2012

DEER CREEK HIGH SCHOOL: Energy Assessment

March 2012

Participants:

Debbie Adams

Assessors:

Marty Pool

Jeff Lasker

Funded by:

Oklahoma Dept. of Commerce

SCHOOL SUMMARY PAGE

School Name:	Deer Creek High School		
Service Address:	6101 NW 206th St. Edmond, Oklahoma 73012		
School Contact:	Debbie Adams	Site Contact:	same
Phone:	405-348-5720	Phone:	
Building Type:	High School	Peak Demand:	N/A
Electric Service Provided by:	Oklahoma Gas & Electric Company (OG&E)	Gas Service Provided by:	Oklahoma Natural Gas
Date of Site Visit:	3/6/12	Square Footage:	105,450

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Executive Summary

Deer Creek High School (Deer Creek) applied for and was selected to receive a building energy audit through the Oklahoma Green Schools Program. Funded by the State of Oklahoma, Brendle Group performed the audit to identify opportunities for potential energy conservation. This is the first step toward developing a long-term energy plan for Deer Creek. Brendle Group visited the school on March 6th 2012 and met with Debbie Adams. This report outlines quantified conservation opportunities as well as strategic opportunities. Strategic opportunities can include behavior change programs, improved equipment control, new equipment policies, maintenance practices, or measures that may require further analysis before savings and/or implementation costs can be accurately determined.

The Oklahoma Green Schools Program can serve as an ongoing resource to the school. Later in 2012, the Green School's Committee may follow-up with individual schools. In the meantime, the school can connect with the Program through its website at www.okgreenschools.org. The Program's website includes contact information as well as news, resources and updates.

Key quantified conservation opportunities include: hand sink faucet aerator replacement, computer power management, lighting upgrades and de-lamping, and vending machine occupancy sensor. These opportunities are summarized in the table below.

Key strategic opportunities include: temperature setpoint and scheduling, domestic hot water (DHW) pump timer, dishwasher booster heater, kitchen and refrigeration efficiency, high efficiency rooftop units (RTU), personal radiant space heater ENERGY STAR appliances and office equipment.

Energy Conservation Opportunity Summary Table

	Energy Conservation Opportunity	Estimated Electric Savings (kWh/yr)	Estimated Gas Savings (CCF/yr)	Estimated Cost Savings ($/yr)	Estimated Capital Cost ($)	Simple Payback (Years, w/ Incentives)	Estimated Utility Incentives ($)*
Payback less than 2 years							
1	Hand Sink Faucet Aerator Replacement	n/a	280	$1,100	$1,200	1	n/a
Payback 2 – 10+ years							
2	Computer Power Management	23,000	n/a	$920	$1,500	2	n/a
3	Lighting Upgrade and De-lamping	11,000	n/a	$940	$1,700	2	$90
4	Gym Lighting Upgrade	12,000	n/a	$1,100	$7,500	6	$1,300
5	Vending Occupancy Sensor	3,600	n/a	$140	$800	6	n/a

*Incentives are estimated based on the 2011 OG&E program. Incentive amounts and availability may change. For more information visit: http://www.oge.com/business-customers/save-energy-and-money/EnergyEfficiencySolutions/Pages/Lighting.aspx

Facility and Operations Description

Deer Creek, part of Deer Creek School District, is a 105,450 square foot high school, located at 6101 NW 206th in Edmond, Oklahoma. Originally built in 1982, the school includes an east, central and west wing; a number of classrooms; administrative offices; computer lab; library area; gym; cafeteria; and kitchen. The school operates from about 6:30 AM to 7:30 PM Monday through Friday. Deer Creek has occasional use on the weekends and summer school use as well.

Lighting for Deer Creek is primarily provided by T8 fluorescent lights. Lighting for the gym is provided by metal halide lamps. Lighting is manually controlled for each space throughout the building with limited duel switching in the classrooms and offices.

Heating, ventilation, and air conditioning (HVAC) for a majority of the building are provided by a series of RTUs. Older RTUs do not have economizer functions and are set to a fixed gate position. The heating and cooling equipment is controlled both by individual thermostats located in most classrooms and a building automation system (BAS). The thermostats are able to control the temperature of the space by 3°F. The kitchen has several reach-in refrigerators and freezers and additional equipment, including a gas oven, a steamer, electric heating trays, electric booster water heater, and a cabinet-type dishwasher. DHW for the building is provided by electric tank-type water heaters.

