Indiana Area School District
East Pike Elementary School
Building Energy Profile

July 29, 2011
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Building Name:	East Pike Elementary School
Building Location:	501 East Pike Indiana, Pennsylvania 15701
Building Representative:	Dale Kirsch/Business Manager Greg Trout/Supervisor of Buildings and Grounds
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Building Energy Profile

Summary

This report is an overview of the building and operations at Indiana School District/East Pike Elementary School. The District Administration Offices are in a separate wing connected to this facility. Key energy and performance benchmarks are captured from utility billing information provided by the site contacts and from observations made during the building assessment.

This facility incurs approximately $110,087.00 in annual utility costs. The site energy use index is approximately **84** kBtu/sf-year. According to the *Commercial Building Energy Consumption Survey*, US Energy Information Administration (Source: Data adapted from DOE-EIA .), the average EUI for K-12 schools with approximately 78,000 square footage, without walk-in coolers/refrigeration is **65**.
This facility's energy performance rating is **21.**

Acknowledgement

AllFacilities Energy Group gratefully acknowledges the support and assistance of Dale Kirsch/Business Manager Indiana Area School District and Greg Trout/Supervisor of Buildings and Grounds.

Abbreviations

The following abbreviations may be found on these pages:

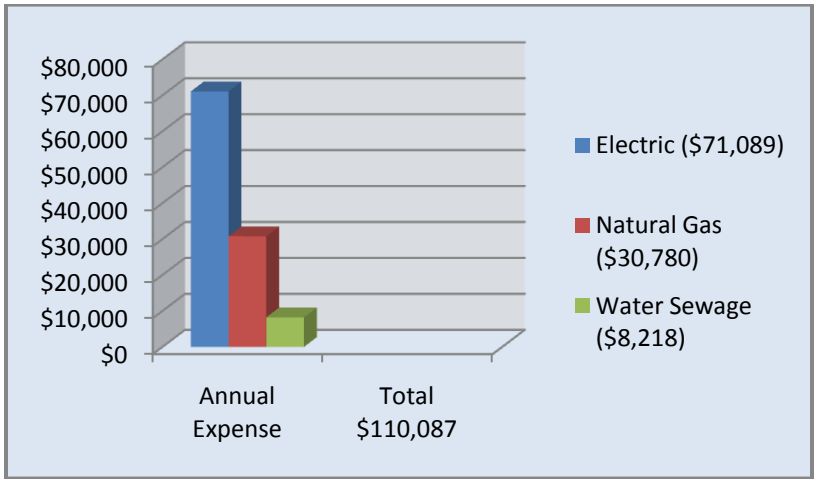
kGal	1,000 gallons (of water). Unit of measurement used by your water company
DHW	Domestic Hot Water – Water heated and used for domestic related purposes, such as washing hands, etc. (water from the hot water heater).
EUI	Energy Use Index – total energy (electricity and fossil fuels) consumed per square foot. This value is used to compare and benchmark facilities.
HVAC	Heating, Ventilation, Air Conditioning – Equipment used to heat, cool and provide air flow to the building.
kBtu	One thousand Btus (British thermal units). Standard unit of measurement of energy (can be used for both electric and fossil fuels) often used in benchmarking comparisons.
kWh	One thousand Watt hours (of electricity consumed). Unit of measurement used by the electric company.
kcf	One thousand cubic feet of natural gas (on utility bills, **mcf** is often used by the natural gas companies to mean 1,000cf)

Building Energy Profile

Utility Data

(Note* the Utility Data/Use includes District Administration Offices located in unit D)

Energy Cost Breakdown by Utility	
NATURAL GAS (Dominion-Peoples/Amerda) ***Account# not provided*** ***Meter# not provided***	**$30,780.00 (7/10 to 6/11)**
ELECTRICITY (Penelec/Amerda Hess) **Rate# All Electric School, Church, or Hospital** ***Account# 10 00 02 0680 9 4*** ***Meter# G15037466***	**$ 71,089.00 (7/10 to 6/11)**
WATER (Pennsylvania American Water) **SEWAGE (Indiana Borough and White Twp.)** ***Account# not provided*** ***Meter# not provided***	**$8,218.00(7/10 to 6/11)**
Total Utility Cost	**$110,087.00**
Total Square Footage	**77,735 SF**
Utility Cost Per Square Foot	**$1.42***



