McCormick
Facilities Management

Building Energy Assessment

SAU 80 – Shaker Regional School District
Canterbury Elementary School

Energy Audit Report

Presented to: SAU 80 – Shaker Regional School District
58 School Street
Belmont, New Hampshire 03220

Presented by: McCormick Facilities Management
8 Main Street
Dexter, Maine 04930

February 2010

McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Building Energy Assessment

SAU 80 – Shaker Regional School District
Canterbury Elementary School

Table of Contents

McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Energy Assessment and Report

SAU 80 – Shaker Regional School District

SAU 80 Canterbury Elementary School
15 Baptist Road, Canterbury, New Hampshire

Audit Date: December 17, 2009

Introduction

The schools of SAU 80 – Shaker Regional School District, like many consumers of electrical power and heating fuel, have struggled to deal with the increased cost of energy and the budget difficulties that it causes. To help control these costs and to use energy more efficiently, we conducted a walk through energy audit of the Canterbury Elementary School located at 15 Baptist Road in Canterbury, New Hampshire to determine potential energy conservation measures. Our survey collected specific information regarding the type of construction, building envelope, lighting and mechanical systems, energy consumption and usage patterns. This analysis enabled us to develop an inventory of energy consuming equipment as well as a list of building components that will be useful in future budget planning and to prioritize implementation of targeted energy performance enhancements.

This building is used by the Shaker School District as an elementary school educational space and includes classrooms, offices, a multipurpose room, and library. The building is occupied from approximately 6:00 am to 6:00 pm per day, for at least five days a week with approximately 129 students plus staff.

There are approximately twelve classrooms of 800 square feet each, approximately four offices, a multipurpose room, computer lab, library, several storage and custodial closets, and restrooms.

This report details the recommendations and conclusions of an energy audit conducted at the Canterbury Elementary School located at 15 Baptist Road. The initial site visit was conducted on December 17, 2009. The audit inventory information was collected by Deirdre McCormick and Michael McCormick, Certified Energy Auditor, from McCormick Facilities Management. At the time of the audit we met on site with Mary Morrison, school principal, and custodian Andy Hurd, who provided us with information and floor diagrams as needed.

Executive Summary

Energy conservation is a philosophy of effective stewardship of facilities placed in the charge of representatives of the public. It must be a policy of the governing body. There must be an advocate within the administration who:

- leads the energy conservation effort;
- assures that the governing body's energy conservation policies are carried out;
- reports energy conservation actions and results regularly to the governing body;
- identifies ways for each employee and customer to participate in energy conservation;
- maintains a current knowledge in this field; and
- identifies creative ways to address energy conservation.

Effective energy conservation must become a way of life for all stakeholders in the Shaker School District.

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Although it is not discussed in this report, we would like to point out that there is also a positive long-term impact on the environment when energy savings activities occur that benefit everyone.

The outcome of the audit has provided an opportunity for directed building modifications that we will refer as Energy Conservation Measures or ECM's. The term “energy conservation measure” includes installations or modifications that are primarily designed to reduce the consumption of fuel oil, electricity, propane, water, increase occupant thermal comfort and improve the management of energy demands.

The ECM's we are suggesting are considered with economics based on the walk through inventory of this building. Any estimates of cost of replacement, upgrade or installation are approximated and are for reference purposes only. As ECM's are considered for implementation, detailed specifications, designs and estimates will be required to provide costs at the time the measures will be performed.

Details of these ECM's and our finding and recommendations are contained within this report.

It is our opinion that many opportunities exist within this building to conserve energy, increase thermal comfort, and reduce energy costs. These upgrades and replacements will help to lower the buildings energy burden as well as improve the working environment for personnel working there.

After reviewing this facility we believe this building would benefit by the implementation of a standardized energy policy. This working document should be utilized as an educational tool for the building's operators and occupants to help better manage energy use. It will direct how the building should be operated on a daily and seasonal basis taking into consideration the heating and cooling system usage, temperature settings, lighting utilization, computer and office equipment usage as well as the usage of personal appliances. We encourage involving the users of the building possibly by forming a committee that would work with the SAU 80 energy manager in the development, implementation and use of a policy. This inclusion will bring value as well as harboring ownership that will encourage people to take pride in participating in conservation. Once the policy is implemented it should be revisited and updated on a regular basis especially as technology and building uses change.

An energy manager should be hired or contracted for whose sole responsibility would be to save energy on a continual basis. There is enough energy being consumed, and could be interpreted as being wasted, to pay for this position from the savings and still save the district money. Technologies and purchasing strategies are continually changing yielding continued opportunities for this position to justify the expenditure.

We would also like to strongly recommend the implementation of energy data tracking. In gathering information to complete this report, we found that little historic data was kept in regards to electrical usage at this school. In attempting to set usage trends, it was difficult to make observations based on a limited number of months. For better energy management and for the option of viewing trends and usage, detailed records should be kept for both electrical and fuel usage. This will facilitate better energy management and awareness in the future.

Potential savings, cost, and payback

As will be demonstrated throughout this report, we indentified 25 realistic opportunities to save energy and dollars. Implementing fairly straight forward conservation measures, expenditure on the order of $374,000 would save nearly $46,000 annually in energy costs between electricity and oil costs, with an overall payback of around 8 years.

Refer to the ECM chart to follow for specifics on these figures.

McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

General Observations

During our review we noted the following:

- insufficient historic energy data is kept;
- computers and office equipment left on when not in use;
- personal appliances that were not Energy Star rated;
- the custodian has a manual override switch to stop gym heaters because they get too hot;
- part of the building is controlled by the Facility Manager via remote access;
- the library can not be controlled, is either too hot or too cold;
- there are 2 separate heating systems to heat the facility;
- teachers manually shut off univents
- all windows were very drafty with no curtains; and
- the vending machines cool 24/7 with the light on.

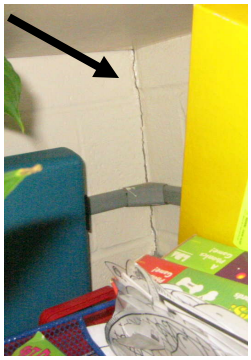
The above listed items, although some are low in consumption, are still wasting energy when left on unattended or are left plugged in when not in use. Utilizing a power strip and turning it off when items are not in use and turning down lights when the building is unoccupied is a simple measure that can reduce phantom electrical loads and help to save energy and reduce utility costs. Adding a vending miser to the vending machines will ensure that they are not running/cooling when not necessary.

Computers should be equipped with software that shuts them down unless being used. Generally speaking, a typical computer tower that is left on will consume 420 kWh per year whereas the monitor will consume anywhere from 230 – 430 kWh per year (depending if it is a CRT or LCD screen). Other examples of phantom energy hogs in many buildings are computer printers, which consume anywhere from 25 – 250 kWh per year, and photo copiers which can consume close to 1,200 kWh per year when left on. It is good practice to turn office equipment off when not in use. Energy Star rated units should be procured as older units are replaced to gain maximum efficiency.

Appliances should be converted to Energy Star rated appliances when new ones are purchased. Furthermore, it is good practice not to allow individual coffee pots and other appliances in offices. Although one personal appliance may not consume much energy, having an appliance at each desk or in each room can usually cost $10-30 per year, per appliance. Making use of a common kitchen area will cut down on the number of personal appliances and reduce unnecessary spending.

Findings Leading to Potential Energy Conservation Measures

Building Envelope



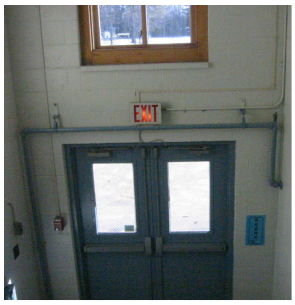
The 30,000 square foot building is a metal framed structure with un-insulated cement block infill and brick veneer exterior. It was constructed in three time periods, 1957, 1969, and 1990. It is currently used as an elementary school. The 1957 and 1969 sections appear to be in fair condition for a building of this age, type, and use. The 1990 section is in good/average repair.

The roofs are flat with a metal superstructure, rubber membrane covering, and foam insulation.

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Observation of the foundation does not indicate an opportunity to add insulation due to the proximity of exterior finishes and landscaping.

The 1957 and 1969 section envelopes are very open to the outdoor elements. We observed areas above the ceiling tile where daylight could be seen at the exterior wall-floor deck-roof deck interface. There is no barrier between the eave soffit of the first floor and the interstitial space between the ceiling tile and 2nd floor deck.



Doors

There are a total of nineteen exterior doors on this building. Four of these doors are full-glass metal insulated doors in fair condition. Three are ½-glass, metal insulated doors, two of which should be replaced. There are also six ½-glass metal un-insulated doors that are in poor condition. There is a metal insulated door, a metal un-insulated door, and one ¾-glass metal insulated door – each should be replaced. We recommend weather-stripping all the doors in the building annually to prevent infiltration/exfiltration of air.

Windows

There are a total of eighty-one windows in the building. Forty-five of them are double-pane, wood framed windows, which are extremely drafty and should be replaced. There are also thirty-three double-pane, wood framed windows that are part of the double-hung window system and most should be replaced to reduced draftiness. The remaining windows are skylights. In the library, under the skylights and vaulted ceiling, cold drafts could be felt at the floor level. This is due to poor insulating value of the skylights, little or no insulation in the vaulted ceiling area, and the large round picture window lacking an insulating curtain.

Electrical

Interior lighting

There are three hundred and seven light fixtures in this building. One hundred and six of these lights are inefficient, T12 fixtures. One hundred, fifty-five of the lights are more efficient T8 fixtures. The exit signs are florescent type, which should be converted to LED. There are also thirteen incandescent bulbs throughout the building, which should be changed to CFL bulbs to save energy.

Occupancy sensors

There are no occupancy sensors within this building.

Exterior lighting

There are thirteen exterior lights on the building. Seven are high pressure sodium, two are quartz, and four are low pressure sodium.

Electrical consumption

From January 2008 to December 2008, this facility consumed 125,989 kilowatt hours (kWh). Average monthly usage was 10,499 kWh. During this time period, demand charges ranged from 20 kW to 60 kW with charges from $157 to $474 per month. Total cost for these twelve months was $20,287 with a monthly average of $1,691. According to data provided by school staff, consumption for FY08 was 123,432 kWh. This consumption in 2008 equals 4.2 kWh/square foot, this compares to your peers average of 5.6 kWh. Cost per square foot was 68 cents. The energy use intensity was 65 kBTU, which compares to 89 kBTU for this climate zone.

From January 2009 to November 2009, this facility consumed 113,166 kilowatt hours (kWh). Average monthly usage was 10,288 kWh. During this time period, demand charges ranged from 19 kW to 53 kW with charges from $149 to $421 per month. Total cost for these eleven months was $18,262 with a monthly average of $1,660. According to data provided by school staff, consumption for FY09 was 124,081 kWh. This consumption in 2009 equals 3.8 kWh/square foot, this compares to your peers average of 5.6 kWh. Cost per square foot was 61 cents. The energy use intensity was 47 kBTU, which compares to 89 kBTU for this climate zone.

Of all the buildings this consumption ranked 2nd out of 5 for the January through November, 2009 period.

Mechanical

Heating system(s)
The two older building sections are heated by a single Burnham hot water boiler model V909 nine section boiler. The boiler is rated at 1.054 MMBTU, with a firing rate of 9.1 GPH. It has a Carlin burner model 702CRD with a firing rate capacity of 6-13 GPH. It burns #2 fuel and has no fuel pre-heaters.

There are four 1-horsepower, 144 gallon per minute, single speed circulator pumps running 24/7/365. There are two ½-horsepower, 114 gallon per minute, single speed circulator pumps running 24/7/365.

The newest building section has two Weil-McLain model 894 hot water boilers. The boilers are each rated at 1.574 MMBTU, with a firing rate of 17.5 GPH. These two boilers also have Carlin burners, model 702CRD which have a firing rate capacity of 6-13 GPH. Each uses #2 fuel and have no fuel pre-heaters.

There are six HHW circulator pumps ranging in size from 1/8 to 1/3 horsepower and 9-50 gallons per minute. They are all single speed circulator pumps running 24/7/365.

HVAC Controls
There is a mix of control manufacturers and types. The older building sections generally have electro-mechanical systems and the 1990 section has Siemens direct digital controls. The older sections are reportedly being converted to Siemens DDC controls at the rate of 2 rooms per year.

Domestic Hot Water Heating Timer and Insulation
There is a 50 gallon, State Industries gas fired water heater that is in good condition.

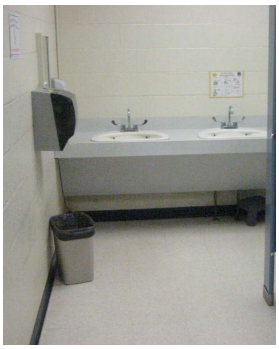
Air conditioning
Air conditioning was not reported or observed.

Air distribution
There is one roof top unit, RTU 1, rated at 6000 CFM. There are four heating and ventilating units, HV 1-4, rated between 1000 and 1950 CFM. They have heating coils rated from 27 to 70 MBTU/h. Fan motors are from ½ to ¾ horsepower. There are six exhaust fans in bathrooms and other areas. There is an exhaust hood in the kitchen.

Fuel consumption
Between FY02 and FY09, the elementary school used a total of 76,616 gallons of #2 fuel. The highest amount was consumed during FY03 at 12,160 gallons. During FY08 the elementary school consumed 11,064 gallons of

#2 fuel. The cost per gallon was $2.195, for a total consumption cost of $24,285 in FY08. This building consumed 7,105 gallons of #2 fuel during the FY09 time period. The average price paid per gallon was $2.887 for a total cost of $20,513. For the last two school years (FY08 and FY09) the elementary school has averaged 9,085 gallons per year.

This fuel consumption figures to be .303 gallons per square foot and $0.747 per square foot, ranking the elementary school as 4th out of 5 for the SAU 80 buildings. This compares to .33 gallons per square foot with your peers for this climate zone.



Water

There are sixty water consuming devices in the elementary school. Devices that were counted include urinals, toilets, and sinks. There is a mix of high and low water consuming devices. All high consumption devices should be converted to low ones when possible.

Recommended Energy Conservation Measures

Important Note about ECM Recommendations: Each ECM annual savings is based on a percentage of savings from the 2009 energy costs. As each ECM is implemented, the savings should be calculated on the newly resulting energy consumption cost.