There are about 60 computers in the computer lab and library and 1-2 computers in every classroom and office. In the computer lab and library, all computers are shut off at night and during holidays; however, power saving settings may not be enabled during the day. Staff members are responsible for the power settings on their individual computers. A staff lounge and a few other rooms have a variety of additional small appliances, such as coffee makers, standard and mini-refrigerators, vending machines, stoves, and microwaves.

Historical utility data were provided by historic utility bills. Based on these data, Deer Creek has a blended electricity cost of $0.089 per kWh of electricity. Natural gas cost was estimated based on similar schools in the area to be $0.70/CCF. In some cases, cost savings may be based on utility rates published by the area's electricity and natural gas utility companies.

Current Energy Saving Efforts

The Green Team and Facilities Management at Deer Creek have already taken steps toward improving energy efficiency and conservation at the school. By reducing energy consumption, these efforts are helping reduce expenses for the school district. Current measures include the following:

- Behavioral initiative to turn off lights at night
- Changed lights to high efficiency T8 fixtures
- Green team meetings after school with students
- Preformed student-led energy audit of building
- Setbacks and shut off of HVAC control

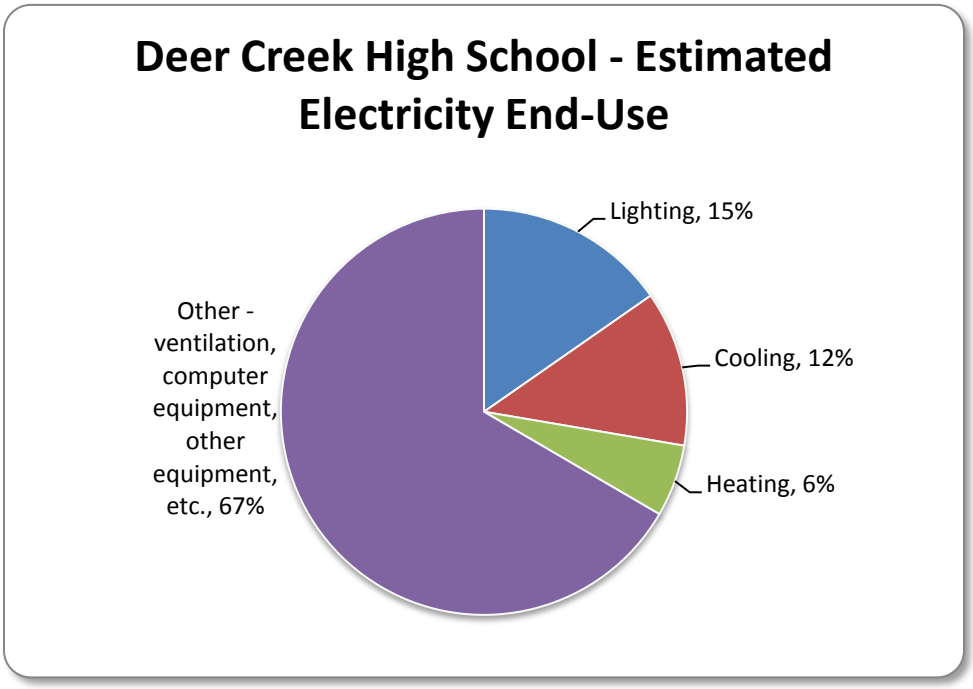
Energy efficiency and conservation measures generally fit into two main categories: equipment improvement and behavior change. While equipment improvement is usually addressed by facilities personnel, behavior change involves everyone at the school – teachers, staff, and students. Examples of behavior change include turning off lights, computer equipment, and other devices when they are not in

use or relaxing temperature setpoints. While many schools already have begun to implement these strategies to some level, Deer Creek School District may want to consider additional energy challenges or incentive-based programs to support behavior change. These types of programs could offer rewards for reducing energy use. One example is to take a baseline of the facility's energy use and offer the school a portion of the cost savings achieved if the school reduces energy from the baseline.