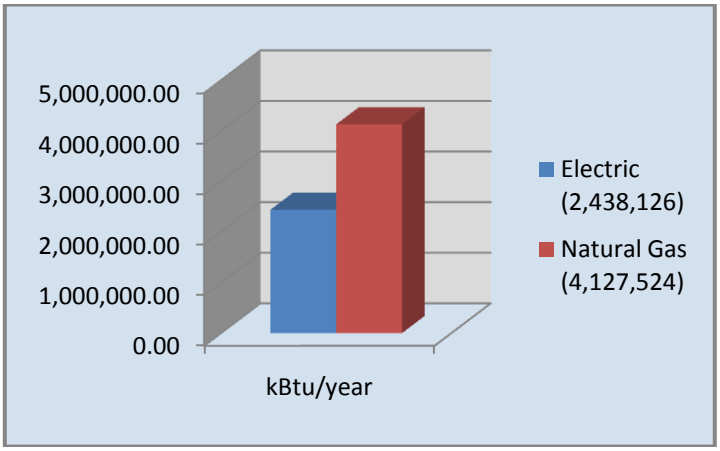
Building Energy Profile

*According to the *American School and University Annual Maintenance Survey 2008*, the average cost per square foot for all utilities, for all types of schools (including heavy energy users such as high schools with swimming pools) and including all utility costs in the US (of which Pittsburgh is in the bottom 25%) should be at **$1.90**

Based on 12 months of utility data provided, this facility is currently at **$1.42** per square foot for all utilities.

Annual Utility Use	
Annual Electricity use in kWh **Annual Electricity use in kBtu** ***Account#10 00 02 0680 9 4*** ***Meter# G15037466***	**714,574 kWh/year** **2,438,126 kBtu/year**
Maximum Demand (in kW)	**222.4 kW during July 2011**
Annual Natural Gas use in kcf* **Annual Natural Gas use in kBtu** ***Account# not provided*** ***Meter# not provided*** *Note: it has been confirmed with the supplier that consumption is expressed in MCF on the bill, which is normally *million cubic feet,* but is actually 1,000 cubic feet (kcf) in this instance.	**4,011.2 kcf/year** **4,127,524 kBtu/year**
Annual Water use in kGals	**583 kGal/year**
Energy Use Index (EUI) electric and gas (expressed as kBtu/sq.ft.-year)	****84**

Building Energy Profile



** Energy auditors use a measure called Energy Use Index (EUI) to enable comparisons between different buildings and energy types. EUI is calculated by converting all energy used in a building to a common unit, BTUs, and then dividing it by the square footage of the heated/ cooled space in the building. The EUI is the most common means of expressing the total energy consumption for each building. The EUI is usually expressed in *BTUs/Square Foot-Year* and can be used to compare energy consumption relative to similar building types or to track consumption from year to year in the same building. Sometimes EUI is given as thousands of BTU/square foot-year.

Building Energy Profile

Target Energy Performance Results

The design **must** achieve a rating of 75 or higher to be eligible for "Designed to Earn the ENERGY STAR".

NOTE: Values are 37% Electricity - Grid Purchase and 63% Natural Gas. The Target & Average Building energy use for this facility are calculated based on fuel mix of input estimated energy use.

Target Energy Performance Results (estimated)			
Energy	**Design**	**Target**	**Average Building**
Energy Performance Rating (1-100)	**21***	75	50
Energy Reduction (%)	N/A	22	0
Source Energy Use Intensity (kBtu/Sq. Ft./yr)	160	96	123
Site Energy Use Intensity (kBtu/Sq. Ft./yr)	****84**	51	**65**
Total Annual Source Energy (kBtu)	12,464,858	7,481,952	9,567,764
Total Annual Site Energy (kBtu)	6,565,650	3,940,990	5,039,655
Total Annual Energy Cost ($)	$ 118,441	$ 71,093	$ 90,913
Pollution Emissions			
CO2-eq Emissions (metric tons/year)	565	339	434
CO2-eq Emissions Reduction (%)	-30%	22%	0%

Facility Information
15701
United States

Facility Characteristics	
Space Type	**Gross Floor Area (Sq. Ft.)**
K-12 School	77,735
Total Gross Floor Area	77,735