ECM 1 – Interior lighting – The inefficient T12 lighting throughout the building should be converted to high-performance T8s. There are also incandescent bulbs in the building that should be changed to compact fluorescents (CFLs). This ECM will cost $4,900 to implement, saving an approximate $2,952 annually. Based on this savings, a simple payback is calculated to be 1.7 years. Incentives and rebates were considered in the installation calculations.

ECM 2 – Occupancy sensors – No occupancy sensors exist in the building and we are recommending installing them in commonly occupied spaces. Depending on actual occupancy in each of the rooms, the payback may vary; however, we based our estimations on hours of building operation. A total of fifty-three occupancy sensors should be installed. A breakdown of each location is on the attached lighting sheet. This ECM will cost approximately $2,470, saving $3,222 annually for a payback of less than 1 year.

ECM 3 – Replace CRT monitors – There are several CRT computer monitors throughout the building. A typical CRT monitor can consume over 400 kWh per year if left on. By switching the computer monitors to more efficient LCD computer monitors, a significant amount of kilowatt hours can be saved: in some cases almost 200 kWh per year, per monitor. Based on the number of CRT monitors we observed, we estimate an investment of $3,900 will save $1,800 annually and payback in 2.2 years.

ECM 4 – Vending machine miser – The vending machine in the main lobby is not equipped with a vending miser and cools 24 hours a day. By installing a vending miser, the machine can be controlled to turn on and cool only during school hours. An additional measure would be to remove the bulb in the machine and mark it as “on with bulb removed”. This will save additional energy. The vending miser cost is estimated $250 and should save $250, for a payback of 1 year.

ECM 5 – Block gravity vents – There are gravity vents, approximately fifteen of them, located throughout the building that are no longer in use. We recommend closing them off. The cost for this project is $4,000 and will save an approximate $625 annually, for a payback just 6.4 years.

ECM 6 – Install Airius units - Gym – We recommend installing Airius units in the gym for better air movement.

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

The Airius unit will de-stratify, or move, the warmer air from the ceiling to the floor in a much more efficient manner than other commonly used methods, thus saving energy overall. The cost for this project is $2,000 and is estimated to save $500 annually. Based on these figures, the payback is 4 years.

ECM 7 – Complete DDC installation – A portion of the building has had DDC controls installed. We learned that this installation has been happening is phases. These are many issues with this process of installation, for example, the building system is very unbalanced and the controls, even the new ones, are now different ages and possibly different models. We recommend completing the DDC installation for the rest of the building in one, single project for better building control and efficiency. The cost for this ECM is $20,000 with a savings of approximately $2,000. With this savings, the project will payback in 10 years.

ECM 8 – Install CO_2 detectors – There are no CO_2 detectors within the building so the air handlers run even when it is not necessary. Installing these detectors will make for a more comfortable environment for the occupants, as well as save energy by shutting down equipment when it is not needed. The estimated cost for the CO_2 detector installation is $4,250 , saving approximately $2,000 a year and paying back in 2.1 years.

ECM 9 – Repair dampers – The dampers to the univents are damaged. We recommend repairing the dampers to cut back on wasted energy. The cost for this project is estimated at $3,000 with a savings of $500. The payback for this project based on these figures is 6 years.

ECM 10 – Replace bathroom fixtures – Most of the restroom fixtures in the building are high consumption devices, which are consuming more water than necessary to function. We estimate twenty-five of these fixtures should be replaced with low flow devices. The cost for this project is approximately $16,000 and will save $900 in water consumption annually. Based on these savings, the project will payback in 17.8 years.

ECM 11 – Replace drinking fountains – Four of the drinking fountains should be replaced with newer models that have timers. These models will only cool water during demanded hours. The current fountains cool on a 24 hour basis and much of that time, cold water is not needed. The project cost for this measure is approximately $6,500 with an annual savings of $400. The payback based on these figures is 16 years.

ECM 12 – Install VFDs on AHUs – The air handling system runs at a constant speed. By installing variable speed drives to the air handling units, there will be more control over air flow. This will allow air to move less frequently and only as needed to specific areas, thus cutting back on the run time of equipment. The estimated cost for this measure is $7,500, with an annual savings of $1,000. We estimate a project payback of 7.5 years.

ECM 13 – VFD circulator pumps – We recommend replacing the single speed motors with variable speed drives and motors for the heating hot water circulation loops. The project cost is estimated at $8,000, with an annual savings of approximately $1,200. Based on the savings, this project will payback in 6.7 years.

ECM 14 – Wood-pellet boiler – The existing boilers were installed in 1990 making them 20 years old. We are recommending installing a wood-pellet boiler system in the school for better heating and lowered heating costs. The cost for this project is $155,000, with an annual savings of $12,000 and a payback of just under 13 years. Furthermore, dependence on foreign oil and the unpredictable prices that accompany it could be avoided.

ECM 15 – Motorized damper – Boiler room – Motorized dampers should be installed in the boiler room so that the dampers open when needed and close when they are not. Allowing the dampers to close as needed will cut back on wasted energy. The cost for this project is approximately $1,250 with a savings of $125 annually. Based on this saving the payback is 10 years.

ECM 16 – Insulate piping – Several sections of the heating hot water piping is un-insulated, thus wasting heat

as it travels through the building. Adding insulation to the piping will help the water to retain its heat and deliver it to the terminal devices where it is intended to be. The estimated cost to insulate the building pipes is $3,000, which will save around $500 annually and payback in 6 years.

ECM 17 – Install Airius units - Library – We recommend installing Airius units in the library for better air movement. The Airius unit will de-stratify, or move, the warmer air from the ceiling to the floor in much more efficient manner than other commonly used methods, thus saving energy overall. The cost for this project is $500 and is estimated to save $125 annually. Based on these figures, the payback is 4 years.

ECM 18 – Balance AHU and HHW – The building air handling units and heating hot water system are out of balance throughout the entire building. This is resulting in uneven air flow and heating. The estimated cost for this project is $5,000 and should be completed in conjunction with the DDC system. Savings, once completed, is estimated to be $1,500 annually, plus increased occupant comfort. Payback for this project is just over 3 years.

ECM 19 – Split HHW zone – The heating hot water zone in the 1990 section should be split into two zones for better efficiency. Currently, HHW runs from the boilers through the gym and up the corridor before it gets to the library and office areas. When only the gym or library sections need heat, the entire loop is heated, resulting in unnecessary energy costs. The cost for this project is $4,000, with an estimated annual savings of $1,000. Based on these figures, the payback for this measure is 4 years.

ECM 20 – Replace exterior doors – Most of the doors in the two older sections have been rated in poor condition and should be replaced with newer, metal insulated doors. This measure will reduce heat loss due to loose fittings and lack of proper insulation. A total of nine doors should be replaced at a total project cost of $13,500. The savings once this project is complete is estimated to be $1,350 annually, with a payback of 10 years.

ECM 21 – Replace exterior windows – Almost all of the windows were observed to be very drafty, causing air infiltration/ex-filtration, as well as occupant discomfort. We recommend replacing the exterior windows in the building. The cost of this project is $70,000 and will save $2,540 annually, as well as increase comfort within the building. The payback based on these figures is 27.6 years.

ECM 22 – Door seals – We recommend replacing door weather-stripping and seals on a yearly basis, or at least as needed. New caulking and weather-stripping will reduce air infiltration and exfiltration, thus reducing energy spending. For this project, we estimate an expenditure of $1,100 will save $250 annually and payback in 4.4 years.

ECM 23 – Repair eave / roof interface – There are many areas where the eave and roof interface have separated from the building, leaving large gaps for air infiltration and exfiltration. This is causing many occupant comfort issue throughout the building. We recommend repairing this issue to reduce energy spending and increase comfort in the building. The cost of this project is approximately $20,000, with an annual savings of $3,000. Based on these numbers, the project will payback in 6.7 years.

ECM 24 – Add insulation – There is very little insulation above the ceiling of the building, and due to the ceiling type, more insulation can easily be added. We recommend adding insulation to the roof deck or the ceiling throughout the building for added comfort and to lower energy costs. The projected expenditure for this project is $15,000. Annual savings is approximately $3,000, for a payback of 5 years.

ECM 25 – Insulated curtains – There are three skylights throughout the building, and although they are nice to let light in, they are also inefficient, especially on cold days. We recommend adding insulated curtains to the

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

skylights in the building as well as the large round window in the library. The typical cost for such curtains is $25 per square foot, or in this case $3,675 for an approximate savings of $3,000 annually. The payback for this project is just over 1 year.

The savings estimate for each specific ECM is based on the CURRENT consumption and cost for energy. Actual savings for any specific ECM will vary, depending upon whether any of the other ECM measures have been previously implemented.

McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Estimated cost savings and costs of energy conservation measures					
ECM #	**Measure**	**Annual Energy Savings**	**Installed Cost**	**Annual dollar Savings**	**Simple Payback (Years)**
ECM-1	**Interior lighting**	14,718 kWh	$4,900	$2,952	1.7
ECM-2	**Occupancy sensors**	20,013 kWh	$2,470	$3,222	0.8
ECM-3	**Replace CRT monitors**	appx 200 kWh ea	$3,900	$1,800	2.2
ECM-4	**Vending machine miser**	% electricity	$250	$250	1.0
ECM-5	**Block gravity vents**	% of energy	$4,000	$625	6.4
ECM-6	**Airius fan in gym**	% of energy	$2,000	$500	4.0
ECM-7	**Compete DDC installation**	% of energy	$20,000	$2,000	10.0
ECM-8	**Install CO_2 detectors**	% of energy	$4,250	$2,000	2.1
ECM-9	**Repair dampers**	% of energy	$3,000	$500	6.0
ECM-10	**Replace restroom fixtures**	% of water	$16,000	$900	17.8
ECM-11	**Replace drinking fountains**	% of energy	$6,500	$400	16.3
ECM-12	**Install VFDs on AHUs**	% of energy	$7,500	$1,000	7.5
ECM-13	**VFD circulator pumps**	% of energy	$8,000	$1,200	6.7
ECM-14	**Wood-pellet boiler**	% of fuel	$155,000	$12,000	12.9
ECM-15	**Motorized dampers**	% of energy	$1,250	$125	10.0
ECM-16	**Insulate piping**	% of energy	$3,000	$500	6.0
ECM-17	**Airius fan in library**	% of energy	$500	$125	4.0
ECM-18	**Balance AHU & HHW**	% of energy	$5,000	$1,500	3.3
ECM-19	**Split HHW zone**	% of energy	$4,000	$1,000	4.0
ECM-20	**Replace exterior doors**	% of fuel	$13,500	$1,350	10.0
ECM-21	**Replace exterior windows**	% of fuel	$70,000	$2,540	27.6
ECM-22	**Door seals**	% of fuel	$1,100	$250	4.4
ECM-23	**Repair eave/roof interface**	% of fuel	$20,000	$3,000	6.7
ECM-24	**Add insulation**	% of fuel	$15,000	$3,000	5.0
ECM-25	**Insulated curtains**	% of fuel	$3,675	$1,000	1.2

*Savings calculated using FY09 energy data.

Note 1.
Door and window upgrades offer a reduction in air infiltration rates, decreased heat loss, and increased thermal comfort for the building occupants. This audit consists of an inventory only. Diagnostic measurements are not included within the scope of work that was to be provided.

Note 2.
Some ECMs would be required as regular capital renewal of expired or inoperable systems regardless of energy savings.

McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Energy Assessment and Report

SAU 80 – Shaker Regional School District

SAU 80 Canterbury Elementary School
15 Baptist Road, Canterbury, New Hampshire

Audit Date: December 17, 2009

Financial Analysis

Electrical

Based on the assessment of the Canterbury Elementary School, it was determined that the total kilowatt usage for during January through November 2009 was 113,166 kilowatt hours (kWh), averaging 10,288 kWh per month. The total cost was $18,262 or an average of $1,660 per month. Of the total $18,262 , $4,183 was spent on demand charges during this time period, averaging $380 in demand charges per month. The building went into demand consumption every month during this time period at the rate of 48 kW monthly, on average.

Our firm has made several suggestions for lighting, fixtures, and control upgrades. If only the lighting changes are made, it is predicted 14,718 kWh will be saved. If all of the suggested upgrades and changes are followed for lighting and lighting controls, it is predicted 34,731 kWh could be saved.

Based on our calculations, it is determined that the current lighting and controls use 75,041 kWh or 66% of the building's total electrical consumption. The projected annual kilowatt usage, if only the lighting changes are made, is 60,324 kWh. If changes are made for both lighting and controls, the new usage should be 40,310 kWh.

The cost of the electrical recommendations, including currently available rebates from Unitel, is $11,520. An estimated $8,224 in annual savings could be realized, with a simple payback of 1.4 years.

Lighting Only

	KW Hrs	KW
Current	75,041	32.34
Projected	60,324	26.19
Saved	14,718	6.15

Lighting & Controls*

	KW Hrs	KW
Current	75,041	32.34
Projected	40,310	17.50
Saved	34,731	14.84

**Assumes upgrades to lighting have already been implemented.*

Mechanical

In FY09 this facility consumed 7,105 gallons of #2 heating oil annually. Total annual expenditure was $20,513. This is a cost of $.75 per square foot, putting the Canterbury School at 4th out of the 5 buildings.

If the mechanical recommendations of this report were implemented, savings of nearly $12,500 could be achieved at an installed cost of $85,000 and a resulting payback of around 6.9 years. If fuel switching to wood

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

pellets were implemented, an additional $12,000 could be saved. The payback on a pellet installation is less than 13 years. Further, annual servicing costs would be reduced, as would dependence on foreign fuel supplies and the budget fluctuations that result.

Building envelope and miscellaneous

This building envelope is not as tight as it should be. There is much large glass fenestration and gaps at the interface between exterior walls and floor connections, and other penetrations that all contribute to the infiltration of cold air and escape of warmed air.

Due to the construction type of the building, it is difficult to suggest realistic improvements that are justifiable. Further, it is difficult to determine a savings as a result of what may appear to be obvious inefficient building systems. As such, we recommend the more obvious opportunities with costs we can comfortably determine be considered and likely savings will result.

The installed cost of the suggested improvements to the building is $123,275, possibly saving $13,000 a year. The simple payback for these projects is 9.4 years.

Grand total

As a part of this scope of work, we are recommending that all items in this report be implemented. Generally, we would suggest items with a payback of 10 years or less. Though some of our suggestions are greater than 10 years, by combining them all, greater overall savings and conservation will be achieved.

