Energy Conservation Action Plan

Energy conservation is undertaken for a variety of reasons which includes utility cost containment and reduction of the carbon footprint. Incumbent upon all of us is the preservation of resources to perpetuate a quality life style. A holistic approach to conservation is articulated in this plan which outlines action items for an energy conservation program. This energy conservation plan is offered to discuss steps taken, work practices in place, new strategies, and energy conservation policies.

At Creighton University, as is the case for most colleges and universities, it is recognized that deferred maintenance on buildings exists and as such, so does the inefficiency of operation. Advancing programs that reduce deferred maintenance will not be specifically addressed in this plan.

A variety of action items to enhance energy conservation are offered in this plan to draw attention to a variety of tasks and opportunities that can be pursued.

Action Item:

A) Implement an Energy Conservation Policy:

An energy conservation policy is needed to document the goals of the University in establishing recognition of energy savings. The energy conservation policy includes:

- Creating guidelines for proper management of our energy resources; (e.g. water, natural gas, and the energy products of steam, chilled water, and electricity).
- Controlling the waste of natural resources.
- Maintaining the most comfortable and safest environmental conditions in university buildings at the lowest cost.
- Creating an outline to be used for educating faculty, staff, students and guests of the University in the day to day practice of energy conservation.

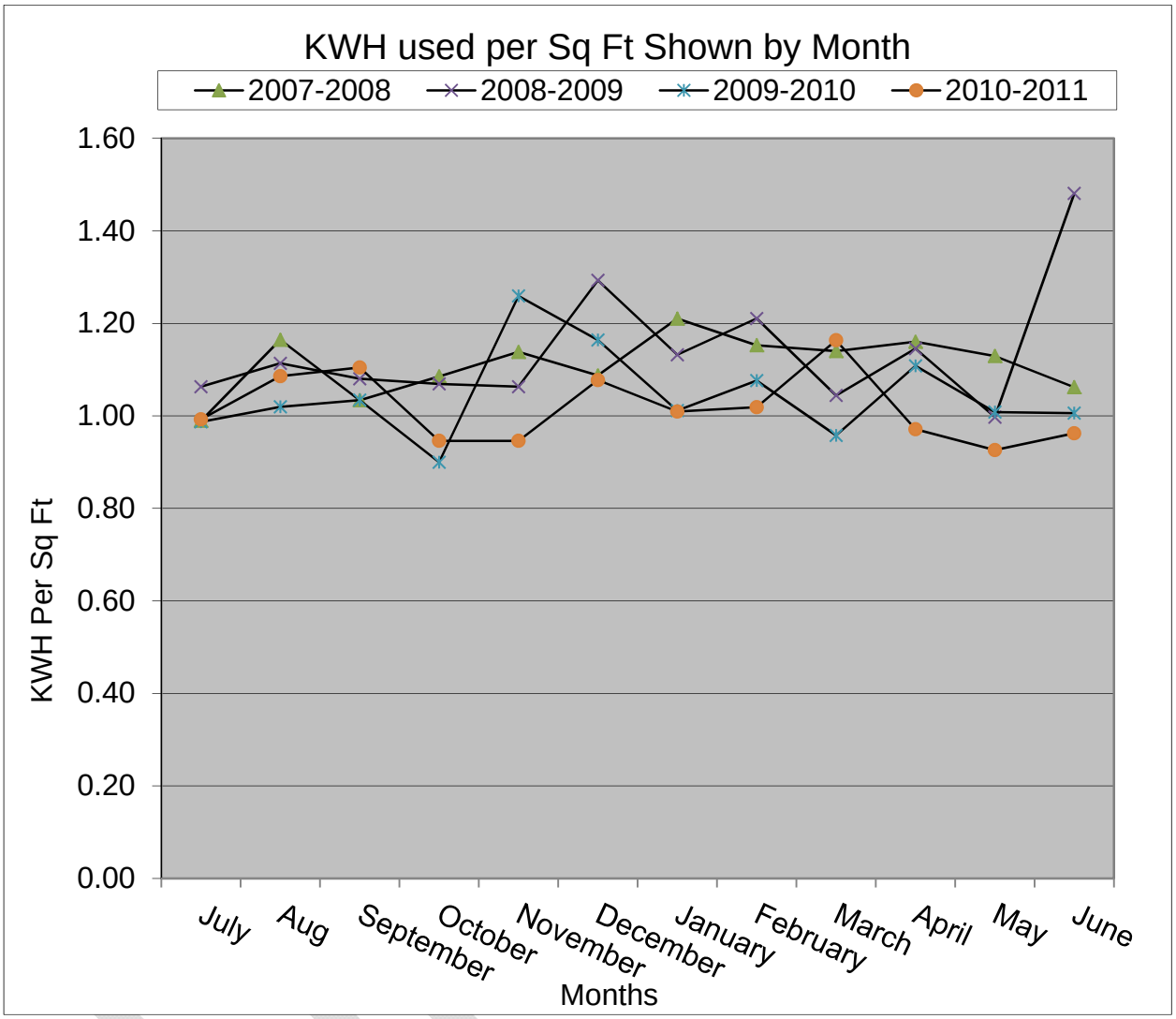
An updated but unapproved policy is attached for further discussion and consideration.