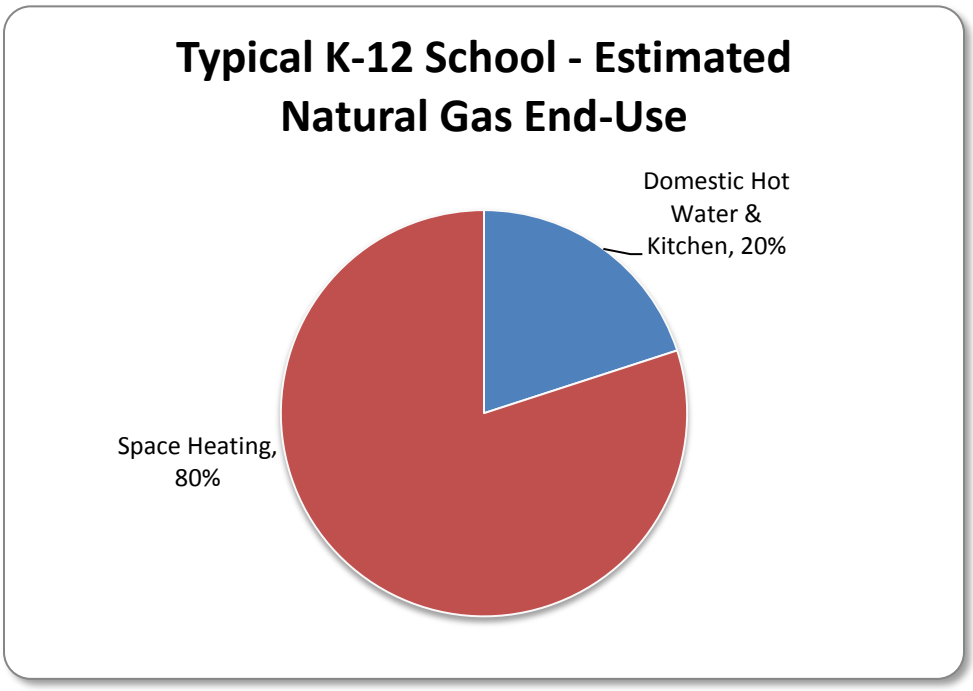
Energy Profile

The following charts illustrate annual electric use at Deer Creek.

Electric Energy End Use Profile



Natural Gas Energy End Use Profile for Typical K-12 School



Site Energy Use – Typical K-12 School

	Annual Total Energy Use (kBtu/square foot)	Annual Electricity Use (kWh/square foot)	Annual Natural Gas Use (kBtu/square foot)
Average K-12 School, Central Oklahoma Climate Zone:	63.5	12.7	20.2

Energy Conservation Opportunities

The table below summarizes all of the quantified energy conservation opportunities identified for Deer Creek. For a detailed description of each opportunity, please refer to the Opportunity Analysis sections following this table.

Energy Conservation Opportunity Summary Table

	Energy Conservation Opportunity	Estimated Electric Savings (kWh/yr)	Estimated Gas Savings (CCF/yr)	Estimated Cost Savings ($/yr)	Estimated Capital Cost ($)	Simple Payback (Years, w/ Incentives)	Estimated Utility Incentives ($)*
Payback less than 2 years							
1	Hand Sink Faucet Aerator Replacement	n/a	280	$1,100	$1,200	1	n/a
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2	Computer Power Management	23,000	n/a	$920	$1,500	2	n/a
3	Lighting Upgrade and De-lamping	11,000	n/a	$940	$1,700	2	$90
4	Gym Lighting Upgrade	12,000	n/a	$1,100	$7,500	6	$1,300
5	Vending Occupancy Sensor	3,600	n/a	$140	$800	6	n/a

*Incentives are estimated based on the 2011 OG&E program. Incentive amounts and availability may change. For more information visit: http://www.oge.com/business-customers/save-energy-and-money/EnergyEfficiencySolutions/Documents/Lighting%20Rebates.pdf

Quantified Conservation Opportunity Analysis

Opportunity 1: Hand Sink Faucet Aerator Replacement

Most of the hand sinks at Deer Creek had measured flow rates between 1.5 and 2.2 gallons per minute (gpm). Replacing 25 hand sink aerators with models rated at 0.5 gpm would result in water savings as well as energy savings from reduced hot water demand. Implementing this measure at Deer Creek would consist of replacing about sink aerators. Spray rinse valves in the kitchen have already been upgraded to low-flow fixtures (1.5 gpm or less).

This measure is estimated to save 280 CCF of natural gas, 130,000 gallons of water, and $1,100 per year. Implementing this measure is estimated to cost $1,200, giving it a simple payback of about 1 year. The estimated cost savings associated with water use reduction are based on water utility rates from historical utility data.

The next step for this opportunity would be to conduct a detailed inventory of all hand sink faucets to get an exact count of how many fixtures need to be replaced and determining an applicable 0.5 gpm aerator for the fixtures (standard or junior, male or female threads, etc.).

Opportunity 2: Computer Power Management

Deer Creek has an estimated 125 computers throughout the facility. Reportedly the computers are turned off at night, over weekends, and during school breaks by individual teachers. For Deer Creek,

adhering to these recommended power saving strategies has an estimated savings of 23,000 kWh and $920 per year. With an estimated capital cost of $1,500 the simple payback becomes 2 years. Additionally, sleep and shut-off settings should be applied to printers, copiers, fax machines, and other applicable office equipment.