Implementing fairly straight forward conservation measures, yields an expenditure of around $375,000 and would save nearly $46,000 of energy costs between electricity and heating oil, with an overall payback of 8.2 years.

McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

ECM SUMMARY

ECM Summary

SAU 80 - Canterbury Elementary School

Electrical

ECM	ECM Description	Installed Cost	Annual Savings	Simple Payback
ECM 1	T8 & CFL lighting	$4,900	$2,952	1.66
ECM 2	Lighting controls-interior	$2,470	$3,222	0.77
ECM 3	Replace 26 CRT Monitors w/ LCD	$3,900	$1,800	2.17
ECM 4	Add Vending Miser	$250	$250	1.00
		$11,520		

Installed cost is after assumed efficiency rebates.

Building & Miscellaneous

ECM	ECM Description	Installed Cost	Annual Savings	Simple Payback
ECM 20	Replace 9 exterior doors	$13,500	$1,350	10.00
ECM 21	Replace exterior windows	$70,000	$2,540	27.56
ECM 22	Weatherstrip 10 Exterior Doors	$1,100	$250	4.40
ECM 23	Repair Eave/Roof Interface	$20,000	$3,000	6.67
ECM 24	Add Insulation To Roof Deck or Ceiling	$15,000	$3,000	5.00
ECM 25	Install Insulated Curtains - 3 Skylights	$3,675	$3,000	1.23
		$123,275		

Mechanical

ECM	ECM Description	Installed Cost	Annual Savings	Simple Payback
ECM 5	Block off gravity vents-15	$4,000	$625	6.40
ECM 6	Install Airius units In gym	$2,000	$500	4.00
ECM 7	Complete DDC installation all areas	$20,000	$2,000	10.00
ECM 8	Install CO_2 detectors	$4,250	$2,000	2.13
ECM 9	Repair dampers on univents	$3,000	$500	6.00
ECM 10	Replace 25 hi-flow bathroom fixtures	$16,000	$900	17.78
ECM 11	Repl. 4 drinking fountains w/ timed ones	$6,500	$400	16.25
ECM 12	Install VFD's on AHU's	$7,500	$1,000	7.50
ECM 13	Install VFD's on HHW pumps	$8,000	$1,200	6.67
ECM 14	Install wood pellet boiler system	$155,000	$12,000	12.92
ECM 15	Install motorized damper-boiler room	$1,250	$125	10.00
ECM 16	Insulate HHW piping	$3,000	$500	6.00
ECM 17	Install Airius unit In library	$500	$125	4.00
ECM 18	Balance AHU and HHW systems	$5,000	$1,500	3.33
ECM 19	Split HHW zone in 1990 to two	$4,000	$1,000	4.00
		$240,000		

Please Note: Each ECM annual savings is based on a percentage of savings from the 2009 energy costs. As each ECM is implemented, the savings should be calculated on the newly resulting energy consumption cost.

McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Energy Assessment and Report

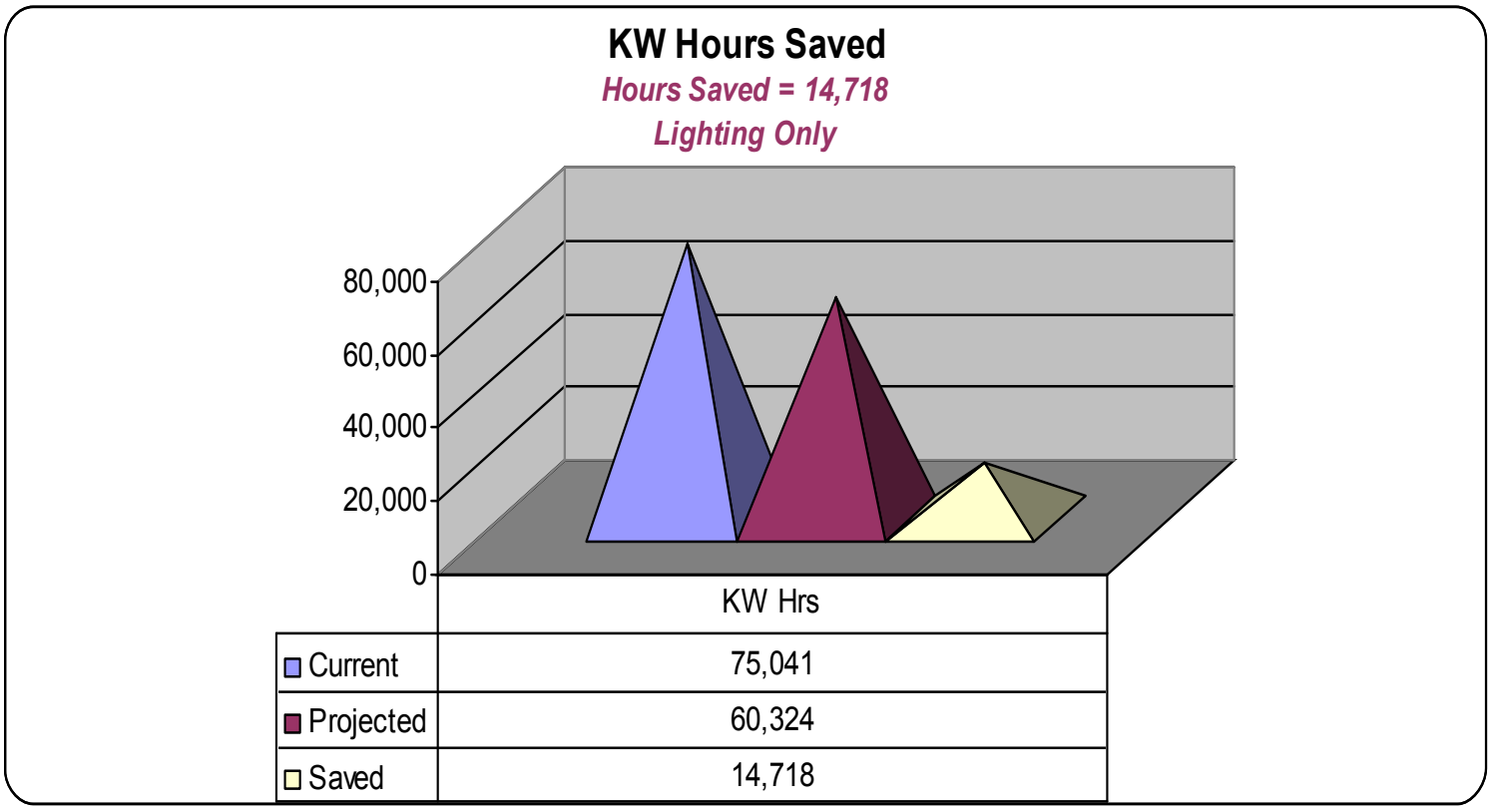
SAU 80 – Shaker Regional School District

SAU 80 Canterbury Elementary School
15 Baptist Road, Canterbury, New Hampshire

Audit Date: December 17, 2009

Lighting Savings Calculations

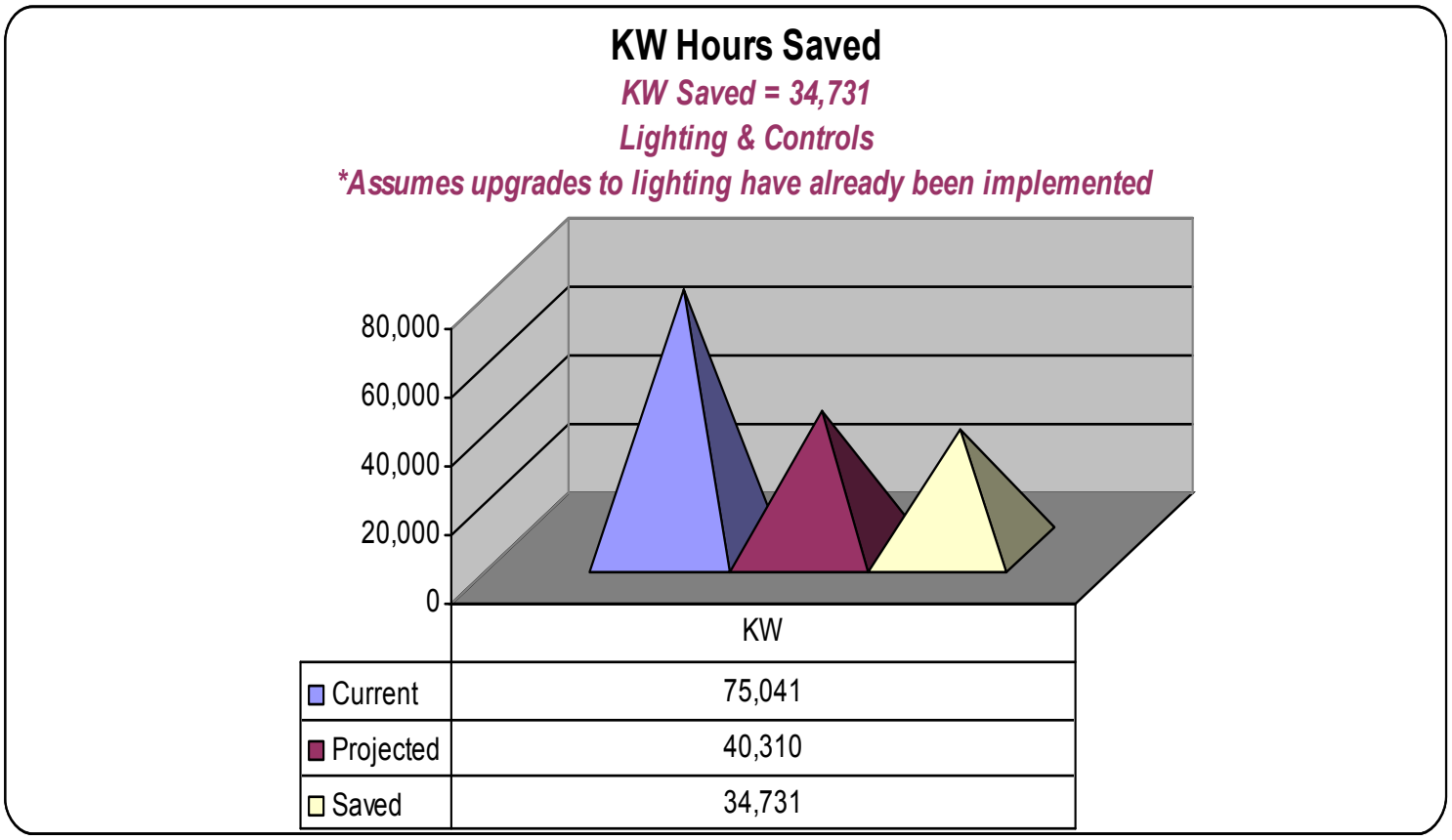
Information has been included as part of this report to breakdown light savings calculations by room. The following chart is a summary of the findings and displays the current estimated kilowatt hour (kWh) usage from the lighting only. Based on our recommendations for lighting upgrades, the following projected kWh usage is foreseen, along with the total kWh savings.



McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

The following chart displays current usage and projections if both the lighting and lighting controls are implemented.



McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Energy Assessment and Report

SAU 80 – Shaker Regional School District

SAU 80 Canterbury Elementary School
15 Baptist Road, Canterbury, New Hampshire

Audit Date: December 17, 2009

Energy Graphs – Electricity 2008

Canterbury Elementary School					
Electricity Usage - 2008					
Source: Unitel					
		kWh	Cost	Demand kW	Demand Cost
2008	Jan	11,547	$1,793	58	$460
2008	Feb	12,089	$1,859	59	$467
2008	Mar	11,046	$1,684	55	$435
2008	Apr	12,237	$1,856	60	$474
2008	May	11,588	$1,771	56	$441
2008	Jun	11,313	$1,844	51	$404
2008	Jul	9,168	$1,528	48	$378
2008	Aug	6,399	$954	20	$157
2008	Sep	8,072	$1,372	45	$352
2008	Oct	10,981	$1,823	52	$408
2008	Nov	10,797	$1,852	56	$440
2008	Dec	10,752	$1,949	57	$453
	Total	125,989	$20,287	616	$4,869
Mo	Avg	10,499	$1,691	51	$406
Avg	$/kW		$0.1610		

kWh/SF 4.20 Cost/SF $ 0.68

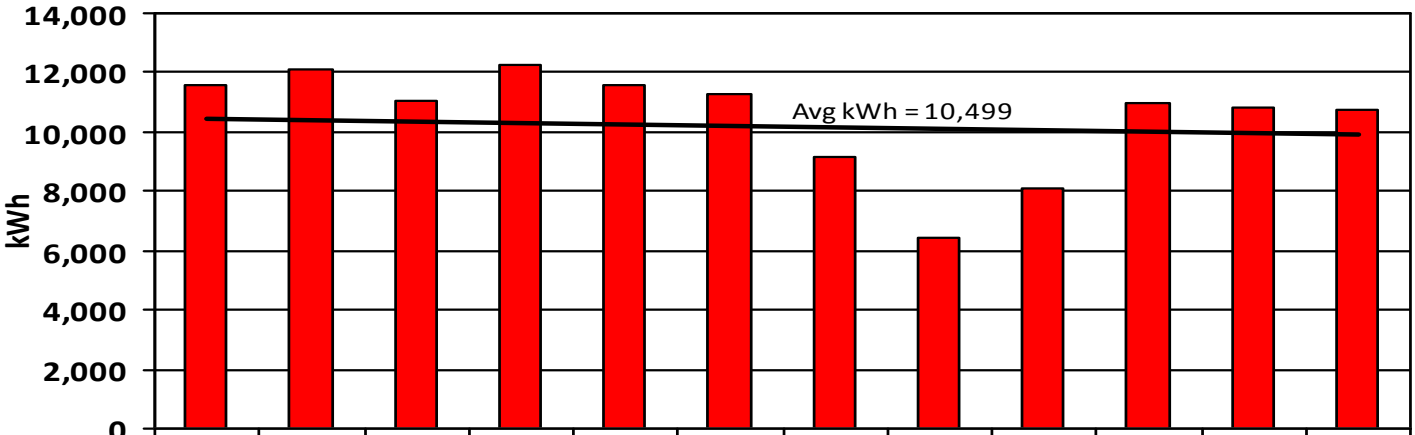
Unitel

Acct# 1019477-1017364

McCormick Facilities Management

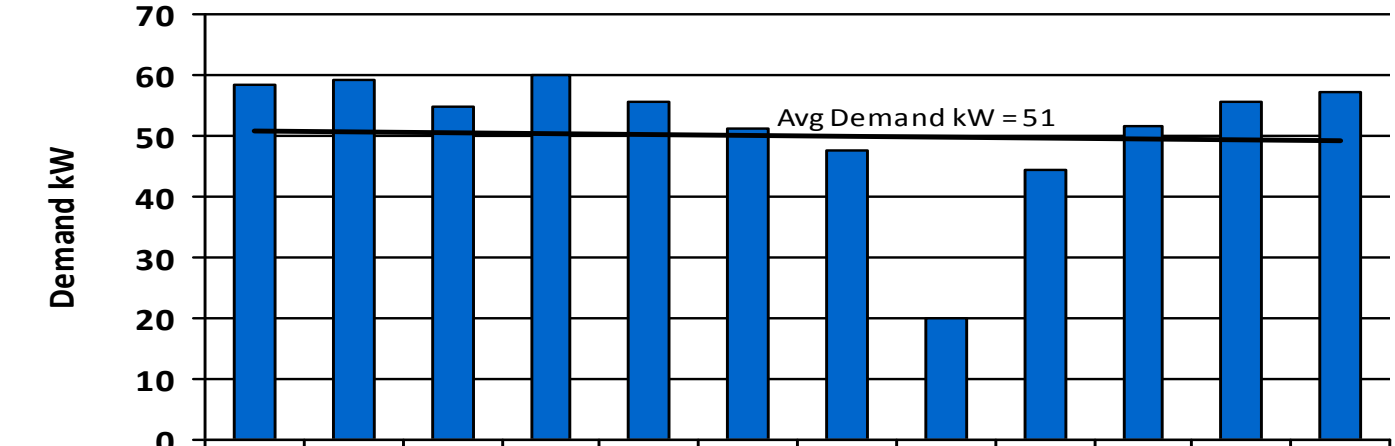
8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Canterbury Elementary School kWh Usage - 2008
Source: Unitel