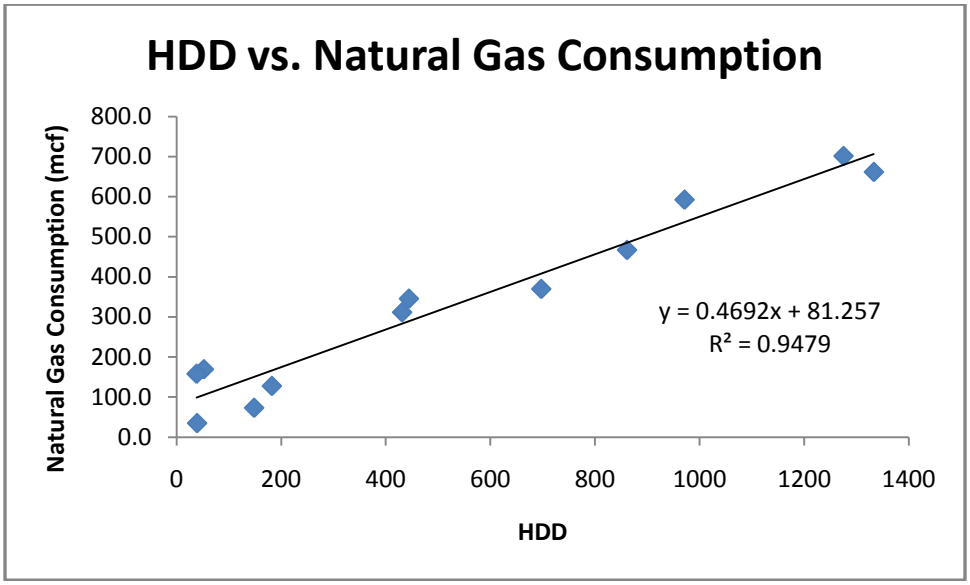
* The Average Building is equivalent to an EPA Energy Performance Rating of 50.

Estimated Design Energy			
Energy Source	**Units**	**Estimated Total Annual Energy Use**	**Energy Rate ($/Unit)**
Electricity - Grid Purchase	kBtu	2,438,126	$ 0.027/kBtu
Natural Gas	kBtu	4,127,524	$ 0.013/kBtu

Source: Data adapted from DOE-EIA.

Building Energy Profile

Utility Costs per Unit	
Electricity Cost per Unit	**$ 0.10per kWh**
Natural Gas Cost per Unit	**$ 7.67 per kcf**
Water/Sewage Costs per Unit	**$ 14.10 per kGal**



Linear regression analysis determines the relationship between the weather and building energy use. Generally, an R squared value of 0.80 or above indicates that there is a good relationship between weather and building energy use. The R squared value is 0.95 for this facility. The natural gas load is directly proportional to outdoor air temperature and the gas load of the building primarily serving the system for heating.

Maintenance & Operations Costs per Area
(Expressed in median dollars per square foot)

Total Energy/Utilities	$ 1.42
Gas/Electricity/Other Fuels	$ 1.31
Other Utilities	$ 0.11

Building Energy Profile

Building Profile

Building Use:	Elementary School/Grades K-6
Class:	Public School
Anchor Tenant:	Indiana Area School District
Setting:	Indiana, Pennsylvania

Utilities

Electric:	Penelec/Amerada Hess
Natural Gas:	Dominion Peoples/Amerada
Water:	Pennsylvania American Water
Sewage:	Indiana Borough and White Twp.
Number of Full Time Staff:	62
Number of Students:	397 (October 2010) 355 (projected 2011/2012)
Year Constructed:	1967
Renovations/Additions:	1999
Days Occupied:	Days: 178 student days, 185 teacher days, 260 days for office and custodial staff
Hours of Operation:	Elementary students start at 8:55 a.m. and dismiss at 3:15 p.m. Teachers at all schools begin at 7:30 a.m. and dismiss at 3:30 p.m. Office staff work 7:30 to 4:00 during the school year and 7:30 to 3:30 during the summer months

Energy Performance Rating for this facility: **21***

*To be eligible for the Energy Star, facilities must obtain a rating of at least 75

Building Energy Profile

Building Area

(Total square footage and descriptions/operating characteristics of each major space)

Gross floor area:	77,735
Building Type:	Brick/Masonry
Number of Stories:	1
Basement:	Yes
Roofing System:	Flat/membrane-ballasted round stone

Year Installed:	1999
Roof Insulation:	
Windows:	(130) Aluminum frame/double pane (1) Skylight double bubble acrylic above lobby pond

Building Energy Profile

Building Envelope

As indicated on design drawings.