To ensure the maximum energy savings are realized throughout the district, Deer Creek School District also could consider implementing district-wide central network computer power management settings. This type of control ensures consistent sleep and shut-off settings throughout the district. ENERGY STAR offers a number of enterprise-scale resources that can be used to implement computer power management without interfering with update schedules. For more information visit: www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_implementation_res#ensure

The following table presents the typical energy use of various types of office equipment when operating and in sleep mode. Note that actual values vary depending on the manufacturer, equipment configuration, age, etc.

Equipment Type	Typical Operating Power (Watts)	Typical Sleep Power (Watts)
Computer	150	10
Monitor (15”)	75	4
Laser Printer	350	20
Fax Machine	300	10
Copier (small)	300	20
Copier (large)	1,400	40

The following tips and other information are offered to help Deer Creek achieve energy savings with good power management practices:

- Go to the ENERGY STAR website to find out about full-featured power management systems offered by private vendors that allow for fine-tuning sleep modes to individual use patterns (www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_comm_packages).
- Computer monitor screensavers, even the blank screen option, do not reduce computer energy use and should be disabled. In fact, from the computer’s perspective a screensaver represents active use and will prevent a computer with power management features enabled from entering sleep mode.
- Check and activate all available and appropriate standby and sleep modes for printers, scanners, fax machines, copiers, monitors, etc. Energy savings of over 60% can result.

Opportunity 3: Lighting Upgrade and De-lamping

Lighting at Deer Creek is comprised primarily of T8 fluorescent fixtures with electronic ballasts. The T8 lighting system is a higher efficiency model and provides a high quality of light. The current industry standard for fluorescent and high-efficiency lighting is the T8 fluorescents. Deer Creek also has several incandescent bulbs in use and MR 16 fixtures also known as halogen spots. It is recommended that Deer Creek upgrade to any remaining incandescent bulbs to compact fluorescent bulbs (CFLs) and replace any existing MR 16 fixtures with light emitting diode (LED) technology.

During the site visit it was noted that areas such as hallways and some classrooms may be over-lit. There is an opportunity for electricity cost savings from delamping (removing lamps or bulbs) from current fluorescent fixtures in areas that are over-lit. Light levels are measured in foot-candles (fc). Lighting industry recommendations for classrooms are in the range of 30 to 50 fc, with even lower recommended levels of 10 to 30 fc for areas such as hallways and cafeterias. During the site visit, classroom light level readings were in the range of 60-90 fc. Removing two lamps from each of the hallway and classroom 4-lamp fixtures could be done using in-house labor, creating little to no extra cost.

Light levels and quality should be evaluated during this process to determine the most appropriate combination of lamps and ballasts. Lower light levels may be acceptable depending on current lighting levels and space use.

Implementing the above opportunities at Deer Creek could save an estimated 11,000 kWh and $940 per year. The project is estimated to cost $1,700 and may qualify for $90 in incentives through the OG&E; this gives the project a payback of about 2 years. For more information visit the OG&E website: http://www.oge.com/business-customers/save-energy-and-money/EnergyEfficiencySolutions/Pages/Lighting.aspx

Contacting at least two qualified lighting vendors or contractors to provide recommendations and estimates of equipment and installation retrofit costs would be the next step for this opportunity.

Opportunity 4: Gym Lighting Upgrade

Lighting in the gym at Deer Creek is comprised of 400-watt metal halide fixtures. Induction lighting has the advantages of instant start-up, long life, and high efficiency and is especially well suited for hard-to-reach areas such as gyms with high ceilings. Additional alternative technologies for high-bay metal halide replacement to consider include T8 fluorescent, T5 fluorescent, and LED. This analysis compares induction and T8 fluorescent replacement options.

Technology	Estimated Electric Savings (kWh/yr)	Estimated Cost Savings ($/yr)	Estimated Capital Cost ($)	Estimated Incentives ($)	Simple Payback
Induction	**9,800**	**$880**	**$13,000**	**$1,300**	**13**
T8 Fluorescent	**12,000**	**$1,100**	**$7,500**	**$1,300**	**6**

The two technologies have similar energy savings, light output, light quality, and instant-on capability. Induction lighting has a much higher first cost but also much longer life and lower maintenance costs. T8 fluorescents have lower first costs and a longer track record.