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
KWH	11,547	12,089	11,046	12,237	11,588	11,313	9,168	6,399	8,072	10,981	10,797	10,752

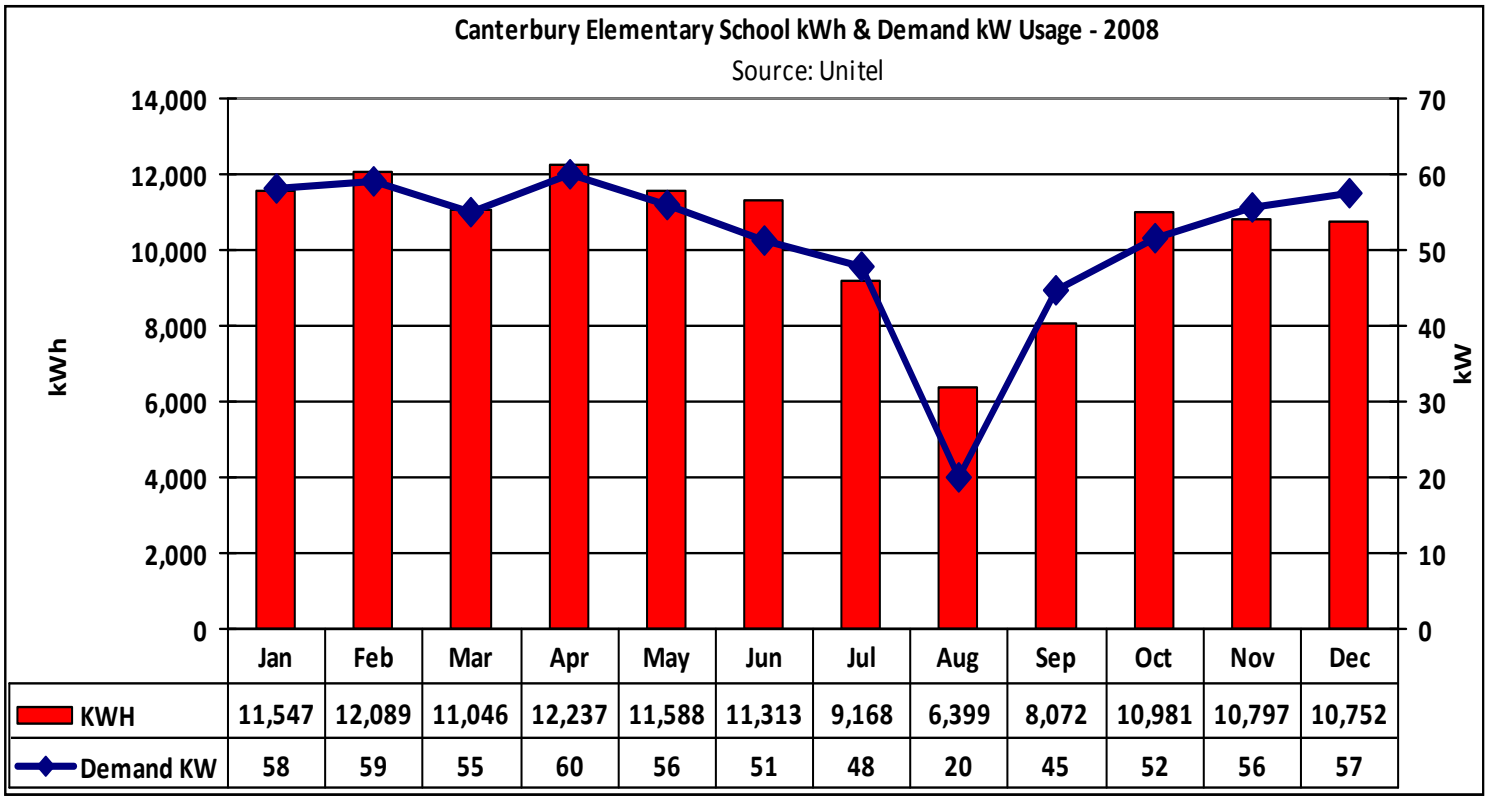
Canterbury Elementary School Demand kW Usage - 2008
Source: Unitel



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Demand KW	58	59	55	60	56	51	48	20	45	52	56	57

McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

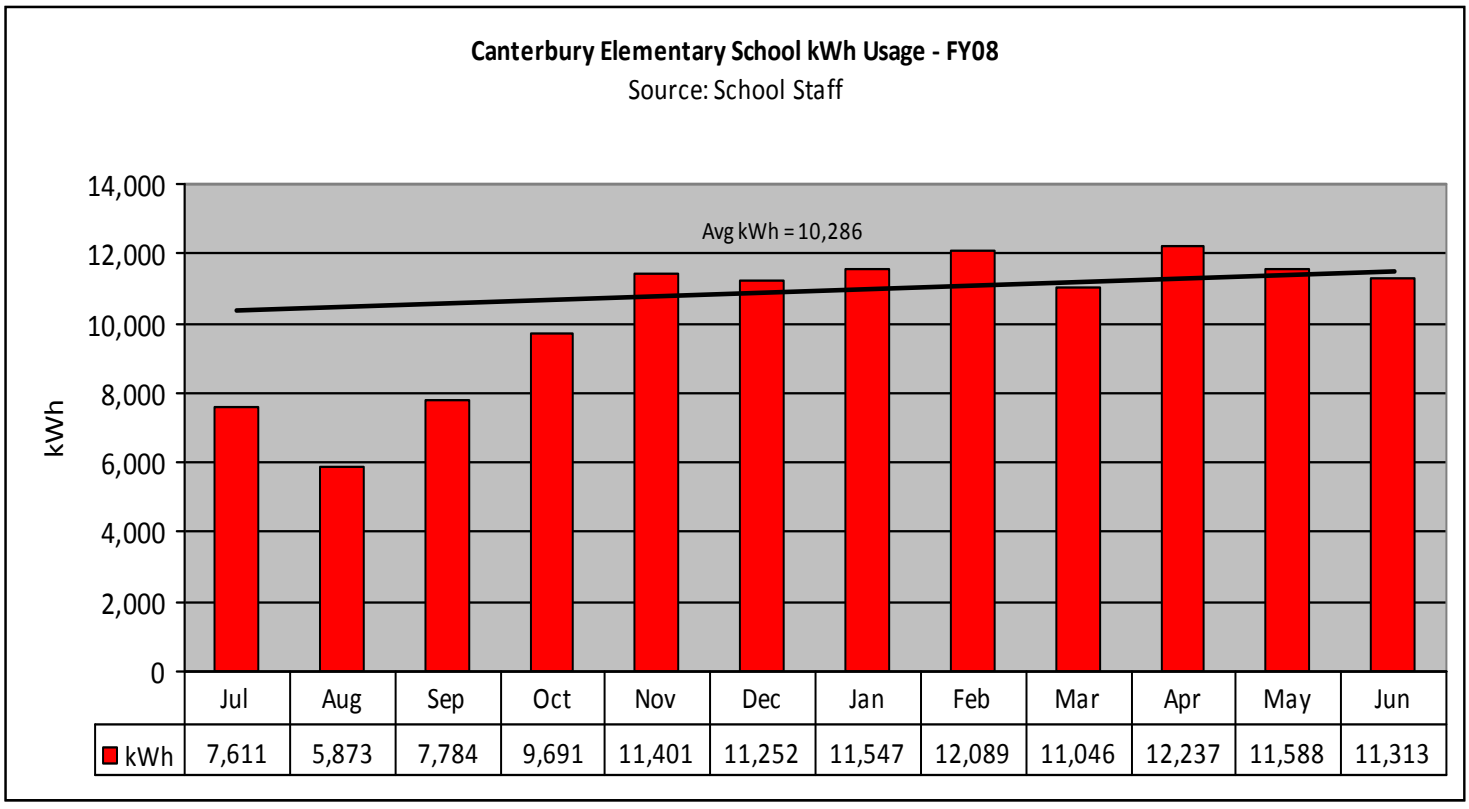


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
KWH	11,547	12,089	11,046	12,237	11,588	11,313	9,168	6,399	8,072	10,981	10,797	10,752
Demand KW	58	59	55	60	56	51	48	20	45	52	56	57

McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Canterbury Elementary School		
Electricity Usage-FY08		
Source: School Staff		
		kWh
2007	**Jul**	**7,611**
2007	**Aug**	**5,873**
2007	**Sep**	**7,784**
2007	**Oct**	**9,691**
2007	**Nov**	**11,401**
2007	**Dec**	**11,252**
2008	**Jan**	**11,547**
2008	**Feb**	**12,089**
2008	**Mar**	**11,046**
2008	**Apr**	**12,237**
2008	**May**	**11,588**
2008	**Jun**	**11,313**
	Total	**123,432**
Mo Avg kWh - FY08		**10,286**
FY08 kWh / SF		4.11



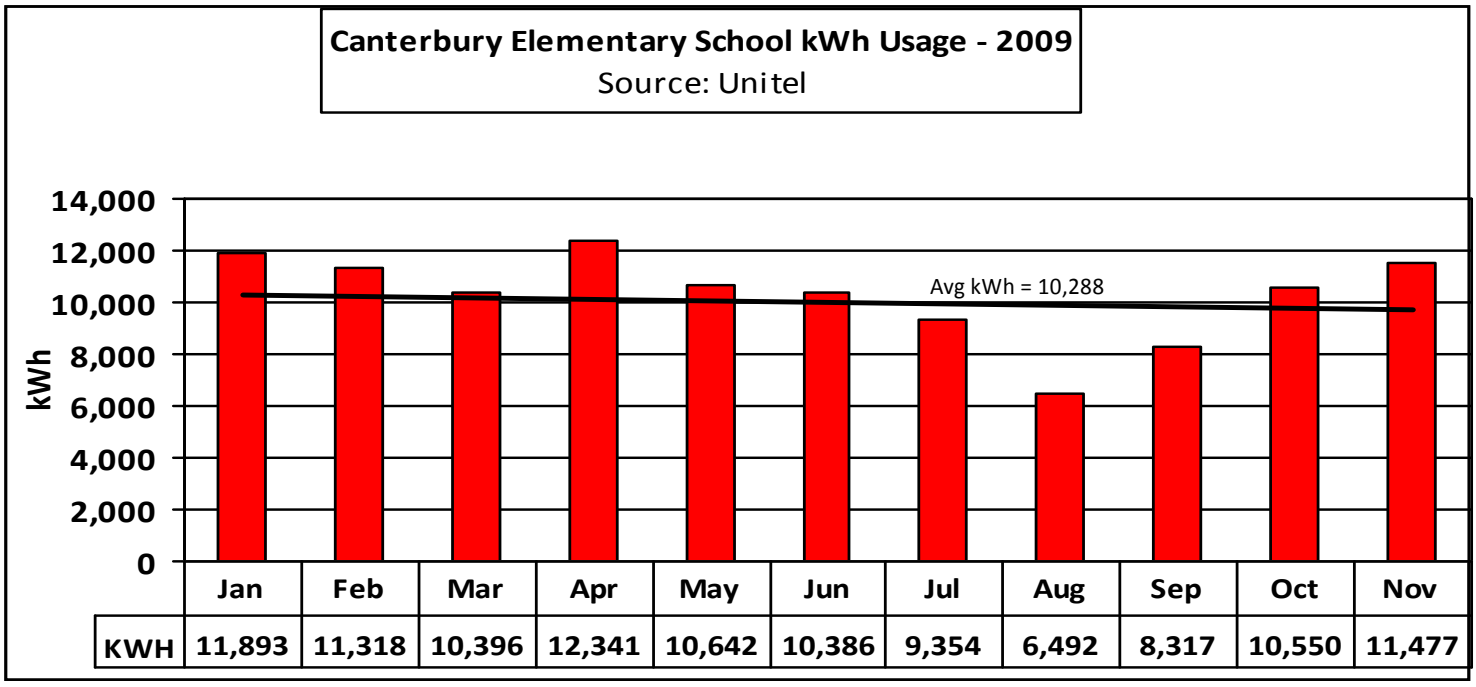
McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Energy Graphs – Electricity 2009

