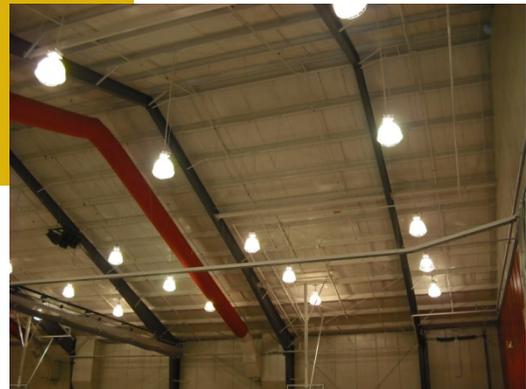




Borton  
Lawson

ENGINEERING  
ARCHITECTURE

Lititz recCenter  
*Lititz, PA*



Submitted to:



June 18, 2009



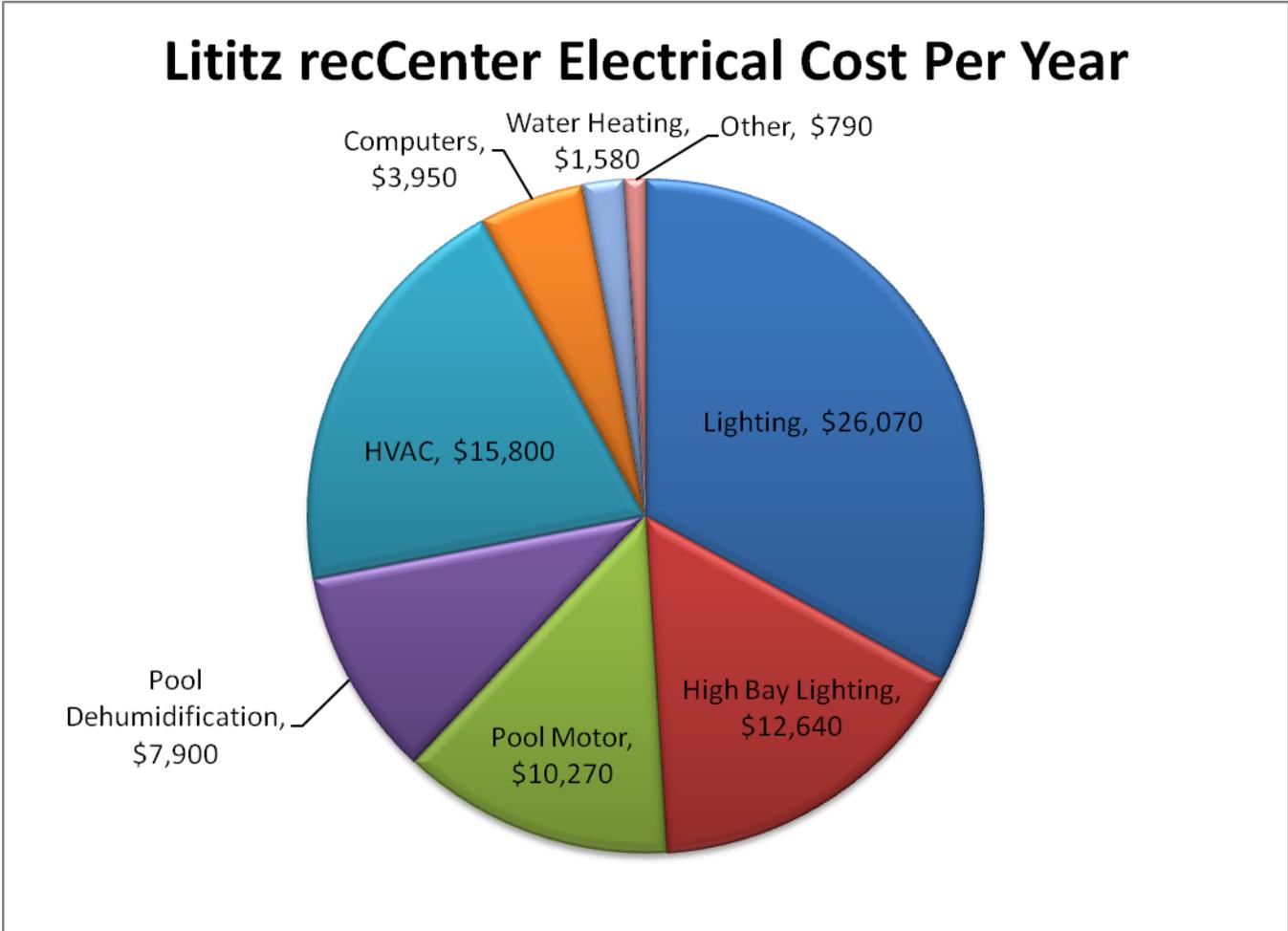
## I. Executive Summary

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 Lititz recCenter site is in excellent condition and care has been taken with the maintenance of equipment.

Upon reviewing the utility billing, the site currently pays \$0.08 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:

- Change high bay lighting from 400W metal halide to T5 fixtures saving an estimated \$4,700 annually.
- Install occupancy sensors in unoccupied areas, save up to \$6,000 annually.
- Use a thermal pool blanket during unoccupied periods and save up to \$1,750 annually, see [http://www.ppoa.org/print\\_blanket.htm](http://www.ppoa.org/print_blanket.htm) for additional information.
- Change the 20HP motor for water circulation to a NEMA Premium motor when rebates become available and save \$210 annually.

Consider the following for current action:

- Continue to review the Dry-O-Tron dehumidifier for replacement, not for energy efficiency but for age and parts replacement.
- Install a night setback thermostat and outdoor air shutoff during unoccupied periods which could save up to \$1,580 annually.\*

Consider the following for your long-term strategic plan:

- “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.
- Verify that the site meets current OSHA, NFPA 70E or NEC code for arc flash protection. \*
- Consider changing the fixtures to low flow motion detection in order to best conserve water.
- 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, and pool system modifications.

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 a recreational center constructed in 1920 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 has units which are energy efficient.
4. Reduce Infiltration:
  - a. Overall there is little accidental loss of air outside of the building. However, there is considerable space above the ceiling not currently utilized that appears to be kept to an equal temperature to the occupied area. It appears that most of the condition air in moving into this space via openings in the light fixtures. This does not pose an immediate problem in regards to energy savings however it should be noted that the space would be an excellent candidate for expansion.