Contacting at least two qualified lighting vendors or contractors to provide recommendations and estimates of equipment and installation retrofit costs would be the next step for this opportunity. For more information on the OG&E rebate program visit: http://www.oge.com/business-customers/save-energy-and-money/EnergyEfficiencySolutions/Documents/Lighting%20Rebates.pdf -

Opportunity 5: Vending Machine Occupancy Sensors

At Deer Creek, four beverage vending machines were observed during the assessment. Depending on factors such as size, age, and ambient temperature a single vending machine can use an estimated 2,500 to 4,000 kWh per year with an associated cost of about $150 to $250.

Deer Creek should consider installing an occupancy control on the four beverage machines to reduce energy usage. This device essentially acts as an occupancy sensor that reduces electrical power consumption when no one approaches the equipment for a set (and adjustable) period of time, including after hours. Both Coca-Cola and Pepsi have approved the products for beverage vending machines.

This measure is estimated to save 3,600 kWh and $140 per year. Implementing this measure is estimated to cost $800, giving it a simple payback of about 6 years. Note that savings may be up to 50% less on a machine that has already had its lighting removed.

Another option would be to remove the machines altogether. For this approach, the income from each machine should be evaluated compared to the cost of operation.

Strategic Opportunity Analysis

Opportunity 6: Temperature Setpoints and Scheduling

Deer Creek has HVAC equipment connected to the central BAS controls and has local thermostats in each space. The general control strategy for the school is to enable the local thermostats in classrooms and allow teachers and staff partial control during occupied hours. The BAS then controls temperature setpoints or equipment operation during unoccupied times. This control strategy has significantly helped Deer Creek save energy and money. Additional reductions in energy use could be achieved through behavior-based energy management and would complement the current education and behavior program.

Deer Creek could implement a behavior-based program by educating and training staff, teachers, and students on ways to save energy, such as raising or lowering thermostat settings and turning off lights. At Deer Creek, spaces were observed to have a range of temperature setpoints (between 68°F and 72.5°F for *both* cooling and heating setpoints). This variance in control can result in excess energy use and highlights an area that could be targeted as part of the behavior program. Among other communication channels, Deer Creek should consider signage to inform proper thermostat use. Signs can include recommended setpoints and settings for fan mode (i.e. using “auto” vs. “on”) and when to use cooling and heating modes. In general, setpoints are recommended to be 68-72°F for heating and 74-78°F for cooling.

Deer Creek School District may want to consider installing consistent thermostat models District-wide. Using the same type of thermostats makes it easier for teachers and staff to learn proper control practices. To illustrate the potential for savings, using heating and cooling setpoints of 72°F and 78°F, respectively, instead of 68°F and 72.5°F can save an estimated 0.5 – 1.0 Mcf of natural gas and 1,000 – 2,000 kWh of electricity (or $75 to $150) per year in an average classroom.

Opportunity 7: DHW Pump Timer

There is one DHW loop at Deer Creek that has a small circulation pump to continuously move hot water through the piping. Energy savings could be realized by installing a timer on the pump to control the pump's schedule and turn it off at night. First, electric energy is saved by reducing the number of hours the pump is running. Second, thermal losses throughout the hot water piping system are reduced because hot water is not being circulated throughout the night.

This measure is estimated to save 1,400 kWh of electricity, 64 CCF of natural gas, and $100 per year. Implementing this measure is estimated to cost $300, giving it a simple payback of about 3 years.

Opportunity 8: Dishwasher Booster Heater

The dishwasher at Deer Creek has an electric booster heater rated at 27 kW. Electric heating can be expensive for a facility whose electricity cost includes an electric demand component. It is unclear if Deer Creek is on a demand rate structure. However, if a piece of equipment is contributing to demand monthly peak the payback will be greatly reduced.

Deer Creek should consider replacing the electric booster heater with a natural gas booster heater. The new heater is estimated to use about 350 CCF per year and save an estimated 8,100 kWh. The upgrade is expected to save about $480 per year. The new heater is estimated to cost about $6,000 (dependent on installation requirements such as venting, gas connection, and available space), giving this upgrade a payback of about 13 years.

Opportunity 9: Kitchen and Refrigeration Efficiency

Deer Creek has a full service kitchen with a walk-in cooler and freezer. Consider the following efficiency measures to achieve energy savings in the kitchen.

- Exhaust hood and fan controls – Exhaust hood function can be improved by installing corner flanges on the sides, which allows proper exhausting of heat and fumes while minimizing the exhausting of conditioned air from the kitchen. In addition, kitchen exhaust hoods typically operate continuously to exhaust heat, steam, and smoke generated during kitchen activities. Controls are available that reduce the exhaust flow rate during periods of reduced activity.
- Energy efficient cookware – Using efficient cookware can save on gas costs by heating liquids faster and introducing less heat into the kitchen. One such product is the Turbo Pot made by Eneron (www.theturbopot.com).