Canterbury Elementary School					
Electricity Usage-2009					
		kWh	Cost	Demand kW	Demand Cost
2009	Jan	11,893	$2,063	53	$417
2009	Feb	11,318	$1,990	53	$421
2009	Mar	10,396	$1,837	50	$394
2009	Apr	12,341	$2,176	55	$438
2009	May	10,642	$1,850	52	$409
2009	Jun	10,386	$1,593	53	$421
2009	Jul	9,354	$1,447	49	$389
2009	Aug	6,492	$895	19	$149
2009	Sep	8,317	$1,269	48	$377
2009	Oct	10,550	$1,494	45	$352
2009	Nov	11,477	$1,649	53	$416
	Total	113,166	$18,262	530	$4,183
Mo	Avg	10,288	$1,660	48	$380
Avg	$/kW		$0.1614		$7.90

kWh/SF 3.77 Cost/SF $ 0.61
Unitel
Acct# 1019477-1017364

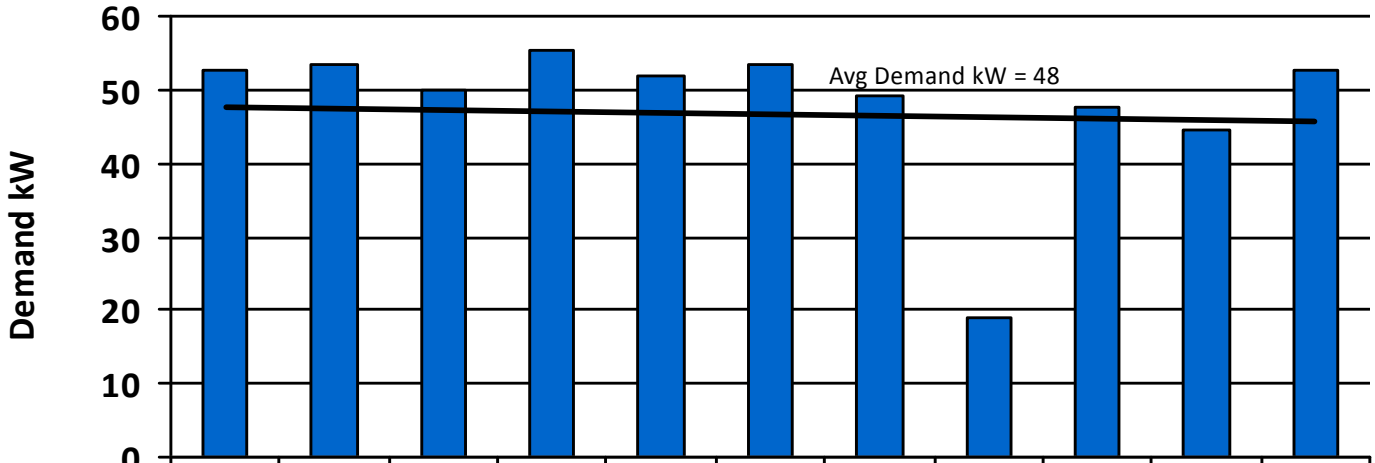


McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Canterbury Elementary School Demand kW Usage - 2009

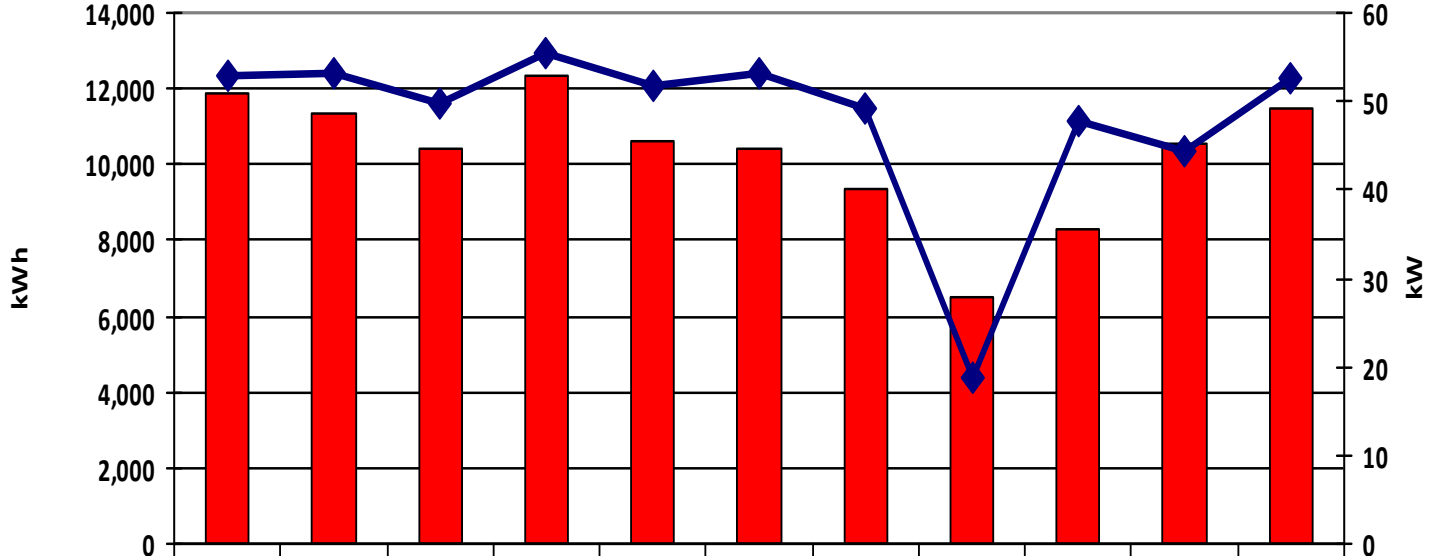
Source: Unitel



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Demand KW	53	53	50	55	52	53	49	19	48	45	53

Canterbury Elementary School kWh & Demand kW Usage - 2009

Source: Unitel

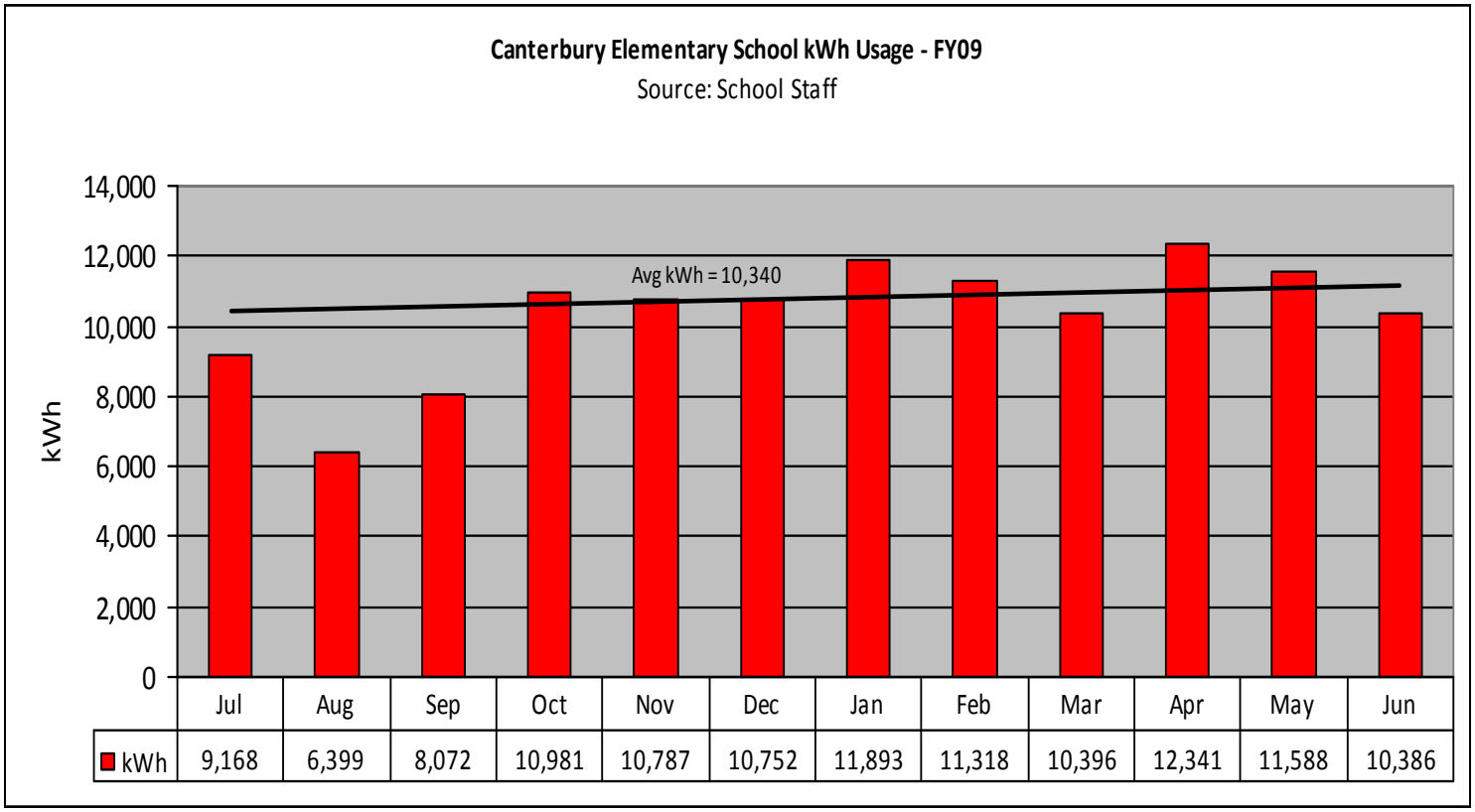


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
KWH	11,893	11,318	10,396	12,341	10,642	10,386	9,354	6,492	8,317	10,550	11,477
Demand KW	53	53	50	55	52	53	49	19	48	45	53

McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Canterbury Elementary School		
Electricity Usage-FY09		
Source: School Staff		
		kWh
2008	**Jul**	**9,168**
2008	**Aug**	**6,399**
2008	**Sep**	**8,072**
2008	**Oct**	**10,981**
2008	**Nov**	**10,787**
2008	**Dec**	**10,752**
2009	**Jan**	**11,893**
2009	**Feb**	**11,318**
2009	**Mar**	**10,396**
2009	**Apr**	**12,341**
2009	**May**	**11,588**
2009	**Jun**	**10,386**
	Total	**124,081**
Mo Avg kWh - FY09		**10,340**
FY09 kWh / SF		4.14



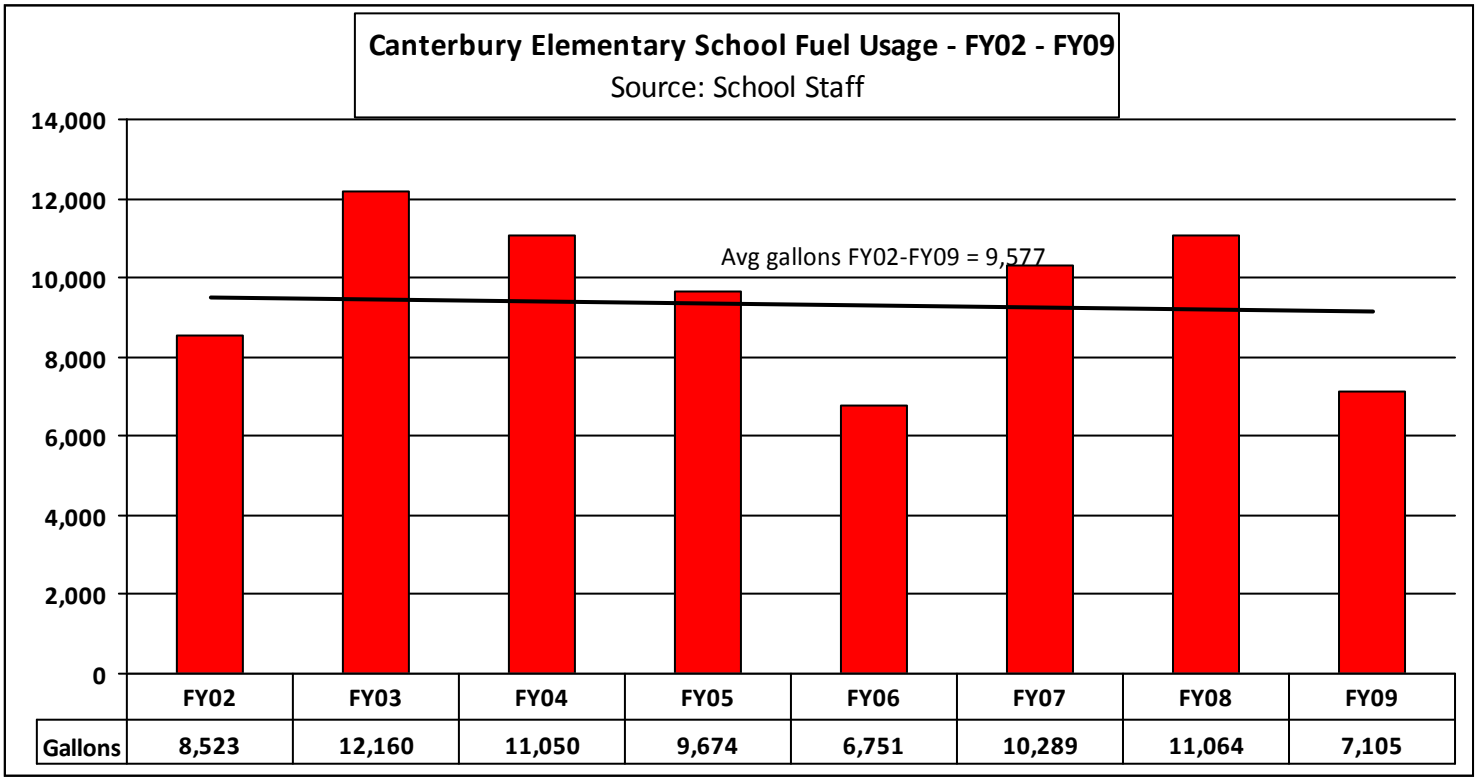
McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Energy Graphs – Fuel Usage

Canterbury Elementary School			
Fuel Usage			
Source: School Staff			
		Gallons	Cost/Gal Cost
	FY02	8,523	
	FY03	12,160	$0.795
	FY04	11,050	$1.148
	FY05	9,674	$1.345
	FY06	6,751	$1.766
	FY07	10,289	$2.395
	FY08	11,064	$2.195
	FY09	7,105	$2.887
2-year	Total	18,169	$44,798
2-year avg	Avg	9,085	22,399
$/gal	Avg		$2.54

Gal/SF	2-year avg	0.303
Cost/SF	2-year avg	$0.747
Avg Cost		
FY08	$24,285	
FY09	$20,513	
FY02-FY09 Totals		
Total Gal FY02-FY09		76,616
Total Avg gals FY02-FY09		9,577
Total Avg Cost FY03-FY09		$116,715



McCormick Facilities Management

8 Main Street
Dexter, Maine
(207) 924-5762
www.memccormick.com

Energy Assessment and Report

SAU 80 – Shaker Regional School District

SAU 80 Canterbury Elementary School
15 Baptist Road, Canterbury, New Hampshire

Audit Date: December 17, 2009

Alternative Energy Opportunities

We are recommending the installation of a wood pellet fired boiler system to replace the oil fired system currently in place. Removal of one of the existing boiler would be required to make room for the pellet boiler. The remaining oil boiler would be used for low consumption shoulder seasons, provide peak load during unusually cold/windy days, and redundancy for the pellet boiler.