Action Item:

B) Energy Conservation Efforts In Place:

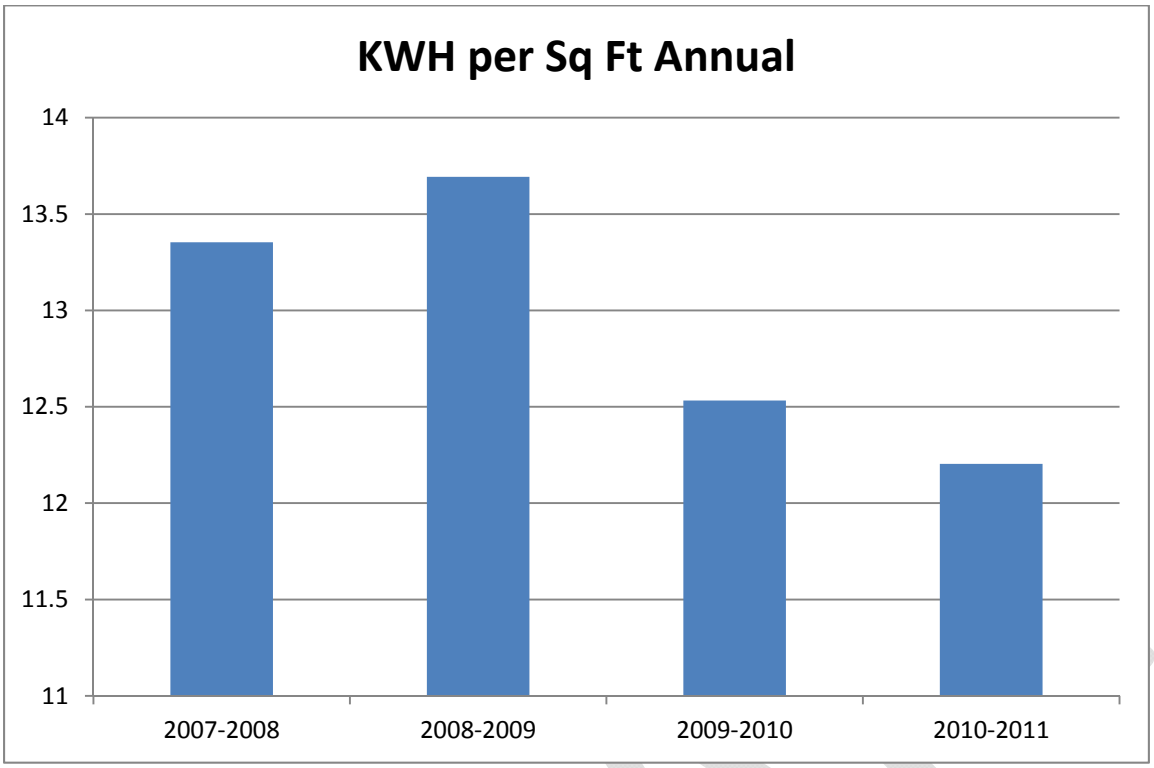
Over the past few years Creighton has focused on energy conservation to reduce utility expense and achieve a greater sustainability program. A review of work occurring is included elsewhere in this plan.

The impact of on-going conservation efforts is displayed in the following graphs ~ the significant energy conservation efforts are noted in the first two graphs that indicate a decline in the use of electricity. The reduction in electrical use is often coupled with a reduction in the demand for air conditioning because lighting systems generate heat.



Because Creighton does not generate the majoirity of chilled water required for air conditioning, the majority of the electrical demand is lighting. Technology advancements in the lighting industry can reduce the electricity consumed. Other factors that have helped reduce electrical consumption are the use of occupancy sensors for lighting controls. The employee position previously filled to inspect campus daily to turn off lights, unused office appliances and to close windows also had an impact. The impact of the work by the employee did save energy and also conveyed an attitude among building occupants that turning off lights and equipment was a better option than getting a reminder about being caught with lights left on or being visited by someone encouraging conservation.

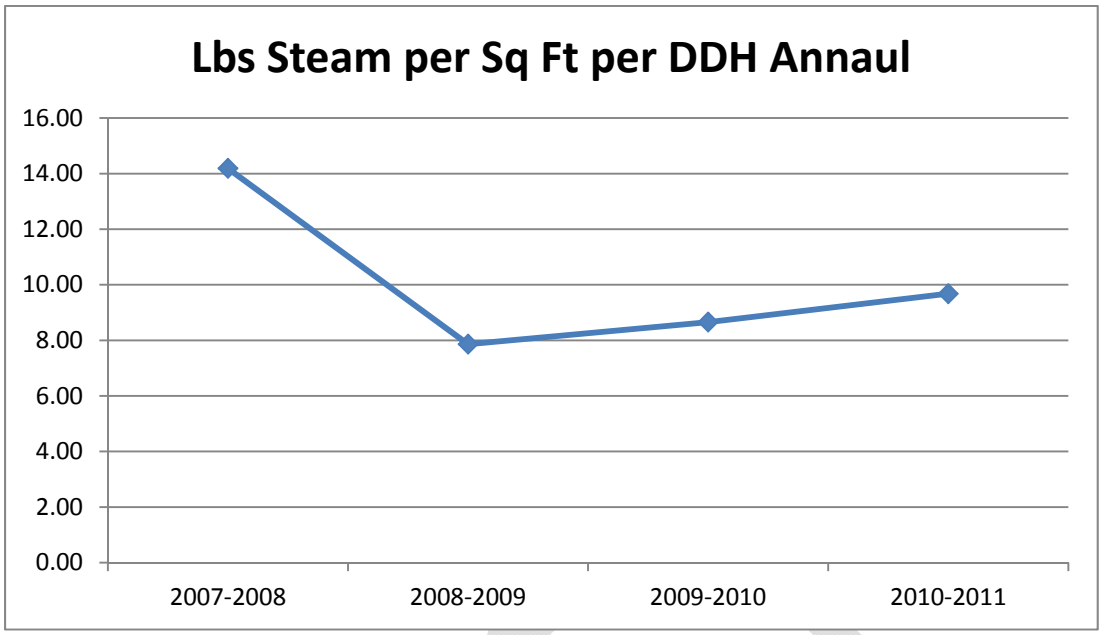
Electricity usage has declined in the last two years even with an increase of campus building square footage – primarily the Harper Center becoming operational in the 08-09 fiscal year.