Additionally, several options allow for more efficient control of larger refrigeration systems, such as walk-in coolers. Refrigeration units work in a series of cycles, or starts and stops, to maintain the required storage temperature. The following technologies increase control of these cycles for greater efficiency:

- Walk-in evaporator fan motors – Walk-in coolers and freezers use evaporator fans to keep the units cool and to distribute cold air. More efficient electronically commutated motors (ECMs) can be retrofitted to save on electricity and cooling costs. Each motor is estimated to save $50 per year.

- Walk-in evaporator fan controls – Evaporator fans in walk-in and reach-in refrigerators and freezers typically run continuously even when no cooling cycle is occurring. This unnecessary fan run time uses electricity and can also contribute to food dehydration. Evaporator fan controls, such as two speed controls (high speed for when cooling is actually occurring and low speed for when not cooling), can be installed to save energy. Evaporator fan controllers are available that can be used to control walk-in coolers as well as upright units. Each device is estimated to save $40 per year.

Opportunity 10: High Efficiency Rooftop Units

Deer Creek has 17 RTUs on the west wing, 20 RTUs on the east wing, and 22 RTUs that provide heating and cooling to the central area. Some of the RTU units are older and could be nearing the need for replacement. In general, replacement is the best time to consider energy efficiency right-sizing options for HVAC equipment. Calculating the exact savings from improved efficiency can be difficult because cooling energy use in a building depends on a number of factors including climate, building construction, and cooling equipment control. However, though higher efficiency models and energy saving features may cost more up front, their reduced annual energy consumption will lead to significant cost savings over the unit's life. The incremental cost of a new high efficiency unit over a new standard efficiency unit typically has a simple payback in the range of 4 – 8 years in warmer climates such as Oklahoma. Below is some information to consider for purchasing an RTU with energy efficient models and options:

- Right-sizing: When an RTU unit is replaced, selecting a correctly-sized new unit is important. Rather than simply replacing the existing equipment with a new unit of the same size (or using standard rules-of-thumb to size the unit), ensure that the installer/contractor considers the various factors that determine the size of a unit, including the building's lighting (and other equipment), area, construction/envelope (insulation, windows, etc.), occupancy, etc.
- High efficiency units: Cooling efficiency is rated using what is known as the energy efficiency ratio (EER). The current standard efficiency for an RTU is around 10 – 11 EER, while high efficiency units are around 12 – 13 EER or even higher for smaller units. For every 1 EER improvement an RTU will use about 5 – 10% less energy to cool a space. If possible, also choose a unit with a heating efficiency of 85% or better (rather than the 80% standard efficiency).
- Outdoor air economizers: Economizers use outdoor air to provide cooling and ventilation as warranted by outdoor conditions (typically during the spring and fall). Economizers avoid unnecessary energy use and costs of running air-conditioner compressors.

Opportunity 11: Personal Radiant Space Heaters

Some staff members want to use space heaters to improve comfort and may try to use standard space heaters regardless of regulations. Though standard electric space heaters are small, they draw a significant amount of power – 1,000 to 1,500 watts, equal to about twenty 2-lamp T8 linear fluorescent lights or ten computers. Consider low-wattage radiant heaters for a more comfortable, energy-efficient solution. These heaters use about 100 to 200 watts, about one-tenth of the power of a standard space heater. Available as rubber floor mats, carpeted floor mats, or radiant panels, these heaters are well suited for providing warmth to a person working at a desk without heating the entire room. These energy-efficient heaters operate at safer, lower temperatures with no tipping hazard.

Allowing personal radiant heaters does result in electricity use for these heaters. However, these heaters allow for staff members to address their individual comfort needs. With personal radiant heaters the room temperature setpoints may possibly be lowered 1 or 2 degrees, resulting in greater overall energy savings. *As with many types of plug-load equipment, these heaters should always be turned off when not in use.* Consider outlet timers to ensure that heaters are not accidentally left on over night. One such timer is the Belkin Conserve Socket Power Timer.