A fuel storage silo would be added near the boiler room and pellets fed to the boiler via a screw auger mechanism.

A larger thermal storage tank would be installed in the boiler room to store energy and act as a buffer between the pellet boiler and heat load of the building.

These systems are becoming very common place in schools and other institutional facilities. Fuel supply and forest sustainability have been thoroughly investigated and found to be adequate for many years.

Other alternative options were explored for this facility such as solar light tubes, geo-thermal, wind, and others but due to the expense, none were found to be viable at this time.

SAU 80 - Shaker Regional School District
Location: Canterbury Elementary School

Saved KWH - Lighting Only															
Room Name	Hours	QTY	Existing watts	Existing fixture type	Suggested replacement	Replacement watts	KW Hr saved	KW saved	Dollars saved	Cost each	Project cost	Incentive	Payback	KW Hr cost	KW cost
Canterbury Elementary School															
C1 - Corridor	2700	13	102	2L4T12	2L4HPT8	60	1474	0.55	$289	$75	$975	$585	1.35	$0.161	$ 7.90
	8736	3	10	Flor exit	LED exit	3	183	0.02	$32	$30	$90	$36	1.71	$0.161	$ 7.90
C2 - Corridor	2700	4	102	2L4T12	2L4HPT8	60	454	0.17	$89	$75	$300	$180	1.35	$0.161	$ 7.90
	8736	2	10	Flor exit	LED exit	3	122	0.01	$21	$30	$60	$24	1.71	$0.161	$ 7.90
C3 - Corridor	2700	6	102	2L4T12	2L4HPT8	60	680	0.25	$133	$75	$450	$270	1.35	$0.161	$ 7.90
	8736	3	10	Flor exit	LED exit	3	183	0.02	$32	$30	$90	$36	1.71	$0.161	$ 7.90
C4 - Corridor	8736	4	10	Flor exit	LED exit	3	245	0.03	$42	$30	$120	$48	1.71	$0.161	$ 7.90
	2700	6	88	3L4T8										$0.161	$ 7.90
	2700	4	102	2L4T12	2L4HPT8	60	454	0.17	$89	$75	$300	$180	1.35	$0.161	$ 7.90
S2 - Stairway	2700	1	60	1L4T12	1L4HPT8	30	81	0.03	$16	$65	$65	$45	1.26	$0.161	$ 7.90
	8736	1	10	Flor exit	LED exit	3	61	0.01	$11	$30	$30	$12	1.71	$0.161	$ 7.90
1-1 - Entrance	2700	1	102	2L4T12	2L4HPT8	60	113	0.04	$22	$75	$75	$45	1.35	$0.161	$ 7.90
1 -	2250	1	102	2L4T12	2L4HPT8	60	95	0.04	$19	$75	$75	$45	1.56	$0.161	$ 7.90
1A - Custodian	2700	1	102	2L4T12	2L4HPT8	60	113	0.04	$22	$75	$75	$45	1.35	$0.161	$ 7.90
2 -	2250	1	102	2L4T12	2L4HPT8	60	95	0.04	$19	$75	$75	$45	1.56	$0.161	$ 7.90
3 - Kitchen	2250	11	102	2L4T12	2L4HPT8	60	1040	0.46	$211	$75	$825	$495	1.56	$0.161	$ 7.90
	2250	1	60	1L4T12	1L4HPT8	30	68	0.03	$14	$65	$65	$45	1.46	$0.161	$ 7.90
	2250	3	60	INCA 60W	CFL 23W	24	243	0.11	$49	$15	$45		0.91	$0.161	$ 7.90
	8736	1	10	Flor exit	LED exit	3	61	0.01	$11	$30	$30	$12	1.71	$0.161	$ 7.90
4 -	2250	2	102	2L4T12	2L4HPT8	60	189	0.08	$38	$75	$150	$90	1.56	$0.161	$ 7.90
	2250	1	102	2L4T12	2L4HPT8	60	95	0.04	$19	$75	$75	$45	1.56	$0.161	$ 7.90
	8736	1	10	Flor exit	LED exit	3	61	0.01	$11	$30	$30	$12	1.71	$0.161	$ 7.90
5 - Mechanical	250	4	102	2L4T12	2L4HPT8	60	42	0.17	$23	$75	$300	$5	13.00	$0.161	$ 7.90
7 -	2700	4	162	3L4T12	3L4HPT8	88	799	0.30	$157	$75	$300	$180	0.77	$0.161	$ 7.90
8 -	2700	4	162	3L4T12	3L4HPT8	88	799	0.30	$157	$75	$300	$180	0.77	$0.161	$ 7.90
9 -	2700	5	162	3L4T12	3L4HPT8	88	999	0.37	$196	$75	$375	$225	0.77	$0.161	$ 7.90
10 - Library	2700	14	162	3L4T12	3L4HPT8	88	2797	1.04	$549	$75	$1,050	$420	1.15	$0.161	$ 7.90
	2700	3	162	3L4T12	3L4HPT8	88	599	0.22	$118	$75	$225	$60	1.40	$0.161	$ 7.90
	8736	2	10	Flor exit	LED exit	3	122	0.01	$21	$30	$60	$24	1.71	$0.161	$ 7.90
	2700	1	60	1L4T12	1L4HPT8	30	81	0.03	$16	$65	$65	$20	2.83	$0.161	$ 7.90
13 -	2250	2	88	3L4T8										$0.161	$ 7.90
	1125	2	60	INCA 60W	CFL 23W	24	81	0.07	$20	$15	$30		1.51	$0.161	$ 7.90
14 - Grade 1	2250	12	88	3L4T8										$0.161	$ 7.90
15 - Kindergarten	2250	12	88	3L4T8										$0.161	$ 7.90
	1125	1	60	INCA 60W	CFL 23W	24	41	0.04	$10	$15	$15		1.51	$0.161	$ 7.90
16 - Restroom	2700	2	102	2L4T12	2L4HPT8	60	227	0.08	$44	$75	$150	$90	1.35	$0.161	$ 7.90
17 -	2250	2	204	4L4T12	4L4HPT8	112	414	0.18	$84	$80	$160	$90	0.83	$0.161	$ 7.90
	1125	1	60	INCA 60W	CFL 23W	24	41	0.04	$10	$15	$15		1.51	$0.161	$ 7.90
18 - Grade 1-2	2250	12	88	3L4T8		88								$0.161	$ 7.90
19 - Grade 3	2250	12	88	3L4T8		88								$0.161	$ 7.90
20 - Restroom	2250	2	88	3L4T8		88								$0.161	$ 7.90
20A - Closet	1125	1	60	INCA 60W	CFL 23W	24	41	0.04	$10	$15	$15		1.51	$0.161	$ 7.90
21 -	2250	1	204	4L4T12	4L4HPT8	112	207	0.09	$42	$80	$80	$45	0.83	$0.161	$ 7.90
22 - Reading tutor	2250	3	112	4L4T8										$0.161	$ 7.90
22A -	2250	1	112	4L4T8										$0.161	$ 7.90
23 -	2250	1	204	4L4T12	4L4HPT8	112	207	0.09	$42	$80	$80	$45	0.83	$0.161	$ 7.90
24 - Grade 4	2250	12	88	3L4T8										$0.161	$ 7.90
25 - Grade 2	2250	12	88	3L4T8										$0.161	$ 7.90
26 - Storage	1125	7	102	2L4T12	2L4HPT8	60	331	0.29	$81	$75	$525	$35	6.04	$0.161	$ 7.90
27 - Multipurpose	2700	16	176	6L4T8										$0.161	$ 7.90
	8736	3	10	Flor exit	LED exit	3	183	0.02	$32	$30	$90	$36	1.71	$0.161	$ 7.90
28 - Grade 5	2250	12	112	4L4T8										$0.161	$ 7.90
29 - Music	2250	13	112	4L4T8										$0.161	$ 7.90
30 - Storage	2250	1	112	4L4T8										$0.161	$ 7.90
30A -	1125	1	112	4L4T8										$0.161	$ 7.90
31 - Restroom	2250	2	60	1L4T12	1L4HPT8	30	135	0.06	$27	$65	$130	$10	4.38	$0.161	$ 7.90
32 - Resource room	2250	12	88	3L4T8										$0.161	$ 7.90
33 - Computer lab	2250	12	88	3L4T8										$0.161	$ 7.90
34A - Storage	1125	1	60	INCA 60W	CFL 23W	24	41	0.04	$10	$15	$15		1.51	$0.161	$ 7.90

Room Name	Hours	QTY	Existing watts	Existing fixture type	Suggested replacement	Replacement watts	KW Hr saved	KW saved	Dollars saved	Cost each	Project cost	Incentive	Payback	KW Hr cost	KW cost
	1125	1	60	1L4T12	1L4HPT8	30	34	0.03	$8	$65	$65	$5	7.25	$0.161	$ 7.90
	1125	2	102	2L4T12	2L4HPT8	60	95	0.08	$23	$75	$150	$10	6.04	$0.161	$ 7.90
36 -	2250	2	102	2L4T12	2L4HPT8	60	189	0.08	$38	$75	$150	$10	3.65	$0.161	$ 7.90
37 - Mechanical	100	4	102	2L4T12	2L4HPT8	60	17	0.17	$19	$75	$300	$20	15.03	$0.161	$ 7.90
38 -	100	2	60	INCA 60W	CFL 23W	24	7	0.07	$8	$15	$30		3.76	$0.161	$ 7.90
39 -	2250	2	112	4L4T8										$0.161	$ 7.90
39A - Restroom	1125	2	60	INCA 60W	CFL 23W	24	81	0.07	$20	$15	$30		1.51	$0.161	$ 7.90
														$0.161	$ 7.90
Exterior	2080	2	460	400W HPS										$0.161	$ 7.90
	2080	3	90	70W HPS										$0.161	$ 7.90
	2080	2	250	250 Quartz										$0.161	$ 7.90
	2080	2	190	LPS 150										$0.161	$ 7.90
	2080	2	295	LPS 250										$0.161	$ 7.90
	2080	2	45	35W HPS										$0.161	$ 7.90
														$0.161	$ 7.90
														$0.161	$ 7.90
TOTALS		**307**	**7,284**			**2,429**	**14,718**	**6.15**	**$2,952**	**$2,605**	**$8,705**	**$3,805**	**1.66**		

Energy Cost	$0.1610	$/kwhr
Demand Cost	$7.90	$

Current KWH								
Room name	Hours	QTY	Existing watts	Existing fixture type	Suggested replacement	Replacement Watts	KW Hrs base	KW base
C1 - Corridor	2700	13	102	2L4T12	2L4HPT8	60	3,580	1.33
	8736	3	10	Flor exit	LED exit	3	262	0.03
C2 - Corridor	2700	4	102	2L4T12	2L4HPT8	60	1,102	0.41
	8736	2	10	Flor exit	LED exit	3	175	0.02
C3 - Corridor	2700	6	102	2L4T12	2L4HPT8	60	1,652	0.61
	8736	3	10	Flor exit	LED exit	3	262	0.03
C4 - Corridor	8736	4	10	Flor exit	LED exit	3	349	0.04
	2700	6	88	3L4T8			1,426	0.53
	2700	4	102	2L4T12	2L4HPT8	60	1,102	0.41
S2 - Stairway	2700	1	60	1L4T12	1L4HPT8	30	162	0.06
	8736	1	10	Flor exit	LED exit	3	87	0.01
1-1 - Entrance	2700	1	102	2L4T12	2L4HPT8	60	275	0.10
1 -	2250	1	102	2L4T12	2L4HPT8	60	230	0.10
1A - Custodian	2700	1	102	2L4T12	2L4HPT8	60	275	0.10
2 -	2250	1	102	2L4T12	2L4HPT8	60	230	0.10
3 - Kitchen	2250	11	102	2L4T12	2L4HPT8	60	2,525	1.12
	2250	1	60	1L4T12	1L4HPT8	30	135	0.06
	2250	3	60	INCA 60W	CFL 23W	24	405	0.18
	8736	1	10	Flor exit	LED exit	3	87	0.01
4 -	2250	2	102	2L4T12	2L4HPT8	60	459	0.20
	2250	1	102	2L4T12	2L4HPT8	60	230	0.10
	8736	1	10	Flor exit	LED exit	3	87	0.01
5 - Mechanical	250	4	102	2L4T12	2L4HPT8	60	102	0.41
7 -	2700	4	162	3L4T12	3L4HPT8	88	1,750	0.65
8 -	2700	4	162	3L4T12	3L4HPT8	88	1,750	0.65
9 -	2700	5	162	3L4T12	3L4HPT8	88	2,187	0.81
10 - Library	2700	14	162	3L4T12	3L4HPT8	88	6,124	2.27
	2700	3	162	3L4T12	3L4HPT8	88	1,312	0.49
	8736	2	10	Flor exit	LED exit	3	175	0.02
	2700	1	60	1L4T12	1L4HPT8	30	162	0.06
13 -	2250	2	88	3L4T8			396	0.18
	1125	2	60	INCA 60W	CFL 23W	24	135	0.12
14 - Grade 1	2250	12	88	3L4T8			2,376	1.06
15 - Kindergarten	2250	12	88	3L4T8			2,376	1.06
	1125	1	60	INCA 60W	CFL 23W	24	68	0.06
16 - Restroom	2700	2	102	2L4T12	2L4HPT8	60	551	0.20
17 -	2250	2	204	4L4T12	4L4HPT8	112	918	0.41
	1125	1	60	INCA 60W	CFL 23W	24	68	0.06
18 - Grade 1-2	2250	12	88	3L4T8		88	2,376	1.06
19 - Grade 3	2250	12	88	3L4T8		88	2,376	1.06
20 - Restroom	2250	2	88	3L4T8		88	396	0.18
20A - Closet	1125	1	60	INCA 60W	CFL 23W	24	68	0.06
21 -	2250	1	204	4L4T12	4L4HPT8	112	459	0.20
22 - Reading tutor	2250	3	112	4L4T8			756	0.34
22A -	2250	1	112	4L4T8			252	0.11
23 -	2250	1	204	4L4T12	4L4HPT8	112	459	0.20
24 - Grade 4	2250	12	88	3L4T8			2,376	1.06
25 - Grade 2	2250	12	88	3L4T8			2,376	1.06
26 - Storage	1125	7	102	2L4T12	2L4HPT8	60	803	0.71
27 - Multipurpose	2700	16	176	6L4T8			7,603	2.82
	8736	3	10	Flor exit	LED exit	3	262	0.03
28 - Grade 5	2250	12	112	4L4T8			3,024	1.34
29 - Music	2250	13	112	4L4T8			3,276	1.46
30 - Storage	2250	1	112	4L4T8			252	0.11
30A -	1125	1	112	4L4T8			126	0.11

Lighting Only

	KW Hrs	KW
Current	75,041	32.34
Projected	60,324	26.19
Saved	14,718	6.15

Lighting & Controls*

	KW Hrs	KW
Current	75,041	32.34
Projected	40,310	17.50
Saved	34,731	14.84

*Assumes upgrades to lighting have already been implemented.