(Approximately 67,735 sq. ft. units A, B, C, and D)

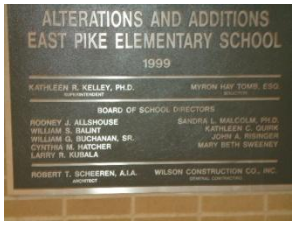
Unit A; eight classrooms, teachers aid office, seminar room three restrooms (one single occupant), one entry/exit

Unit B; cafeteria, computer classroom, conference room, faculty room, kitchen, library, multipurpose room with stage, two learning support (special education), three offices, nurses office with exam rooms, two seminar rooms, and five storage rooms. Main entry (double doors) with lobby, three additional entry/exits, seven restrooms (5 single occupant) and front exterior courtyard.

Unit C; art room, boiler room, guidance office, learning support (special education), electrical/mechanical systems room, eleven classrooms, receiving/storage, eleven restrooms, two coat rooms, and four storage rooms

Unit D; administrative offices, business manager, conference room, copy room, storage vault, and three restrooms. Lobby/vestibule into business reception area, two additional entry/exits, elevator, and 2 stairways.

(Approximately 10,000 sq. ft.)
Unit D Basement; administration support offices, conference/library, records storage room, technology support room, lunch room, elevator and elevator equipment room, three storage, two entry/exits, and two stairways.



Building Energy Profile

Facilities & Equipment

Auditorium — Multipurpose Room Unit B

Cafeteria — Multipurpose Room Unit B

Classrooms — (18) Regular Classrooms
(3) Full-Time Kindergarten

Computer Labs — Unit B

Copy Room

Elevator/Lifts (1) Unit D

Gymnasium Multipurpose Room Unit B

Kitchen Unit B

Kitchen (faculty lounge)

Library Unit B

Locker Rooms None

Misc. Rooms	Unit A – teacher aid office Unit B – conference room, faculty room, nurses office with exam rooms. Unit C – art room, boiler room, guidance office, electrical and mechanical rooms Unit D – administration offices, conference and copy room, storage vault Unit D basement – operation support offices, technology support
Restrooms (24)	
Unit A	(1) boys/2 sinks, 3 toilets, and 6 urinals (1) girls/4 sinks and 6 toilets (1) single occupant
Unit B	(1) men/2 sinks, 2 toilets, and 6 urinals (1) women/3 sinks and 3 toilets (5) single occupant
Unit C	(1) boys/2 sinks and 2 toilets (1) girls/2 sinks and 2 toilets (9) single occupants/classroom
Unit D	(1) men/1 sink, 1 toilet, and 1urinal (1) women/1 sink and 1 toilet (1) single occupant

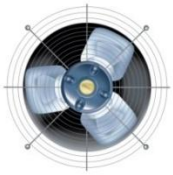
Total fixtures; 32 restroom sinks with sensors, 21 classroom sinks, 36 toilets, and 13 urinals

Food Service

Kitchen	2 - Southbend/convection oven/model# GS225C 120v/1ph/7.9amp natural gas 1 – Legion/skittle/combi pan/ model# SKG5-5 120v/natural gas/input 34,000 Btu

Primary cooking equipment fuel source; natural gas

Building Energy Profile



HVAC SYSTEMS

Heating: Boiler
Cooling: Offices, library, and computer laboratories
(Note: D level admistration office wing including basement is air conditioned)
Air Distribution: VAV rooftop units
Unit ventilators