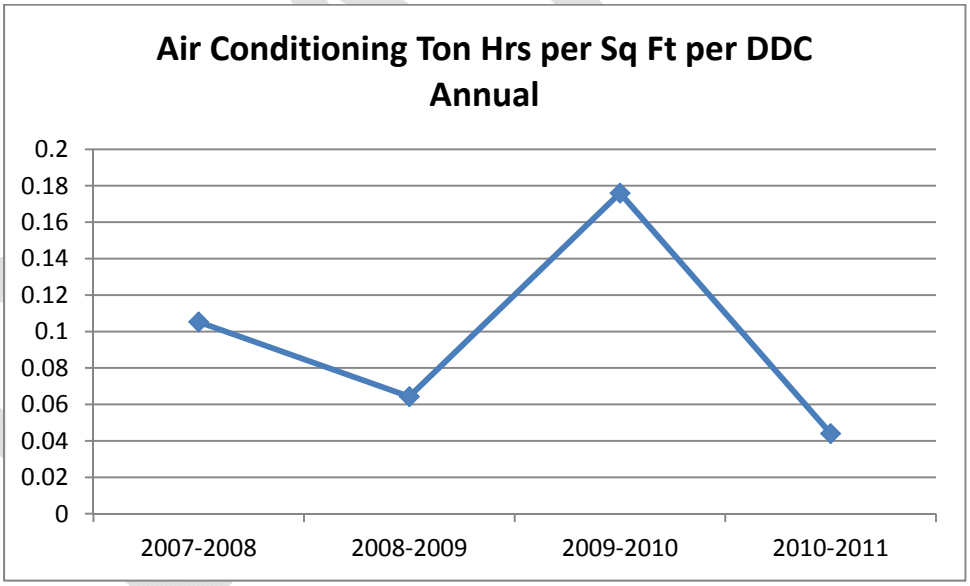


The next set of graphs displays steam and chilled water use. Steam consumption is measured from year to year based on the area of space heated and the number of cold days. A degree day heating (DDH) is the measure of temperature below 32 degrees. For the purposes of this graph, it is assumed that the heat in a pound of steam is the same from year to year. Even though the formula is an accepted benchmark, it does not take into account wind speed and the extreme cold that demands building systems to work harder to keep a building warmer.

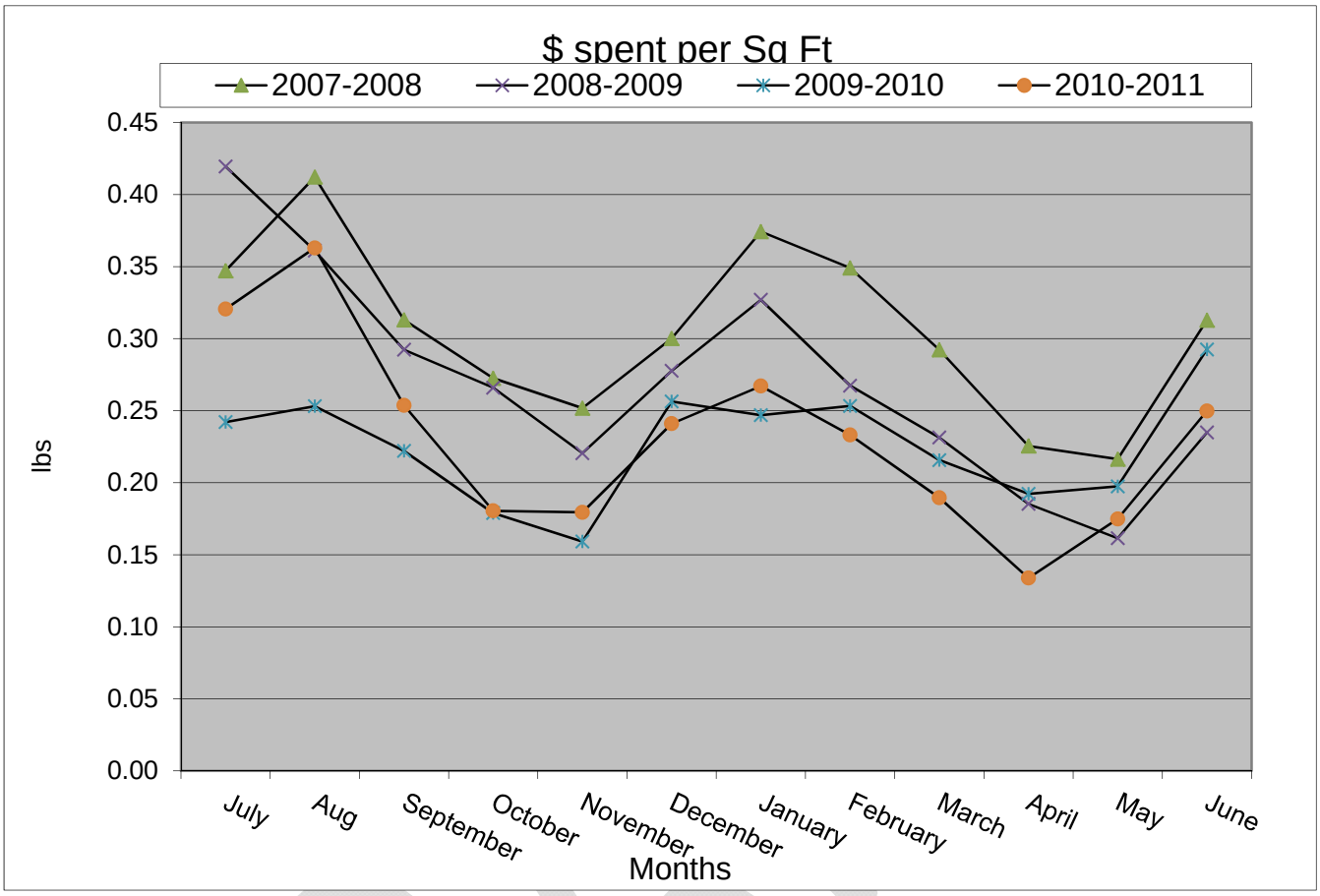
Steam use has a base line of building load beyond heat. Most buildings heated with steam are also provided domestic hot water from steam. The summer us of steam begins to identify the steam demand for other than heating. Taking the swimming pool off line had a measureable impact on the demand for steam.