McCormick Facilities Management

Room name	Hours	QTY	Existing watts	Existing fixture type	Suggested replacement	Replacement Watts	KW Hrs base	KW base
31 - Restroom	2250	2	60	1L4T12	1L4HPT8	30	270	0.12
32 - Resource room	2250	12	88	3L4T8			2,376	1.06
33 - Computer lab	2250	12	88	3L4T8			2,376	1.06
34A - Storage	1125	1	60	INCA 60W	CFL 23W	24	68	0.06
	1125	1	60	1L4T12	1L4HPT8	30	68	0.06
	1125	2	102	2L4T12	2L4HPT8	60	230	0.20
36 -	2250	2	102	2L4T12	2L4HPT8	60	459	0.20
37 - Mechanical	100	4	102	2L4T12	2L4HPT8	60	41	0.41
38 -	100	2	60	INCA 60W	CFL 23W	24	12	0.12
39 -	2250	2	112	4L4T8			504	0.22
39A - Restroom	1125	2	60	INCA 60W	CFL 23W	24	135	0.12
Exterior	2080	2	460	400W HPS			1,914	0.92
	2080	3	90	70W HPS			562	0.27
	2080	2	250	250 Quartz			1,040	0.50
	2080	2	190	LPS 150			790	0.38
	2080	2	295	LPS 250			1,227	0.59
	2080	2	45	35W HPS			187	0.09
TOTALS		**307**	**7,284**			**2429**	**75,041**	**32.34**

Saved KWH - Lighting Controls														
Room Name	Number of controls	On hrs	Fixture Quantity	Suggested Replacement	Watts	On KW Hrs	Est off	KW Hrs saved	Dollars saved	Cost each	Project cost	Incentive	Payback years	KW Hr cost
Canterbury Elementary School														
C1 - Corridor	3	2700	13	2L4HPT8	60	2,106	0.3	632	$102	$75	$225	$35	1.9	$ 0.161
		8736	3	LED exit	3	79							-	$ 0.161
C2 - Corridor	2	2700	4	2L4HPT8	60	648	0.3	194	$31	$75	$150	$35	3.7	$ 0.161
		8736	2	LED exit	3	52							-	$ 0.161
C3 - Corridor	1	2700	6	2L4HPT8	60	972	0.3	292	$47	$75	$75	$35	0.9	$ 0.161
		8736	3	LED exit	3	79							-	$ 0.161
C4 - Corridor		8736	4	LED exit	3	105							-	$ 0.161
	1	2700	6		88	1,426	0.3	428	$69	$75	$75	$35	0.6	$ 0.161
	2	2700	4	2L4HPT8	60	648	0.3	194	$31	$75	$150	$35	3.7	$ 0.161
S2 - Stairway	1	2700	1	1L4HPT8	30	81	0.5	41	$7	$75	$75	$35	6.1	$ 0.161
		8736	1	LED exit	3	26							-	$ 0.161
1-1 - Entrance	1	2700	1	2L4HPT8	60	162	0.5	81	$13	$75	$75	$35	3.1	$ 0.161
1 -	1	2250	1	2L4HPT8	60	135	0.5	68	$11	$75	$75	$35	3.7	$ 0.161
1A - Custodian	1	2700	1	2L4HPT8	60	162	0.7	113	$18	$75	$75	$35	2.2	$ 0.161
2 -	1	2250	1	2L4HPT8	60	135	0.5	68	$11	$75	$75	$35	3.7	$ 0.161
3 - Kitchen	3	2250	11	2L4HPT8	60	1,485	0.5	743	$120	$75	$225	$35	1.6	$ 0.161
		2250	1	1L4HPT8	30	68							-	$ 0.161
		2250	3	CFL 23W	24	162							-	$ 0.161
		8736	1	LED exit	3	26							-	$ 0.161
4 -	1	2250	2	2L4HPT8	60	270	0.5	135	$22	$75	$75	$35	1.8	$ 0.161
		2250	1	2L4HPT8	60	135							-	$ 0.161
		8736	1	LED exit	3	26							-	$ 0.161
5 - Mechanical		250	4	2L4HPT8	60	60							-	$ 0.161
7 -	1	2700	4	3L4HPT8	88	950	0.4	380	$61	$75	$75	$35	0.7	$ 0.161
8 -	1	2700	4	3L4HPT8	88	950	0.4	380	$61	$75	$75	$35	0.7	$ 0.161
9 -	1	2700	5	3L4HPT8	88	1,188	0.4	475	$77	$75	$75	$35	0.5	$ 0.161
10 - Library	3	2700	14	3L4HPT8	88	3,326	0.3	998	$161	$75	$225	$35	1.2	$ 0.161
		2700	3	3L4HPT8	88	713							-	$ 0.161
		8736	2	LED exit	3	52							-	$ 0.161
		2700	1	1L4HPT8	30	81							-	$ 0.161
13 -	1	2250	2		88	396	0.3	119	$19	$75	$75	$35	2.1	$ 0.161
		1125	2	CFL 23W	24	54							-	$ 0.161
14 - Grade 1	1	2250	12		88	2,376	0.3	713	$115	$75	$75	$35	0.3	$ 0.161
15 - Kindergarten	1	2250	12		88	2,376	0.3	713	$115	$75	$75	$35	0.3	$ 0.161
		1125	1	CFL 23W	24	27							-	$ 0.161
16 - Restroom	1	2700	2	2L4HPT8	60	324	0.7	227	$37	$75	$75	$35	1.1	$ 0.161
17 -	1	2250	2	4L4HPT8	112	504	0.3	151	$24	$75	$75	$35	1.6	$ 0.161
		1125	1	CFL 23W	24	27							-	$ 0.161
18 - Grade 1-2	1	2250	12		88	2,376	0.3	713	$115	$75	$75	$35	0.3	$ 0.161
19 - Grade 3	1	2250	12		88	2,376	0.3	713	$115	$75	$75	$35	0.3	$ 0.161
20 - Restroom	1	2250	2		88	396	0.7	277	$45	$75	$75	$35	0.9	$ 0.161
20A - Closet		1125	1	CFL 23W	24	27								$ 0.161
21 -	1	2250	1	4L4HPT8	112	252	0.5	126	$20	$75	$75	$35	2.0	$ 0.161
22 - Reading tutor	1	2250	3		112	756	0.4	302	$49	$75	$75	$35	0.8	$ 0.161
22A -	1	2250	1		112	252	0.4	101	$16	$75	$75	$35	2.5	$ 0.161
23 -	1	2250	1	4L4HPT8	112	252	0.3	76	$12	$75	$75	$35	3.3	$ 0.161
24 - Grade 4	1	2250	12		88	2,376	0.3	713	$115	$75	$75	$35	0.3	$ 0.161
25 - Grade 2	1	2250	12		88	2,376	0.3	713	$115	$75	$75	$35	0.3	$ 0.161
26 - Storage	1	1125	7	2L4HPT8	60	473	0.4	189	$30	$75	$75	$35	1.3	$ 0.161
27 - Multipurpose	3	2700	16		176	7,603	0.5	3802	$612	$75	$225	$35	0.3	$ 0.161

Room Name	Number of controls	On hrs	Fixture Quantity	Suggested Replacement	Watts	On KW Hrs	Est off	KW Hrs saved	Dollars saved	Cost each	Project cost	Incentive	Payback years	KW Hr cost
		8736	3	LED exit	3	79							-	$ 0.161
28 - Grade 5	1	2250	12		112	3,024	0.3	907	$146	$75	$75	$35	0.3	$ 0.161
29 - Music	1	2250	13		112	3,276	0.5	1638	$264	$75	$75	$35	0.2	$ 0.161
30 - Storage	1	2250	1		112	252	0.5	126	$20	$75	$75	$35	2.0	$ 0.161
30A -	1	1125	1		112	126	0.3	38	$6	$75	$75	$35	6.6	$ 0.161
31 - Restroom	1	2250	2	1L4HPT8	30	135	0.7	95	$15	$75	$75	$35	2.6	$ 0.161
32 - Resource room	1	2250	12		88	2,376	0.3	713	$115	$75	$75	$35	0.3	$ 0.161
33 - Computer lab	1	2250	12		88	2,376	0.5	1188	$191	$75	$75	$35	0.2	$ 0.161
34A - Storage		1125	1	CFL 23W	24	27							-	$ 0.161
		1125	1	1L4HPT8	30	34							-	$ 0.161
	1	1125	2	2L4HPT8	60	135	0.5	68	$11	$75	$75	$35	3.7	$ 0.161
36 -	1	2250	2	2L4HPT8	60	270	0.5	135	$22	$75	$75	$35	1.8	$ 0.161
37 - Mechanical		100	4	2L4HPT8	60								-	$ 0.161
38 -		100	2	CFL 23W	24								-	$ 0.161
39 -	1	2250	2		112	504	0.4	202	$32	$75	$75	$35	1.2	$ 0.161
39A - Restroom	1	1125	2	CFL 23W	24	54	0.7	38	$6	$75	$75	$35	6.6	$ 0.161
													-	$ 0.161
Exterior		2080	2										-	$ 0.161
		2080	3										-	$ 0.161
		2080	2										-	$ 0.161
		2080	2										-	$ 0.161
		2080	2										-	$ 0.161
		2080	2										-	$ 0.161
													-	$ 0.161

	53		**307**					**20,013**	**$3,222**		**$3,975**	**$1,505**	**1**	**TOTALS**

Client Name	SAU 80 - Shaker School		
Building Name	Canterbury Elementary School		
Date of field survey	17-Dec-09	Time of day	8:30 AM
Existing weather conditions	cold, sunny		

Field Inventory Sheets

Lighting

Location by room	Hours per Day	Total Hours	Quantity	Total Watts	Existing Fixture type	Suggested Replacement	Ballast type	Mounting method	Lighting level FC	Occupancy sensors (Y/N)	# of Light Levels
C1 - Corridor	12-5-45	2700	13	102	2L4T12	2L4T8	M	Drop ins		N	1
	24-7-52	8736	3	10	Flor exit	LED exit		Surface			
C2 - Corridor	12-5-45	2700	4	102	2L4T12	2L4T8	M	Drop ins		N	1
	24-7-52	8736	2	10	Flor exit	LED exit		Surface			
C3 - Corridor	12-5-45	2700	6	102	2L4T12	2L4T8	M	Drop ins		N	2
	24-7-52	8736	3	10	Flor exit	LED exit		Surface			
C4 - Corridor	24-7-52	8736	4	10	Flor exit	LED exit		Surface			
	12-5-45	2700	6	88	3L4T8		E	Drop ins		N	1
	12-5-45	2700	4	102	2L4T12	2L4T8	M	Drop ins		N	1
S2 - Stairway	12-5-45	2700	1	60	1L4T12	1L4T8	M	Drop ins		N	1
	24-7-52	8736	1	10	Flor exit	LED exit		Surface			
1-1 - Entrance	12-5-45	2700	1	102	2L4T12	2L4T8	M	Drop ins		N	1
1 -	10-5-45	2250	1	102	2L4T12	2L4T8	M	Surface		N	1
1A - Custodian	12-5-45	2700	1	102	2L4T12	2L4T8	M	Drop ins		N	1
2 -	10-5-45	2250	1	102	2L4T12	2L4T8	M	Surface		N	1
3 - Kitchen	10-5-45	2250	11	102	2L4T12	2L4T8	M	Drop ins	27	N	2
	10-5-45	2250	1	60	1L4T12	1L4T8	M	Surface		N	1
	10-5-45	2250	3	60	INCA 60W	CFL 23W		Cooking			1
	24-7-52	8736	1	10	Flor exit	LED exit		Surface			
4 -	10-5-45	2250	2	102	2L4T12	2L4T8	M	Drop ins		N	1
	10-5-45	2250	1	102	2L4T12	2L4T8	M	Surface		N	1
	24-7-52	8736	1	10	Flor exit	LED exit		Surface			
5 - Mechanical	5-2-25	250	4	102	2L4T12	2L4T8	M	Pendant		N	1
7 -	12-5-45	2700	4	162	3L4T12	3L4T8		Drop ins	56	N	1
8 -	12-5-45	2700	4	162	3L4T12	3L4T8		Drop ins	56	N	1
9 -	12-5-45	2700	5	162	3L4T12	3L4T8	M	Drop ins		N	1
10 - Library	12-5-45	2700	14	162	3L4T12	3L4T8	M	Tropher	47	N	2
	12-5-45	2700	3	162	3L4T12	3L4T8	M	Pendant		N	1
	24-7-52	8736	2	10	Flor exit	LED exit		Surface			
	12-5-45	2700	1	60	1L4T12	1L4T8		Pendant		N	1
13 -	10-5-45	2250	2	88	3L4T8			Drop ins	55	N	1
	5-5-45	1125	2	60	INCA 60W	CFL 23W		Surface		N	1
14 - Grade 1	10-5-45	2250	12	88	3L4T8			Drop ins	85	N	2
15 - Kindergarten	10-5-45	2250	12	88	3L4T8			Drop ins	61	N	2
	5-5-45	1125	1	60	INCA 60W	CFL 23W		Surface		N	1
16 - Restroom	12-5-45	2700	2	102	2L4T12	2L4T8	M	Drop ins		N	1
17 -	10-5-45	2250	2	204	4L4T12	4L4T8	M	Drop ins	56	N	1
	5-5-45	1125	1	60	INCA 60W	CFL 23W		Lamp		N	1