Systems (2) Smith/series#3500 boilers with C-3 G0 burner, installed 1998

(1) Futera Fusion/boiler with HeatNet controls

VAV rooftop units

Exhaust fans

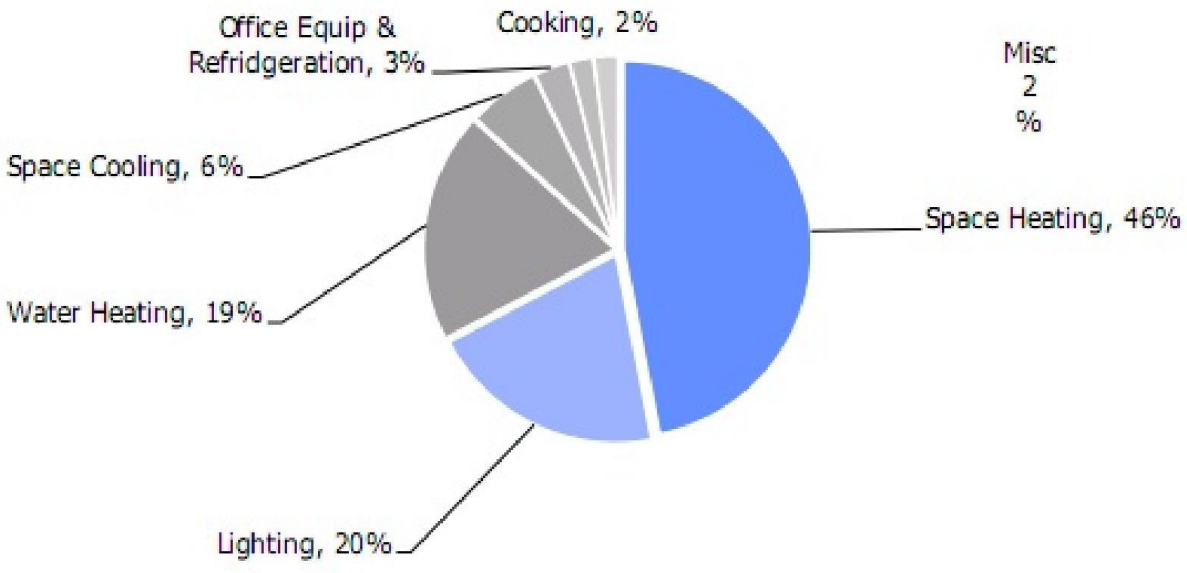
Unit ventilators

(1) Ventmaster-ventilator (kitchen)
model # not identified/120v/1ph/1.0kw

Air Compressor with dryer

HVAC Service	Performance contract with Trane
Temperature Controls;	Pneumatic/DDC

Domestic Hot Water; Raypak natural gas water heaters coupled to storage tank (approximate age 15 years old)



Breakdown of energy use in Schools
Source: US DOE, 2006

Building Energy Profile

LIGHTING

(no lighting protection or automated system)

Indoor Lighting:

Unit A		
	Classrooms	(231) 4'/fluorescent/suspended/3 lamp/32w T8
		(32) 4'/fluorescent/wall mount/2 lamp/32w T8
	Hallway	(16) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
	Office	(24) 4'/fluorescent/suspended/3 lamp/32w T8
	Restrooms	(6) 4'/fluorescent/suspended/2 lamp/32w T8
	Storage Rooms	(4) 4'/fluorescent/suspended/3 lamp/32w T8
	Seminar Room	(24) 4'/fluorescent/suspended/3 lamp/32w T8
		(6) 4'/fluorescent/wall mount/2 lamp/32w T8
Unit B		
	Cafeteria	(8) surface/250w/metal halide
	Computer Lab	(24) 4'/fluorescent/suspended/3 lamp/32w T8
	Conference Room	(8) 4'/fluorescent/suspended/3 lamp/32w T8
	Faculty Room	(18) 4'/fluorescent/suspended/3 lamp/32w T8
	Hallway	(50) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
		(22) recessed/incandescent/40w (display cases)
	Kitchen	(12) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
		(12) 4'/fluorescent/suspended/3 lamp/32w T8
	Library	(12) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
		(30) 4'/fluorescent/suspended/3 lamp/32w T8
	Library Media Storage	(10) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
	Lobby	(6) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
		(8) recessed/incandescent/75w/spot
	Multipurpose Room	(8) surface/250w/metal halide
	Nurse/Exam Rooms	(10) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
		(3) 2' x 2'/fluorescent/recessed/ 2 lamp/17w T8
	Offices	(8) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
		(8) 2' x 2'/fluorescent/recessed/ 2 lamp/17w T8
	Restrooms	(10) 4'/fluorescent/suspended/2 lamp/32w T8