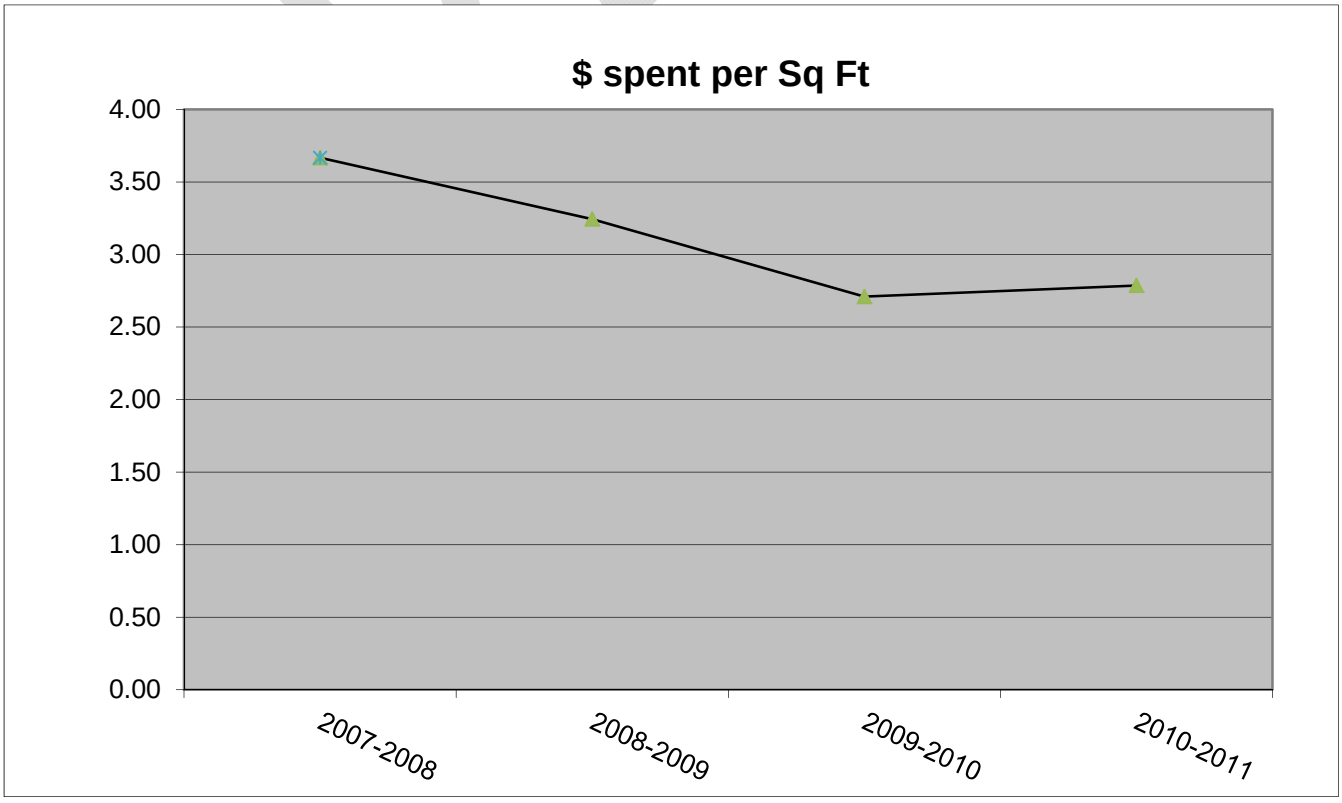
The summer demand for steam is also influenced by the need for steam to heat air supplied to a space. Chilled water is used to cool the air supplied to the room. In an effort to keep humidity lower, the air is heated after the air is chilled. The effort, known as re-heat, is frequently done with steam. Recent innovations are being tested to reduce the amount of chilled air entering the space so the space to reduce over cooling. In exchange for cooler room temperatures with less fresh air supplied, the re-heat functions are turned off. The cost to heat a room back to 78 degrees is avoided if the room is allowed to seek a lower temperature and still have dryer air. The innovation does not work in all cases and requires a vigilant watch for environmental issues if humidty rises too high for a long period of time.





The cost of fuel impacts the savings achieved in energy conservation. Periods of high cost of natural gas impacts budget certainty. Noted for comparison is a graph on how the utility budget is expensed over time.


$ spent per Sq Ft
2007-2008
2008-2009
2009-2010
2010-2011
lbs
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
July
Aug
September
October
November
December
January
February
March
April
May
June
Months


$ spent per Sq Ft
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2007-2008
2008-2009
2009-2010
2010-2011

The energy conservation efforts to date have made a difference in the amount spent on energy. The impact is felt beyond the impact of fuel costs. There isn't a successful way of predicting how much can be saved by implementing a more aggressive energy conservation plan. Vendors and contractors are suggesting 20% savings through conservatiion. The impact of such a plan will be felt but maybe not in the first year and probably not at the 20% level.

Action Item:

C) Conduct An Energy Audit and Implement Strategies Identified:

An energy audit will provide a comprehensive review of all campus buildings to identify areas of energy waste and to develop projects and tactics that can be accomplished with an attractive return on investment. Simple engineered systems that require little or no human involvement to operate have the longest life expectancy for energy waste reduction. Engaging a consultant to study the campus is highly recommended. Estimated cost for a consultant would be about $0.07 per square foot of building.