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 vast majority of the high bay lighting is 400W metal halide. These units should be upgraded to T5 fixtures saving an estimated \$4,700 annually.
  - b. The space with regular ceiling heights has T8 fixtures. These fixtures do not currently have a financially attractive alternative.

- c. Occupancy sensors should be considered along unoccupied areas including restrooms and conference rooms. This enhancement can save up to \$6,000 annually.
  - d. 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 9 exterior air conditioning units have a SEER of around 13. These units are efficient to today's standards and there is no financial justification to change these units.
  - b. The 2 energy recovery ventilators are excellent additions to the other energy saving conditioned air units.
  - c. Heating is provided by natural gas and the units used are energy efficient.

### Pool Conditioning Systems

1. The Dry-O-Tron Dehumidifier has an approximate SEER of over 10 meaning that is not a candidate for an energy efficiency upgrade however, the age of the unit
2. A thermal pool blanket should be used as it will retain and reduce evaporation by 90% during unoccupied periods. This could save up to \$1,750 annually.
3. A night setback thermostat and outdoor air shutoff during unoccupied periods will cut room heating and ventilation requirements by 20% during unoccupied periods. This could save up to \$1,580 annually.
4. The existing 20HP motor for water circulation should be changed to a NEMA Premium Motor. This would save approximately 2% on the annual electrical usage which totals \$10,400 or \$210 annually.
5. The standard chlorine system is currently augmented with an efficient UV system.



## 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 units are energy efficient and do not need to be changed at this time.



## 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 outside of the pool circulation system. 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.