	Stage	(44) 4'/fluorescent/suspended/3 lamp/32w T8(dimming)
		(4) recessed/incandescent/150w spot
	Storage	(16) 4'/fluorescent/suspended/2 lamp/32w T8
		(6) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
Unit C		
	Art Room	(34) 4'/fluorescent/suspended/3 lamp/32w T8
		(4) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
		(2) 4'/fluorescent/suspended/2 lamp/32w T8 (storage)
	Boiler Room	(4) 4'/fluorescent/suspended/2 lamp/32w T8
	Classrooms	(305) 4'/fluorescent/suspended/3 lamp/32w T8
	Coat Rooms	(4) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
	Learning Support	(24) 4'/fluorescent/suspended/3 lamp/32w T8
	Hallway	(29) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
		(4) 2' x 2'/fluorescent/recessed/ 2 lamp/17w T8
	Offices	(12) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
	Mechanical Room	(16) 4'/fluorescent/suspended/2 lamp/32w T8
	Receiving	(6) 4'/fluorescent/suspended/2 lamp/32w T8
	Restrooms	(7) 4'/fluorescent/suspended/3 lamp/32w T8
		(9) 3'/fluorescent/recessed/2 lamp/25w T8
Unit D		
	Conference Room	(12) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
		(12) recessed/incandescent/100w
	Copy Room	(10) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
	Hallway	(10) 2' x 2'/fluorescent/recessed/ 2 lamp/17w T8
	Lobby	(4) recessed/incandescent/60w
	Offices	(42) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
	Restrooms	(3) 4'/fluorescent/suspended/3 lamp/32w T8
		(2) 3'/fluorescent/recessed/2 lamp/25w T8
	Stairway	(4) 4'/fluorescent/suspended/2 lamp/32w T8
	Storage	(2) 4'/fluorescent/suspended/3 lamp/32w T8
Unit D (basement)		
	Conference Room	(4) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
	Hallway	(8) 2' x 2'/fluorescent/recessed/ 2 lamp/17w T8
	Library (conf.)	(12) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
	Lunch Room	(8) 2' x 4'/fluorescent/recessed/4 lamp/32w T8
	Offices	(12) 2' x 2'/fluorescent/recessed/ 2 lamp/17w T8

Record Storage	(10) 2’ x 4’/fluorescent/recessed/4 lamp/32w T8
Stairway	(2) 4’/fluorescent/suspended/2 lamp/32w T8
Storage	(11) 4’/fluorescent/suspended/2 lamp/32w T8
Tech Support Room	(8) 2’ x 4’/fluorescent/recessed/4 lamp/32w T8

Building Mounted Exterior Lighting: (controlled by timer)

Canopies	(17) surface mount/metal halide/70w
Entry/Exits	(5) surface mount/metal halide/70w
Wall	(21) surface mount/metal halide/100w

Exit Signs: (40)

Unit A (9)
Unit B (16)
Unit C (7)
Unit D (2)
Unit D (4) basement

Electrical Equipment (@main distribution 277/440, 3 phase, 4 wire)

I.T. Equipment

199 – classroom pc units
(age, mfg, model not identified)

32 - printers
(age, mfg, model not identified)

45 – administration pc units
(age, mfg, model not identified)

Copiers

Xerox copier models-W5675, W5638

Xerox copier models- Administration (East Pike)-W5665 WC7655

Building Energy Profile

Kitchen	1 - Traulsen/upright freezer/RLT232NREHHS 115v/1ph/14.9amp
	2 - Traulsen/upright freezer/RLT232WREHHS 208v/1ph/9.2amp
	1- Beverage Air/milk cooler/model# SM58N 115v/6.3amp
	1- Beverage Air/milk cooler/model# BM34N 115v/4.8amp
	1 - Servolift Eastern/modular food serving counter/model# 501-4 208v/32.7amp/6800 watt
	1 – Servolift Eastern/ice cream freezer/model# 505 120v/5.9amp
	1 - Legion-skittle model # not identified/120v/1ph/5amp
	1 - Traulsen/refrigerator/model#RHT232NREHHS 115v/1ph/10.4amp
	1 - Amana/microwave oven/model# RFS10MP2 120v/1ph/2.2amp
	1 - Traulsen/cooler (pass-thru)/model#RHT132WPTHHS 115v/1ph/8.3amp
	1 - hot food holding cabinet model # not identified/120v/1ph/2.25kw
	1 - Beverage Air-milk cabinets model # not identified/120v/1ph-1/3 hp
	1 - hot food serving counter model # not identified/208v/1ph/6.8kw
	1 - Hobart/dishwasher/model# C44A13 208v/3ph/56amp