A second and more affordable option for an energy audit is to retain a consultant that is knowledgeable in the field to act as a facilitator and utilize students in the Energy Technology major perform the audit. The students would be held to the same scope of work and would be directed to provide projects complete with a predicted return on investment. The individual retained to act as a facilitator would be a hybrid between an energy engineer and a faculty member.

The energy audit will help identify the energy conservation champions in each department and building. Involvement in the audit process by building occupants is very desirable.

A series of projects that help save energy have been identified as part of a study of deferred maintenance needs being accomplished. These are the kinds of projects that would be identified in an audit. Following are examples of projects that will be included in the energy audit or further studied individually if an audit is not performed.

- Cooling and heating need to be replaced for age of unit and energy conservation in –
    - Heider Hall Apartments - Cooling and heating units are very inefficient and need replacement. Coils and piping are plugged, rotted, and waste energy. There are no energy management controls to regulate the difference in temperature between the chilled water entering the system and the temperature of the water leaving the building. Facilities Management recommends replacement of the heating/cooling units, valves, and installing a more robust building managemnet system.
    - Law School - Fan coils need replaced. The coils and pipes are plugged and have no control valves to regulate chilled water temperature. Facilities Management recommends replacement of the fan coil units and valves and installing an up to date building management system.
    - Gallagher Hall - Fan coils are old, original equipment without any working control valves. Facilities Management recommends replacement of the fan coil units and valves and installing a more robust building management system.

    - Deglman Hall - Fan coils are old, original equipment and the control valves do not function well. Facilities Management recommends replacement of the fan coil units and valves and installing a robust building management system. A project is currently in design and will include window replacement. The work is anticipated for summer 2013.
- Steam trap replacement: There are about 1,400 steam traps on campus. Typical failure rate annually for steam traps is 15% to 30% of the population. If Creighton has a 14% failure rate and half of the traps fail open, the steam loss equates to an annual expense of $391,000. A wholesale steam trap replacement program will cost less than $500,000. Facilities Management has completed a steam trap inspection program at a cost of $15,000. The study confirmed 87 bad traps in the system requiring immediate attention but negating the need for a wholesale steam trap replacement program. Given warranty periods for new traps and a service agreement for trap maintenance, the program will be viable for 5 years and could be longer if the University opted to extend the program soon after July1, 2011.
- Fume hood exhausts in the research facilities are relatively new but technology has changed to enhance energy conservation. A program that replaces the fume hood exhaust controls and replaces the fume hoods is estimated to cost about $800,000 and has a calculated return on investment of slightly less than 2 years. The savings will continue for the life of the hood expected to be about 20 years. Costs can be lower if some of the newer hoods are not replaced. There will be an environmental fee for asbestos removal that has not been calculated. Facilities Management is in the process of testing a new hood from one manufacturer as a solution and in the process of testing new technology for controls supplied by a second manufacturer.
- Move away from building controls that operate building systems with compressed air to a system utilizing direct digital electrical controls is known to be a cost effective method of saving energy if for no other reason than eliminating air compressors.

As mentioned throughout this planning document, colleges and universities can find energy savings through multiple efforts.

Low-Cost Measures –

- Measure and track energy performance.
- Turn off lights when not in use or when natural daylight can be used.
- Set back the thermostat in the evenings and other times when buildings are unoccupied.
- Perform monthly maintenance of heating and cooling equipment to guarantee efficient operation throughout the year.
- Educate students and staff about how their behaviors affect energy use on campus, particularly in residence hall settings.

Cost-Effective Investments –

- Upgrade and maintain heating and cooling equipment. Replace chlorofluorocarbon chillers, retrofit or install energy-efficient models to meet a building's reduced cooling loads, and upgrade boilers and other central plant systems to energy-efficient standards.
- Install energy-efficient lighting systems and controls that improve light quality and reduce heat.
- Sub-meter campus buildings so that energy use can be more accurately measured and tracked.
- Work with an energy services provider to help manage and improve energy performance.
- Purchase energy-efficient products like ENERGY STAR qualified office equipment.
- Install window films and add insulation or reflective roof coating to reduce energy consumption.

Many of these measures are in effect in varying degrees at Creighton University.

Action Item:

D) Implement Culture Changes:

Having ownership of the energy conservation program at the grass roots level is a low cost effort that can yield up to a 20% reduction in consumption. It is considered that energy conservation is a habit learned early in life and could be enhanced. The effort might include but is not limited to ~

- "Green Fairs" – Feature hands on demonstration and educational material to help campus persons understand the technology behind the energy efficiency technical recommendations identified in the energy audit.
- A public relations tool kit – Includes educational booths, press releases awards and recognition for project milestones.
- Videos that captures the image of campus individuals willing to demonstrate how to conserve energy – Students and other campus persons can showcase their skills and talents by writing, scripting and producing simple videos that could be shown on a web site or on digital signage.
- Contests among buildings, departments or wings to reward for conservation efforts.
- Surveys of groups to solicit input and expand awareness of energy conservation. A survey in October, 2011, was completed by 170 people of which 70 explicitly expressed a desire to be more involved. The feedback gained from the survey was not new news but it did reinforce the need to do more of the simpler tasks like controlling irrigation water and having more attention given to spaces too hot or too cold.
- Develop a living and learning community in a residence hall for those students engaged in energy conservation, sustainability and/or the energy technology major.
- Make energy saving technology more available to individuals by expanding programs like the program at the Reinert Alumni Library where one can check out the OPPD kilowatt meter or perhaps a program where energy technology students using a thermo camera to take infrared photos of homes.
- Establishment of a full time position to promote energy conservation programs – The effort now is spread among many in Facilities Management and other departments on campus almost as assigned extra duties pushed upon well intended individuals.
- Displays of real time dashboards that can be used to highlight consumption – As contests among residence halls or campus buildings, or departments on campus are promoted a method of display real time energy conservation has proven to be very effective. The University is lacking in good utility metering at the individual buildings thereby requiring an initial investment of $600,000 to have a campus-wide, building by building dashboard display. An investigation of funding sources to help finance the meter program has not been successful.
- Sustainability pledge – A pledge with language common at other Jesuit colleges is on line at Creighton for individuals to commit to aspects of sustainability including energy conservation. Perhaps the pledge could be abandoned in favor of a more specific energy conservation pledge. Such a pledge has been developed locally that is specific to a given demographic within the University population reaching out separately to faculty, staff, and students. The pledge is designed to impact social norms by individuals committing to 5 or fewer impact areas. Other

institutions have recognized real savings approaching $75,000 annually with the return on investment of only a few months.

