do not hesitate to contact the Director of Electrical Engineering Services, William J. McFarland P.E., LEED AP, at 570-821-1994 x344.



II. Detailed Report

General Information

1. The facility is administrative offices constructed in 1990 in excellent condition.

Envelope

1. Ceiling/Roof:
 - a. The roof is in excellent condition.
2. Walls/Floors:
 - a. Walls and floors are generally in good condition.
 - b. Caulking is used where appropriate.
 - c. The exterior walls are well insulated.
3. Windows/Doors:
 - a. The facility's windows are not the typical double paned unit but a cover over the permanent single pane. There is little data on the effectiveness of these types of units as compared to full double paned windows. These units should be considered for upgrade if the funds are available.
4. Reduce Infiltration:
 - a. Overall there is little accidental loss of air except for the windows.
5. Entrance:
 - a. The main entrance has a vestibule system.



Lighting

1. Lighting Levels:
 - a. Lighting levels appear adequate. Please note that no light readings were taken.
2. Task Lighting:
 - a. Task lighting is used where necessary.
3. Light Colored Interior Wall Finishes:
 - a. The current finishes meet the needs of the facility.
4. Interior Energy Efficient Lighting Systems:
 - a. The space has many T12 fixtures. These fixtures are financially attractive to replace as an estimated \$300 can be saved each year.
 - b. Occupancy sensors should be considered along unoccupied areas including restrooms and conference rooms.
 - c. Exit signs appear to be energy efficient.

5. Exterior Energy Efficient Fixtures:
 - a. There are exterior metal halide parking lot fixtures that can be changed to more efficient fixtures. The cost benefit of induction lighting should be reviewed. Typically these lamps cost more but the energy use and the life span of the fixture creates a lower cost of ownership.
6. Use Day Lighting
 - a. The window placement and the use of the space for reading make a day-lighting controlled system unlikely to meet the clients need.

HVAC Systems

1. General Systems
 - a. The heat pumps all have an EER of around 12.5. These units are efficient to today's standards and there is no financial justification to change these units.
 - b. The Cemline boiler specifications are not available from the manufacturer. It is also questionable if the heating element is still commercially available. The boiler is oversized by 5% therefore an inoperative heating element will drop the unit below the capacity to service the space. In regards to energy, a new Energy Star boiler would save approximately \$200 annually.
 - c. Digital thermostats are not locked. If the thermostat settings are modified by customers or employees consider installing lockable covers.

Water Heating

1. Fixtures/Faucets
 - a. Consider changing the fixtures to low flow motion detection in order to best conserve water.
2. Efficiency of the System
 - a. The A.O Smith unit is past its prime and should be changed when funds are available.
 - b. Consider putting the hot water heater on a timer so that the unit does not expend energy off hours.



Power Systems

1. Billing Structure
 - a. The site is on general service rate, the proper rate for this facility from a tariff perspective.
2. Alternate Sources of Energy
 - a. The site due to its location is not appropriate for wind generation at the current cost per kW per installation.
 - b. The site appears to be conducive to having photovoltaic system installed on the roof. This could be augmented with a solar hot water heating application.
3. Arc Flash Compliance
 - a. It was unclear if the electrical system meets current OSHA, NFPA 70E or NEC code for arc flash protection.
4. Energy Efficient Motors
 - a. There are few motors at the site. Any new motor installations should be rated NEMA Premium.
5. Computer Energy Conservation
 - a. "Smart Strip" makes a power strip that can sense when a computer shuts down and in turn shuts down other peripheral devices such as monitors, printers and scanners.

Miscellaneous

1. Consider placing the water cooler on a timer so that the unit does not expend energy off hours.
2. The server room is warm. Relocation of the server to a dedicated area with proper cooling should be considered or the current location should be better conditioned.