1 – In Sink-Erator/Disposl/model# SS200-29
208/230v/5amp/2hp

Miscellaneous Equipment

Transformer MGE

Fire Alarm Fire Suppression System (kitchen)

Vehicles None Identified

Emergency Generator Onan/ model#80 GGHC/80KW/diesel/installed 1998
Unit D mechanical room

Maintenance

Support staff performs quarterly preventative maintenance scheduled per the academic calendar year.
Service agreement with Trane.

Building Energy Profile

According to the U.S. Department of Energy, the average school spends 46% of its energy consumption on heating, air conditioning and air handling and 20% on lighting. Following is a short list of the most common Energy Conservation Measures (ECM) that are being implemented by schools:

Building Automation Systems: Since operating hours at a school vary by season, school calendar and outside activities, many schools have installed sophisticated building automation systems. However, independent audits reveal that many of these controls are not functioning correctly, have programmed settings that are out of date, or are maintained by staff or volunteers who need additional training in how to use them. Recommissioning and training for these systems can improve energy efficiency by as much as 15%. Upgrading to newer control technology may be recommended in spaces with variable use. For example, dormitory rooms, meeting rooms, bathrooms and classrooms can now employ wireless programmable thermostats that set back temperatures when rooms are unoccupied for set periods of time. The energy savings versus cost analysis revealed a 2.6-year payback. More complex buildings require building automation systems that can deliver even higher savings, but require more training to properly maintain them.

Lighting Replacement: Even buildings that are only two years old can be using outdated lighting technology. The most popular energy conservation measures in lighting include: replacing T-12 fluorescent fixtures with T-8 fixtures/electronic ballasts, replacing Exit sign lamps with LED bulbs, and replacing standard incandescent light bulbs with CFLs (compact fluorescent lamps). New developments in “high-bay” lighting now offer significant savings for applications in warehouses, gymnasiums, auditoriums, etc.

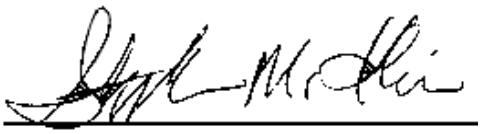
Light Occupancy Sensors: Occupancy sensors turn off lights when the space is not in use. Where standard wall switches control room lighting, a low-cost replacement of the switch with a combination switch/occupancy sensor can reduce energy in offices, storage rooms, bathrooms, athletic locker rooms, maintenance facilities, kitchens, coolers and freezers. More sophisticated lighting-control systems can manage multiple buildings and unique applications such as outdoor recreation areas, warehouses, storage and basement areas and even individual classrooms. Lighting controls have also successfully been used where daylight is available in rooms, common areas, and so on to turn down or turn off lighting during mid-day periods when outside light can be used instead. Called “daylighting,” installing more windows and overhead skylights partnered with lighting controls allows spaces to use less lighting during the 8:30 a.m. to 4:30 p.m. period.

Fans and Air-Handling Equipment: Proper maintenance and routine cleaning can make a big difference in the energy efficiency of fans and other air-handling devices. Additional analysis and possible retro commissioning of equipment such as dampers and fans will ensure that they are being used efficiently and only when needed. Finally, upgrading to variable frequency drives on motors that do not need to be in constant use provides additional significant energy savings.

Building Energy Profile

Energy Misers: Many new devices are available that cut power or lower power to devices such as computers, copiers, flat screen monitors and vending machines. The return on investment for these types of devices is usually between one and two years. Also, another simple idea is to put hot water tanks on timers to set back water temperatures when a building is not in use. Charging extra for hot water washers in dormitories and only running cold water lines to the majority of washers can reduce energy in laundry facilities.

Water Conservation: Water and sewer rates are now higher than ever before and are expected to continue to rise. New low-flow faucet aerators and fixtures with sensors can cut back water use dramatically and are showing paybacks in less than six months.
ENERGY STAR: Organizations that make a purchasing commitment to ENERGY STAR rated equipment and standards for building equipment have been able to drive more than $0.40 per square foot off of their baseline energy costs.



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