Action Item:

E) Utilizing Renewable Energy Sources:

Already Creighton University is demonstrating good stewardship of the earth with the installation of solar panels and wind turbines. While the return on investment on such projects is not yet attractive, efforts to be leaders in use of alternative energy and renewable energy should remain a high priority in the energy conservation plan.

The AIA (American Institute of Architects) has adopted a core value of having all buildings designed in 2030 and beyond be net zero energy. The design criteria will expand the use of alternative energy production along with influencing the characteristics of buildings such as use of insulation and the selection of fenestrations.

The "Building Sector" is the major source of demand for energy and materials that produce by-product greenhouse gases (GHG). Stabilizing and reversing emissions in this sector is key to keeping future global warming under one degree Celsius ('C) above today's level.

To accomplish this, and avoid dangerous climate change, Architecture 2030 has issued "The 2030 'Challenge" asking the global architecture and building community to adopt the following targets:

- All new buildings, developments and major renovations be designed to meet a fossil fuel, greenhouse gas (GHG) emitting, energy consumption performance standard of 50% of the regional (or country) average for the building type.
- At a minimum, an amount of existing building area equal to that of new construction be renovated annually to meet a fossil fuel, greenhouse gas (GHG) emitting, energy consumption performance standard of 50% of the regional or (country) average for that building type.
- The fossil fuel reduction standard for all new buildings be increased to:

  60% in 2010
  70% in 2015
  80% in 2020
  90% in 2025
  Carbon-neutral by 2030 (zero fossil-fuel, GHG emitting energy to operate).

This may be accomplished through innovative design strategies, application or renewable technologies and/or the purchase (maximum 20%) of renewable energy.

Omaha has adopted a sustainability master plan for future development. The plan includes energy conservation and support of the AIA 2030 platform. The Master Plan, prepared by Omaha by Design, was adopted by the City Council within the past two years.
Article IV, Section 7.04 of the Omaha Municipal Code calls for the city's Master Plan to establish policies, goals and standards that "…at a minimum address the areas of land use; the provision of urban

services, including transportation, parks and recreation, utilities, public facilities, and disposal of solid and liquid wastes; housing and community development; economic development, environmental protection; development management; urban design; historic preservation; and any other areas, necessary to guide the physical development of the city." Although the master plan elements – including Land Use, Parks and Recreation, Urban Design, Urban Development, and Storm Water – have touched on various environmental issues, development of this environment element more comprehensively incorporated the issues to serve the purposes called for in the City Charter.

Action Item:

F) Establishing Carbon Footprint Reduction:

Creighton University has joined the list of several hundred colleges and universities that signed the American College and University President's Climate Commitment (ACUPDC). By making this commitment, the University will strive to reduce carbon discharged into the atmosphere. The commitment requires an action plan by early 2013.

As a first step to a carbon action plan, the University retained the Brendle Group as a consultant to identify the amount of carbon in the University's footprint and the source of the carbon. It was noted that 70.7% of the carbon discharge is from energy: natural gas; purchased electricity; purchased steam; and purchased chilled water.

Reducing energy consumption has a direct impact on the carbon footprint. Solving the commitment to reduce the carbon footprint can be accomplished by purchasing carbon credits on the open market. Having similar funding applied to energy conservation projects or the acquisition of alternative energy is suggested to be a better use of funding.

Action Item:

G) Energy Conservation Through Innovation:

Creighton University has been successful at rebuilding light fixtures in many locations. The rapidly changing lighting industry has been very helpful in the venture. One such example was relighting the lower decks of the parking garages using florescent lamps in existing fixtures. The switch increased the light level, reduced the cost of replacing lamps and ballasts and had a payback in energy savings of less than a year.

The University has implemented use of a computerized irrigation control system complete with a weather station to reduce the amount of water used to irrigate. The system has been in a testing mode for about a year and is expected to be quite robust over about 35% of the irrigated landscape during the 2012 growing season. Payback from water savings is expected in less than five years. Other innovations can be expected as technology improves and becomes more reasonably priced.

Through the use of the building management system, the method of heating, cooling and conditioning the space can be altered through experimentation. Further, new technologies like carbon dioxide sensors can be incorpairted into a given space and to help determine the need for more fresh air. Such

technology is on campus at selected areas and can be added at a reasonable cost with a better return on investment occurring in larger spaces.

Energy conservation through a shift to a four day work week would have minimal impact unless the entire campus went to the same schedule. The change to a four day woirk week or working from home would have a dramatic impact on reducing the carbon footprint, however.

Action Item:

H) LEED and Energy Star:

The University has incorporated LEED (Leadership in Energy and Environmental Design) design criteria in recently constructed buildings. The criteria have added a piece of energy conservation to the design. Lighting, fenestrations, and insulation are each influenced by LEED.

Two recent significant impacts of the LEED commitment include:

a) Possibly also an innovation, the Wareham building is heated and cooled with water source heat pumps. The water is from a small boiler or a cooling tower depending on the season. No water wells were required.
b) The Harper Center is home to a large heat transfer wheel that captures the temperature of exhaust air and introduces the temperature to air supplied to the building. The cool air leaving an air conditioned building is used to cool warm air being introduced to the building.