Opportunity 12: ENERGY STAR Appliances and Office Equipment

Deer Creek High School and the Deer Creek School District are encouraged to purchase ENERGY STAR labeled equipment for new and replacement equipment, including computers, monitors, printers, copiers, water heaters, clothes washers, and kitchen equipment. Newly labeled ENERGY STAR equipment options are added to the program on a regular basis. For an updated and detailed listing of all ENERGY STAR appliances and equipment, visit:
www.energystar.gov/index.cfm?fuseaction=find_a_product

Glossary

The following definitions will help you understand the information in this report and how it relates to your energy bills:

- **kWh is a kilowatt-hour.** It is a measure of energy, and is usually used to describe electrical energy. It is the amount of electricity used when 1 kilowatt of power is used for 1 hour.
- **kBtu is 1,000 Btu (British Thermal Units).** Btu and kBtu are measures of energy, and are generally used when referring to heating or cooling energy.
- **Therm.** A therm is a unit of energy equivalent to 100,000 Btu.
- **Ccf is 100 cubic feet of natural gas.** For the purposes of measuring energy use in this report, a therm and a Ccf of natural gas are equivalent.
- **Mcf is 1,000 cubic feet of natural gas.** For the purposes of measuring energy use in this report, a dekatherm (10 therms) and an Mcf of natural gas are equivalent.
- **Conversions:**
    - 1 kWh = 3.412 kBtu
    - 1 kBtu = 0.293 kWh
    - 1 Ccf = 1 therm = 100 kBtu = 100,000 Btu
    - 1 Mcf = 10 therms = 1,000 kBtu = 1,000,000 Btu

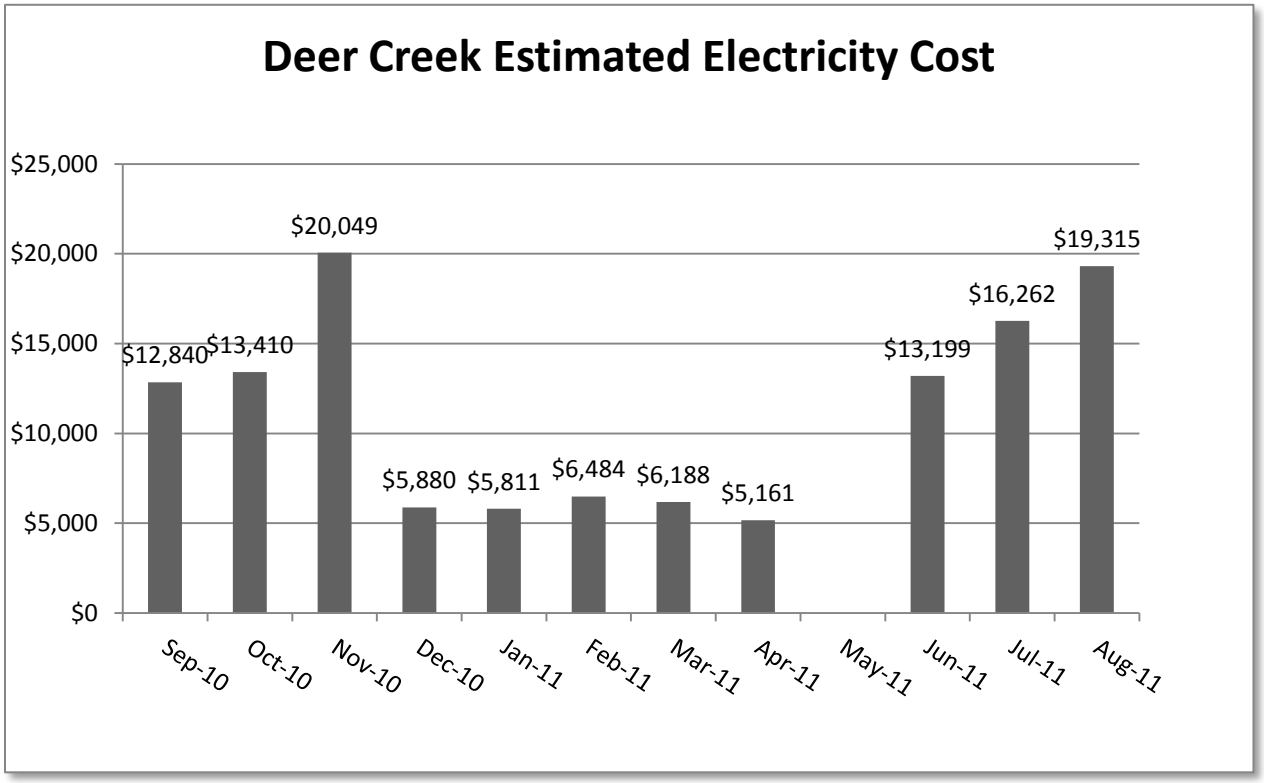
APPENDIX: Annual Electricity Data

Most recent available utility data: September 2010 – August 2011

Electricity

Month	Energy (kWh)	Total Cost	Cost / kWh
Aug-11	178,980	$19,315	$0.11
Jul-11	147,600	$16,262	$0.11
Jun-11	119,200	$13,199	$0.11
May-11	n/a	n/a	n/a
Apr-11	86,000	$5,161	$0.06
Mar-11	102,800	$6,188	$0.06
Feb-11	99,920	$6,484	$0.06
Jan-11	92,840	$5,811	$0.06
Dec-10	109,360	$5,880	$0.05
Nov-10	197,120	$20,049	$0.10
Oct-10	131,920	$13,410	$0.10
Sep-10	127,280	$12,840	$0.10
Avg.	**126,638**	**$11,327**	**$0.09**
Total	**1,393,020**	**$124,599**	