Lighting

Location by room	Hours per Day	Total Hours	Quantity	Total Watts	Existing Fixture type	Suggested Replacement	Ballast type	Mounting method	Lighting level FC	Occupancy sensors (Y/N)	# of Light Levels
18 - Grade 1-2	10-5-45	2250	12	88	3L4T8			Drop ins	61	N	2
19 - Grade 3	10-5-45	2250	12	88	3L4T8			Drop ins	61	N	2
20 - Restroom	10-5-45	2250	2	88	3L4T8			Drop ins		N	1
20A - Closet	5-5-45	1125	1	60	INCA 60W	CFL 23W		Surface		N	1
21 -	10-5-45	2250	1	204	4L4T12	4L4T8	M	Drop ins		N	1
22 - Reading tutor	10-5-45	2250	3	112	4L4T8		E	Drop ins		N	1
22A -	10-5-45	2250	1	112	4L4T8		E	Drop ins		N	1
23 -	10-5-45	2250	1	204	4L4T12	4L4T8	M	Drop ins		N	1
24 - Grade 4	10-5-45	2250	12	88	3L4T8			Drop ins		N	2
25 - Grade 2	10-5-45	2250	12	88	3L4T8			Drop ins		N	2
26 - Storage	5-5-45	1125	7	102	2L4T12	2L4T8	M	Pendant		N	1
27 - Multipurpose	12-5-45	2700	16	176	6L4T8			Surface		N	4
	24-7-52	8736	3	10	Flor exit	LED exit		Surface			
28 - Grade 5	10-5-45	2250	12	112	4L4T8		E	Drop ins		N	2
29 - Music	10-5-45	2250	13	112	4L4T8		E	Drop ins		N	2
30 - Storage	10-5-45	2250	1	112	4L4T8		E	Drop ins		N	1
30A -	5-5-45	1125	1	112	4L4T8		E	Drop ins		N	1
31 - Restroom	10-5-45	2250	2	60	1L4T12	1L4T8	M	Surface		N	1
32 - Resource room	10-5-45	2250	12	88	3L4T8		E	Drop ins		N	3
33 - Computer lab	10-5-45	2250	12	88	3L4T8		E	Drop ins		N	3
34A - Storage	5-5-45	1125	1	60	INCA 60W	CFL 23W		Surface		N	1
	5-5-45	1125	1	60	1L4T12	1L4T8	M	Surface		N	1
	5-5-45	1125	2	102	2L4T12	2L4T8	M	Surface		N	1
36 -	10-5-45	2250	2	102	2L4T12	2L4T8	M	Surface		N	1
37 - Mechanical	2-2-25	100	4	102	2L4T12	2L4T8	M	Surface		N	1
38 -	2-2-25	100	2	60	INCA 60W	CFL 23W		Surface		N	1
39 -	10-5-45	2250	2	112	4L4T8		E	Drop ins		N	1
39A - Restroom	5-5-45	1125	2	60	INCA 60W	CFL 23W		Surface		N	1
Exterior	8-5-52	2080	2	460	400W HPS			Street lamp			
	8-5-52	2080	3	90	70W HPS			Large wall mt.			
	8-5-52	2080	2	250	250 Quartz			Flood			
	8-5-52	2080	2	190	LPS 150			Wall pack			
	8-5-52	2080	2	295	LPS 250			Wall pack			
	8-5-52	2080	2	45	35W HPS			Recessed			

Client Name	SAU 80 - Shaker School		
Building Name	Canterbury Elementary School		
Date of field survey	17-Dec-09	Time of day	8:30 AM
Existing weather conditions	cold, sunny		

Exterior doors

Location	Quantity	Size	Glazing	Thickness	Description	Condition	Photo #
C1 - Corridor	2	3068	Full Glass	5/8"	Metal Insulated	Fair	
C3 - Corridor	2	2670	1/2 Glass	1/8"	Metal Uninsulated	Replace	
C4 - Corridor	2	2670	1/2 Glass	1/8"	Metal Uninsulated	Replace	
S2 - Stairway	2	2670	1/2 Glass	1/8"	Metal Uninsulated	Replace	
1-1 - Entrance	2	3068	Full Glass	5/8"	Metal Insulated	Fair	
4 -	1	3068			Metal Uninsulated	Replace	
10 - Library	1	3068			Metal Insulated	Fair	
15 - Kindergarten	1	3068	1/2 Glass	1/8"	Metal Insulated	Replace	
19 - Grade 3	1	3068	1/2 Glass	1/8"	Metal Insulated	Replace	
27 - Multipurpose	4	3068	3/4 Glass	3/4"	Metal Insulated	Fair	IMG 4-5
32 - Resource room	1	3670	1/2 Glass	3/8"	Metal Insulated	Fair	

Client Name	SAU 80 - Shaker School		
Building Name	Canterbury Elementary School		
Date of field survey	17-Dec-09	Time of day	8:30 AM
Existing weather conditions	cold, sunny		

Windows

Location	Quantity	Description	Size (SF)	Glazing	Thick-ness	Low E Coating (Y/N)	Frame type	Comments	Comfort Issues (Y/N)	Photo #
C1 - Corridor	1	Slider	20	Double pane	1/2"		Metal	Replace		
	2	Skylight	49					Add curtain		
	2	Fixed	8	Double pane	1/2"		Metal	Replace		
C3 - Corridor	2	Fixed	5	Single pane	1/8"		Metal	Replace		
C4 - Corridor	3	Fixed	8	Double pane	1/2"		Metal	Replace		
S2 - Stairway	1	Slider	96	Double pane	1/2"		Wood	drafty		
1-1 - Entrance	1	Fixed	32	Double pane	1/2"					
7 -	1	Slider	35	Double pane	1/2"		Wood	drafty		
	1	Slider	20	Double pane	1/2"		Wood			
8 -	1	Slider	35	Double pane	1/2"		Wood	drafty		
	1	Slider	20	Double pane	1/2"		Wood			
10 - Library	3	Slider	35	Double pane	1/2"		Wood	drafty		
	1	Slider	20	Double pane	1/2"		Wood			
	1	Fixed	30	Double pane	1/2"		Wood			
	1	Skylight	49	Double pane				Add curtain		
14 - Grade 1	1	Slider	12	Double pane	1/2"		Wood	drafty		
	2	Slider	96	Double pane	1/2"		Wood	drafty		
15 - Kindergarten	1	Slider	12	Double pane	1/2"		Wood	drafty		

Windows

Location	Quantity	Description	Size (SF)	Glazing	Thick-ness	Low E Coating (Y/N)	Frame type	Comments	Comfort Issues (Y/N)	Photo #
	2	Slider	96	Double pane	1/2"		Wood	drafty		
	2	Fixed	8	Double pane	1/2"		Wood	drafty		
18 - Grade 1-2	1	Slider	12	Double pane	1/2"		Wood	drafty		
	2	Slider	96	Double pane	1/2"		Wood	drafty		
	2	Fixed	8	Double pane	1/2"		Wood	drafty		
19 - Grade 3	1	Slider	12	Double pane	1/2"		Wood	drafty		
	2	Slider	96	Double pane	1/2"		Wood	drafty		
	2	Fixed	8	Double pane	1/2"		Wood	drafty		
22 - Reading tutor	2	Slider	96	Double pane	1/2"		Wood	drafty		
22A -	1	Slider	96	Double pane	1/2"		Wood	drafty		
23 -	1	Slider	96	Double pane	1/2"		Wood	drafty		
24 - Grade 4	2	Slider	96	Double pane	1/2"		Wood	drafty		
	2	Fixed	8	Double pane	1/2"		Wood	drafty		
25 - Grade 2	2	Slider	96	Double pane	1/2"		Wood	drafty		
	2	Fixed	8	Double pane	1/2"		Wood	drafty		
28 - Grade 5	6	Fixed	8	Double pane	1/2"		Wood	drafty		
	2	Slider	96	Double pane	1/2"		Wood	drafty		
29 - Music	6	Slider	96	Double pane	1/2"		Wood	drafty		
	2	Fixed	8	Double pane	1/2"		Wood	drafty		

Windows

Location	Quantity	Description	Size (SF)	Glazing	Thick-ness	Low E Coating (Y/N)	Frame type	Comments	Comfort Issues (Y/N)	Photo #
30 -	1	Slider	96	Double pane	1/2"		Wood	drafty		
30A -	1	Slider	96	Double pane	1/2"		Wood	drafty		
31 -	1	Slider	96	Double pane	1/2"		Wood	drafty		
32 - Resource room	2	Fixed	8	Double pane	1/2"		Wood	drafty		
	2	Slider	96	Double pane	1/2"		Wood	drafty		
33 - Computer lab	2	Fixed	8	Double pane	1/2"		Wood	drafty		
	2	Slider	96	Double pane	1/2"		Wood	drafty		
38 -	1	Fixed	4	Single pane	1/4"		Metal	Replace		
39 -	1	Fixed	4	Single pane	1/4"		Metal	Replace		

Client Name	SAU 80 - Shaker School		
Building Name	Canterbury Elementary School		
Date of field survey	17-Dec-09	Time of day	8:30 AM
Existing weather conditions	cold, sunny		

Personal appliances

Location	Device type	Watts	Amps	Volts	Hours of usage	Photo #	
13	Mini fridge						
39 -	Microwave						
	18CF Fridge						non E start

Client Name	SAU 80 - Shaker School
Building Name	Canterbury Elementary School
Date of field survey	17-Dec-09 Time of day
Existing weather conditions	cold, sunny

Water usage

Location	Device type	High or low consumption	Infrared (Y/N)	Other flow control device	Quantity	Photo #
1	Sink	High			1	
	Toilet	High			1	
2	Sink	High			1	
	Toilet	High			1	
3	Toilet	Low			1	
	Sink	Low			1	
10	Sink	High			1	
13	Sink	High			1	
	Toilet	High			1	
14	Sink	High			1	
15	Sink	High			1	
16	Toilet	Low			1	
	Toilet	High			1	
	Urinal	High			2	
	Sink	Low			2	
17	Sink	High			1	
18	Sink	High			1	
19	Sink	High			1	
20	Toilet	Low			3	
	Sink	Low			3	
21	Sink	Low			3	
	Toilet	Low			2	
	Urinal	Low			2	
23	Sink	Low			3	
	Toilet	Low			3	
24	Sink	High			1	

Water usage

Location	Device type	High or low consumption	Infrared (Y/N)	Other flow control device	Quantity	Photo #
25	Sink	High			1	
28	Sink	High			1	
30	Sink	High			2	
31	Sink	Low			2	
	Urinal	Low			2	
	Toilet	Low			2	
32	Sink	High			1	
33	Sink	High			1	
34A	Wash sink	High			1	
36	Toilet	Low			3	
	Sink	Low			2	
39A	Sink	High			1	
	Toilet	High			1	

Client Name	SAU 80 - Shaker School		
Building Name	Canterbury Elementary School		
Date of field survey	17-Dec-09	Time of day	8:30 AM
Existing weather conditions	cold, sunny		

Computers & Equip

Location	Equipment type	Quantity	Photo #
7	Laptop	1	
	Printer	1	
8	Laptop	1	
	Printer	1	
9	LCD Monitor	1	
	Computer Tower	1	
	Printer	1	
	Copier	2	
10	LCD Monitor	7	
	Computer Tower	7	
	Copier	1	
13	LCD Monitor	1	
	Computer Tower	1	
	Printer	1	
14	Laptop	1	
	LCD Monitor	1	
	Computer Tower	1	
	Printer	1	
	TV	1	
15	Laptop	1	
17	Laptop	1	
18	LCD Monitor	1	
	Computer Tower	1	
	Printer	1	
19	Laptop	1	
22	CRT Monitor	2	

Computers & Equip

Location	Equipment type	Quantity	Photo #
	Computer Tower	2	
22A	LCD Monitor	1	
	Computer Tower	1	
24	LCD Monitor	1	
	Computer Tower	1	
	Printer	1	
	Laptop	10	
	TV	1	
25	LCD Monitor	1	
	Computer Tower	1	
	Printer	1	
28	LCD Monitor	1	
	Computer Tower	1	
29	LCD Monitor	1	
	Computer Tower	1	
32	Laptop	1	
	LCD Monitor	1	
	Computer Tower	1	
	Printer	1	
	TV	1	
33	CRT Monitor	24	
	LCD Monitor	1	
	Computer Tower	25	
	Printer	2	

TARGET FINDER

PRINT FREQUENTLY ASKED QUESTIONS CONTACT US HELP

Return to ENERGY STAR Web site > **Target Energy Performance Results**

Target Energy Performance Results

The design **achieved** a rating of 75 or higher:

APPLY for "Designed to Earn the ENERGY STAR"

NOTE: Values are 24% Electricity - Grid Purchase, 74% Fuel Oil (No. 2) and 2% Liquid Propane. The Target & Average Building energy use for this facility are calculated based on fuel mix of input estimated energy use.

View Statement of Energy Design Intent

Target Energy Performance Results (estimated)			
Energy	**Design**	**Target**	**Average Building**
Energy Performance Rating (1-100)	78	83	50
Energy Reduction (%)	25	30	0
Source Energy Use Intensity (kBtu/Sq. Ft./yr)	93	88	125
Site Energy Use Intensity (kBtu/Sq. Ft./yr)	60	56	80
Total Annual Source Energy (kBtu)	2,803,969	2,631,140	3,758,771
Total Annual Site Energy (kBtu)	1,799,535	1,688,616	2,412,309
Total Annual Energy Cost ($)	$ 49,176	$ 46,145	$ 65,922
Pollution Emissions			
CO2-eq Emissions (metric tons/year)	153	144	206
CO2-eq Emissions Reduction (%)	25%	30%	0%

Facility Information Edit

Canterbury Elementary School
Belmont, NH 03224
United States

Facility Characteristics Edit	
Space Type	**Gross Floor Area (Sq. Ft.)**
K-12 School	30,000
Total Gross Floor Area	30,000

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

Estimated Design Energy Edit			
Energy Source	**Units**	**Estimated Total Annual Energy Use**	**Energy Rate ($/Unit)**
Electricity - Grid Purchase	kWh	124,081	$ 0.161/kWh
Fuel Oil (No. 2)	Gallons	9,577	$ 2.887/Gallons
Liquid Propane	Gallons	523	$ 2.870/Gallons

Source: Data adapted from DOE-EIA. See EPA Technical Description.