Facilities Management has developed a design criteria check list for remodel projects based on LEED-EB (Existing Building) criteria. The check list includes a review of energy conservation measures incorporated into the design.

The University signed an agreement with EPA to be an Energy Star partner.

Purchasing has a policy enforcing procurement of Energy Star rated appliances. The successes is most noted in the purchase of computers but is also noted in appliances purchased for the kitchens and in furnace replacement. The replacements are frequently more expensive than non-rated appliances but energy conservation trumps first cost.

Active Item:

I) Energy Conservation Applied to Technology Hardware:

Next to lighting, computers and office machines are the largest consumer of energy, typically. The shift to the Xerox fleet of printers and copiers is reputed to have made a reduction in the electrical energy consumed but further measurements are required.
There are numerous methods of reducing the amount of energy consumed by computing. Some methods include:

- Screen savers do not save energy but giving your computer a nap does. Enable power management features so your computer monitor and hard drive will go into a low power (blank screen) “sleep mode” when not actively in use.

- Keep all computer equipment off unless in use – especially at night and on weekends.
- Turn off your monitor when you go to lunch or to a meeting
- Turn off monitors on servers.
- Enable power management features on laser printers and/or turn off laser printers when not actively printing.
- When purchasing computers and peripherals, buy low wattage equipment certified by the EPA's "Energy Star" program and be sure to enable power management features when setting up equipment.
- **Special note to computer lab operators:** minimally, power management features should be enabled on all monitors in computer labs. Sleeping monitors save energy as well as screens and will keep your lab cooler. Also, when lab use is low (e.g. late hours, during breaks, or summer semesters), it may be possible to provide full service to your users while keeping off come or many of the computers and monitors in your lab. Experiment to see what the minimum number of operating computers is actually needed.
- Lap top computers consume less electricity than a desk top machine.
- Data Center/Communication Closets can be operated at higher room temperatures because of upgrades in equipment design.

Action Item:

J) Energy Conservation Grants and Rebates:

The University has received grants for energy conservation. A more recent grant was from the Department of Energy for the Alternative Energy Program. The grant paid for the solar panels and wind turbines that when operating at optimum efficiency, will produce about 4% of the campus electricity requirements. The University is also taking advantage of lighting upgrade rebates made available from OPPD. More grants, large and small, will be pursued as they become known.

The University has engaged in performance contracting to incorporate energy conservation measure such as lighting retrofits and use of high efficiency electric motors. The program allows from payment of the project over time from energy cost savings. The performance contracting has been taken advantage of the low hanging fruit. Future energy conservation measures will experience a longer period for the return on investments. It is understood that the use of a performance contract is useful as a funding source. Caution is required to protect the University in the contract language because of the controversy around the guaranteed savings and the interest rate can be favorable to the contractor.

The University could seek out a community or corporate partner to assist with the energy conservation program. The partner could be an asset to the proposed living and learning community.

Currently, there are isn't an awareness of grants that might be pursued. Such opportuities need to be frequently researched.

Action Item:

K) Utility and Energy Master Plan:

The University is currently requesting help for a utility infrastructure and energy use master plan. The unfunded plan will help define the need for and distribution of energy. When the plan is funded, the consultant retained will perform specific tasks.

1. Coordinate and align utility distribution with the University Campus Master Plan,
2. Identify operational and functional issues and priorities that require capital renewal or investment in the existing utility infrastructure and building energy systems to replace unreliable or inefficient equipment and upgrade systems to meet future projected requirements.
3. Provide recommendations for infrastructure expansion or upgrades and define comprehensive design guidelines to be followed for projects that will expand the utility infrastructure to meet University requirements.
4. Provide recommendations for modifications or upgrade of energy systems within existing campus facilities and define comprehensive design guidelines to be followed for projects that will renovate existing or build new facilities on campus.
5. Provide recommendations to ensure the University is able to meet its needs for reliable and economic energy production and distribution of all utility commodities provided to the campus.
6. Reduce energy consumption and optimizes the use of energy in the campus buildings.
7. Identify energy conservation measures that minimize energy losses in utility production and distribution systems.
8. Maximize overall utility plant and facility fuel use efficiency.
9. Provide energy efficiency guidelines for new constructions, procurement, information technology and building operation.
10. Reduce carbon dioxide emissions through the above efficiency gains, the use of technology such as combined heat and power and a possible renewable energy component.
11. Provide incremental capacity for campus growth from reductions in demand created by efficiency improvement and loss reduction.
12. Establish recommended energy efficiency design guidelines and standards for new building construction on campus compared to the most recent ASHRAE and LEED standards.
13. Position the University as a model of sustainable energy use and management with full consideration and use of life-cycle economics.
14. Identify and recommend implementation of technology improvements and upgrades in the areas of utility and energy production, distribution, storage, metering, automation, optimization use and reporting to support the development of a smart energy campus that continuously monitors and adjusts energy use to ensure overall needs are met in the most reliable, efficient and cost-effective manner. Consider and include, as appropriate, recommendations to support technology including plug-in vehicles, use of direct current power supply for data centers, smart meters, renewable energy generation, design standards for energy efficient equipment and lighting, and energy management software to monitor, integrate and optimize the use of energy.

Energy Conservation Efforts in Place

- As part of a performance contract in 1999 fluorescent light fixtures have been converted to electronic ballasts, T-8 fluorescent bulbs. Newer technology is allowing replacement of 32 watt T-8 bulbs with 25 watt bulbs. LED's are also being installed when practical to reduce electrical consumption and demand for space air-conditioning.
- Facilities Management engineers have been changing out high wattage bulbs to more energy efficient bulbs resulting in a $34,000 a year savings for fiscal 2010. The savings in electrical energy costs is frequently surpassed by savings in cooling.