Natural Gas data not available


Deer Creek Estimated Electricity Cost
$25,000
$20,000
$15,000
$10,000
$5,000
$0
$12,840
$13,410
$20,049
$5,880
$5,811
$6,484
$6,188
$5,161
$13,199
$16,262
$19,315
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May-11
Jun-11
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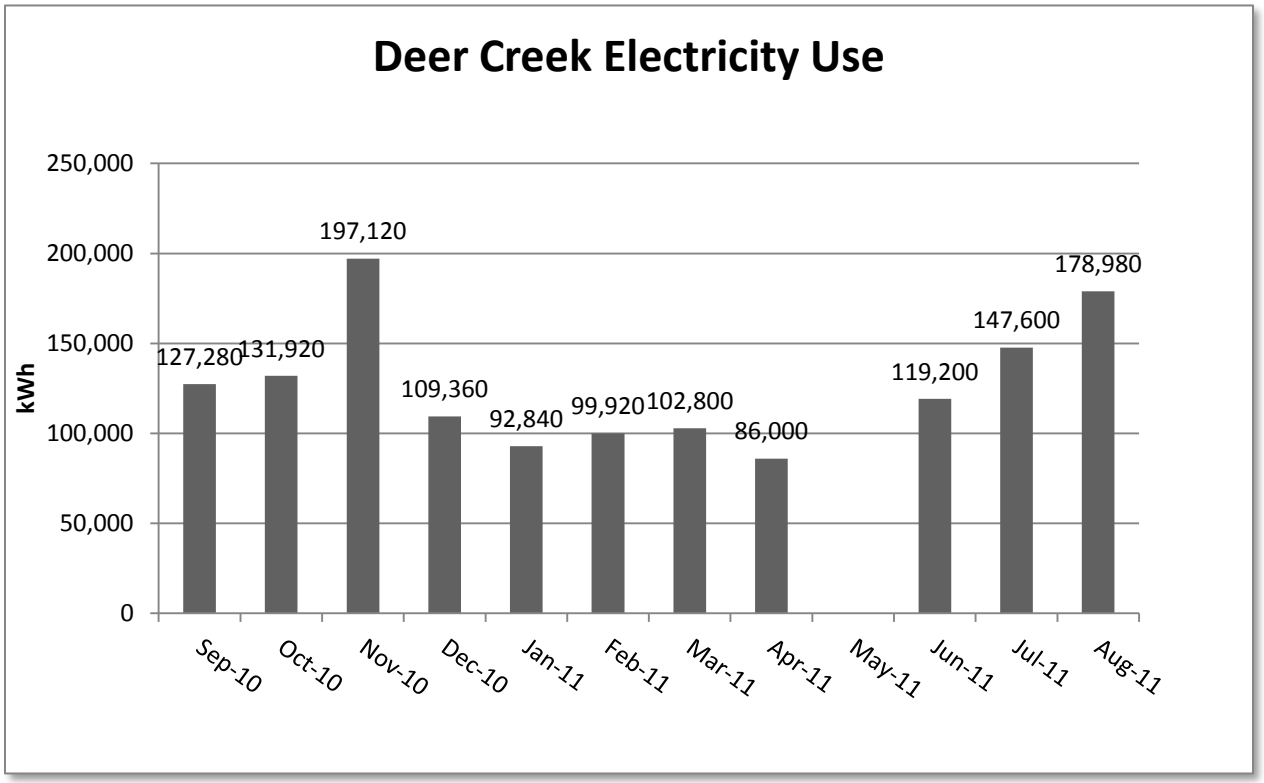
Aug-11


Deer Creek Electricity Use
kWh
250,000
200,000
150,000
100,000
50,000
0
127,280
131,920
197,120
109,360
92,840
99,920
102,800
86,000
119,200
147,600
178,980
Sep-10
Oct-10
Nov-10
Dec-10
Jan-11
Feb-11
Mar-11
Apr-11
May-11
Jun-11
Jul-11
Aug-11