- Facilities Management has installed several hundred occupancy or motion sensors for lighting control in the last three years. The conversion is a result of a direct initiative as well as being part of space remodels. This is a design standard and is a matter of routine practice for future years.
- Facilities Management has installed low flow aerators on sink faucets, low flow shower heads, low flow flush kits on toilets and urinals. Facilities Management is looking at changing out faucet aerators from 2.2 gallons per minute to 1.5 gallons per minute flow; this has a potential annual saving of 6,000,000 gallons a year.
- New flat roof membranes are white or light colored to reflect heat and addition insulation is installed.
- New building roofs and walls are well insulated and the windows utilize efficient glazing.
- Window tinting is being tested in several locations. The cost of window tinting has a return on investment of about 2 years.
- Facilities Management has design standards specifically related to energy conservation as well as complying with building codes and state laws.
    - The Energy Management department has been working with the Planning and Design department to establish new design guidelines for energy savings like, installing heat pumps and high energy efficient natural gas furnaces 92% + instead of standard central air units; day light harvesting; and the use of enthalpy wheels in air handling units. An enthalpy wheel uses return air and mixes it without side air to pre heat or pre cool saving energy.
    - Recent buildings are designed and constructed to follow LEED certification.
    - Facilities Management is looking at establishing a new metering program that will allow better monitoring, recording, archiving, and the ability to make adjustments to utility usage on campus.
    - Facilities Management has adopted the latest technology in building management control programming, Tridium AX. Using this new controls platform in the Dundee and Twin Creek clinics has allowed for better control of the spaces and greater energy savings. The electrical bill for the Dundee Clinic was cut in half by managing air conditioning.
- A committee calling itself the Energy Awareness Committee is composed of cross campus constituents. The group meets monthly specifically to advance energy awareness. The committee has designated members to shut off energy wasting equipment in their own areas and educate their colleagues on how to save energy. The committee also works with students, faculty, and staff, including kitchen managers and their employee's to help them organize energy saving competitions, organize and set up the Earth Day celebration, and educates them thru training and energy saving posters as reminders.
- The Sustainability Council also concerns its self with energy conservation.
- Interior temperature settings of 78˚ summer and 67˚ winter are the goal. These temperatures are typical of other colleges and universities and within the ASHRAE standards. Reducing temperature's for heating and raising temperatures for cooling generally saves 1% of energy used for each degree adjusted. These temperatures are listed in the draft energy conservation policy found elsewhere in this plan.
- Facilities Management schedules the Heating, Ventilating, and Air Conditioning (HVAC) systems for energy savings during usage (occupied) and non-usage (unoccupied) times and utilizing a robust computerized building management system to accomplish night setbacks to conserve energy.
- Facilities Management is utilizing more building return air in the air handlers during peak winter usage thereby supplying warmer air back into the air stream to save energy. This reduces the amount of outside or fresh air entering the building.
- The Facilities Management, Energy Management Shop (EMS) has created operations manuals with the original set points for all building automation systems as a baseline reference point to track energy savings, this has been crucial when changing set points.

- EMS convenes morning meetings with the Facilities Management Engineering Shop to identify and repair critical Building Automation System (BAS) problems and coordinate daily operations that may require HVAC equipment shut down.
- EMS has been more aggressive in identifying and repairing key equipment like steam and chilled water actuators, valves, pressure regulators, thermostats, fresh air dampers, and control systems etc.
- Daily temperature checks by the engineering shop employees identify problem areas that are too hot or too cold and allow corrective action repairs and adjustments to the BAS and conserve energy. The BAS is verified as operational when compared to the information received in the daily temperature checks.
- Facilities Management reduced the steam pressure in the Boyne Bldg to save energy during non-use times through a temperature set back schedule.
- Facilities Management has been evaluating light levels and eliminated some lighting in areas where it is safe and practical and installed motion sensors in other areas to turn off lights.
- Facilities Management Carpenters have a building envelope inspection program. PMs (Preventative Maintenance work check lists) have been made and the effort has been working towards sealing the exterior envelope which includes doors, windows, caulking and weather stripping.
- Facilities Management rerouted the main campus electrical power to the Harper Center electrical feed to accomplish a lower electrical rate.
- Facilities Management conducts semiannual training with the Energy Management department and building Engineers on summer/winter change over procedures. We look at potential energy savings by maintaining Delta T which is the difference between the supply and return chilled water temperatures entering and leaving the buildings. The goal is to maintain at least a 14˚ difference, and cleaning coils and changing filters in the air handlers and fan coil units are one way to help accomplish this goal, another way is to raise room temperature set points in unoccupied spaces.
- Facilities Management has started a gradual change out of standard incandescent Christmas lights to LED's.
- Facilities Management continues projects to insulate more utilities steam and chilled water piping in equipment rooms and tunnels to reduce heating and cooling losses.
- Facilities Management is researching a new energy efficient high pressure heating converter that has the potential for a 20 percent reduction in steam usage over what we're using now.
- The Energy Management department continues to work with many Creighton University departments both on and off campus to obtain scheduled hours of operation so schedules can be set to turn off or down the HVAC systems during unoccupied times to conserve energy. Having evening classes consolidated in fewer buildings allows the buildings not used to be set back possibly as early as 3:30PM on selected days of the week. The building may stay in setback mode all weekend.
- Facilities Management is working with several departments, like the Hitchcock building, to switch their evening classes to day time classes or move them to an energy efficient location.
- Facilities Management is working on a plan to eliminate all personal space heaters. It is recommended that individuals not use personal space heaters but call Facilities Management if there is a cold area. A 1500 watt electrical heater costs the university $13.20 per month when operating for eight hours a day. Space heaters are the number one cause of fires during winter months.